Introduction to the Human Context of Science and Technology
HCST 100 & HCST 100H
FALL 2004
Rev. August 24, 2004

HCST 100 (3 credits)
MW 2:00 p.m.-3:15 p.m. ACIV150
HCST 100H (4 credits)
MW 2:00 p.m.-3:15 p.m. ACIV150 + W 3:15- 4:15 p.m. ACIV207

This course explores the human context of science and technology. It asks such questions as: how is science done? What role does intention play in technological invention? What values do science and technology represent? And, what are the ethical implications of advances in scientific and technical fields?

The course will open with a reading of C.P. Snow's classic statement of the problem posed by the separation of humanistic from scientific and technical learning. It will then consider case studies of important examples of scientific discovery and technological innovation. This course carries Arts/Humanities GFR credit.

Instructors for the HCST 100 Core: Dr. Joseph N. Tatarewicz (History) and Mr. Eric Brown (Interdisciplinary Studies)

Instructors for Case Studies: Dr. Kevin E. Omland (Field Biology); Dr. Jessica Pfeifer (Philosophy of Science); Dr. Linda Lear (History); Ms. Patricia LaNoue (Interdisciplinary Studies); Dr. Laszlo Takacs (Physics); Mr. John Fritz (Office of Information Technology); Dr. Joseph Tatarewicz (History) and Dr. Ted Foster (Engineering); Dr. Thomas Robinson (Evolutionary Psychology). Dr. Sandra Herbert (History); Dr. Philip Sokolove (Biological Sciences); Dr. Mark Henriksen (Joint Center for Astrophysics); Dr. G. Rickey Welch (Biological Sciences & Dean, College of Arts and Sciences)

Library Resources: Mr. Drew Alfgren (x 53608)

Books Available for purchase at the UMBC Bookstore:

Harry Collins and Trevor Pinch, *The Golem at Large: What You Should Know about Technology*.
Harry Collins and Trevor Pinch, *The Golem: What You Should Know about Science*. (Recommended)
Linda Lear, *Lost Woods: The Discovered Writing of Rachel Carson.*
C.P. Snow, *The Two Cultures.*
Aldous Huxley, *Brave New World.* (Honors)

Other required readings are posted on the Blackboard Site, "Documents" section.

Assignments

Students will be required to write 6 short papers, and will be given a choice of questions for their essays. For HCST 100 two hard copies of papers should be brought to class on the date that the assignment is due. For HCST 100H one copy of the assignment should be brought to class on the day that it is due. Late papers will be penalized.

Attendance

Attendance, which is mandatory, will be taken at the beginning of each class period. Punctuality is expected, and to be marked as present students must be in the classroom when roll is called. Unexcused absences in excess of three during the course of the semester will lower the student's final grade.

Academic Integrity

In their papers for the course students are expected to cite all work by other authors in footnotes and to enclose verbatim passages in quotation marks. This would include material from the Web as well as from printed material. The UMBC Academic Conduct Policy (http://www.umbc.edu/integrity/students.html) will be the expected code of conduct.

Schedule of Classes

Topic I Science, Technology, and Culture

Reading for Topic I: C. P. Snow, *The Two Cultures.*

Wed 9/01 Introductory lecture by Profs. Tatarewicz & Brown: Science, Technology, and Culture

Mon 9/06 Labor Day holiday

Wed 9/08 Discussion led by Profs. Tatarewicz & Brown of Snow's "The Two Cultures"

First Assignment: A one page paper (250 words) on Snow's essay. Due in class on Monday September 13.

Topic II Creativity in Science: Some Examples from Biology

Reading for Topic II-a: Darwin, “Geology and Natural History”; Kevin E. Omland, "Thrashing Out Species: Limits in the Southwest" and "The Evolution of Long Distance Migration in Orioles;" S. Freeman "How Did *Mycobacterium tuberculosis* Become Resistant to Antibiotics?"; R.M.Nesse and G.C. Williams, "Evolution and the Origins of Disease"; Nina G. Jablonski and George Chaplin, "Skin Color."

Mon 9/13 Discovering Evolution: Charles Darwin's work on the Galápagos Islands Lecture by Dr. Herbert. Reading by Darwin.

Wed 9/15 Film on the Galápagos Islands
Discussion led by Dr. Herbert

Mon 9/20 Arguing Evolution: natural selection and the argument for evolution
Lecture by Dr. Pfeifer

Wed 9/22 Evolution in the Field 2004
Lecture by Dr. Kevin Omland. Readings by Omland.
Field Trip directly following the class (optional for HCST 100 students but required for HCST 100H students).

Mon 9/27 Evolution in action: antibiotic resistance
Lecture by Dr. Sokolove. Readings by Freeman and by Nesse and Williams.

Wed 9/29 Evolution and skin color
Lecture by Dr. Sokolove. Reading by Jablonski and Chaplin.

Second Assignment: A 3 page essay (750 words). Due in Class on Monday October 4.

