

HS/ILS 202: Rise of Modern Science
Syllabus
Summer 2001

Welcome to HS/ILS 202. Over the next eight weeks, we will examine developments in science between the seventeenth and the twentieth centuries and the ways in which these developments interacted with technology, philosophy, religion, and “worldview” generally.

Meeting Time: 8:55 – 10:10 am MTWR
Meeting Place: 4308 Social Science

In general, 45 or 50 minutes of each class session will be devoted to lecture and the remainder to discussion. But you should feel free to ask questions or try out your ideas at any time. I hope to build a comfortable enough atmosphere so that you feel free to speak up and to engage me and your classmates in conversation. You should not be afraid to critique the views of others (including me), but do respect the people who express them. Now, about me.

Instructor: Daniel Thurs
Office: 7142 Social Science
Phone: 262-3999 (office)
294-9514 (home)
E-mail: dpthurs@students.wisc.edu
Office Hours: 10:10 – 11:00 MWRF

I encourage everyone to stop into office hours at least once during the next several weeks to talk about the lectures and readings, assignments, the location of Survivor III, or anything you find interesting. Outside of office hours, the best way to contact me is via e-mail. Expect about a 24-hour turn-around time on any message you send. If you need to talk to me immediately, feel free to call me at home. But please only call between 10am and 10pm. Calling at other times will result in much despair.

Content

We will begin the course by examining the work of Isaac Newton (1642-1727) against the backdrop of seventeenth century ideas about the natural world. After Newton, we'll look at the wider implications of Newton and his work in the eighteenth century, both for the content of science, its connection with religion and industry, and its place in European culture.

Then we will move into the nineteenth century, a period in which science was becoming more and more organized. At the same time, naturalists such as Charles Darwin (1809-1882) were contemplating the organization and history of life on earth. We will examine Darwinian evolution and its social and cultural importance, particularly in discussions of material, social, and intellectual progress.

Finally, we will turn to the revolutionary developments in physics during the late nineteenth and early twentieth centuries, particularly the work of Albert Einstein (1879-1955). As Einstein's ideas opened up new worlds for physics, new developments in technology and mass communications opened up new scientific worlds for the average person, including new views on the place of humans in the universe.

Themes

Our central story will involve the place of science in the emergence of one aspect of the modern, western “worldview” (by which we will mean that group of beliefs about the world that most people hold inside them, even if they never express them). You should try to use this course as an opportunity to examine your own worldview and hopefully gain some insight about how you have come to believe what you do about the workings of the universe. Within the context of this big story, we will see several themes:

- People knew different things about nature in the past, and to them these things made sense and seemed consistent with the evidence available.
- The practice of science has become more tied to technological tools and more rooted in organization and institutions.
- Science has been partly shaped and has helped to shape other aspects of culture, such as religion. In fact, science has often derived its value in the eyes of many people from links with religion or technology.
- Many people have increasingly used the name of “science” to achieve many ends, and have often fought over the right to speak for science.

Objectives

This course is designed to help you accomplish a number of goals. Some of these are particular to this class. These include:

- Learning something about how people in the past thought about nature.
- Learning about how science has changed over time.

However, instilling information about the history of science is only a small part of what I hope you will take away from our time together. To say that school should teach a person how to think and not what to think is an old, familiar chestnut. In this case, I hope to teach you how to think historically. That means learning several particular skills:

- Learning to ask good questions.
- Learning to think synthetically, to see patterns in diverse collections of evidence.
- Learning to think critically and to make, and defend, arguments.
- Learning to see the importance of context – how people and culture matter.

The questions you will be given to answer in the course are designed (how well may be a matter for later discussion) to lead you from the first of these to the last. The final question will hopefully allow you to integrate all of these aspects.

Readings

The readings for this course have all been gathered together in a single course reader, available in **7143 Social Science**. It costs \$21.25. You should purchase this reader as soon as possible, particularly given the condensed nature of the summer session.

Within the course reader, you will find two sorts of readings. The first are “primary” sources – that is, documents from the time period we are talking about. You should use these to try to get a sense of how people thought in the past, how they wrote, what was important to them, and the like. You should notice that these primary sources become more familiar as we move toward the present.

