**SS189 –INTRODUCTION TO SCIENCE AND TECHNOLOGY STUDIES**

**Fall 2016**

**Location TBA**

**TR 9:30-10:45**

**Instructor:** Taylor Dotson

**Office:** Fitch 205

**Phone:** x5211

**E-mail:** tdotson@nmt.edu

**Office Hours:** TBA

**Course Description:**

Despite the ubiquity of beliefs to the contrary, culture and politics permeate science and technology. Not only do ideas, interests, and beliefs shape the production of facts and artifacts but evolving technoscience, in turn, also helps construct new ways of living and social realities. The presence of these sociopolitical factors does not separate “good” from “junk” technoscience but rather inexorably shapes any technoscientific endeavor.

The aim of this course is to disabuse STEM students of a range of dominant cultural myths about science and technology through an introductory survey of the social scientific study of science and technology. We will explore historical cases of scientific and technical controversy, coming to recognize the complexities and uncertainties of reality glossed over in the simplistic “great man” stories pervasive in popular media. Most importantly, we will evaluate technoscientific decisions and sociotechnical changes as political phenomena, which entail winners and losers as well as often intractable disagreements about what a desirable world looks like and how “we” ought to get there.

**Pre-requisites/Co-requisites:** None

**Place in Curriculum**: General Education Core requirement, Area 4 – Social Sciences

**Course Learning Outcomes**:

This course explores the social, cultural, and political roots and effects of technoscience. Course assignments, moreover, will help students hone their analytical, writing, and oral presentation skills. By the end of the course, students should be able to: (1) Recognize and articulate how social factors have shaped historical cases of science and technology, (2) Critically describe the political implications and dominant guiding logics of contemporary regimes of scientific R&D and technological innovation, (3) Enumerate and characterize the possibilities for more democratic, precautious, or otherwise more desirable technoscience, and (4) Summarize and assess an academic level text.

**Program Learning Outcomes**:

Students will:

1. Identify, describe, and explain human behaviors and how they are influenced by social structures, institutions, and processes within the contexts of complex and diverse communities.

2. Articulate how beliefs, assumptions, and values are influenced by factors such as politics, geography, economics, culture, biology, history, and social institutions.

3. Describe ongoing reciprocal interactions among self, society, and the environment.

4. Apply the knowledge base of the social and behavioral sciences to identify, describe, explain, and critically evaluate relevant issues, ethical dilemmas, and arguments.

**Course Requirements**:

**Required Texts:**

1) Collins, Harry and Trevor Pinch. 2012. *The Golem: What You Should Know About Science*. New York: Cambridge University Press.

2) Pool, Robert. 1999. *Beyond Engineering: How Society Shapes Technology.* New York: Oxford University Press.

3) Course Reader (Available from the bookstore). Material from Sarewitz’s *Frontiers of Illusion.*

**Note:** Students must locate or purchase a text for their book review assignments. Suggested books are listed at the end of the syllabus.

**Assignments**

The structure of this course requires careful reading in preparation for engaged class discussion. Students will be expected to have extracted the main arguments and evidentiary basis for claims within the readings, taking copious notes, prior to that day’s class. Students are strongly encouraged to do the assigned readings in groups so that more class lecture and discussion time can be devoted to going beyond the readings rather than merely review them.

Students may miss no more than two classes without incurring a significant penalty to their attendance grade (full letter grade per day). Moreover, any absence will negatively affect the student’s participation grade. Penalties can only be avoided by completing an additional reading and writing assignment.

This course consists of readings, class discussions, a book review paper and presentation, pop quizzes, a midterm, and a final exam.

**Participation:** Students will be graded on their appearing prepared to discuss and respond to questions regarding that day’s reading, which entails comprehending the author’s main claims, logic, and evidentiary bases. **Students on their laptops or otherwise preoccupied with a digital device will receive a zero for that day’s participation grade**. Students are encouraged to take handwritten notes so as to avoid the alluring pull of email and other computerized distractions. Listening attentively but otherwise not participating will earn students a non-zero (but also non-passing: e.g., <50%) participation grade. Finally, students should put their phones on vibrate and keep them in their book bags or pockets.

