



## SYLLABUS – WINTER 2026

### Welcome to HUMS 4103

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Science and the humanities, though often perceived as distinct disciplines, share a fundamental pursuit: understanding the world and making sense of human experiences. Both rely on critical thinking, analysis, and interpretation to generate insights and uncover new knowledge. The connections between these fields are not merely complementary but often transformative. For instance, historians may apply scientific techniques to analyze artifacts, while scientists might draw on philosophical frameworks to shape their research questions and ethical considerations. Together, science and the humanities enrich our understanding of the modern world and our place within it, highlighting the interconnectedness of human inquiry.

### Contact Information

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**Professor:** James J. Cheetham, Ph.D., Department of Biology  
**Office:** CTTC 4615  
**Lectures:** Mondays - 11:35 pm to 2:25 pm  
**Office hours:** Online or by appointment. Feel free to chat after class or send me questions by email or better yet, post them in the **Questions & Responses Forum**.  
**email:** james.cheetham@carleton.ca

### Calendar Description

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#### HUMS 4103 [0.5 credit]

##### Science in the Modern World

An introduction to the major scientific ideas of our time (such as Big Bang theory, molecular genetics, evolution, atomic structure), and the impact of technology on society (e.g. global warming, pollution, genetically modified foods, viral infections). Precludes additional credit for HUMS 4100 (no longer offered). Prerequisite(s): restricted to students in the Bachelor of Humanities program. Lectures three hours a week.

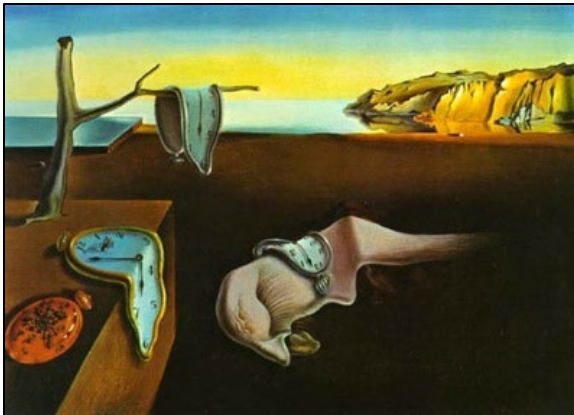
## Purpose of the Course

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A solid understanding of science and mathematics has long been considered a cornerstone of a well-rounded education. Over the past few centuries, scientific knowledge and technological advancements have dramatically reshaped our world. Yet, fundamental questions about science remain. What are its goals? How is scientific knowledge generated? In what ways does science differ from other forms of understanding? What does science reveal about reality? How has it transformed our lives? Is there a clear distinction between science and pseudoscience?

This course seeks to explore these important questions. We will examine the nature of science, its impact on society, and the relationships between science, art, and the humanities. Additionally, we will investigate the various roles science plays in modern life and explore diverse perspectives on its influence.

Beyond exploring the relevance of contemporary science, the course will also aim to sharpen students' abilities to critically analyze and assess complex scientific concepts and arguments.



### The Persistence of Memory

Salvador Dalí, 1931, Museum of Modern Art, New York

*Some art scholars suggest that Dalí's melting clocks may symbolize Albert Einstein's groundbreaking Theory of Relativity, a new and revolutionary idea in the 1930s. In the theory of relativity, Einstein proposed a new concept of time as being relative and complex - not something fixed and easily tracked with a pocket watch. In Persistence of Memory, Salvador Dalí shows the clocks melting away and thus losing their stability and power over the world around them.*

## Course Requirements and Logistics

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<b>Delivery Type:</b>	Lectures on Mondays from 11:35 am 2:25 pm.
<b>Equipment:</b>	A computer and reliable internet access.
<b>Software:</b>	Microsoft Word, Microsoft Excel, Zoom, Adobe Acrobat (or equivalent).
<b>Email:</b>	Carleton University email and Brightspace accounts.
<b>Textbook:</b>	No required textbook.
<b>Fees:</b>	There are no additional fees in HUMS 4103.
<b>Schedule:</b>	See Tentative Lecture Schedule in this Syllabus.
<b>Readings:</b>	Links on Brightspace course pages.
<b>Quizzes:</b>	Online in Brightspace course pages.
<b>Assignments:</b>	Submitted in Brightspace course pages.

## Assessment

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Students are responsible for, and may be tested on, all the material discussed during lectures. Also, the required reading and video materials, whether covered in lecture or not are fair game. You can potentially acquire a total of 100 marks from the assignments, tests, grant proposal, and participation. The assignments, grant proposal and participation all have rubrics associated with them. You should look at these rubrics.

Activity	Value
Assignments (2 x 15% each)	30%
Tests (3 x 10% each)	30%
Grant Proposal	30%
Participation	10%
<b>Total</b>	<b>100%</b>

## Assignments

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All Assignments in this course should be formatted and documented following the Chicago style guide. If you have any questions about how to document a source after checking the Chicago style guide please ask me, preferably in the Forums so other students can benefit as well, but of course by email at any time. All papers should be 12 pt. font double-spaced from top to bottom without interruption or extra line spaces. Properly setting up your paper counts toward part of your mark on the assignment (**see the Assignment Rubrics**).