The second kind of reading you will encounter is called a “secondary” source. This is a book or article written by someone after the period in questions. I encourage you not to accept these sources as the absolute truth, though you should not dismiss them without some reason. You should approach these readings in an open minded, but critical spirit. My lectures, by contrast, are absolutely true and accurate.

As you go through the various readings assigned in the course, I also ask that you keep notes in a **journal**. As mentioned above, being able to synthesize and draw connections from bit and pieces of evidence is an important aspect of thinking historically (and thinking critically in general). But before you can draw connections, you need to collect the data. Your journal is meant to be a storehouse of evidence that you can draw on in our in-class discussions and in your responses to essay questions. For some guidance, here is a list of questions you will want to respond to as you read. Not every reading will provide answers to all of the questions, but each should contain information related to some of them.

People Questions:

- Who is doing science?
- Who is consuming science?
- How is science done?
- Where is science done?

Knowledge Questions:

- What is known about space?
- What is known about time (and change over time)?
- What is known about matter?
- What is known about life?
- What is known about humans?

Culture Questions:

- What do people believe about the relationship between science and religion?
 - Science and technology?
 - Science and philosophy?
- Why do people think science is useful and valuable?
- Who claims to speak in the name of science?
- What do people think are the limits of science and its methods, if any?

I would suggest that you buy a cheap notebook and write each of these questions followed by a few blank pages. As you read, keep your journal with you, and make notes in the relevant section when you come across a nugget of evidence in the text. This is not meant to be an onerous task, so don't obsess about it, but do try to make your journal entries a part of your reading process.

Grading

Your grade in the course will be based on several elements. You will be **assigned five take-home essay questions** throughout the next eight weeks. Their lengths and the percentage of your grade they represent will increase as the semester progresses (see below). Due dates will be as follows. The first essay will be due in class on Monday, June 25. The second will be due in class on Monday, July 2. The third will be due in class on Monday, July 16. The fourth will be due in class on Monday, July 30. The last one will be due Monday, August 13. I will discuss the grading criteria before each essay. Because of the abbreviated nature of the summer session, **no late work** will be accepted, unless extenuating circumstances are involved.

If you want help with any assignment, please talk to me. You may also visit the Writing Center (6171 Helen C. White Hall, ph. 263-1992) or consult any of the writing guides in the campus libraries, such as Diane Hacker's *A Pocket Style Manual*.

I will also collect your **journals** at the end of the 8-week session with your final essay. It will be worth 5% of your final grade, though that 5% will simply be a measure of whether you've actually made entries in it or not. I will check them from time to time throughout the summer to make certain that you're on the right track, but not grade them.

Finally, a portion of your grade will be based on your **participation and attendance** in class. If you have any questions, please ask them. I will also ask questions from time to time, and if they spark any ideas in you, please mention them. In short, speak up. There will also be several exercises in particular which will give you an opportunity to interact and discuss with your classmates. Participation and attendance will be worth 15% of your final grade.

A summary of the elements of your final grade (including the length of essays) is as follows:

Essay #1	5%	350 words [1 p]
Essay #2	10%	750 words [2 p]
Essay #3	15%	750 words [2 pp]
Essay #4	20%	1000 words [3 pp]
Essay #5	30%	1200 words [4 pp]
Journal	5%	
Participation	15%	

If any problems arise over the course of the next 8-weeks that might endanger your performance in the course, you need to let me know as soon as possible.

If you have any questions about a grade, you should talk to me. I take the job of grading very seriously, and do not award grades without a great deal of thought, but I am always open to talking about them. If we can't come to an agreement, the next step is for you to speak with the History of Science Department Chair Lynn Nyhart or ILS Chair Booth Fowler. They will attempt to resolve the issue informally and inform you of the Appeals Procedures if no resolution is reached. This set of steps is in line with L&S policy and should be available to you in any course, not just this one.