**Quizzes**: The pop quizzes will evaluate whether or not the student has been reading deeply and carefully. Each quiz will be unannounced and compose of a handful of questions to test students’ reading comprehension. The quizzes will be open note but not open book. Therefore, students are encouraged to develop a system for taking reading notes that aids in their comprehension of the text. Six (6) quizzes will be given, of which the best five (5) will count toward the student's final grade. Absent students will receive a zero except in extreme circumstances.

**Book Review:** Students will also complete a five (5) page or 1500 word book review of an academic book related to their lab research project along with a 15-20 minute presentation in two (2) person groups. The review and presentation should consist of an outline of the book’s main argument, description of one or more major examples, and analysis that connects the text to concepts discussed in the course. Students will sign up for books on a first-come first-serve basis. Papers will be due two days after giving their presentation.

**Midterm and Final:** The midterm and final exams will evaluate the student’s understanding of the cases and arguments presented in the first half of the class. The test will consist of a number of short answer and brief essay questions.

**Course Schedule**:

**Tue Aug 23 –** Pool. “Introduction: Understanding Technology”, p. 3-15. In *Beyond Engineering.*

Review of Course & Syllabus – How to Read – Introductory Material – Positivism/Social Constructivism

**HOW SOCIETY SHAPES TECHNOLOGY**

**Thu Aug 25 –** Pool. “History and Momentum” p. 17-52. In *Beyond Engineering*.

Sociotechnical systems. Technological momentum. Suppl. HD-DVDs vs. Blu-Ray. Notes Check

**Tue Aug 30 –** Pool. “The Power of Ideas” p. 53-84. In *Beyond Engineering.* Technological paradigms. Technological Determinism; Social Construction of Technology. Ex. Metal Aircraft/Electric Car

**Thu Sep 1 –** Pool. “Business” p. 85-111. In *Beyond Engineering*.

Privileged position of business. Suppl. Ex: Early history of fluorescent lighting

**Tue Sep 6 –** Pool. “Complexity” p. 119-148. In *Beyond Engineering.* Complexity/Tight Coupling. Suppl Ex: “Normal Accidents,” The Challenger Accident; Wind Turbine building

**Thu Sep 8** – Pool. “Choices” p. 149-176. In *Beyond Engineering.* Technological Lock-In. Suppl. Ex: Suburbia; Air Traffic Control. Technologies as Legislations.

**Tue Sep 13 –** Pool. “Risk” p. 177-214. In *Beyond Engineering*. Risk. Dread. Technological Optimism. Risk-Benefit Analysis. Suppl. Ex. Pinto Madness

**Thu Sep 15 –** Pool. “Control” p. 215-248. In *Beyond Engineering.* Democracy. Participation. Suppl. Ex. AIDs Activitism

**Tue Sep 20 –** Pool. “Managing the Faustian Bargain” p. 249-277. In *Beyond Engineering.*

High Reliability Organizations. Suppl. Ex: Frankenstein’s Monster. Technological Somnambulism.

**Thu Sep 22 –** Pool. “Technological Fixes, Technological Solutions” p. 278-305. *Beyond Engineering.*

Unintended Consequences. Engineering as a Political Activity.

**Tue Sep 27 – Review Day. How to Think About Technology?**

**Thu Sep 29 – [Exam I]**

**Tue Oct 4 –** Review Exam + Introduce Next Section **[Sign Up for Books]**

**WHAT IS SCIENCE? WHAT IS EXPERTISE? MYTHS OF SCIENCE AND PROGRESS.**

**Thu Oct 6 –** Collins and Pinch. “The Chemical Transfer of Memory” p. 5-25. In *The Golem.* Verification. Falsification. Ad-Hoc Hypotheses. Science as Skilled Practice.

**Tue Oct 11 –** Collins and Pinch. “Two Experiments that ‘Proved’ the Theory of Relativity” p. 27-56. In *The Golem.* Scientific Paradigms. Problem of Deduction. Theory Ladeness.

**Thu Oct 13 –** Collins and Pinch. “The Story of Cold Fusion” p. 57-77. In *The Golem*. Social construction of credibility.