## Tests

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The tests during the term are meant to be formative, in that they help you to understand the material. They are also summative and are graded. Tests are conducted **online** using Brightspace, and consist of multiple-choice questions, with a few short answer, fill-in-the-blanks, and matching questions.

Students are expected to take the tests during the scheduled times. Each test will be available during a 24 hour window (from 12:01 am on the test day, until 11:59 pm on the test day). Once you start the test, you will have **ONE HOUR** to finish it. Unlike the short formative **quizzes**, you do not get multiple attempts at the **tests**. There are **THREE** Brightspace tests during the term.

**There is a sample test on the Quiz Page in Brightspace. I suggest you do this sample test before the first REAL test to make sure you understand how the online tests work.**

## Participation

Your participation in class, and in the forums will be assessed by the instructor. Despite what Woody Allen says, participation does **NOT** mean just showing up. **Review the *Participation Rubric*.**

### Some suggested ways to participate:

- Ask questions in the Questions & Responses Forum.
- Contribute interesting articles, comments analysis and opinions to the Discussion Forum.
- Be engaged and contribute ideas during online discussions.
- Read ahead and be prepared for class.
- Post in the Homework Forum



### How to take this course

It's not what you "get" in this course, it's how deep you go. People study science for lots of reasons, usually variations on "it's required." Think about why someone has decided that learning this material might be essential to your university experience, and what that means for you personally.

It is entirely possible to do well in the class without being transformed by your newfound scientific knowledge, but it would be a shame. I like to think that this (and indeed, any) course operates on three levels. Imagine we are standing on the seashore; the course is the ocean. Enter with me and go as deep as you dare...

### Wading

You need the basic outlines of science, the highlights, the main characters & ideas, the surface-level knowledge.

There's nothing wrong with staying in the shallows; this approach may work for you if this is likely to be your only science course, or if you've never taken one before and it's all new.

"Waders" will tend to assume that readings and the professor are mutually reinforcing, telling basically the same story. Waders are mainly concerned with **WHAT** happened in science, and not **why**.

### Snorkeling

You have a grasp of the basics and are ready to think scientifically and explore what's below the surface

Perhaps you've taken a science course before or are a fan of science. You already know that science is a conversation among differing and/or sometimes contradictory perspectives.

"Snorkelers" notice inconsistencies and they respectfully challenge assumptions through lively debate. Snorkelers are interested in **HOW & WHY** things happened as they did.

### Scuba-Diving

You want to go deeper into science, using the cognitive equipment and tools of science as a focused critical thinker

Experienced? You are well-aware of scientific controversies and how scientific knowledge is constructed. You actively seek alternative sources, interpretations, and voices.

"Divers" don't take any of the course's structure or content as natural or inevitable. You see (and then fill) the course's gaps. You are curious, passionate, and concerned with **WHY SCIENCE MATTERS**.

## Grant Proposal

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One way to understand science is to do what scientists do, and one thing that scientists do is write grants. Lots of grants. Therefore, you will write a Grant Proposal to research a scientific problem. You can transcend the arts and sciences in your proposal, but make sure to get approval of your topic from me in the first month of class.

The objectives for the proposal are first, to **ask a good question**, that you might be able to answer. Second, to learn how science is used to formulate and solve problems, third to apply your academic writing skills, which include construction of a logical and persuasive argument. The proposal will evaluate your knowledge base, ability to **ask a good question, formulate an hypothesis, propose experiments to test your hypothesis**, and your ability to integrate and synthesize information and develop a logical argument. **(Look at the *Grant Proposal Rubric*.)**



## Final Grades

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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.

