

# Science and Technology Studies (STS)

Science and technology are among the most powerful forces transforming our world today. They have changed social institutions like work and the family, produced new medicines and foods, influenced economies and international affairs, and have the capacity to alter and destroy human life as well as the natural environment itself. These forces come with a vast and complicated array of ethical and social dilemmas that affect both our daily lives and our world. An individual cannot be considered well educated nor can they participate in civil society as an informed citizen without substantial knowledge of what science and technology are and how they interact with society.

From the perspective of the humanities and social sciences, STS uses a critical, balanced, and interdisciplinary approach, and promotes neither unbridled enthusiasm for, nor an activist rejection of science and technology. While science and technology can be appreciated for their valuable contributions, it is also important to acknowledge the range of negative and unintended consequences that often follow in their wake.

Students with a background in STS will bring a unique social and ethical perspective to pivotal debates in the 21st century including the relations between science and gender, science and religion, technology and social values, the politics of technological innovation, the impacts of disease and natural disasters on society, or whether nano-technologies will change the very nature of what it means to be human.

Students may obtain a Minor, Major or Honours in Science and Technology Studies. The Minor, Major and Honours requirements are stated below.

## Honours

In addition to the requirements for a Major in STS, an Honours degree in STS requires a total of 57 credit hours (21 credit hours beyond the requirements for a Major in STS). The details for an Honours in STS are as follows:

- (i) all of the requirements for a Major in STS
- (ii) the following seminars:
  - 3 credit hour Honours thesis seminar or workshop
  - any 6 credit hour courses beyond the 2000-level that complement the student's focus of study (as approved by the Director of STS)
- (iii) 6 credit hours in either Methods or Theory
- (iv) STS 4006 Honours Thesis

## Major

36 credits hours are required for a Major in STS. These include required courses in the core theoretical concepts in the discipline of STS, and at least 6 credit hours in science. Students can then follow their own particular interests and complete the Major requirements drawing from a range of 2000- and 3000-level courses in STS and from courses in other disciplines, recognized as STS electives. The details are that the Major in STS must include:

- (i) the following core STS courses:
  - STS 1003. Science, Technology & Society I
  - STS 2103. Science, Technology & Society II

STS 3103. Science, Technology & Society III

- (ii) at least 6 credit hours in science (selected from: STS 1503/1513 Principles of Biology I/II, or STS 1713 Science, Technology & the Earth),
- (iii) a total of 9 credit hours selected from any 2000-level STS course (and which may include no more than 6 credit hours electives from ENG 2313, ENG 2393, ENVS 2023, SOC 2323, GRID 2206)
- (iv) a total of 15 credit hours selected from any 3000-level STS course (and which may include no more than 6 credit hours electives selected from ECON 3323, ENVS 3013, HIST 3403, HIST 3423, POLS 3213, RELS 3513, RELS 3523, SOC 3523, SOC 3693)

## Minor

18 credits hours are required for a Minor in STS. These must include:

- (i) STS 1003. Science, Technology & Society I, and
- (ii) an additional 15 credit hours in STS courses at the 2000-3000 level (which may include no more than 6 credit hours from courses in other disciplines, recognized as STS electives. See list of non-STS courses under sections (iii) and (iv) of the requirements for Majors.)

## Program Approval

All students contemplating either a Major or an Honours in Science and Technology Studies must obtain the approval of the Program Director for their proposed course of studies before the end of their second year. Any and all subsequent changes to their course of studies must also have the approval of the Program Director.

## Course Offerings

### **STS-1003. Science, Technology and Society I**

Science and technology are among the most powerful forces in our world today and come with a vast and complicated array of social, ethical, political, legal, and economic implications. This course introduces students to the core theories and various branches of the dynamic field of Science and Technology Studies (STS) in order to facilitate thoughtful analysis of the intertwined relations among science, technology, and society.

### **STS-2103. Science, Technology and Society II**

This course provides an intermediate-level study of the core theories and various branches of the dynamic field of Science and Technology Studies (STS) in order to facilitate thoughtful analysis and discussion of relevant topics which may include: science and public policy, STS and the environment, science and the media, the public understanding of science, gender and science, and/or expertise and scientific knowledge production. Prerequisite: STS 1003.