**Tue Oct 18 –** Collins and Pinch. “Non-Detection of Gravity Waves”, p. 91-108. In *The Golem*. Experimenter’s Regress

**Thu Oct 20 –** Collins and Pinch. “AIDS Cures and Lay Expertise”, **pdf on Canvas**

**Tue Oct 25 –** Collins and Pinch. “Science of the Lambs,” **pdf on Canvas**

**Thu Oct 27 –** Sarewitz, “Ch. 5 Myth of Authoritativeness” **In Course Readers**

**Tue Nov 1 –** Sarewitz, “Ch. 2 Myth of Infinite Benefit” and “Ch. 3 Myth of Unfettered Research” **In Course Reader**

**Thu Nov 3 –** Sarewitz, “Ch. 4 Myth of Accountability” and “Ch. 6 Myth of the Endless Frontier” **In Course Reader**

**Tue Nov 8 – How to Think About Science. Laying Myths to Rest. Review Day**

**Thu Nov 10 – Exam II**

**Tue Nov 15** **–** Review Exam. Discuss Books Reviews.

**EXTENDING AND APPLYING**

**Thu Nov 17 – Film TBA. Hmwk: Read Books.**

**Tue Nov 22 –** Book Review Workshop. Books must be read by this date

**Thu Nov 24 – [Thanksgiving]**

**Tue Nov 29 –** Features of Good Writing/Presentations (Bring in paragraph of writing)

**Thu Dec 1 – Student Presentations [See me with rough drafts]**

**Tue Dec 6 – Student Presentations**

**Thu Dec 8 – Student Presentations [Papers Due Friday by 5pm]**

**[Finals Week]**

**Grading**:

A = 100-94%; A- = 93-90%: B+ = 89-87%; B = 86-84%; B- = 83-80%; C+ = 79-77%; C = 76-74%; C- = 73-70%; D = 69-60%; F=<60%

**Breakdown:**

Attendance and Participation 20%

Book Review Paper and Presentation 20%

(5) Quizzes 20%

Midterm 20%

Final 20%

**Counseling and Disability Services:**

**Reasonable Accommodations**

New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office of Counseling and Disability Services (OCDS) as soon as possible. To schedule an appointment, please call 835-6619.

**Counseling Services**

New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. The confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call 835-6619.

**Academic Honesty**: New Mexico Tech’s Academic Honesty Policy for undergraduate students is found starting on page 60 of the NMT Undergraduate Catalog, <http://www.nmt.edu/images/stories/registrar/2014-2015_UNDERGRADUATE_Catalog_FINAL.pdf>

New Mexico Tech’s Academic Honesty Policy for graduate students is found starting on page 59 of the NMT Graduate Catalog, <http://www.nmt.edu/images/stories/registrar/2014-2015_GRADUATE_Catalog_FINAL.pdf>.

You are responsible for knowing, understanding, and following this policy.

**Respect Statement:** New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the New Mexico Tech Guide to Conduct and Citizenship: “New Mexico Tech’s primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community.”

 **Addendum: Possible Texts for Book Review**

*Addiction by Design* – Natasha Dow Schüll

*Alone Together* – Sherry Turkle

*Fish Sticks, Sports Bras, and Aluminum Cans: The Politics of Everyday Technologies –* Paul Josephson

*Democratizing Technology: Risk, Responsibility, and the Regulation of Chemicals* – Anne Chapman

*Developer’s Dilemma* – Casey O’Donnell

*Disrupting Science* – Kelly Moore

*Green Illusions* – Ozzie Zehner

*Human-Built World* – Thomas Hughes

*It’s Complicated* – Danah Boyd

*Low Power to the People* – Christina Dunbar-Hester

*Material Markets: How Economic Agents of Constructed* – Donald MacKenzie

*Merchants of Doubt* – Naomi Oreskes and Erik M. Conway

*Refining Expertise* – Gwen Ottinger

*The Genealogy of a Gene* – Myles W. Jackson

*Cultural Boundaries of Science: Credibility on the Line* – Thomas Gieryn

*Wired Shut: Copyright and the Shape of Digital Culture –* Tarleton Gillespie

*Coding Freedom: The Ethics and Aesthetics of Hacking –* Gabriella Coleman

*The Demise of Nuclear Energy? –* Joseph Morone and Edward Woodhouse

*Why We Disagree About Climate Change* – Mike Hulme