## Winter Term 2026 – Tentative Lecture Schedule

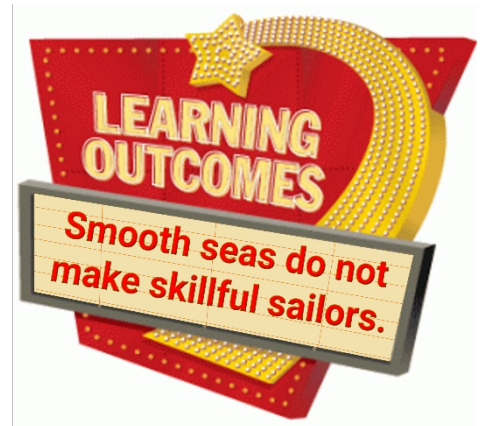
Date	Time	Subject	Notes
<b>WEEK 1 - INTRODUCTION AND THE NATURE OF SCIENCE</b>			
Monday 05Jan2026	Lecture 1 11:35-2:25	Course format, assessment, & readings. Some perspectives on science and technology.	<b>Read the syllabus.</b>
<b>WEEK 2 – PHILOSOPHY OF SCIENCE</b>			
Monday 12Jan2026	Lecture 2 11:35-2:25	Some of the key philosophers of science. Demarcation and falsifiability.	<b>Karl Popper</b> – your new best friend.
<b>WEEK 3 –SCIENCE AND TECHNOLOGY</b>			
Monday 19Jan2026	Lecture 3 11:35-2:25	Some ways to think about science and technology.	The good, the bad, and the ugly.
<b>WEEK 4 – ASTRONOMY AND COSMOLOGY</b>			
Monday 26Jan2026	Lecture 4 11:35-2:25	From ancient Babylon through Galileo, Hubble, and beyond.	The cosmos is all that is, or ever was, or ever will be.
<b>WEEK 5 – PHYSICS</b>			
Monday 02Feb2026	Lecture 5 11:35-2:25	Everything happens for a reason, and that reason is usually physics.	<b>Test #1:</b> Lectures 1,2,3,4 <b>Asn #1 due: Mon 03Feb2026</b>
<b>WEEK 6 – CHEMISTRY AND NANOTECHNOLOGY</b>			
Monday 09Feb2026	Lecture 6 11:35-2:25	Chemistry: it's all about knowing where the electrons want to go.	Make like a proton and stay positive.
<b>READING WEEK</b>			
Monday 16Feb2026	No Lecture	Study time.	Shouldn't you be studying?
<b>WEEK 7 – EARTH &amp; ENVIRONMENTAL SCIENCES</b>			
Monday 23Feb2026	Lecture 7 11:35-2:25	What is the world made of?	Atoms, like everything else.
<b>WEEK 8 - MATHEMATICS</b>			
Monday 02Mar2026	Lecture 8 11:35-2:25	We live in a world described by mathematics.	Mathematics is the music of reason. <b>Asn #2 due: Mon 03Mar2026</b>
<b>WEEK 9 – COMPUTER SCIENCE</b>			
Monday 09Mar2026	Lecture 9 11:35-2:25	Artificial intelligence and how algorithms control your life.	<b>Test #2:</b> Lectures 5,6,7,8
<b>WEEK 10 – EVOLUTION</b>			
Monday 16Mar2026	Lecture 10 11:35-2:25	Where do we come from? Evolution of cooperation.	"I have called this principle, by which each slight variation, if useful, is preserved, by the term of Natural Selection."
<b>WEEK 11 - MOLECULAR BIOLOGY: MENDEL TO THE HUMAN GENOME</b>			
Monday 23Mar2026	Lecture 11 11:35-2:25	Human Genome Project, personalized medicine, bioethics, and transhumanism.	What is a human being, then?
<b>WEEK 12 – BIOTECHNOLOGY AND NEUROSCIENCE</b>			
Monday 30Mar2026	Lecture 12 11:35-2:25	Genetic engineering, GMOs, synthetic biology, neuroscience, fMRI, neuro-optics, and neuro-ethics..	Brain: an apparatus with which we think we think.
<b>WEEK 13 – Test #3</b>			
Monday 06April2026	No Lecture	The final test.	<b>Test #3:</b> Lectures 9,10,11,12 <b>Grant Proposal due today.</b>

## Learning Outcomes

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To facilitate your learning, I state explicit Learning Outcomes. There are Learning Outcomes for the entire course, and Learning Outcomes associated with each lecture.

The Learning Outcomes are intended to increase your understanding of science and technology as an ever-developing body of knowledge, the provisional nature of scientific explanations, the complex relationship between evidence and ideas in science and the impacts of science and technology on the modern world. Course material (lectures, readings, videos, etc.) and assessments (tests, assignments) are aligned with these Learning Outcomes.



**Learning Outcomes for the course are the following:**

**Students who successfully complete this course will be able to:**

- Describe science as a way of thinking.
- Distinguish between science, pseudoscience and nonscience.
- Identify the key theories, methodologies, and personalities in the history of science and explain their impact on various aspects of human culture and civilization, such as philosophy, literature, music, and art.
- Evaluate pros and cons of new scientific discoveries and technologies.
- Communicate your knowledge, thoughts, and reasoning clearly and effectively in written and oral form through class discussions, assignments, online discussions, and the writing of a grant proposal.
- Understand and explain the provisional nature of scientific knowledge.
- Explain the importance of the principle of tolerance in science.
- Identify and intelligently discuss controversies and ethical issues in science and technology.
- Contribute to discussions of current scientific news items to help develop an awareness of science in the modern world.
- Develop individual interests, through assignments, that engage a scientific or technological issue of importance.
- Apply critical reading and thinking skills to scientific texts, including the ability to accurately summarize and analyze their structure and logic.
- Critically evaluate sources of scientific information.
- Recognize and articulate the impacts of science and technology on your own life, the lives of others, the environment, society and our planet.