Topic III The Ethics of Science: Cases from Biology

Reading for Topic III: Lear, *Lost Woods* Chapters 3, 7, 9, 14, 26, 28, 30; Stevens,"Want a Room with a View? Idea May Be in the Genes"

Mon 10/04 Humans Shaping Nature: Ethical uses of chemicals: pesticides from World War II to *Silent Spring.*
Lecture by Dr. Lear Reading: chapters 26, 28, 30 of Lear

Wed 10/06 PBS Video "The Silent Spring of Rachel Carson"
Discussion by Dr. Herbert
Special Lecture by Dr. Lear on Beatrix Potter and Environmentalism 4:00 pm
Kuhn Library & Gallery

Mon 10/11 Humans Living in Nature: Greenway walk led by Ms. Patricia LaNoue
Note: This class will run from 1:15 p.m. - 3:15 p.m.
Students should meet at 1:15 p.m. in Academic IV 150 and be dressed for a hike in the woods.
Reading: Stevens

Wed 10/13 Environmental choice
Lecture by Dr. Herbert
Reading: Lear, chapters 3,7,9,14

Third Assignment: A 3 page essay (750 words) due in class on Monday

October 18.

Topic IV Humans Shaping Their Environment: Materials

Reading for Topic IV: Goffer, "Metals"; “Materials Science and Engineering"; Hosford and Duncan, "The Aluminum Beverage Can"

Mon 10/18 Materials in antiquity and today
Lecture by Dr. Takacs
Reading: Gaffer, “Materials Science and Engineering”

Wed 10/20 Why metals have the properties they do
Lecture by Dr. Takacs

Mon 10/25 Class visit to a materials laboratory

Wed 10/27 From ore to product: a case study
Reading: "The Aluminum Beverage Can"

Fourth Assignment: A 3 page essay (750 words) due in class on Monday Nov. 1.

Topic V Technologies

Readings for Topic V-a

"Seven Principles for Good Practice in Undergraduate Education" available at http://www.tltgroup.org/seven/Home.htm

David Noble, "Part IV: Rehearsal for the Revolution" from his "Digital Diploma Mills" available at http://www.communication.ucsd.edu/dl/

Readings for Topic V-b

Joseph N. Tatarewicz, *Observatories* (Collier’s Encyclopedia); Tatarewicz, *Astronomy and Astrophysics* (Collier’s Encyclopedia); concentrate on the 20th Century portions of these readings.

Readings for Topic V-c

Collins & Pinch, "The Naked Launch: Assigning Blame for the Challenger Explosion"; *Report of the Presidential Commission on the Space Shuttle Challenger Accident.* Retrieve from website. http://history.nasa.gov/rogersrep/51lcover.htm and browse through the report; *Report of the Columbia Accident Investigation Board.* Retrieve from website http://history.nasa.gov/columbia/CAIB_reportindex.html and browse through the report.

Topic V-a On the Nature of Technology

Mon 11/01 Seven principles of learning
Lecture by Mr. Fritz
Reading: "Seven Principles"

Wed 11/03 New educational technology: distance learning
Lecture by Mr. Fritz
Reading: Noble

Topic V-b Technology and Discovery

Mon 11/08 Discovering the Universe: Telescopes and Light
Lecture by Dr. Henriksen
Reading: *Observatories; Astronomy and Astrophysics*

Wed 11/10 Discovering the Universe: Telescopes in Person
Field Trip to UMBC Observatory. Meet at the First Floor Elevators, New Physics Building

Topic V-c Exploration and Risk

Mon 11/15 Exploring the Universe: History of the Space Shuttle
Lecture and discussion by Dr. Tatarewicz
Reading: Collins & Pinch; Challenger & Columbia Accident Reports (read the *Introductions* to each report and browse the chapters).

Wed 11/17 Hazards of Exploration: Challenger and Columbia Accidents
Comparison of the Two Accidents by Dr. Tatarewicz
Challenger Launch Decision by Dr. Foster

Mon 11/22 Managing the Risks of Exploration: Challenger Launch Decision
Re-Enactment of Challenger Launch Decision organized by Dr. Foster
"Two Accidents Rooted in History and Culture" by Dr. Tatarewicz

Topic V-d On the Nature of Technology

Wed 11/24 On the Nature of Technology
Lecture by Prof. Brown
Reading: Volti; Collins & Pinch, "Introduction," Chapters 1 & 7.

***Special Film Showing 11:00 am ITE Building 229:* Students are invited to join Professor Tatarewicz's History of Science Antiquity to 1700 class for a special pre-Thanksgiving showing of the film, *William Harvey and the Circulation of the Blood. Warning:* This film re-creates Harvey's classic experiments and includes

graphic scenes of human and animal dissection and vivisection.

Thanksgiving Holiday Thursday November 25

Fifth Assignment: A 4 page (1000 word) essay due in class on Monday November 29.

Topic VI Human Subjectivity and Experience

Reading for Topic VI-a: Neil Postman, *Technopoly: the Surrender of Culture to Technology.*

Reading for Topic VI-b: DeKay and Buss "Human Nature, Individual Differences, and the Importance of Context: Perspectives on Evolutionary Psychology;" Kenrick, "Evolutionary Psychology, Cognitive Science, and Dynamical Systems: Building an Integrative Paradigm."

Mon 11/29 Humanity and the Culture of Technology
Introduction by Dr. Tatarewicz
Reading: Postman.

Wed 12/01 Humanity and the Culture of Technology
Discussion of Postman led by Dr. Welch

Mon 12/6 Humans and their Mental World: Evolutionary Psychology
Lecture: Dr. Robinson
Reading: DeKay and Buss, Kenrick

Wed 12/8 Film: *The Nature of Human Nature*
Discussion led by Dr. Robinson

Mon 12/13 Concluding Thoughts: the Human Context of Science & Technology
Discussion led by Profs. Tatarewicz & Brown

Sixth Assignment (750 words) due Monday December 15 in the History Office. (7th Floor, Administration Building)

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