MODULE 1

Introduction to Science, Technology and Society Studies

OBJECTIVE:

The first module will aim to present the STS problematic by presenting three perspectives on the relation between society, technology and science **to establish a theoretical background in "perspective lectures"**. Following these lectures, the discussed topic/ perspective will be continued to be dealt by the students through making critical presentations of the required readings in each class.

These perspective lectures will discuss how in the past decades, the image of science has changed dramatically by presenting three basic views of the science-technology-society relationship. It will be made clear that all three views have their specific value and are suitable to address specific questions.

After discussing modernism and the idea of progress in relation to technological developments, the first perspective of "Science and Technology Shaping Society: Technological Determinism will be discussed.

The second perspective is "Society Shaping Technology and Science". The emergence of this perspective can be linked to the 1970s. Here the technological determinist's image of technology and the context-independent, rational image of science are relativised.

The third perspective is "Interrelations between Science, Technology and Society". This view asserts that science and technology are social processes. It is not the impact of one upon the other but the linkages and interrelationships between science, technology and society.

Another aim of the first module is to introduce some of the current issues / problems in the STS field in "issue lectures" such as "Modernity, Progress and Non-western Modernities", "Biotechnology and Genetic Engineering" and "Technology and Democracy" .

MODULE STRUCTURE:

Since the first module's aim is to introduce the students the central conceptualizations of the relationship between society, technology and science, the core teaching of the module is done in two types of activities: lectures given by the instructors and seminars presented by the students. Lectures and student seminars will be followed by discussion of the material that is covered. Therefore all the lecture and seminar materials must be read by all the students and get prepared for the discussion. The respective reading material is shown in the following reading list and supplied as Module 1 Reader.

SKILLS TRAINING: Basic Research Approaches and Library Research

The main objectives skills training are to explain the importance and role of scientific research in social studies, to identify the basic type of research approaches and to explain the role and functions of secondary research in general, literature survey in particular. Thus, the general aim is to help the students to recognise the role and functions of scientific research in studies related to society and technology ,to develop basic skills to understand the use and functions of secondary research.

The topics that will be discussed in Module 1 are:
- Definition of research and the role of research in social sciences
- Main distinguishing characteristics of scientific research
- Basic research approaches (exploratory research, descriptive research, causal research)
- The role and functions of secondary data analysis, the ways of searching through published materials in the library.

ASSESSMENT:

A written exam will be given at the end of the module that will cover all the material discussed in the perspective lectures and seminars. 25 % of the exam score will be graded for the assessment of the module.

The student has to write a **"response paper"** of approximately 5 pages (single space, font 12) on a book which is considered to round up the discussions in the first Module:
* **Stephen H. Cutcliffe & Carl Mitcham (Eds),** *Visions of STS: Counterpoints in Science, Technology and Society Studies***, State University of New York, Albany, 2001,**

The aim of a response paper is;
- to explain the general purpose of the book / article and its content,
- to explore all the arguments of the book / article,
- to explain the methodology used to support these arguments with a critical view

These questions should try to be answered in a response paper:
1) what does this book/author argue?
2) how does he/she make his arguments? what are his/her evidence/support?
3) why is this book / are these arguments important?
4) what are the strengths?
5) what are the weaknesses?

Grading of Module 1: The response paper will constitute 40 % of the grade for the first module and it will be evaluated on the students' ability to structure and present his/her thoughts clearly.
25 % of the grade will depend on the class performance that includes seminar presentations as well as student's participation to discussions.
Grading: Response paper : 40 %
     Final Exam : 25 %
     Class Performance : 35 % (Presentations - 25 %, participation - 10 %)

Lecture 1
(Perspective Lecture)

MODERNISM AND THE IDEA OF PROGRESS –

" A sense of technology's power as a crucial agent of change has a prominent place in the culture of modernity. It belongs to the body of widely shared tacit knowledge that is more likely to be acquired by direct experience than by the transmittal of explicit ideas. Anyone who has witnessed the advent of the computer, for example, knows a great deal about how new technology can alter the very texture of daily life, and has gained this understanding as more than a bystander. Even those who do not use computers have had to accommodate their ways to some of its requirements in supermarkets, post offices, banks, libraries, schools, airlines etc. But of course the computer is only one of the radically new science-based technologies- along with television, jet aircraft, nuclear weaponry, antibiotics, the contraceptive pill, organ transplants and biogenetic engineering- whose transformative power has been experienced by millions alive today." (Source: Smith & Marx, 1994, ix-x)

This citation reflects the image of "Science and Technology Shaping Society". This image is related to the Post War period and the experiences with the Manhattan Project which supported the belief in science and technology, and promoted the "Basic Sciences" as a driving force in economy and society. In the United States, this approach is expressed in, among other things, Vanevar Bush's "Science, the Endless Frontier", the creation of the American National Science Foundation (NSF), the early work of OECD and the efforts to standardise statistics on R&D.

