

Syllabus

ISAT 131 – Technology, Science, and Society

Spring, 2015

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What is This Course About?

The ISAT Program is all about problem solving. ISAT graduates learn to see real-world problems at an appropriate scale, and bring to bear scientific and technical knowledge along with problem-solving skills to produce optimal solutions.

The problems that ISAT students will seek to solve are generally socio-technical problems, or problems that involve socio-technical systems. In order to successfully solve these problems, one must be skilled at analyzing the social elements of the system as well as the technical.

Science is a fundamentally human endeavor in which human scientists observe the natural world, develop systematic explanations for the events they observe, and seek to communicate their understanding to other humans. One cannot properly understand the scientific process without appreciating the role that human social interactions play in the process. For example, a rich understanding of science would include understanding how prestige might influence the funding of scientific experimentation, as well as understanding to the ways in which scientists seek to persuade each other of the truth of their theories.

Technology, likewise, is social as well as technical. Technologies are generally systems that include social elements as well as physical objects. For example, the more valuable way to understand automotive technology is not to merely see the car as a machine, but to understand it as a transportation system that includes an interconnected set of roads, frequently spaced gas stations, driver knowledge and expected behaviors, and laws and other rules of the road. Ignoring the social elements in this transportation system leads to an impoverished understanding of the automobile. Thus, the technology should be better understood as having social dimensions as well as technical dimensions. An important part of understanding these human dimensions is understanding the impacts technologies may have on humans and on social systems, and understanding the way human social groups and institutions influence the development of technologies.

Requirements and Policies

Required Texts / Reading Assignments

- There is **no** required textbook for the course.
- All reading assignments will be provided electronically through Canvas. Please read these reading assignments before coming to class on the dates indicated.

Methods of Evaluation

Online Quizzes (27 quizzes, on average two per week)

Total quiz average.....	20%
Mid-term Take-home Essay Exam	25%
Final Take-home Essay Exam	35%
Attendance (Monday/Friday Classes).....	5%
Senior Project Writing Assignment (April 17)	2%
Wednesday Small Discussion Section Grade	13%

Total **100%**

Discussion Groups (Wednesdays)



Dr. Carole Nash, Sec. 5
Classroom HHS 2207



Dr. Morgan Benton, Sec 6
Classroom ISAT 348



Dr. Eric Maslen, Sec 7
Classroom HHS 1202

Online Quizzes

- Follow the schedule attached and on Canvas – typically two quizzes per week (one due Monday at 12:00 noon, and one due Fridays at 12:00 noon).
- You can take these quizzes at any time up until the deadline. Each quiz will usually be available at least one week before it is due.
- The quizzes are open book, open notes, and you are permitted to research answers on the web. The only rule is that you are not permitted to discuss the quiz with your classmates.

Take-Home Exams

- The course content is organized around several central problems, and the exams are likewise focused on problem-solving. Each exam will present you with a problem not discussed in class, and ask you to write an organized essay on that topic.
- These exams will be open-book, and you may consult static resources. The exam is not intended to be a research assignment. You are permitted to use other resources, but you should be able to complete it without additional research, and you are encouraged not to waste much time with new research.
- The exam is intended to demonstrate what you have learned from assigned readings and lectures, so you are encouraged to refer to these readings and concepts presented in lectures as much as possible.
- The exam should reflect individual effort. It is not a group project, and discussing exams with classmates before they are turned in is in violation of the honor code.

Academic Honesty

Making references to the work of others strengthens your own work by granting you greater authority and by showing that you are part of a discussion located within an intellectual community. When you make references to the ideas of others, it is essential to provide proper attribution and citation. Failing to do so is considered academically dishonest, as is copying or paraphrasing someone else's work. The consequences of such behavior will lead to consequences ranging from failure on an assignment to failure in the course to dismissal from the university. Because the disciplines of the Humanities value collaborative work, you will be encouraged to share ideas and to include the ideas of others in our papers. Please ask if you are in doubt about the use of a citation. Honest mistakes can always be corrected or prevented.

The JMU Honor Code is available from the Honor Council Web site:

<http://www.jmu.edu/honor/code.shtml>.