**There are also learning outcomes associated with each lecture.**

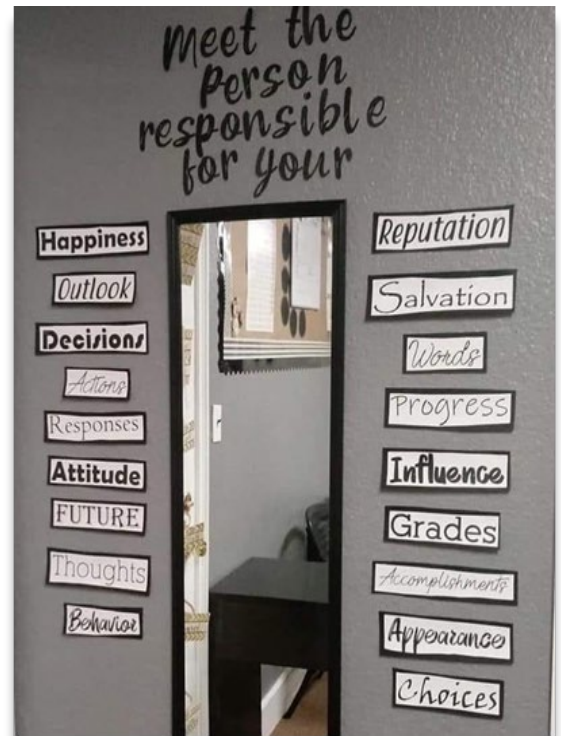
## What I Expect from You

Learning is your responsibility. Just as a personal trainer can't lift the weights for you, I can't learn the material for you.

Therefore, as students in this course, you are expected to take ownership of your learning. This includes:

- Engaging respectfully with your peers through the Forums and contributing to a positive learning environment
- Thinking critically about how science connects to your life, society, and the world around you
- Being open to new ideas and willing to question old assumptions

Success in this course, and in life, depends on your engagement, effort, and willingness to ask questions when needed. You're doing this for yourself - to build knowledge and skills for your future, not to meet my expectations. Above all, students are expected to approach this course with curiosity, effort, and a willingness to grow. Learning is sometimes challenging, but persistence and engagement will serve you well - both here and beyond the classroom.



## What You Can Expect from Me

As your instructor, I am committed to supporting your learning. You can expect:

- Clear, organized, and enthusiastic instruction
- Timely responses to questions and feedback on assessments
- Availability by email for additional support
- Fair and consistent evaluation of your progress through quizzes
- A welcoming environment where questions are encouraged

Don't hesitate to ask questions in the Questions & Responses Forum or by email. Learning can be challenging, but you're not alone. I'm here to help you every step of the way.



## Readings and Videos

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Slides used in class and links to the readings and videos for the course are available on the Brightspace pages. I suggest you look at the available material before class, and then look it over again after. You will spend a lot of time reading. There are also videos to help you learn about science and technology. I suggest you watch them, they will help you. There are also short formative Self-Check Quizzes after some of the readings and videos. You should do these quizzes.

**PRO TIP** Keep up with the readings and the videos. I cannot stress this enough.

## Electronic Communication

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### Brightspace

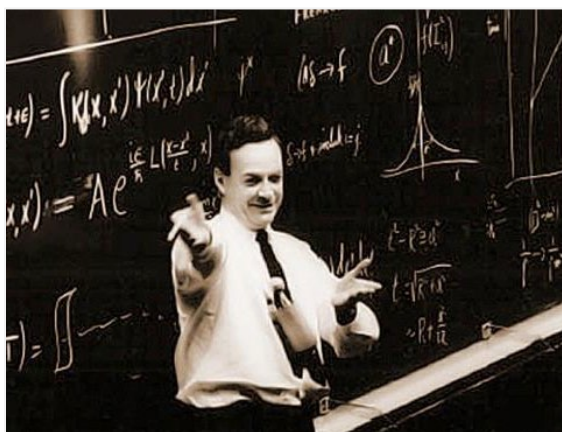
Access to Brightspace is required for this course. The HUMS 4103 Brightspace course pages contain: lecture slides, readings, tutorials, videos, class announcements, assignments, quizzes, tests, the glossary, and your grades. The Brightspace pages will be updated as needed during the term, so visit them often. For help and support with Brightspace, go to:

<https://carleton.ca/brightspace/students>. Any unresolved questions can be directed to Information Technology Services: <https://carleton.ca/its/contact> or by phone at 613-520-3700.

**See the SYLLABUS for details on lectures topics, readings, test dates, and assignment due dates.**

### Emails

Any questions about the course, grades, etc., must come from your Carleton Email account. This is university policy. Please send me an email at: **james.cheetham@carleton.ca** and I will respond, so we know that our electronic communication is working, and your emails are not going into my junk folder. This is also a way for me to check if you have read, at least this far, in the syllabus.



**So I find that teaching and the students keep life going, and I would never accept any position in which somebody has invented a happy situation for me where I don't have to teach. Never.**

**Richard P. Feynman**

## AI Use In This Course

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### Purpose

Artificial Intelligence (AI) tools (e.g., ChatGPT, Copilot, Gemini) are increasingly used in education, research, and industry. This course recognizes their potential to support learning while also emphasizing responsible, ethical, and transparent use. The following guidelines outline how AI may and may not be used in this course.