Lecture Readings:

(1)   Volti, Rudi (1992). *Society and Technological Change*, New York: St.
            Martin's Press, Chapter 1, (p. 1-15).

(2)   Marx, Leo (1997). "Does Improved Technology Means Progress?, in: Teich,
            A. (Ed.), *Technology and the Future*, New York: St.Martin's Press, p.3-14.

Seminar Readings:

(1)   McGinn, Robert (1991). *Science, Technology and Society*, Englewood Cliffs,
            NJ: Prentice Hall, p. 168-178.

(2)   Volti, Rudi (1992). *Society and Technological Change*, New York: St.
            Martin's Press, Chapter 2, (p. 16-31).

Lecture 2
(Perspective Lecture)

SCIENCE AND TECHNOLOGY SHAPING SOCIETY:
TECHNOLOGICAL DETERMINISM

Many people consider technological development a process animated by an inherent force. According to this perspective technological change has its own logic and direction. It seems to feed on itself, growing ever larger and gathering increasing momentum. Moreover, that growth and impetus seem unstoppable and irreversible.

Lecture Readings:

(1)   Bimber Bruce (1994). "Three Faces of Technological Determinism" in:
            Smith, M.R. & Marx, L. (Eds), *Does Technology Drive History? The Dilemma of Technological Determinism*, Cambridge MA: MIT Press, p. 79-100.

(2)   Mackenzie, Donald & Wajkman, Judie (Eds.) (1985). *The Social Shaping of Technology,* Open University Press, p. 3-27.

Seminar Readings:

(1)   Volti, Rudi (1992). *Society and Technological Change*, New York: St.
            Martin's Press, Chapter 3, (p. 35-54).

(2)   Smith, Merrit Roe (1994). "Technological Determinism in American Culture",
            in: Smith, M.R. & Marx, L. (Eds), Does Technology Drive History? The *Dilemma of Technological Determinism*, Cambridge MA: MIT Press, p.1-35.   **(Team of two)**

Lecture 3
(Perspective Lecture)

SOCIETY SHAPING SCIENCE & TECHNOLOGY

This approach of "Society Shaping Science and Technology" presents a different explanation of technological development. The technological determinist image of technology and science was replaced by another form of determinism: "social determinism", in which technological innovation is seen as socially determined, shaped by political, economical and cultural values.

Emerging as a critique of the technological determinist approach, such views have often gone too far: science and technology appeared as mere social products, simply neutral tools subject to manipulation and control by social actors.

Lecture Readings:

(1)   Bijker, Wiebe E. (1995). "Sociohistorical Technology Studies", in: Jasanoff, Sheila et. al., *Handbook of Science and Technology Studies*, London: Sage Publications, p. 229-256.

(2)   Kline, R. and Pinch, Trevor (1995). "The Social Construction of Technology", in: Mackenzie, D.& Wajcman J. (Eds.), *The Social Shaping of Technology,* Open University Press, Chapter 7: p.113-115.

Seminar Readings:

(1)   Winner, Langdon (1985)."Do Artifacts Have Politics?", in: ", in: Mackenzie, D.& Wajcman J. (Eds.), *The Social Shaping of Technology,*Open University Press, Chapter: 1: p.28-40.
(2)   Hughes, P. Thomas (1985). "Edison and Electric Light", in: Mackenzie, D.& Wajcman J. (Eds.), *The Social Shaping of Technology,*Open University Press, Chapter 3: p.50-63.
(3)   Kranakis, Eda (1985). "Constructing a Bridge", in: Mackenzie, D.& Wajcman J. (Eds.), *The Social Shaping of Technology,*Open University Press, Chapter 5: p.87-105.
(4)   Cockburn, Cynthia (1985). "The Material of Male Power", in: Mackenzie, D.& Wajcman J. (Eds.), *The Social Shaping of Technology,*Open University Press, Chapter 15: p.177-198.
(5)   Pinch, Trevor & Bijker, Wiebe (1987). "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and Technology Might Benefit Each Other", in: Bijker, W.E., Hughes T.P.& Pinch, T*., The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology,* Cambridge MA.: MIT Presss, p.17-50. **(Team of two)**

Lecture 4
(Perspective Lecture)

INTERRELATION BETWEEN SOCIETY, SCIENCE & TECHNOLOGY

Both approaches of "technological determinism" and "social determinism" that we discussed, are reductionist in their own way. Nowadays, research in the field of science and technology studies has moved towards a different interpretation of the science-technology-society relationship. This third perspective "Interrelations between Science, Technology and Society" can be considered the result of the search for a new, more adequate image of the science-technology-society relationship. It asserts that science and technology are socio-technical processes. It is not the impact of science and technology on science, nor the impact of society on science and technology that is underlined, but the rich linkages and interrelations between them.

