Instructor

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Office Hours: MWF 10:00 – 10:30 a.m., 2:00 – 3:00 p.m. and by appointment

Course Overview

This course is first of all a history of civilization from the renaissance to the present. There are many 202 courses taught on campus: history of art, history of music, history of literature, just plain history. The main purpose of each is to give students a greater understanding and appreciation of western culture. We don’t often try to teach the history of civilization through science. This course is attempt to do that. Some people may think it is peculiar to try to do that. Judging from the fact that you have enrolled for the course, you probably don’t need to be convinced that this is a reasonable approach. But just in case you have any doubts, ask yourself these questions: How have visual arts changed society in the last century? How has literature or music changed society in the last century? How has science changed society in the last century? What disciplines are likely to change society most in the coming millennium?

Because this course is a history of civilization, we will study a little about visual arts, music, history, and so forth. It is important that we do this. Modifying Aristotle’s doctrine of *horror vacui* (nature abhors a vacuum) a little, we might say, “Physicists can’t exist in a vacuum.” It is improper, if not impossible, to understand the history of physics without understanding a little about the cultural and political milieu in which the physics was conceived.

The course will, however, be primarily a history of physics. We will learn about a number of great physicists and their contributions to science. We will also discuss the most important methods used to model nature in each time period. Our emphasis will be on ideas.

Prerequisites

There are no course prerequisites (math, science, Honors 201, etc.) for this class. I assume that you have an elementary knowledge of algebra and geometry, although even this is not crucial. I do expect you to critically analyze ideas and coherently write about things you have learned.

Texts
To the best of my knowledge, there is no single text that covers all the material I want to teach in this course. I will expect you to make good use of many library and internet resources. The two texts I have chosen for the course are:

*Philosophical Concepts in Physics*, James T. Cushing. This book covers most of the important developments in physical thought, with an emphasis on modern physics. Quotations from primary sources and mathematical descriptions are given in appendices to each chapter.

*The Structure of Scientific Revolutions*, Thomas S. Kuhn. This is a classic book in the history of science which gives one view – a very reasonable view – of how scientific thought evolves.

**Course Structure**

The course will be divided into seven units roughly based on the major time periods of the humanities:

- Unit 1  Foundations
- Unit 2  The Renaissance
- Unit 3  The Baroque
- Unit 4  The Neo-classical era
- Unit 5  The Romantic era
- Unit 6  Early 20th Century
- Unit 7  Physics Today

Most units will consist of six class periods. There will be a little variation from unit to unit, but the schedule will generally be as follows:

- Class 1: Guest lecture
- Class 2: Student presentations
- Classes 3–4: History of physics
- Class 5: Important physical models
- Class 6: Group discussions
Class Work

Reading
For each unit there will be assigned readings. Although these are not extensive, it is important that they are completed on schedule.

Astrolabe
For Unit 1, your only regular assignment will be to put together an astrolabe and familiarize yourself with it.

Unit Reports
For each of Units 2–7, you will need to write a report.

One of the following general topics will be assigned to you for each unit:

History: choose one episode or topic such as the War of the Roses, the counter-reformation, etc. Describe the event and its significance, and briefly explain how this topic relates to the broader history of the time period.

Visual art: Report on one or more artists whose work is similar. Describe their techniques, what influenced them, and why their work is significant.

Music or literature: Report on one or more composer/writer whose work is similar. Describe their techniques, what influenced them, and why their work is significant.

Biography: Choose a significant physicist of the period. Describe how he/she was influenced by their environment and by the prevailing ideas of his/her time. Discuss how he/she changed the prevailing ideas.

History of physics: Find sections from books or periodicals pertaining to the history of physics during this period. Summarize the main ideas. One reference should be from the journal, ISIS.

Original sources: Read an excerpt from original writings of an important physicist of the period. Discuss the major idea being presented and the logic used to persuade the reader. Sources will be put on reserve.

Limit your reading to about three hours.

Write a three page (12 pt double-spaced) report on your research. This will be due on the last lecture for each unit.

Oral Reports
For one unit, you will be assigned to work with a partner to give an oral report.

One of the following topics will be assigned to you:

History: Discuss the major historical themes (nationalism, imperialism, cold war, ...) and events (French Revolution, World War II, ...) of the period. Limit your discussion to the part of the world where physics was “happening.”

Society: Discuss the social structure, who had power, and why. Also talk about everyday life in the period.

Visual art: Discuss some major artists of the period. Describe their characteristic style. Show examples of their work. (Projectable images are preferred.)

Music: Report on the major composers of the period. Describe their characteristic style. Bring (short) examples of their works.
The report will take twelve minutes with three minutes for questions and discussion.

For the **unit prior** to the oral report (or the last unit if your oral report is in unit #1), you need **not** turn in a written report, although you should still do the research for the unit.

The written report for the unit of your oral report will be based on your research for the oral report.

Tests
There will be one mid-term exam and a final exam. Each will consist of several essay questions. The mid-term exam will be held in the testing center on Feb. 22–25. The final exam will be in the classroom on Sat. Dec. 15 at 7:00 a.m.

Group Discussions
The last class period of each unit will be a group discussion. I will divide the class into groups of students with one (or maybe two if necessary) student who has written a unit report on each of the six report topics. Each student will evaluate the other students in the group.

Grades

Grades will be based on the following:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Unit Reports</td>
<td>40%</td>
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<tr>
<td>Oral Report</td>
<td>15%</td>
</tr>
<tr>
<td>Group Evaluations</td>
<td>10%</td>
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<tr>
<td>Mid-term Exam</td>
<td>15%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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You will receive the following letter grades (or better, if I’m merciful and conditions warrant) if your overall percentage is in the indicated range:

- A: 94 - 100%
- A−: 90 - 94%
- B+: 87 - 90%
- B: 84 - 87%
- B−: 80 - 84%
- C+: 77 - 80%

etc.