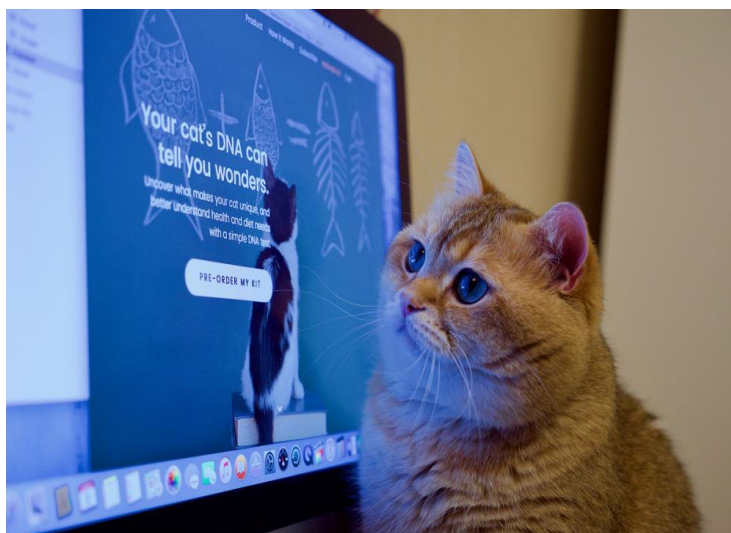
### Permitted Uses

Students are encouraged to use AI tools to support their learning in the following ways:

**Studying & Reviewing:** asking AI to explain scientific concepts in simple terms, generate practice questions, or summarize lecture material.

- **Skill Development:** using AI for grammar checks, improving clarity of writing, or brainstorming ideas.
- **Exploration:** using AI to connect scientific topics to other interests.

When using AI in these ways, students should treat it as a study aid, similar to a tutor, not as a replacement for their own understanding.



### Prohibited Uses

AI must not be used for any activity that undermines academic integrity, including:

Using AI to complete graded quizzes, tests, or assignments.

Violations will be treated as academic dishonesty under Carleton University's Academic Integrity Policy.

### Why This Matters

This course is designed not only to teach you science in the modern world, but also to develop your ability to think critically about how science works and its roles in society. AI can assist you, but it cannot replace the process of learning, questioning, and forming your own evidence-based conclusions. Using AI responsibly will prepare you for a world where such tools are common, while ensuring you build lasting skills and understanding.

## Academic Accommodation

<https://students.carleton.ca/services/accommodation>

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Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website ([students.carleton.ca/course-outline](https://students.carleton.ca/course-outline)).

### Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the [Student Guide](#)

**Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the [Student Guide](#)

**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](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me 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). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the [PMC website](#) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

## Academic Regulations

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Carleton University is committed to ensuring fairness and consistency in the completion of assignments, and examinations. As part of this commitment, students are required to follow proper assignment and examination procedures. A student who commits a violation of this policy on an examination or assignment, or obtains or produces an answer or unfair advantage by deceit, fraud, or trickery, or by an act contrary to the rules of the assignment or examination are subject to the sanction under this Policy. You are expected to follow the Academic Regulations of the University. **Pay attention to the section on Student Conduct.** If you are not sure about the definition of cheating, come and see me, and I will explain it to you in more detail.

## Academic Consideration for Coursework Policy

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Due to medical and other extenuating circumstances, students may occasionally be unable to fulfil the academic requirements of their course(s) in a timely manner. The University supports the academic development of students and aims to provide a fair environment for students to succeed academically.

If students encounter medical and/or other **extenuating circumstances** that temporarily hinder their capacity to fulfil in-class academic requirements for a period that is **five days or less**, they can request academic consideration.

### Extenuating Circumstances:

- are beyond a student's control
- have a significant impact on the student's capacity to meet their academic obligations
- could not have reasonably been prevented

Academic consideration for medical reasons no longer requires a doctor's note. A statement that a serious medical condition exists is now sufficient.

### Non-Extenuating Circumstances

Transit issues, multiple deadlines, social events, employment obligations, forgetting the test date or assignment deadline, submitting the wrong file, technical issues, vacation and travel are **NOT** considered to be extenuating circumstances.

### Tests

It is each student's responsibility to complete tests in Brightspace before the 11:59 pm. on the assigned dates. If you miss a test due to extenuating circumstances (see above), you may request Academic Consideration for Coursework.

**To request Academic Consideration for a missed test, follow these instructions.**

1. Email your instructor no later than 24 hours after the test date and explain your situation.
2. **Complete and submit the Academic Consideration for Coursework Request Form** on the Registrar's Office Webpage (<https://carleton.ca/registrar/academic-consideration-coursework-form>) no later than 24 hours after the test date.
3. When I receive the completed form from the Registrar, your request will be considered and if granted, you will be assigned a make-up test date.
4. There are no make-up tests for missing a make-up test.

## Assignments

It is each student's responsibility to make sure that the correct assignment file is submitted in Brightspace before 11:59 pm on the Assignment due date. Alternate submission mechanisms (e.g., email, uploads to cloud-based systems such as Google drive, time-stamps), cannot be used as alternatives if you have not properly submitted in Brightspace.

