Recent approaches to the study of science have tended to highlight the actual practices of working scientists, the everyday work of experimenting, writing articles and reports, arranging funding, setting up laboratories and research teams. It has also tended to focus on the political and economic context of scientific research. In short, we might say that recent scholarly observers of science tend to notice the sociological as well as the technological factors involved in the production of scientific knowledge. This poses a
challenge to traditional views of science as a "value-free" activity conducted by
disinterested investigators seeking the "objective" truth about nature. This challenge has
given rise to some very heated debates that have come to be referred to as "the science
wars." In this course, we will examine the roots of the science wars and we develop critical
tools for evaluating the various positions. We will begin by examining some classical
understandings of science as well as some very old philosophical problems concerning the
status of scientific knowledge. We will proceed to raise some questions about scientific
theory-formation and the nature of scientific observation and experimentation by
encountering some of the classic positions in the philosophy of science. We will then
proceed into an investigation of the social, historical, political, and material contexts of
science. We will consider Thomas Kuhn's famous analysis of the historicity of science—
where long periods of "normal science" are punctuated by periodic "revolutions" leading to
"paradigm shifts"—, and we will encounter a more radical position called "constructivism,"
a view adhered to by an influential group of contemporary scholars who see scientific
"facts" as resulting from a complex process of construction. Finally, we will, in the final
section of this course, consider these various perspectives on the sciences with reference to
the development, in the last half of the 20th century, of the science of genetics.

Course Resources

Course Website:
Blackboard: http://www.courses.mtu.edu

Required Course Texts (available at the bookstore):


Supplementary Course Text (available at the bookstore):
**Grading Scheme**

Grades will be based on the following:

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<tr>
<td>2 text analyses</td>
<td>20%</td>
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<tr>
<td>2 in-class tests</td>
<td>30%</td>
</tr>
<tr>
<td>Class participation/discussion</td>
<td>5%</td>
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<tr>
<td>Term paper/field research proposal/outline</td>
<td>10%</td>
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<tr>
<td>Term paper/field research</td>
<td>35%</td>
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<tr>
<td><strong>Total Points</strong></td>
<td><strong>100</strong></td>
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**Assignments:**

**Text Analyses:** For each assignment, I will assign one question about one of the texts and you will provide an answer in one single-spaced page. To answer this question effectively you will need to be engaging with and reflecting upon the central themes of the texts.

**In-class tests:** These short tests (consisting of mostly short-answer questions) will evaluate your familiarity with the themes, issues, and positions set out in the readings. The only thing you need to do in order to be prepared for these quizzes is to read the assigned texts.

**Term Paper:** This will be a 10-12 page essay in which you will apply what you have learned in the course to some issue or problem that interests you. You will be expected to submit a proposal and bibliography as well as a rough outline prior to submitting the completed paper.

**Field Research:** (An alternative to the term research paper.) One of the texts that we will read in this course is entitled, *Science in Action: How to Follow Scientists and Engineers Through Society*. We have a unique opportunity to do just that here at Michigan Tech. For this assignment you will be expected to observe and report on the day-to-day activities of a scientist and engineer (or a group of them). You will have to identify someone (graduate student(s), or faculty member(s)) working on some area of research in science, technology, or engineering and you will have to discuss with them some questions that you will develop in consultation with me about their research. You will ask if you might observe some of their research activities and you will submit a written report and analysis. As with the term paper, this assignment will require that you submit a proposal ahead of time.

**Course Policies**

**Academic integrity** is essential to a student’s education. Plagiarism, Cheating, Fabrication and Facilitating Academic Dishonesty are offences that will not be tolerated. Plagiarism—loosely defined as the presentation of the work of another author as if it were your own—will not be tolerated. If you are unclear about how to cite your sources properly, you are urged to discuss the matter with the instructor before submitting an assignment. Academic regulations and procedures are governed by University policy. Academic dishonesty cases will
be handled in accordance with the University policy. See http://www.mtu.edu/dean/conduct/policy/academic-integrity/. If you have questions about plagiarism that are not resolved after reading the policy, ask me for help.

