COURSE ID SHEET

Course No.	5275	NTUA

Semester:	4	Core		Elective	X	Specialization	

Title: **HISTORY OF SCIENCE AND TECHNOLOGY**

Aim:

The course consists of two parts: a) on the one hand, it deals with the birth and evolution of modern science (17th -20th century). It focuses on the scientific revolution (physics and cosmology), the chemical revolution and the physics of the 20th century (relativity and quantum mechanics). At the same time, it comprehensively examines sections concerning the institutional structure of modern science (the foundation of scientific academies, scientific journals, engineering schools and associations of scientists and engineers), i.e. the institutional and informal processes that make up modern science, and its particular national traditions. The relationship between science and technology is also examined, questioning the status quo of scientific theory and its application by engineers, to solve technical problems, since science and technology are interrelated. b) on the other hand, and, at the same time, deals with concepts necessary for a deeper understanding of scientific development and its historical phases in modern times. The relationship between philosophy and science is discussed, the emergence of the Vienna Circle, the Paradigm and normal science according to Thomas Kuhn, Karl Popper's contribution to the philosophical critique of rational positivism, the methodology of Imre Lakatos's scientific research programs, the asymmetry between rival and logically different scientific theories and the quasi-anarchism of PK Feyerabend.

The course clarifies the meaning of Technology and presents how technology gives meaning to the world. Thus, students will be able to assess the impact of technological or technocratic "progress" in the light of the humanities. The relationship between science and war historically (construction of new weapons of destruction, chemicals, medical research, and the Manhattan program) sparks debate about the developments that marked the scientific conquests, and the ethical professional and research dilemmas that now occupy the scientific community. In conclusion, the political semantic content of technology, the role of play and impulses as an interpretation of inventions, the dialogue of users and manufacturers, the contexts of industrial and medical technology and alternative examples are identified. Finally, the eco-centric approach and value-oriented technology are also discussed.

Content:

Indicative teaching modules:

INTRODUCTORY COURSE: SCIENCE, SOCIETY, HISTORY AND PHILOSOPHY. The Origins of the History of Science, Science and Society, Why Modern Science? The Beginnings of Philosophy, the Relationship between Modern Philosophy and the Scientific Revolution

THE SCIENTIFIC REVOLUTION AND THE ENLIGHTENMENT: Changing the layout of the Heavens, Mechanism, Newtonian composition, the scientific method and the experiment, the emergence of philosophes.

The Vienna Circle and New Positivism in Science

T. Kuhn’s Paradigm

K. Popper’s Falsification
I. Lakatos’s Scientific Programs
P. Feyerabend’s epistemological anarchism
THE CHEMICAL REVOLUTION: Chemistry before its "reform", Spiritual Chemistry, Flogton vs. Oxygene, Chemistry after its "reform".
TECHNOLOGICAL DETERMINISM and SOCIAL DEVELOPMENT. Circulation of ideas and technological appropriation
TECHNOCRACY and PROGRESS.
THE ORGANIZATION OF SCIENCE: Institutional structure of science (Science Societies, scientific journals, museums, companies for the advancement of science and the advancement of industrial technology, engineering schools).
THE POPULATION OF SCIENCE / THE SOCIAL CONSTRUCTION OF SCIENCE: World Exhibitions and the Material Culture of Science, Science and Publications, Alternative Science / From the Laboratory to Everyday Use / Consumption
SCIENCE AND TECHNOLOGY: The relevant discussion about their relationship. Does science produce technological innovation? Examples
SCIENCE, TECHNOLOGY AND ETHICS: Science-Army-Industry Relationship, Manhattan Program, Research and Nazism, Cold War, Ethical Dilemmas of Scientists.

Hours per semester:

LECTURE	**26**	EXERCISES	**-**	LABORA-TORY	**-**	HOME-WORK	**34**	**TOTAL HOURS: 60**

Student performance /evaluation:

The evaluation of the students is based on:

- A Final (written) examination (100%).
- Optional presentations of papers in class (50%).