Course Syllabus NSC-202E:

**History and Philosophy of Science**

**Contact Details for Professor**

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**Course Prerequisites (if any):** None.

**Learning Objectives**

After this course, you should have an understanding of the scientific method and its problems.

**Course Description**

In this course, the history and philosophy of science is studied, starting from the origins of science in ancient Mesopotamia, Egypt and Greece to present day science and technology. Key issues from the philosophy of science (such as Popper's falsifiability, Kuhn's paradigm shifts, Gödel's incompleteness and Poincaré's conventionalism) will be illustrated by historical case studies (such as the Copernican revolution, the shift from classical physics to quantum mechanics or the evolution theory). While the focus of this class will be on natural sciences, we will also consider the problem of the scientific method in humane and social sciences.

**Course Materials**

Lecture notes by the instructor will be available on the PointCarré website.  
A list with suggested readings will be available the PointCarré website.  
Students are expected to take notes during the lectures.
Course content:

- Origins of science and philosophy in ancient times (Mesopotamia, Egypt, Greece...: Thales, Pythagoras, Aristotle, Euclid, Archimedes, Heron of Alexandria, Ptolemaus...)
- Science & philosophy in the Roman Empire & Middle Ages (will be short, merely making the bridge from ancient times to enlightenment)
- Renaissance & age of enlightenment (philosophers: Bacon, Descartes, Hume; scientists: Kepler, Copernicus, Galileo, Vesalius)
- Biology, abiogenesis and evolution (Lamarck, Darwin, Mendel, Crick/Watson + what about creationism/Intelligent Design?)
- Classical physics, including relativity (Newton, Leibniz, Maxwell, Poincaré, Einstein)
- New physics (thermodynamics, quantum physics & string theory: Boltzman, Planck, Schrödinger, Klein/Kaluza...)
- Modern logic and mathematics (Frege, Cantor, Hilbert, Gödel, Turing)
- Scientific method (Popper, Lakatos, Feyerabend, Poincaré)
- What about social/human sciences (such as history, economics, psychology)?
Grading Scale of Vesalius College

Vesalius College grading policy, in line with the Flemish Educational norms, is now as stated follows:

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>85%</td>
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<td>A-</td>
<td>81%</td>
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<td>B+</td>
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<td>B</td>
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<td>B-</td>
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<td>C+</td>
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<td>C</td>
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<td>F</td>
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Course Assessment

The students will be evaluated on the basis of their performance as follows:

- In-class participation 10%
- Paper 30%
- Midterm examination 30%
- Final examination 30%
  TOTAL 100%
Further description of assessment activities:

The students will have to read a book or scientific article on the subject. A list with suggested titles will be available, but the students are welcome to read a work outside of the list, provided they ask permission first. A paper (about ten pages) has to be written about the work read. In this paper, the work has to be summarized and situated in its context. Did the author react against some other philosophy? What was the effect of the paper on thinking about science or on the way in which science is being practised? How was the work received? The students have to hand in the paper in duplo in printed form.

During the midterm exams, the students will get 6 problems out of the lectures. They are expected to choose 2 out of the 6 problems and to write a short (one or two pages) essay answering the chosen questions.

The final exam is an oral exam.

Grading Criteria

The following criteria will be applied in assessing your written work:

- Evidence of understanding of the concepts, theories and ideas developed in the course.
**Academic Honesty Statement**

Academic dishonesty is **NOT** tolerated in this course.

Academic honesty is not only an ethical issue but also the foundation of scholarship. Cheating and plagiarism are therefore serious breaches of academic integrity.

Following the College policy, cheating and plagiarism cases will be communicated in writing to the Associate Dean for Students and submitted to the Student Conduct Committee for disciplinary action.

If you refer to someone else’s work, appropriate references and citations must be provided. Grammar, spelling and punctuation count, so use the tools necessary to correct before handing in assignments.

**Protocol for Conducting Exams at Vesalius College**

1. Students must store their cell phones and any other electronic devices (iPods, MP3 Players, tablets etc.) in their bags or coat pockets, outside of their reach. Possession of any such item on the student's person or place will be considered as evidence of cheating.

2. Students must leave their coats, hat, and bags in front or around the periphery of the classroom.

3. Students may have only the material designated by the instructor on their desk. The instructor has the right to inspect this material. You are not allowed to pass any material to other students during the exam.

4. Students are not allowed to leave the classroom during the exam. (If an emergency occurs, another faculty or administration member must escort the student out of the classroom.)

5. Students must remain seated during the last 15 minutes of the exam and wait until the completion of the exam session. If students finish the exam before the final 15 minutes, they will be permitted to leave.

6. If a student is found cheating, the result is an immediate F, and the instructor is required to report the student to the Student Conduct Committee.
Book list NSC-201: History and Philosophy of Science

An updated book list will be posted on the PointCarré website.

You do not have to take a book out of this list, please contact me if you want to read something else.

Some of these books are very difficult, others are easy-reading. Make sure you select a book which fits with your level of understanding.

Classics in science:
Jean Baptiste de Lamarck: *Philosophie Zoologique*, Libraire Dentu 1809

Philosophy of Science:
Henri Poincaré: *La valeur de la science*, Champs/Flammarion, ISBN 2-08-081230-0
Henri Poincaré: *La science et l'hypothése*
Paul Feyerabend: *Against Method*, New Left Books 1975
Karl Popper: *The Logic of Scientific Discovery*, Hutchinson London 1959
Carl G. Hempel: *Philosophy of Natural Sciences*, Prentice-Hall 1966
Douglas Hofstadter: *Gödel Escher Bach*
Larry Laudan: *Science and Values. The Aims of Science and Their Role in Scientific Debate*, University of California Press 1984

History of Science

Syllabus: NSC-201E