

University of Victoria  
Department of Physics and Astronomy

# PHYS304: Physics in Science Fiction

## Spring 2026 Syllabus

We acknowledge and respect the Lək̓ʷəŋən (Songhees and X̱wəpsəm/Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and WSÁNEĆ Peoples whose historical relationships with the land continue to this day.

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### Course Information

**Course:** PHYS304 - The Physics of Science Fiction

**Sections:** Lecture A01

**Unit Value:** 1.5 Units

**Lecture Schedule:** Monday and Thursday from 2:30-3:50pm

**Prerequisites:** There are no prerequisites for this course. The material covered in this course will be taught with a minimum expectation of mathematics.

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### Instructor Information

**Instructor:** Travis Martin

**Email:** travismartin@uvic.ca

Students are expected to include “PHYS304” in the Subject line of their email, and include their name and student ID in the body of the email. Please allow up to 48h to respond to emails. If you do not receive a response within 48h, it is possible that your email was missed.

**Office Hours:** Any day after class.

**In-Term Feedback:** Student comments may be sent via email or on Brightspace, however it is not possible for all feedback to be considered within the term.

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### Modality Information

This course consists of synchronous lectures and an in-person final exam.

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### Technology Information

**Course Webpage:** <http://bright.uvic.ca>

**Other Technologies:** None.

**Digital Tools Policy:** Students may not use LLM Artificial Intelligence (such as ChatGPT) for any portion of this course. Use of these tools will result in charges of academic dishonesty.

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### Course Structure Information

**Lectures:** Section A01 will meet in-person.

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## Course Schedule

Below is an approximate outline of the order and dates in which material will be covered. Depending on the depth of in-class discussion, the material may take more or less time than anticipated. In the scenario that material takes longer than expected, some slides may be skipped in the lectures. Students are responsible for ALL of the material in the slides, including those that are skipped.

Lecture Number	Topic
Lec 1	Introduction
Lec 2-3	The Scientific Method
Lec 4-9	The Physics of Motion
Lec 10-15	Thermodynamics
Lec 16-20	Light and Waves
If time	Quantum Physics
If time	Nuclear and Particle Physics
If time	Relativity and Cosmology
If time	Theoretical Physics
Last 2 Lectures	Case Study - Moonfall

There is more material available in this course than there is time to teach it. Class will take a communal vote on which of the last few topics will be covered, based on the amount of time remaining in the term after the core material is covered.

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## Course Outcomes

**Summary:** Students in this course will explore the major concepts in physics, including the physics of motion, energy, waves and particles. Students will be tested on understanding of material through assignments, a group project and a final exam.

### Essential Course Components:

- Students must complete the final exam and achieve a minimum 40% grade on the final exam to be eligible to pass this course.

Students who complete these components of the course but who have an overall average less than 50% will receive a letter grade of F. Students who do not write the final exam will receive a letter grade of N, regardless of their overall average in the course.

**Intended Learning Outcomes:** By the end of this course, successful students should be able to...

- critically assess statements about the process of science from the perspective of the scientific method.
- evaluate attempts to prove/disprove hypotheses in terms of the scientific method.
- analyze a visual depiction of objects interacting in terms of forces and equilibrium.
- analyze a visual depiction of momentum and angular momentum in terms of Newton's Laws.
- analyze a visual depiction of temperature and heat in terms of thermodynamics.

- analyze a visual depiction of light and waves in terms of understood behaviour.
- analyze a visual depiction of very small objects in terms of quantum mechanics.
- analyze a visual depiction of atoms and subatomic particles in terms of nuclear and particle physics.
- analyze a visual depiction of motion at close to the speed of light in terms of the principles of relativity.
- analyze a visual depiction of space (galaxies) in terms of the principles of cosmology.

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## Assessments

This course has three grading components. The weighted average from these three components will be used to guide the grade assessment. If the application of this scheme would result in grades that are judged by the instructor to be inconsistent with the University's grading descriptions (<https://www.uvic.ca/calendar/undergrad/index.php#/policy/S1AAgoGuV>), then the instructor will assign percentages consistent with them.

### Summary:

Assignments - 30%

Projects - 35%

Final Exam - 35%

### Details:

#### Assignments: 30%

There are three types of assignments in this course. The exam-question-creation assignments are meant to get students thinking about how they will be tested in the course. The analysis assignments are meant to prepare students for the project. The reflection assignments are intended to encourage consistent review of course material. Assignment averages will be based on the combined performance in all three types of assignments.

Assignment due dates are provided on Brightspace. Assignments have a short grace period to account for technological issues or other short term emergencies. Illness or conflict of commitment concessions will be handled exclusively by dropping up to 2 assignments during the term when calculating final grades. No other extensions will be offered.

#### Analysis assignments:

Students will analyze a scene from a science fiction story. The scene may be provided in written or video format, and may be from existing work or may be created by the instructor for the purpose of the assignment. Students are expected to identify any aspects of physics/science that are depicted/described in the work, and then analyze their accuracy/realism based on what has been taught in the course up to that point.

