

Carleton University
Department of Physics

PHYS 1902
From Our Star to the Cosmos
Section V

Summer 2021

Course Outline

Due to the COVID-19 precautions in place, this course will be offered online only for the Summer 2021 term. All course material will be posted on Brightspace.

Instructor: Razieh Enjilela
Email: Razieh.Enjilela@carleton.ca

Office hours: Tuesdays and Thursdays, 8:00 p.m. – 9:00 p.m. or by appointment.
Office hours will take place using the Big Blue Button video conferencing system, which is built into Brightspace.

Teaching Assistants: Ming Liu

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 summer 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, which requires some use of high school level 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 1901 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 %
<hr/>	
Course Total	100 %

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

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, 4 additional lecture recordings will become available; 2 recordings will be posted on Tuesday and 2 recordings will be posted on Thursday.

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, July 7	Wednesday, July 14
2	Thursday, July 15	Thursday, July 22
3	Wednesday, July 28	Wednesday, August 4
4	Thursday, August 5	Thursday, August 12

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 **Monday, July 26, 2021 at 6:00 p.m. – 7:30 p.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 at a later date.

e. Final Exam (40%)

The final examination will be held during the Late Summer exam period, August 19 – 25, 2021, 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 at a later date.

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 Late Summer term are scheduled during September 17 – 19, 2021. 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

Date	Lecture	Topics	Textbook Sections
July 6	1	Course Introduction Our Place in Space	1.1
	2	Scientific Notation, Astronomical Measurement The Scientific Method	1.1 Appendices 1, 2, 1.2
July 8	3	The Celestial Sphere, Earth's Orbital Motion	1.2 – 1.4
	4	Motion of the Moon, The Measurement of Distance	1.4 – 1.5
July 13	5	The Copernican Revolution, Planetary Motion	1.6 2.1 – 2.4
	6	Laws of Motion Newtonian Mechanics	2.5 – 2.7
July 15	7	Light and Radiation Electromagnetic Spectrum	2.8 3.1 – 3.2
	8	Radiation Laws Spectroscopy	3.3 – 3.5 4.1
July 20	9	Spectroscopy Telescopes	4.2 – 4.5
	10	Telescopes	5.1 – 5.4
July 22	11	The Sun	16.1 – 16.7
	12	The Stars	17.1 – 17.4
July 27	13	The Stars	17.5 – 17.8
	14	The Interstellar Medium Star Formation	18.1 – 18.5 19.1 – 19.3
July 29	15	Star Formation Stellar Evolution of Low-Mass Stars	19.4 – 19.6 20.1 – 20.3
	16	Stellar Evolution of High-Mass Stars Stellar Explosions	20.4 – 20.6 21.1 – 21.3
August 3	17	Stellar Explosions Neutron Stars	21.4 – 21.5 22.1 – 22.4
	18	Relativity and Black Holes	22.5 – 22.8
August 5	19	The Milky Way Galaxy	23.1 – 23.7
	20	Galaxies	24.1 – 24.5
August 10	21	Galaxies and Dark Matter	25.1 – 25.5
	22	Cosmology	26.1 – 26.7
August 12	23	The Early Universe	27.1 – 27.6
	24	*Course Review, Part 1	1 – 5, 16 – 17
	25	*Course Review, Part 2	18 – 27

August 16	-	Last day of Early Summer term classes	-
August 19 – 25	-	Final examinations in Late Summer term courses may be held. Examinations are normally held all seven days of the week.	-
August 17– 19	-	Late Summer term deferred examinations will be held.	-

* Please note that there would not be lectures recordings for the “course review” lectures 24 and 25. Instead, there would be two live online classes. Students can attend to discuss and kind of review all the course materials. More details and dates will be announced later.

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 Early Summer exam period is **May 29, 2020** and for the Late Summer exam period is **July 24, 2020**.

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

Summer Sessions:

- **Early Summer:** May 6, 2021 to June 18, 2021
- **Late Summer:** July 2, 2021 to August 16, 2021
- **Full Summer:** May 6, 2020 to August 16, 2021

March 1	Last day for receipt of applications for admission to an undergraduate degree program for the summer term.
May 1	Last day for receipt of applications for undergraduate internal degree transfers to allow for registration for the summer term.
May 6	Early summer and full summer courses begin.
May 13	Last day for registration and course changes (including auditing) for early summer courses.
May 20	Last day for registration and course changes (including auditing) for full summer courses.
May 21	Last day to withdraw from early summer and full summer courses with a full fee adjustment. Withdrawals after this date will result in a permanent notation of WDN on the official transcript.
May 14-26	Fall/winter and winter term deferred final examinations will be held.
May 24	Statutory holiday. University closed.
May 28	Last day to request Formal Examination Accommodation for early summer examinations to the Paul Menton Centre for Students with Disabilities. Note that it may not be possible to fulfill accommodation requests received after the specified deadlines.
June 11	Last day for summative tests or examinations, or formative tests or examinations totalling more than 15% of the final grade for early summer courses before the official examination period (see Examination Regulations in the Academic Regulations of the University section of the Undergraduate Calendar).
June 18	Last day of early summer classes (NOTE: Full summer classes resume July 2). Last day for academic withdrawal from early summer courses.

	Last day for handing in term assignments, subject to any earlier course deadline.
June 19 – 20	No classes or examinations take place.
June 21 – 27	Final examinations in early summer courses and mid-term examinations in full summer courses may be held. Examinations are normally held all seven days of the week.
July 1	Statutory holiday. University closed.
July 2	Late summer courses begin. Full summer courses resume.
July 9	Last day for registration and course changes (including auditing) for late summer courses.
July 16 – 18	Early summer term deferred final examinations to be held.
July 23	Last day to withdraw from late summer courses with a full fee adjustment.
July 30	Last day to request Formal Examination Accommodation for August examinations to the Paul Mention Centre for Students with Disabilities. Note that it may not be possible to fulfill accommodation requests received after the specified deadlines.
August 2	Statutory holiday. University closed.
August 9	Last day for summative tests or examinations, or formative tests or examinations totalling more than 15% of the final grade for late summer and full summer courses before the official examination period (see Examination Regulations in the Academic Regulations of the University section of the Undergraduate Calendar).
August 16	Last day of late summer and full summer classes. Classes follow a Monday schedule. Last day for academic withdrawal from late summer and full summer courses and any other courses that end this term. Last day for handing in term assignments, subject to any earlier course deadline.
August 17 – 18	No classes or examinations take place
August 19 – 25	Final examinations in late summer and full summer courses may be held. Examinations are normally held all seven days of the week.

September 17 – 19 Late summer and **full** summer term deferred final examinations will be held.