**To request Academic Consideration for an assignment, follow these instructions.**

1. Email your instructor no later than 24 hours after the assignment submission deadline and explain your situation.
2. **Complete and submit the Academic Consideration for Coursework Request Form** on the Registrar's Office Webpage (<https://carleton.ca/registrar/academic-consideration-coursework-form>) no later than 24 hours after the assignment submission deadline.
3. Once the completed form is received from the Registrar, your request will be considered and if granted, you will be assigned an extension by a teaching assistant or the instructor.
4. Once all the assignments submitted on time are graded and returned, no further assignments will be graded except for very compelling reasons.
5. Without an extension, late assignments will be **penalized 5% per calendar day** including weekends. Late assignments can very quickly sink to a grade of F.

## Important Things You Should Know

The Registrar's Office considers deferrals for **final exams only**. Coursework deferrals are at the instructor's discretion. The Registrar's Office does **NOT** grant coursework deferrals.

Requests are **NOT** automatically approved. Approving and determining the accommodation remains at the discretion of the instructor.

Providing false or misleading information in order to avoid or delay the submission of work or to avoid a test is a violation of section VI.4 of the [Academic Integrity Policy](#) and will result in an Academic Integrity Investigation by the Dean's Office.

The final deadline for **ALL** coursework is set by the university Senate. It is the last day of classes. Deferred work not submitted by the last day of classes will receive a 0%. Grades will be adjusted if deferred work is accepted later.

## Some Useful Advice

Submit assignments early and frequently to avoid issues. If somehow real disaster strikes and you lose everything at least you will have a partially completed version uploaded, that the TA or instructor can mark. Check your Brightspace Dropbox submission to ensure the correct final file was uploaded. Don't assume that everything was submitted OK. Don't just check file names but at least skim the actual contents (not only to check that the file didn't become corrupt during the upload but also that you submitted the correct version, the latter is a good idea when you make multiple backup copies (like I do). Submitting the wrong file, or a corrupted file or an unreadable file for part or all of your assignment is not a valid reason for an extension.

## Academic Integrity and Regulations

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Carleton University demands academic integrity from all its members. The [Academic Integrity Policy](#) governs the academic behavior of students. Academic dishonesty, in whatever form, is destructive to the values of the university, and risks harming the university's reputation as a place of learning and innovation. Furthermore, it is unfair and discouraging to those students who pursue their studies honestly. Any student who commits a violation of the Academic Integrity Policy on a test, examination or assignment, or obtains or produces an answer or unfair advantage by deceit, fraud, or trickery, or by any act contrary to the rules of the test, examination or assignment is subject to sanctions under the Academic Integrity Policy.

The Academic Integrity Policy is strictly enforced in this course. Academic dishonesty is not tolerated. If you are unclear about what is dishonest, please see the Academic Integrity Policy for clarification. If you are still unsure about specific instructions, Email me.

The study of science is a collaborative endeavor. Working together and helping each other is great. However your submitted tests and assignments must be your own work.

**PRO TIP** READ THE CARLETON UNIVERSITY ACADEMIC INTEGRITY POLICY.

It is the student's responsibility to remain informed of all University rules and regulations as well as those pertaining to their program. Ignorance of the rules and regulations will not be accepted as grounds for waiving them. You are also expected to follow the [Academic Regulations of the University](#).

## Statement on Student Mental Health

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As a student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. For more information, please consult <https://wellness.carleton.ca>

## More Information About HUMS 4103

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Science and technology are pervasive in the modern world. Science has become an integral part of human cultures and arguably, the single most widely-accepted authority for public decision-making. Indeed, technology: the tools and the practical application of scientific knowledge, has always been an essential feature of human society. We cannot escape science and technology and their importance to our everyday lives. As a result, it is essential for us to better understand science and technology.

In this course, we will examine how science and technology have shaped the modern world, and how society and culture have shaped the production and consumption of science and technology throughout history. This course will challenge you to think about the world in new and sometimes counter-intuitive ways, and to find links between different sciences, and between science and other disciplines.

Students studying science often feel like they are **learning a new language**. The Homework will help you to master these new terms. Some of the topics we study (quantum mechanics) are very difficult to understand but embracing the difficult is a good thing (see Kennedy quote below). The best way to learn complex disciplines is to become an active participant in them. How can that be achieved in this course? First, try teaching other people about what you learn and explain concepts to them. The most satisfying proof of mastering a difficult topic is the ability to explain it to another person. It is expected that you will work with other students outside the classroom in preparation for lectures and tests. I strongly encourage you to take advantage of the forums to pose questions, exchange ideas, and connect with this unique community. You'll get a lot more out of this course if you don't go through it alone. As I often tell my biochemistry students, science is a team sport.