#### Exam-question-creation assignments:

Students will create an exam-style question following the provided guidelines. The question must test specific knowledge from the course, and students are expected to provide what they feel is

the correct answer to the question to receive full marks. This could be in the form of a multiple choice question, a short answer question, or a long answer question. Alternative types of questions that are common from other fields of study are welcome. **Note: Bonus marks will be awarded if the question is good enough to be entered into the course question bank on BrightSpace. Bonus marks will count towards your overall course grade rather than just the assignment component of your grade.**

Reflection assignments:

Reflection assignments are meant to inspire students to consider the material that was taught as a whole, and to summarize the main ideas into their own words. At the end of each topic, students will be expected to write a brief review of the material that includes: 1. A brief description of the main concepts taught in that topic. 2. A reflection on the concepts that students feel confident in their understanding, based on the description in class. 3. A reflection of the concepts students continue to struggle with their understanding, along with an explanation of what aspects provided difficulty.

**Project: 35%**

Students may choose to complete this project in groups of up to two people or work alone. Note that group projects may reduce the amount of writing each person needs to do, but will increase the amount of work needed to coordinate with the partner(s). This is simply trading one type of effort for another, which is why the group nature of the project is optional.

There will be three submissions for the group project with due dates and content explained on BrightSpace. A short grace period is available to account for technological issues or other short term emergencies. Extensions to address longer term illness or conflict of commitment will be considered only if students submit what they have accomplished by the end of the grace period to demonstrate that some progress has already occurred.

**Final Exam: 35%**

The material of the final exam will be comprehensive of the material covered in the course. The questions will be collections of questions created by students for the assignments, as well as a standard set of questions created by the instructor. Questions may include multiple choice, true/false, multiple select, short answer and long answer. Video clips will be incorporated into the exam, and questions may be based on a critical viewing of the video clip.

**Academic Integrity**

Students are expected to adhere to the academic integrity policy of the University of Victoria. Details on this policy can be found here: [https://www.uvic.ca/calendar/undergrad/index.php#/policy/Sk\\_0xsM\\_V](https://www.uvic.ca/calendar/undergrad/index.php#/policy/Sk_0xsM_V).

**Course Materials:**

There are no official course materials, however a subscription to a video streaming service may be useful for watching films required for the course project. Course content is provided in the form of slides, which are available to all students.

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## Resources for Students

UVic Learn Anywhere - <https://onlineacademiccommunity.uvic.ca/LearnAnywhere/>

Many high schools do not adequately prepare students for how to succeed in university, in large part due to the large differences in expected workload. The UVic Learn Anywhere site can help students use their time more effectively and have better outcomes.

UVic Centre for Academic Communication - <https://www.uvic.ca/learningandteaching/cac/>  
Struggling with homework that involves writing? English not your first language? The Centre for Academic Communication has supports available to help you.

UVic Math and Stats Centre - <https://www.uvic.ca/science/math-statistics/current-students/undergraduate/msac/index.php>

Struggle with math? No matter the course, the Math and Stats Centre can provide assistance. As long as the assistance is with the mathematics of the problem, there are people available to help.

Academic Accommodations - <https://www.uvic.ca/students/academics/academic-concessions-accomm/index.php>

Have a disability that might be affecting your studies? The Centre for Accessible Learning can review your diagnosis and provide you with academic accommodations that help reduce the effects of the barriers to education you are experiencing as a result of interactions between course design and your disability.

Student Code of Conduct - <https://www.uvic.ca/services/studentlife/student-conduct/index.php>

Students are expected to behave with respect towards their environment and their community. When there are allegations of student misconduct, this is governed by the Office of Student Life.

Sexualized Violence - <https://www.uvic.ca/sexualizedviolence/>

If you have been the victim of sexualized violence, this link will help you know how to take the next steps for resolution.

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## UVic Policies & Statements

General Information for all Students - <https://www.uvic.ca/calendar/archives/202301/undergrad/index.php#/content/62daf5e98b7d47001d0fc38b>

This is a list of links to information that may be useful to you.

Academic Concession Policy - <https://www.uvic.ca/calendar/undergrad/index.php#/policy/HJjAxiG04>

This policy governs your rights and responsibilities in the case that you experience an unexpected and unavoidable circumstance (e.g. illness, injury, bereavement, etc), or have conflicting responsibilities (e.g. varsity sports event).

Policy on Respectful and Productive Environment - <https://www.uvic.ca/calendar/archives/202301/undergrad/index.php#/policy/HkQ0pzdAN>

This is a statement and policy about UVic's dedication to a respectful and productive learning environment. This includes human rights, equity and fairness, as well as discrimination and harassment policies.

Policy on Religious Observances - <https://www.uvic.ca/calendar/archives/202301/undergrad/index.php#/policy/r1q0gofdN>

This policy governs students' rights towards religious observances and how to manage your observances with your course responsibilities.

Policy on Non-Academic Misconduct - <https://www.uvic.ca/services/studentlife/student-conduct/non-academic-misconduct/index.php>

This policy governs students' rights and responsibilities with regard to non-academic behaviour. Students are expected to treat each other and staff/faculty with respect.

Statement on Equity, Diversity and Inclusion - <https://www.uvic.ca/vpacademic/about-contacts/equity-diversity-inclusion/index.php>

This is UVic's official statement on equity, diversity, inclusion and anti-racism.