### **STS-2123. Food, Science & Sustainability**

This course explores the relationships in our society among science, technology, and food by examining the ways that technology and scientific knowledge have altered food production. In addition, we will look more broadly at how our technical relationship to food has laid the foundations of modern civilization. We will also look at advocates of alternative modes of food production and consumption who claim to redress some of the dilemmas of our modern food ways.

**STS-2243. Science and Technology in World History: From Pre-History to 1543**

Examines the transformation of civilizations around the world by technologies such as stone tools, catapults, hydraulic engineering, metallurgy, and gunpowder. Also examines the growth of the abstract, theoretical sciences of astronomy, mathematics, and medicine in various regions including China, the Americas, Egypt and Greece. Aims to understand the social, political, economic, and religious consequences of science and technology from the Paleolithic Era to the mid-16th century.

**STS-2253. Science and Technology in World History: From 1543 to the Present**

Examines the transformation of civilizations around the world by technologies such as steam engines, electricity, airplanes, and nuclear bombs. Also examines the development and impact of new scientific theories of universal gravitation, evolution, genetics, and bio-engineering. Aims to understand the social, political, economic, and religious consequences of science and technology from the mid-16th century to the present.

**STS-2313. Energy and Society.**

This course examines energy systems (oil, gas, coal, hydroelectric, nuclear, and renewable) both historically and in the contemporary world, in terms of environmental and economic impacts, theories of technological change in their creation, deployment, and decommissioning, as well as public policy issues.

**STS-2403. Science, Technology, and War (HMRT 2283)**

This course explores the development of modern techniques, technologies, and social systems for the purposes of making war. It also explores how wars change societies, technologically, socially, and structurally. Note: Students who have taken STS-1403 will not receive credit for STS-2403.

**STS-2413. Science, Technology, and Innovation**

This course examines the field of science and technology studies (STS) with a focus on science and technological-based innovation, historically and in the contemporary world. The course will offer students an opportunity to critically evaluate theories of technological change, and science and technology in globalization, and the post-modern economy. Students will also be expected to critically discuss implications for public policies in the areas of research and development, science and technology, and innovation. No pre-requisites required.

**STS-2503. Plagues and Peoples**

This course studies the impact of disease epidemics on human populations and on economic, social, intellectual, religious, and political aspects of life from ancient times to the present.

**STS-2603. Animals: Rights, Consciousness, and Experimentation**

This course is an introduction to the scientific, legal, philosophical, and political debates over animal rights, animal consciousness, and animal experimentation.

**STS-2703. History of Life Sciences**

This course examines the historical background and development of the life sciences from the ancient Greek world to the present. Particular attention will be focused on the fields of biology, ecology, medicine and genetics.

**STS-2903. The Politics of Science**

This course introduces students to the many ways in which science interacts with political

interests. This includes the ways in which political considerations from outside of science and elected officials influence the development of science. It also includes the ways in which political interests from within science itself control the development of science and how scientific concerns often guide the development of public policies made by politicians.

### **STS-2913. Communicating Science In Democracy**

In modern democratic societies, the sciences are dominant forces that affect everyone. This course examines how critical scientific issues are communicated to (or with), members of the public, government, and within the scientific community itself. The basic question we will be exploring is: What science communication strategies work, what don't work, and most importantly, why? This course explores the relationship between the communication of complex scientific issues and democracy.

### **STS 3003 - Scientific Reasoning**

This course provides students with the tools needed to pursue research in Science and Technology Studies. The course will typically cover the basic elements of a traditional conceptual framework used by scientists to describe their work, including the concepts of prediction, testing, theoretical models, and scientific change over time, as well as the basic elements of alternative theoretical frameworks. Some mathematical content. Prerequisite: at least 9 credit hours in STS or permission of the instructor.

### **STS-3013. Controversies in Science and Technology**

This course explores controversial issues involving science and technology in order to investigate the underlying dynamics of science and technology themselves since it is during controversies that the normally hidden social dimensions of techno-science become more explicit. Various controversies, such as climate change, transgenic foods, biofuels, and chemical additives in food are studied to reveal the rhetorical tools, underlying assumptions, and social, political, economic, and philosophical struggles embedded within science and technology. Pre-requisite: STS 1003.