**We choose to go to the Moon in this decade and do the other things, *not because they are easy, but because they are hard*; because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one we intend to win.**

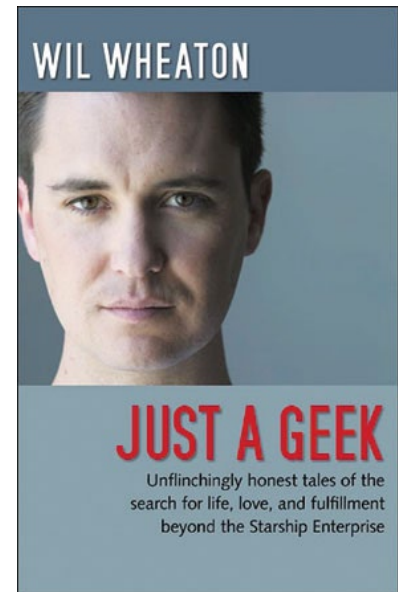
**John F. Kennedy**

**September 12, 1962**

## Course Policies

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1. Your experience in this course (and in life) will be more enjoyable if you treat your classmates and your instructor with courtesy and respect (**Google “Wheaton’s Law”**).
2. When you come to class, be on time, and be prepared. If you are unavoidably late, enter the room quietly and choose a seat as quickly as possible. Do not invite your friends in to chat in this class.
3. Once in class, stay for the duration. If you must leave early, give me advance warning. You will not be allowed to meander in and out of the classroom. This is disruptive and unfair to your fellow students, and makes me unhappy. Take care of your personal needs before class.
4. Turn off the sound on communications devices. This includes cell phones, personal entertainment (TV, music, etc.) devices or anything else that will disturb your classmates. Students with special circumstances need to speak with me right away. Do not talk on your cell phone while I am lecturing, or a guest is lecturing.
5. No chit-chat or unnecessary noise during lectures. If everyone is making noise, no one can hear anything. Stay focused on the material under consideration during lecture. You are paying a lot of money to be in this class. If somebody is talking near you, he or she is disrupting your learning experience, and essentially stealing your tuition money. You are not paying tuition to listen to buddy talk about his views on whatever (save that for Twitter, or Instagram). I suggest you ask them to shut up, if they are disrupting your learning experience.
6. Academic dishonesty is not tolerated. If you are unclear about what is dishonest, please see the Undergraduate Calendar for clarification. If you are still unsure about specific instructions, ask me. Science is a collaborative endeavor. Therefore, you are encouraged to work together as much as possible. However, tests are not collaborative and must be completed without the assistance of other people.



## Forum Discussion Guidelines

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**Source:** Howard Gabennesch, (1992) The Teaching Professor, 6(9).

1. Try to make comments that connect ideas from the course with phenomena outside the classroom, and between ideas in one part of the course and those in a different part.
2. Avoid war stories, rambling speeches heavily punctuated with the word "I," and raw opinions that we could just as easily get from the average patron at the nearest pub, who has never heard of this course and its assigned readings.
3. Realize that when our emotions are aroused our brain wants to take orders from them. It is essential; therefore, to be willing to disconnect one's brain from one's gut long enough to render due process to ideas, particularly those that are unpopular or personally distasteful. This is an unnatural act, and requires courage. You will probably find it easier to join lynch mobs from time to time.
4. Understand that the right to have an opinion does not include the right to have it taken seriously by others. Nor is having an opinion necessarily laudable in itself. An opinion is only as good as the evidence, theory, and reasoning on which it is based.
5. Be careful about basing your opinions uncritically on the testimony of experts. Experts are subject to error and bias. They often disagree with other experts. All of this applies to the authors of your texts and your professors.
6. Beware of the tendency to view questions in dichotomous terms, such as either-or, all-or-none. The world is a complex, messy place where absolute answers are hard to find, gray is more common than black and white and contradictory things are often in the same package. **(Watch the Jacob Bronowski video).**
7. Value tentativeness. It's OK to admit you're unsure. It's OK to change your mind when presented with new evidence. **(Watch the Jacob Bronowski video, again).**



**Philosophy in Action:**  
Students engaged in a dialectical discourse for the purpose of determining the truth and avoiding error.



*"We've arranged a global civilization* in which the most crucial elements — transportation, communications, and all other industries; agriculture, medicine, education, entertainment, protecting the environment; and even the key democratic institution of voting — profoundly depend on science and technology

We have also arranged things so that *almost no one understands science and technology*. This is a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power is going to blow up in our faces."

- Carl Sagan

# University Regulations for All College of the Humanities Courses (December 2025)

## Academic Dates and Deadlines

This schedule contains the dates prescribed by the University Senate for academic activities. Dates relating to fee payment, cancellation of course selections, late charges, and other fees or charges will be published in the Important Dates and Deadlines section of the Registration Website.

## Grading System at Carleton University

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.

The system of grades used, with corresponding grade points and the percentage conversion can be found [here](#).  
[Grade Appeal Process Information](#)

## Student Rights and Responsibilities at Carleton

Carleton University strives to provide a safe environment conducive to personal and intellectual growth, free of injustice and characterized by understanding respect, peace, trust, and fairness.