Over the last decade more and more research science and technology is directed towards opening the black box of technology. In this approach science, technology &society are considered a together evolving systems, mutually shaping and shaped.

There are different ways to study the seamless web of science, technology & society: The Social Construction of Technological Systems (SCOT), the Actor- Network Approach and Large Technological Systems Approach. Latour's Actor-Network Approach where he suggests that 'facts' and 'artifacts' are the outcome of social processes will be taken up in Module 3.

Thomas Hughes' work is a classical example of a sociological examination of innovation. In his studies of the invention of the bulb he shows that there is nothing inevitable or predetermined about the way technological systems are established. No matter their scale, technological systems are never autonomous from the social shaping that gives them their stability. Nor are they free from the influence of innumerable inventions and technological development. As such technology shapes technology as well but not solely.

Lecture Reading:

(1)   Bijker, Wiebe (1995). *Of Bicycles, Bakelites and Bulbs. Towads a Theory of Sociotechnical Change,* Cambridge MA: MIT Press, p.1-17 (Introduction).

Seminar Readings:

(1)   Bijker, Wiebe E. & Law, John (1992). "General Introduction", in: *Shaping Technology / Building Society, Studies in Sociotechnical Change*, Cambridge MA.: MIT Press, p.1-19.

(2)   Wyatt, Sally (1998). "Studying the Society-Technology relationship", *Technology's Arrow,* Chapter 3: p.53-69.

(3)   Summerton, Jane (1994). "Introductory Essay: The Systems Approach to
            Technical Change", in: Summerton, J. (Ed.), *Changing Large
            Technical Systems*, Oxford:Westview Press, p.1-21.

(4)   Hughes, Thomas (1987). The Evolution of Large Technological Systems, in:
            Bijker, W.E., Hughes T.P.& Pinch, T.*, The Social Construction of
            Technological Systems. New Directions in the Sociology and History of
            Technology,* Cambridge MA.: MIT Presss, p.51-82.

(5)   Callon, Michel (1987). "Society in the Making: The Study of Technology as a
            Tool for Sociological Analysis", in: Bijker, W.E., Hughes T.P.&
            Pinch, T., *The Social Construction of Technological Systems. New
            Directions in the Sociology and History of Technology,* Cambridge
            MA.: MIT Presss, p.83-103.

Issue Lecture 1

MODERNITY, PROGRESS, NON-WESTERN MODERNITIES

In this lecture, first the concepts and processes of modernity in intellectual, political, and economic terms will be examined. The concept of "progress" in the context of modernism will then be scrutinised with a special emphasis on Thomas Kuhn´s "The Structure of Scientific Revolutions". Finally, it will be aimed at rethink modernity in relation to non-western experiences within the framework of "globalisation".

Readings:

Issue Lecture 2

BIOTECHNOLOGY/GENETIC ENGINEERING:
Where do new genetics lead us: An ethical discussion

-Fundamental subjects in contemporary genetic research and biotechnology
-Natural and artificial in biotechnology
-The complementarity principle of nature
-Ideals in human societies vs. the ideal of nature
-Genetic counselling: Directive vs. non-directive counselling
- Ethics in reproductive genetics: A feminist approach
-Human genome project: The work, the outcome and the future
-Intellectual property rights in genetics: Can nature be patented?

Readings:

Alcamo, E (1996) *DNA Technology: The awesome skill,* Dubuque, IA:Wm.c.Brown
　　　Publishers.
Buchanan A et.al (2000) From Chance to Choice: Genetics and Justice, Cambridge
　　　University Press
Mahowald MB, Verp MS, Anderson RR (1998). "Genetic Counselling: Clinical and
　　　Ethical Challenges", *Annual Review of Genetics*, 32, p. 547-59.
Mahowal MB (2001) Genes, Women and Equality, Oxford University Press.
Rifkin, Jeremy (1998). *The Biotech Century: harnessing the gene and remaking the
　　　world,* New York: Jeremy P. Tarcher/Putnam.

Issue Lecture 3

TECHNOLOGY AND DEMOCRACY