Class Attendance is very important. Three excused or unexcused absences are permitted; it is your responsibility to notify the instructor if you cannot be in class. More than three unexcused absences can result in a lowering of the final course grade by at least a half letter grade, and additional unexcused absences may result in a grade of F being recorded for the entire course. See http://www.mtu.edu/dean/conduct/policy/attendance/ for more information.

Late Policy: All papers and assignments must be submitted at the beginning of class on the day they are due. Late papers will be reduced a fraction of a grade (e.g., from B to B-) for each week, or part thereof, of lateness, up to two full grades (e.g., from B to D).

Disabilities

If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see me as soon as possible so that we can make appropriate arrangements. The Affirmative Action Office has asked that you be made aware of the following:

Michigan Tech complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. If you have a disability and need a reasonable accommodation for equal access to education or services at Michigan Tech, please call the Dean of Students Office, at 487-2212. For other concerns about discrimination, you may contact your advisor, department head or the Affirmative Action Office, at 487-3310. Affirmative Action: http://www.admin.mtu.edu/ao/

Disability Services:
http://www.admin.mtu.edu/urel/studenthandbook/student_services.html#disability


Tentative Schedule of Readings and Assignments

Week 1:

Tuesday, Aug. 30: Introductions

Thursday, Sept. 1: Hume: The problem of induction (reading on Blackboard: "Hume")

Week 2:

Tuesday, Sept. 6: Positivism (Blackboard: "Suppe")

Thursday, Sept. 8: Positivism, cont'd (Blackboard: "Ayer")
Week 3:
Tuesday, Sept 13: The problem of induction (Blackboard: “Popper 1”)
Thursday, Sept. 15: Demarcation: Science vs pseudo-science (Blackboard: “Popper 2”)

Week 4:
Tuesday, Sept 20: Kuhn on “normal science” (Structure, pp. vii-42)
Thursday, Sept 22:

Week 5:
Tuesday, Sept 27: Kuhn on the function of “paradigms” (Structure, pp. 43-91)
Thursday, Sept 29: [first 1-page text analysis due]

Week 6:
Tuesday, Oct. 4: Kuhn on “revolutions” (Structure, pp. 92-173)
Thursday, Oct. 6: [Mid-term quiz]

Week 7:
Tuesday, Oct. 11: Imre Lakatos (Blackboard: “Lakatos”)
Thursday, Oct. 13: Ian Hacking (Blackboard: “Hacking”)

Week 8:
Tuesday, Oct. 18: Latour and the “construction” of scientific facts (Blackboard: “Latour”)
Thursday, Oct. 20: Latour (Science in Action, Introduction)

Week 9:
Tuesday, Oct. 25: Latour (Science in Action, Part 1—pp. 21-102)
Thursday, Oct. 27:

Week 10:
Tuesday, Nov. 1: Latour (Science in Action, Part 2—pp. 103-178)
Thursday, Nov. 3:

Week 11:
Tuesday, Nov. 8: Latour (Science in Action, Part 3—pp. 179-269) [paper proposal due]
Thursday, Nov. 10:

Week 12:

Tuesday, Nov. 15: Watson on the discovery of the structure of DNA (*The Double Helix*)
(*second 1-page text analysis due*)

Thursday, Nov. 17: Watson, cont'd.

*Thanksgiving break*

Week 13:

Tuesday, Nov. 29: Fox Keller on the science of genetics (*Century of the Gene*)

Thursday, Dec 1: *(End of term in-class quiz)*

Week 14:

Tuesday, Dec. 6: Fox Keller (*Century of the Gene*)

Thursday, Dec. 8: last class (no readings)

This syllabus may be changed during the term to accommodate the needs of either the students or the professor.