

**Carleton University
Department of Physics**

**PHYS 1902
From Our Star to the Cosmos
Section V**

Winter 2022

Course Outline

Due to the COVID-19 precautions in place, this course will be offered online only for the winter 2022 term. All course material will be posted on Brightspace.

Instructor: Razieh Enjilela
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Office hours: Mondays and Wednesdays (time: TBA) or by appointment.
Office hours will take place using the Big Blue Button video conferencing system, which is built into Brightspace.

Teaching Assistants: TBA

Textbook: *Astronomy Today*, 9th Edition by Eric Chaisson and Steve McMillan,
Publisher: Pearson.

Please note that Faculty of Science students may only take this course as a free elective.

Welcome to your first (or second) course in astronomy! I hope that you have an enjoyable winter session studying at Carleton. This course is aimed at general interest students who have had minimal exposure to science or mathematics. As such, this course will rely mostly on descriptive explanations employing diagrams and pictures to help build a heuristic understanding of the cosmos. However, studying astronomy also requires a basic understanding of the laws of physics and mathematics.

PHYS 1902 is one of two introductory courses on astronomy offered by Carleton (the other being PHYS 1901: *Planetary Astronomy*). PHYS 1902 focuses on galaxies and stellar phenomena. By the end of this course, you will understand the motions of the sky, how telescopes work, the properties of stars and how they form and evolve, how galaxies form, and the methods astronomers and scientists use to learn about the Universe on its largest scales. I hope that you will gain a deeper appreciation of science and astronomy and have fun while learning!

1. Calendar Description

Starting with the Sun, the course studies its composition and source of power, then compares our Sun with the other stars in the galaxy and beyond. Modern ideas concerning the structure, origin and evolution of the universe, pulsars and supernovae are examined. Precludes additional credit for [PHYS 2203](#).

2. Carleton Online

CUOL website: www.carleton.ca/cuol

CUOL Student Centre: D299 Loeb, 613-520-4055

Email: cuol@carleton.ca (general information)

PHYS 1902 is offered through Carleton University OnLine (CUOL). All lectures and course materials will be available through Brightspace system, and you will have access to them at any time during the semester.

3. Course Modality

PHYS 1902 is offered as Asynchronous Course. This course is an online course where the instructor and students share information, ideas, and learning experiences in a virtual course space. Asynchronous courses do not have required live, scheduled meetings online. However, students are expected to remain up to date with the deadlines and due dates provided by the instructor. These courses require high-speed Internet access and a computer.

4. Textbook

The required textbook is *Astronomy Today*, 9th Edition by Eric Chaisson and Steve McMillan, Publisher: Pearson.

5. Course Components and Marking Scheme

a. Marks and passing conditions

The marking scheme is as follows:

Assignments (4 × 10 %)	40 %
Midterm Exam	20 %
Final Exam	40 %
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Course Total	100 %

In order to pass the course, your overall grade must be at least 50 %. **In addition, you have to**

submit at least 2 assignments to pass the course. There would be two fun class activities with a bonus mark as well. Participation in class activities is not mandatory.

As with any university-level course, it is imperative that you view all lectures if you wish to succeed. The course assessment consists of four assignments, a midterm exam, and a final exam. In this section, I explain how each assessment component factors into your final grade.

b. Lectures

The lectures will be available online through the Brightspace. Each week, 2 additional lecture recordings will become available; 1 recording will be posted on Tuesday and 1 recording will be posted on Thursday. Each recording is a traditional lecture, approximately 1 hour and 30 minutes in length.

Refer to Section 6 of this course outline for a detailed schedule of the delivery of the material, including the content and textbook chapters covered every week. The textbook is an important tool to learn the scientific material. The book identifies the learning objectives, explains the fundamental concepts, and contains several review problems.

c. Assignments (40%)

There will be four written assignments to be completed outside of class. I encourage collaboration with your colleagues on the assignments, but I stress that collaboration does not mean copying. Please familiarize yourself with Carleton University's policies regarding plagiarism and academic honesty (you can find these policies in the Undergraduate Calendar and in Section 6 of this course outline). I hope that you will find the assignments thought provoking and fun. Don't worry if at times you get stuck – I will be more than willing to help. Remember, the process of getting unstuck is called learning.