Additional policies

As required by James Madison University, a number of other policies apply to all JMU courses and are available on the JMU website, <http://www.jmu.edu/syllabus/>. These include policies on: attendance, academic honesty and Safe Assign, adding/dropping courses, disability accommodations, inclement weather, and religious accommodations.

Course Outline/Schedule

Introduction

Lecture 01 - Monday, Jan 12 Introduction to Course

Important Themes of This Course:

Science is a social process

In solving technical problems, one must understand that socio-technical systems have social components as well as technical. Both must be understood in working towards a solution of the problem.

Technology can affect Humans

Technology can have unanticipated consequences for humans

Technology can affect different people differently

Example: The rich get richer, the poor get poorer

Technology cause social change (changes in society)

Humans control technology

Social groups have a choice to adopt technologies

Social institutions shape technology

Societies interpret technologies

Humans (individually and collectively) have choices

Some choices are objectively better than others, based on evidence and reason.

Lecture 02 - Friday, Jan 16 Introducing Science and Technology

Content:

Defining Science, Technology, and "Technoscience"

Guest lecture, Dr. Jeffrey Tang

Readings:

- Rudi Volti, "The nature of Technology," pp. 3-7 in Society and Technological Change (1992 New York: St. Martin's).
- Robert McGinn, "Science and Technology: Their Natures and Relationship," 13-19 in Science, Technology, and Society (1990 Upper Saddle River, NJ: Prentice Hall).

[Monday, Jan 19 – No class – MLK Day]



Problem 1: Can we trust the climate scientists who say that human activity is causing the earth to warm?

Lecture 03 - Jan 23 Climate Change and Science: Understanding the Problem

Readings:

- “The Politics of Climate Change,” by Clark Miller

Lecture 04 - Jan 26 Is science trustworthy? Philosophy of Science I

Content:

The Orthodox view of science

Falsificationism

Readings:

- “On Scientific Method,” by Robert Prigogine, excerpt from *Zen and The Art of Motorcycle Maintenance : An Inquiry Into Values*. New York : HarperPerennial, 2005.
- Miller, David. 1999. "Being an Absolute Skeptic." *Science*, 1999. 1625.

Lecture 05 - Jan 30 Is science trustworthy? Philosophy of Science II

Content:

Paradigms

Research Programmes

Methodological Anarchism

Readings:

- “Karl Popper, the enemy of certainty, part 4: Lakatos, Kuhn and Feyerabend,” by Liz Williams, *The Guardian*, Monday, October 1, 2012, available online at: <http://www.theguardian.com/commentisfree/belief/2012/oct/01/karl-popper-lakatos-kuhn-feyerabend>
- Lehoux, Daryn, and Jay Foster. 2012. "A Revolution of Its Own." *Science* 338, no. 6109: 885.
- “Chapter 8: General Considerations,” by A. Hallam, in *Great Geological Controversies*, Oxford University Press, 1989: 216 – 232.

Lecture 06 - Feb 2 Studying Science as a Social Process

Readings: TBA

Lecture 07 - Feb 6 Science, Politics, and Patronage

Readings: TBA

Lecture 08 - Feb 9 Ethical Reasoning I

Content:

Defining ethics

On the difference between descriptive and normative arguments

Models of ethical reasoning

- The rationalist model
- The social intuitionist model

Ethics as a Human Project

Readings: TBA

Lecture 09 - Feb 13 Ethical Reasoning II

Content:

The Madison Collaborative and the Eight Key Questions

Readings:

- “The Eight Key Questions,” unpublished, by David McGraw and Mark Piper, 2013.