One last note on a great and dreadful evil: **Plagiarism**. Plagiarism on any written assignment is unacceptable and grounds for automatic failure on the given assignment. If you use **3 or more words** in a row from another author, it **must** be placed in quotation marks and cited. Otherwise it is plagiarism. You should also cite ideas you use if you found them in the work of another author. If you have any questions, please see me, consult the folks at the Writing Center, or see one of the many writing guides in campus libraries.

HS/ILS 202: Rise of Modern Science
Lecture Outline
Summer 2001

Week 1: Science in an Early Modern World

6/18) The Sixteenth Century World
6/19) Newton: Life and Times
6/20) Newton: Mechanics, Gravity, and Alchemy
6/21) Newtonianism

Essay #1 due 6/25

Week 2: The Newtonian Universe

6/25) The Royal Society
6/26) The Enlightenment
6/27) Newtonian Science, Society, and Religion
6/28) The Industrial Revolution

Essay #2 due 7/2

Week 3: The Organization and Spread of Science

7/2) The British Association for the Advancement of Science
7/3) Popular Science
7/4) [No Class]
7/5) Natural Theology

Week 4: The Evolution of Science

7/9) The Species Question
7/10) Darwin: Life and Times
7/11) Darwin: Evolution and Natural Selection
7/12) Response to Darwin

Essay #3 due 7/16

Week 5: Engines of Progress

7/16) The Evolution of Society
7/17) Medicine and the Germ Theory
7/18) Physical Science, Energy, and EM
7/19) Transportation and Communication

Week 6: The Modernity Express

7/23) Einstein: Life and Times
7/24) Einstein: Special Relativity
7/25) Einstein: General Relativity
7/26) Quantum Mechanics

Essay #4 due 7/30

Week 7: The New World of Science

7/30) Science Journalism and Science Fiction
7/31) Science and World War I
8/1) Radios and Automobiles
8/2) Eugenics

Week 8: Humans in Nature

8/6) Psychical Research and Parapsychology
8/7) Psychology and Anthropology
8/8) Conservationism and Ecology
8/9) Conclusion: Twentieth Century World

Essay #5 Due on 8/13

HS/ILS 202: Rise of Modern Science
 Reading Schedule
 Summer 2001

6/18) The Sixteenth Century World	
6/19) Newton: Life and Times.....	Reader 11-30
6/20) Newton: Mechanics, Gravity, and Alchemy.....	Reader 1-10, 31-42
6/21) Newtonianism.....	Reader 73- 83
6/25) Royal Society.....	Reader 57-62
6/26) The Enlightenment.....	Reader 63-72
6/27) Newtonian Science, Society, and Religion.....	Reader 43-56, 83-99
6/28) The Industrial Revolution.....	Reader 99-106
7/2) British Association for the Advancement of Science.....	Reader 113-134
7/3) Popular Science.....	Reader 135-146
7/5) Natural Theology.....	Reader 107-112
7/9) The Species Question.....	Reader 177-204
7/10) Darwin: Life and Times.....	Reader 155-176
7/11) Darwin: Evolution and Natural Selection.....	Reader 147-154
7/12) Reaction to Darwin.....	Reader 205-218
7/16) The Evolution of Society.....	Reader 219-242
7/17) Medicine and the Germ Theory.....	Reader 243-256
7/18) Physical Science, Energy, and EM	
7/19) Transportation and Communication.....	Reader 257-288
7/23) Einstein: Life and Times.....	Reader 319-336, 289-298
7/24) Einstein: Special Relativity.....	Reader 298-310
7/25) Einstein: General Relativity.....	Reader 310-312
7/26) Quantum Mechanics.....	Reader 313-318
7/30) Science Journalism and Science Fiction.....	Reader 337-350
7/31) Science and World War I.....	Reader 351-362
8/1) Radios and Automobiles.....	Reader 377-396
8/2) Eugenics.....	Reader 363-376
8/6) Psychical Research and Parapsychology.....	Reader 397-416
8/7) Psychology and Anthropology.....	Reader 417-432
8/8) Conservationism and Ecology.....	Reader 433-446
8/9) The Twentieth Century World	