The assignment schedule is as follows:

Assignment	Date Handed Out	Deadline
1	Wednesday, January 19	Wednesday, February 2
2	Monday, February 7	Monday, February 21
3	Monday, February 28	Monday, March 14
4	Wednesday, March 16	Wednesday, March 30

Assignment Submission Policy

- You must submit your assignments electronically in Brightspace, by uploading a file in PDF or Microsoft Word format. **Do not email your assignment to me or the TA.**
- **Assignments must be submitted no later than 11:59 p.m. Eastern Time on the above due dates.**
- **Late assignments are not accepted under any circumstances, and I will assign a grade of zero.** Only under the most serious of circumstances will I exempt a student from an assignment, in which case the remainder of the student's assessment will be reweighted.

d. Midterm Exam (20%)

The midterm exam will be held on **Saturday, February 26, 2022 at 10:00 a.m. – 11:30 a.m Eastern Time**, and will take place online through Brightspace. The exam will be open-book and consist of multiple-choice questions. If you have a legitimate reason for missing the midterm exam, a deferred midterm exam may be scheduled for you. More details about the midterm exam will be announced later.

e. Final Exam (40%)

The final examination will be held during the Winter exam period, April 14 – 28, 2022, and will take place online through Brightspace. The date and time of the exam is scheduled by the central University scheduling service and will be announced part of the way through the term. The final exam will be cumulative, open-book, and consist of multiple-choice questions. More details about the exam will be announced later.

Brightspace

f. Deferred Exams

If you miss the Final Exam for a valid reason such as illness, you may apply for a Deferred Exam through the registrar's office. A Deferred Exam replaces only the Final Exam portion of your grade. Deferred Exams for the Winter term are scheduled during May 20 - June 1, 2022. Brightspace. Students with significant incomplete term work, such that a failing grade would be awarded regardless of the final exam score, will not be permitted to write a deferred exam.

6. Lecture Schedule and Important Dates

Lecture	Date	Topics	Textbook Sections
1	January 10	Course Introduction Our Place in Space	1.1
2	January 12	Scientific Notation and Units in Astronomy The Scientific Method	Appendices 1, 2 1.2
3	January 17	The Celestial Sphere, Earth's Orbital Motion	1.3 – 1.4
4	January 19	Motion of the Moon, The Measurement of Distance, Ancient Astronomy Assignment 1 Handed Out	1.5 – 1.6
5	January 24	The Copernican Revolution, Planetary Motion	2.1 – 2.5
6	January 26	Laws of Motion	2.6 – 2.8
7	January 31	Light and Radiation	3.1 – 3.3
8	February 2	Radiation law Spectroscopy Assignment 1 Due	3.4-3.5 4.1-4.2
9	February 7	Spectroscopy Telescopes Assignment 2 Handed Out	4.2-4.5 5.1-5.2
10	February 9	Telescopes	5.3-5.8
-	February 14	Course review, part 1	
11	February 16	The Sun	16.1-16.7
-	February 21	Assignment 2 Due	
-	February 22-25	Winter Break. Classes are suspended.	-
-	February 26	Midterm Exam, 10:00 a.m. – 11:30 a.m.	-
12	February 28	The Stars Assignment 3 Handed Out	17.1-17.4
13	March 2	The Stars	17.5-17.8
14	March 7	The Interstellar Medium Star Formation	18.1-18.5 19.1-19.3
15	March 9	Star Formation Stellar Evolution of Low-Mass Stars	19.4-19.6 20.1-20.3
16	March 14	Stellar Evolution of High-Mass Stars Stellar Explosions Assignment 3 Due	20.4 – 20.6 21.1 – 21.3
17	March 16	Stellar Explosions, Neutron Stars Assignment 4 Handed Out	21.4 – 21.5 22.1 – 22.4
18	March 21	Relativity and Black Holes	22.5 – 22.8
19	March 23	The Milky Way Galaxy	23.1 – 23.7
20	March 28	Galaxies	24.1 – 24.5

21	March 30	Galaxies and Dark Matter Assignment 4 Due	25.1 – 25.5
22	April 4	Cosmology	26.1 – 26.7
23	April 6	The Early Universe	27.1 – 27.6
-	April 11	Course review, part 2	18-27
-	April 14 – 28	Final examinations in winter term courses may be held. Examinations are normally held all seven days of the week.	-
-	May 20 – June 1	Winter term deferred examinations will be held.	-

* Please note that there would not be lectures recordings for the “course reviews 1 and 2. Instead, there would be two live online classes. Students can attend to discuss any problem they have about the course materials.