Lecture 10 - Feb 16 Ethical Reasoning in Science

Content:

Scientific Dishonesty

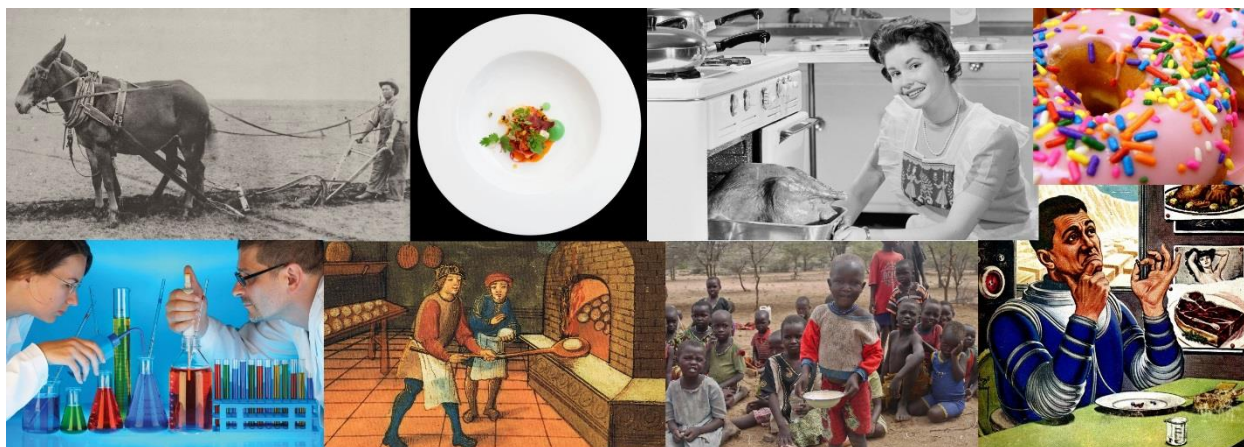
The Impacts of Science on Society

Readings: TBA

Lecture 11 - Feb 20 Gender Issues in Science

Guest lecture, Dr. Shannon Conley

Readings: TBA



Problem 2: Feeding an increasing population

Lecture 12 - Feb 23 Food: Understanding the Problem

Readings: TBA

Lecture 13 - Feb 27 A History of Agricultural Revolutions [technological determinism]

Readings: TBA

Lecture 14 - Mar 2 Food: The Social Construction of Agriculture and Food

Readings:

- "The Social Construction of Facts and Artifacts," by Trevor Pinch and Weibe Bijker
- "The Social Construction of Taste," by Diane Seymour, in *Culinary Taste: Consumer Behavior in the International Restaurant Sector*, Ed. By Donald Sloan, Elsevier: Amsterdam, 2004.

Lecture 15 - Mar 6 New Technologies and Potential Consequences: Biotechnology, GMOs, and Nanotechnology

Readings: TBA

[Mar 9 No Class – Spring Break]

[Mar 13 No Class – Spring Break]

Lecture 16 - Mar 16 Alternative Agricultural Choices: Organic Farming, the Slow Food Movement, and the Amish

Readings:

- "Shaping Technology for the 'Good Life': The Technological Imperative Versus the Social Imperative," by Gary Chapman
- "Amish Technology: Reinforcing Values and Building Community," by Jameson Wetmore

Lecture 17 - Mar 20 Food Ethics: The ethics of scarce resources

Readings: TBA

Lecture 18 - Mar 23 Ethics: Should Animals Have Rights? What About Plants?

Readings: TBA



Problem 3: Producing and delivering energy for the 21st Century

Lecture 19 - Mar 27 Energy: Understanding the problem

Readings:

- Excerpt from *Energy, Society, and Environment: Technology for a Sustainable Future*, by David Elliott, New York: Routledge, 2002.

Lecture 20 - Mar 30 Designing energy systems: Generating electricity

Readings: TBA

Lecture 21 - April 3 Designing energy systems: Distribution

Readings: TBA

Lecture 22 - Apr 6 Designing energy systems: Assessing Risk

Readings: TBA

Lecture 23 – April 10 – Guest Lecture: Dr. Kathryn de Ridder-Vignone

Readings: TBA

Lecture 24 - Apr 13 The Ethics of Energy Fuel Choices

Readings: TBA

[Apr 17 – NO CLASS - Senior Symposium]



Unit 4: Progress and the Future

Lecture 25 - Apr 20 The Concept of Progress I

Readings: TBA

Lecture 26 - Apr 24 The Concept of Progress II

Readings: TBA

Lecture 27 - Apr 27 What Will the Future Hold?

Readings:

- “The Machine Stops,” by E.M. Forster
- “Why The Future Doesn’t Need Us,” by Bill Joy