

PHYSICS
Complementary
The Physics of Hollywood

203-BWT-03 section 01

Fall 2018

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Pre-requisites None

Co-requisites None

Ponderation 3-0-3 (3 hours of lecture and 3 hours of work outside class per week)

Course objectives The objective of this course is to enable students to understand nature through its portrayal in popular culture. Students will learn how to characterize typical scientific thought processes and methods. Students will also use qualitative and quantitative analysis to separate science fact from science fiction. Links between science and technology, including the impact on society, will also be explored.

Course competencies At the conclusion of this course, students should understand the scientific method as well as an assortment of fundamental physical theories. Students should be able to associate an appropriate physical theory to an example taken from popular culture. Students should be able to critique a portrayal of nature using both qualitative and quantitative arguments. Finally, students should see the link between scientific discovery and technological innovation and be able to comment on the consequences and challenges these innovations may present.

Evaluation The Institutional Student Evaluation Policy (ISEP) is designed to promote equitable and effective evaluation of student learning and is therefore a crucial policy to read and understand. The policy describes the rights and obligations of students, faculty, departments, programs, and the College administration with regard to evaluation in all your courses, including grade reviews and resolution of academic grievance. ISEP is available on the Dawson website.

Quizzes [†]	30%
Class work	30%
Group assignment	10%
Term project	30%

[†]Your teacher will provide a tentative test schedule during the first week of class.

Notes:

- **If the student receives a grade less than 60% in the term project, the maximum course grade they will be granted is 55%.**
- At the end of every theme (approx. 2 weeks) there will be a quiz on the material in that theme. Dates for the quizzes will be announced at least one week in advance.
- On a regular basis, students will be asked to complete small in-class assignments and activities.
- The due dates for the term project (including elements that may be required before the final project is due) will be specified by your teacher in the first full week of classes.

The student should be able to demonstrate a general understanding of the physical principles examined in each topic/theme, and to use this understanding to analyze the science portrayed in selected movies and television shows. Students will also produce one essay that is consistent with the level of a college student. In order to pass the course an average grade of 60% is required, calculated according to the evaluation scheme above. **Note: course work not submitted by the due date may be penalized at the teacher's discretion.**

Reference materials

- **No required text book.** Hand-outs will be distributed in class or posted online.
- Reference texts:
 1. Fantastic Voyages: Learning Science through Science Fiction Films (2nd ed.), Dubeck, Moshier & Boss, Springer-Verlag, 2004 (full text available on Google Books)
 2. The Physics of Star Trek and Beyond Star Trek, L.M. Krauss, Harper, 1995 (partial text available on Google Books)
 3. The Physics of Superheroes, J. Kakalios, Gotham Books, 2005
 4. Physics for Poets (5th ed.), R. H. March, McGraw-Hill, 2003

Teaching methods

The course will explore the scientific method and particular topics in physics by exploring themes. Each theme will last about two to three weeks. Excerpts from movies and TV shows will be used to explore the ideas and misconceptions within a particular theme. Demonstrations and experiments will be performed to verify or refute what was seen in the clips. The bulk of the course material presented in class will be in the form of PowerPoint presentations and students will be asked to take an active role in the classroom.

Attendance & participation

In order to be successful, students are strongly encouraged to attend all classes and students are expected to participate actively in classroom discussions. Students should arrive on time for the lectures so as not to miss any part of the movie clips shown - these are central to the understanding of the course material. In the event that a class is missed, the student is responsible for all material covered or assigned during that class. Students who do not have prior permission from the teacher must write the complete assignments and quizzes as scheduled, except in the case of unforeseen emergencies (proper documents may be required for verification).

On a regular basis, students will be asked to complete small assignments in class which will be marked for the in-class assignment marks. These small assignments can only be completed in class so attendance is important.

At the end of every theme (approx. 2 weeks) there will be a quiz on the material in that theme. Students must write the quizzes at the scheduled times except for unforeseen emergencies confirmed by proper documents. For additional information students should refer to the Institutional Student Evaluation Policy (ISEP section III-C) regarding attendance.

Literacy standards

It is expected that students will be able to comprehend the course material and express themselves appropriately as a normal part of their academic performance in the course. Marks may be deducted for inadequate communication skills.

Student conduct

Everyone has the right to a safe and non-violent environment. Students are obliged to conduct themselves as stated in the Student Code of Conduct and in the ISEP section on the roles and responsibilities of students (ISEP section II-D). Disruptions or excessive noise will not be tolerated. Students who do not comply with these rules will be asked to leave the class and may be referred to Student's Services for disciplinary action. **Mutual respect is the key to a harmonious learning environment.**

Academic integrity

Cheating, copying, or any other form of academic dishonesty will not be tolerated. Students should acquaint themselves with the policy of the College on plagiarism and cheating. According to ISEP, the teacher is required to report to the Sector Dean all cases of cheating and plagiarism affecting a student's grade (ISEP section V-C). The usual penalty for the first instance of cheating will be a grade of zero for the piece of work in question to all parties involved (under certain circumstances, even a first offence may be penalized by failure in the course). A second offence may result in the failure of the course. Students should note that using someone else's laboratory data without authorization from the student and the teacher is cheating.

Intensive course conflicts

If a student is attending an intensive course, the student must inform the teacher, within the first two weeks of class, of the specific dates of any anticipated absences.

Policy on religious observance

Students who intend to observe religious holidays must inform their teachers, in writing, within the first two weeks of the semester as prescribed in the ISEP Policy on Religious Observances. (ISEP, Section IV D). This includes any religious holidays that occur during the final exam period. Please refer to the academic calendar for the exact dates. Forms for this purpose are available from your teacher. Your teacher will inform you of any modifications to planned course activities resulting from the teacher's own religious commitments.

**Course
content**

Movies and television shows sometimes take great liberties when it comes to the laws of physics or in portraying science, but they also get it right sometimes. When are they right and when are they wrong?

Are they sometimes only partly right and partly wrong? This course will explore science and physics through movies and television shows. Both the qualitative and quantitative aspects of science and physics will be explored however, students are only expected to use basic math and simple calculations (advanced math is *not* required).

Most of the course material will be presented in themes with each lasting about two weeks and involving a specific topic. There will be approximately 5 or 6 themes explored in this course. Possible theme topics include: Energy, momentum and conservation; gravity, forces and motion; the stars and the universe (cosmology); modern physics; size and scaling. Your teacher will discuss the themes to be covered during the first full week of classes.

While there is no laboratory component in this course, experimental verification of physical reality is a key aspect of science and as such some class activities will occasionally involve experimental demonstrations and the analysis of data collected in the class or acquired from film clips. No lab reports will be required for this course.