7. University Policies

Grade Definition:

In accordance with the Carleton University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90 – 100	B+ = 77 – 79	C+ = 67 – 69	D+ = 57 – 59
A = 85 – 89	B = 73 – 76	C = 63 – 66	D = 53 – 56
A- = 80 – 84	B- = 70 – 72	C- = 60 – 62	D- = 50 – 52
F = <50			

WDN = Withdrawn from the course

ABS = Student absent from final exam

DEF = Deferred (see Section 5f above)

FND = Failed, no Deferred (student could not pass even with 100% on final exam)

Academic Regulations, Accommodations, Plagiarism, etc.:

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university’s website, here:

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

Academic Accommodations for Students with Disabilities:

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic

accommodations in this course, please contact PMC at **613-520-6608** or **pmc@carleton.ca** for a formal evaluation. For more information visit: <https://carleton.ca/pmc/>.

If you are already registered with the PMC, contact your PMC coordinator to send your **Letter of Accommodation** at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*).

*The deadlines for contacting the Paul Menton Centre regarding accommodation for final exams for the Winter exam period is **March 16, 2022**.

For Religious Obligations:

Students requesting academic accommodations on the basis of religious obligation should make a formal, written request to their instructors for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory event.

Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in a way that avoids academic disadvantage to the student.

Students or instructors who have questions or want to confirm accommodation eligibility of a religious event or practice may refer to the Equity Services website for a list of holy days and Carleton's Academic Accommodation policies or may contact an Equity Services Advisor in the Equity Services Department for assistance. <https://carleton.ca/equity/focus/discrimination-harassment/religious-spiritual-observances/>

For Pregnancy:

Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services to complete a letter of accommodation. The student must then make an appointment to discuss her needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required. <https://carleton.ca/equity/contact/form-pregnancy-accommodation/>

Plagiarism:

Plagiarism is the passing off of someone else's work as your own and is a serious academic offence. For the details of what constitutes plagiarism, the potential penalties and the procedures refer to the section on Instructional Offences in the Undergraduate Calendar.

What are the Penalties for Plagiarism?

A student found to have plagiarized an assignment may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from full-time studies; and/or a reprimand; a refusal of permission to continue or to register in a specific degree program; academic probation; award of an FNS, Fail, or an ABS.

What are the Procedures?

1. All allegations of plagiarism are reported to the Dean of the Faculty of Science. Documentation is prepared by instructors and/or departmental chairs.
2. The Dean writes to the student and the University Ombudsperson about the alleged plagiarism.
3. The Dean reviews the allegation. If it is not resolved at this level, then it is referred to a tribunal appointed by the Senate.

Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy (see <https://carleton.ca/registrar/academic-integrity/>). The Policy is strictly enforced and is binding on all students. Plagiarism and cheating – presenting another’s ideas, arguments, words, or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the undergraduate degree. Academic dishonesty in any form will not be tolerated. Students who infringe the Policy may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from full-time studies; a refusal of permission to continue or to register in a specific degree program; academic probation; or a grade of Failure in the course.

For any offences committed after January 6, 2020, minimum penalties for violations of the Academic Integrity Policy will be applied as follows:

- First offence, first-year students (< 4.0 credits completed): No credit for the assignment or activity in question, or a final grade reduction of one full letter grade (e.g., A- becomes B-, if reduction results in an F, so be it), whichever penalty is more severe.
- First offence (everyone else): F in the course
- Second offence: One-year suspension from program
- Third offence: Expulsion from the University

Note: these are minimum penalties. More severe penalties will be applied in cases of egregious offences (e.g., a first-year student accessing Brightspace from their phone during an exam will be given an F in the course; bribing a faculty member or a TA for a better grade would be grounds for suspension, etc.)

If you are unsure of the expectations regarding academic integrity (how to use and cite references, how much collaboration with lab- or classmates is appropriate), ASK your instructor or your TA. It is NEVER okay to upload assignments to online sites such as Chegg, CourseHero, OneClass, etc.

Failure to inform yourself of the expectations regarding academic integrity is not a valid excuse for violations of the policy.