The [Student Rights and Responsibilities Policy](#) governs the non-academic behaviour of students. Carleton University is committed to building a campus that promotes personal growth through the establishment and promotion of transparent and fair academic and non-academic responsibilities.

## Academic Accommodations

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University.

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes, including information about the *Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances*, are outlined on the [Academic Accommodations website](#).

### Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes can be [found here](#).

### Addressing Human Rights Concerns

The University and all members of the University community share responsibility for ensuring that the University's educational, work and living environments are free from discrimination and harassment. Should you have concerns about harassment or discrimination relating to your age, ancestry, citizenship, colour, creed (religion), disability, ethnic origin, family status, gender expression, gender identity, marital status, place of origin, race, sex (including pregnancy), or sexual orientation, please contact the [Department of Equity and Inclusive Communities](#) at [equity@carleton.ca](mailto:equity@carleton.ca).

## Academic Consideration Policy

As per the [Academic Consideration Policy](#), if students encounter extenuating circumstances that temporarily hinder their capacity to fulfil in-class academic requirements, they can request academic consideration. The

Academic Consideration for Coursework is only available for accommodations regarding course work. Requests for accommodations during the formal exam period must follow the [official deferral process](#).

NOTE: As per the Policy, students are to speak with/contact their instructor before submitting a request for Academic Consideration. Requests are not automatically approved. Approving and determining the accommodation remains at the discretion of the instructor. Students should consult the course syllabus about the instructor's policy or procedures for requesting academic consideration. [More information here](#).

## Academic Integrity Policy

The University Academic Integrity Policy defines plagiarism as 'presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own.' This includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

### Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT)
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment
- using another's data or research findings without appropriate acknowledgment
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one's own
- failing to acknowledge sources with proper citations when using another's work and/or failing to use quotations marks."

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor.

The Associate Dean of the Faculty follows a rigorous process for academic integrity allegations, including reviewing documents and interviewing the student, when an instructor suspects a violation has been committed. Penalties for violations may include a final grade of "F" for the course.

## Deferred Final Exams

Students who are unable to write a final examination because of extenuating circumstances, as defined in the [Academic Consideration Policy](#), may apply for accommodation. Normally, the accommodation for a missed final examination will be granting the student the opportunity to write a deferred examination. In specific cases when it is not possible to offer a deferred examination, and with the approval of the Dean, an alternate accommodation may be made.

The application for a deferral must:

1. be made in writing to the Registrar's Office no later than **three (3) working days** after the original final examination or the due date of the take-home examination; and,
2. be fully supported by appropriate documentation. In cases of short-term extenuating circumstances normally lasting no more than five (5) days, students must complete the University's self-declaration form which is included in the deferral application found on the [Registrar's Office website](#). Additional documentation is required in cases of extenuating circumstances lasting longer than five (5) days and must be supported by a medical note specifying the date of onset of the illness, the (expected) date of recovery, and the extent to which the student was/is incapacitated during the time of the examination. The University's preferred medical form can be found at the Registrar's Office [here](#).

## Deferred Term Work

In some situations, students are unable to complete term work because of extenuating circumstances beyond their control, which forces them to delay submission of the work. Requests for academic consideration are made in accordance with the [Academic Consideration Policy for Students in Medical or Other Extenuating Circumstances](#).

1. Students who claim short-term extenuating circumstances (normally lasting up to five days) as a reason for missed term work are held responsible for immediately informing the instructor concerned and for making alternate arrangements with the instructor. If the instructor requires supporting documentation, the instructor may only request submission of the University's self-declaration form, which is available on the [Registrar's Office website](#). The alternate arrangement must be made before the last day of classes in the term as published in the academic schedule.
  - a) Normally, any deferred term work will be completed by the last day of term. In all cases, formative evaluations providing feedback to the student should be replaced with formative evaluations. In the event the altered due date must extend beyond the last day of classes in the term, the instructor will assign a grade of zero for the work not submitted and submit the student's earned grade accordingly; the instructor may submit a change of grade at a later date. Term work cannot be deferred by the Registrar.
2. In cases where a student is not able to complete term work due to extenuating circumstances lasting for a significant period of time/ long-term (normally more than five days), the instructor and/or student may elect to consult with the Registrar's Office (undergraduate courses) or Graduate Registrar (graduate courses) to determine appropriate action.
3. If a student is concerned the instructor did not respond to the request for academic consideration or did not provide reasonable accommodation, the student should follow the appeals process described in the [Academic Consideration Policy](#).
4. If academic consideration is granted, but the student is unable to complete the accommodation according to the terms set out by the instructor as a result of further illness, injury, or extraordinary circumstances beyond their control, the student may submit a petition to the Registrar's Office (undergraduate courses)/Graduate Registrar (graduate courses). Please note, however, that the course instructor will be required to submit an earned final grade and further consideration will only be reviewed according to established precedents and deadlines. (More information: [Undergraduate](#)).

## Department Contact Information

Digital Humanities (Minor), Bachelor of the Humanities, Greek and Roman Studies, and  
MEMS:

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