Assistance for Students:

- Academic and Career Development Services: <https://carleton.ca/career/>
- Writing Services: <http://www.carleton.ca/csas/writing-services/>

- Peer Assisted Study Sessions (PASS): <https://carleton.ca/csas/group-support/pass/>
- Math Tutorial Centre: <https://carleton.ca/math/math-tutorial-centre/>
- Science Student Success Centre: <https://sssc.carleton.ca/>

Important Information:

- Student or professor materials created for this course (including presentations and posted notes, labs, case studies, assignments, and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).
- Students must always retain a hard copy of all work that is submitted.
- Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.
- Carleton University is committed to protecting the privacy of those who study or work here (currently and formerly). To that end, Carleton's Privacy Office seeks to encourage the implementation of the privacy provisions of Ontario's *Freedom of Information and Protection of Privacy Act* (FIPPA) within the university.
- In accordance with FIPPA, please ensure all communication with staff/faculty is via your Carleton email account. To get your Carleton Email you will need to activate your MyCarletonOne account through Carleton Central. Once you have activated your MyCarletonOne account, log into the MyCarleton Portal.

8. Important Dates

WINTER 2022

January 5	University reopens.
January 10	Winter term classes begin.
January 24	Last day for registration and course changes in Winter term classes. Last day to change courses or sections (including auditing) for winter term courses.
January 21-23, 28-30	Fall term deferred examinations will be written.
January 31	Last day for withdrawal from winter term and winter portion of fall/winter courses with full fee adjustment. Withdrawals after this date will result in a permanent notation of WDN on the official transcript.
February 18	April exam schedule available online.
February 21	Statutory Holiday. University closed.
February 22-25	Winter Break, no classes.
March 1	Last day for receipt of applications to Bachelor of Architectural Studies, Bachelor of Humanities, Bachelor of Industrial Design, Bachelor of Information Technology (Interactive Multimedia and Design), Bachelor of Journalism, Bachelor of Journalism and Humanities, and the Bachelor of Music degree programs for the fall/winter session. Last day for receipt of applications for admission to an undergraduate program for the summer term. Last day for receipt of applications for admission from candidates who wish to be guaranteed consideration for financial assistance (including Carleton fellowships, scholarships and teaching assistantships) administered by Carleton University. Candidates whose applications are received after the March 1 deadline may be considered for the award of a fellowship, scholarship or teaching assistantship (Graduate students only).
March 16	Last day to request formal exam accommodations for April examinations to the Paul Menton Centre for Students with Disabilities. Note that it may not be possible to fulfil accommodation requests received after the specified deadlines.

March 29	Last day for summative tests or examinations - or for formative and/or practical tests or examinations totaling more than 15% of the final grade - before the official examination period (see Examination regulations in the Academic Regulations of the University section of the Undergraduate Calendar/General Regulations of the Graduate Calendar).
April 1	Last day for receipt of applications for admission to an undergraduate program for the fall/winter session from candidates whose documents originate outside Canada or the United States, except for applications due February 1 or March 1. Last day for receipt of applications from potential spring (June) graduates.
April 12	Winter term ends. Last day of fall/winter and winter term classes. Last day for take-home examinations to be assigned, with the exception of those conforming to the Examinations regulations in the Academic Regulations of the University section of the Undergraduate Calendar/General Regulations of the Graduate Calendar. Last day for academic withdrawal from fall/winter and winter term courses. Last day for handing in term work and the last day that can be specified by a course instructor as a due date for term work for fall/winter and winter term courses.
April 13	No classes or examinations take place.
April 14-28	Final Examinations. Exams are normally held all seven days of the week.
April 15	Statutory Holiday. University closed.
April 28	All take-home examinations are due on this day, with the exception of those conforming to the Examinations regulations in the Academic Regulations of the University section of the Undergraduate Calendar/General Regulations of the Graduate Calendar.
May 1	Last day for receipt of applications for undergraduate internal degree transfers to allow for registration for the summer session.
May 20-June 1	Fall/Winter and winter term deferred final examinations will be held.
June 1	Last day for receipt of applications for admission to an undergraduate program for the fall/winter session except for application due February 1 or March 1 or April 1.

June 15

Last day for receipt of applications for undergraduate degree program transfers for the fall term.