### **STS-3043. Heaven and Earth: Astronomy and Matter Theories from the Ancient World to the Scientific Revolution**

This course explores theories explaining the structure and material makeup of the universe from ancient times to the Scientific Revolution. Technical details of astronomy and matter theories are examined in philosophical, theological, and medical contexts. Topics include: the shift from an earth-centered to a sun-centered astronomy, medical astrology, the shift from ancient atomism to mechanistic theories of matter, and the implications of postulating empty space in the macro and micro universe.

### **STS-3063. Science, Religion, and Galileo's Trial (HMRT 3283)**

Examines the complex interactions between Western science and the Judeo-Christian religious tradition in the ancient, medieval, and early modern periods culminating with a close study of Galileo's trial by the Inquisition in 1632 to reveal how variable and complex interactions between science and religion have been characterized at different times by conflict, cooperation, separation, understanding, misunderstanding, dialogue, and alienation. Prerequisite: STS 2243 or permission of the instructor.

### **STS 3103 - Science, Technology & Society III**

This course further develops an integrative understanding of the core theories and various branches of the dynamic field of Science and Technology Studies (STS) through an advanced study of the theoretical roots and current trends in the discipline. Students will

develop skills in critical thinking, research, as well as written and oral presentations by applying theoretical perspectives to different case studies. Prerequisite: STS 2103.

### **STS-3163. Contemporary Perspectives on Science and Religion**

This course examines the recent debates over the relation between science and religion. A resurgence of interest in these debates has been sparked by developments in the sciences, particularly in physics and genetics, as well as by a newly-emerging understanding of what science is. The central questions include whether science and religion are compatible and whether recent developments in the sciences give new answers to religious and theological questions. Readings will represent all sides of these debates. Prerequisite: STS 2253 or permission of the instructor.

### **STS-3203. Science, Technology and Nature**

In this seminar, students will be asked to question the boundary between culture and nature. Although we will explore how humans have made and remade the “natural” world, often with technologies of almost unimaginable power, we will also consider how natural forces - the sun, the soil, horses, rivers, germs, insects, even gravity - shape our built environments.

### **STS-3303. Sex, Science & Gender (HMRT 3263)**

This course examines how scientific research, in the late 19th and 20th centuries, has shaped common conceptions of sex behaviour and how this scientific knowledge has also been shaped by cultural conceptions of gender roles and “normal” behaviour.

### **STS-3413. God, Nature, and Charles Darwin**

This course examines the complex interactions between theories of biological evolution and Christianity. Beginning with ancient Greek theories of how species arise, the course will focus primarily on the social, political, economic, techno-scientific, and religion contexts of the 19th century when ideas of species transmutation or evolution were discussed. Prerequisite: a minimum of 9 credit hours beyond the 1000-level.

### **STS-3503. Feminism and Techno-Science (HMRT 3273)**

Examines a variety of feminist perspectives on science and technology which suggest that scientific authority (particularly in the biological and life sciences) rationalizes and normalizes gender stereotypes and inequalities, and also marginalizes women from its institutions. The content and positions of various perspectives (as well as counter-arguments) are studied for their political, philosophical, and epistemic assumptions. Prerequisite: at least 9 credit hours in STS or permission of the instructor.

### **STS-3533. Science and Scientific Knowledge**

This course examines the study of science and scientific knowledge from a sociological perspective. It focuses on the effort of the Edinburgh School to provide a materialist resolution to the debate between positivist and relativist epistemologies.

### **STS-3563. Philosophy of Science (PHIL)**

This course will examine science from the perspective of philosophy. Topics will include the historical relation between science and philosophy, the differences between the social and the physical sciences, the nature of scientific change in history, the role of values in science, the reality of ‘theoretical’ objects of science, and feminist alternatives to traditional scientific research. Examples will be drawn from both the physical and the social sciences. Prerequisite: at least 9 credit hours in STS or permission of the instructor.

### **STS-4006. Honours Thesis**

Students in their fourth year of the Honours program in Science and Technology Studies will register for this course and receive credit for it upon successful completion of their Honours thesis.

### **STS-4103. Independent Study**

Special courses in topics not normally covered in regular course offerings in Science and Technology Studies. Students work closely with a faculty member on a project involving independent research. Approval must be given by the Director.

## Science Courses

St. Thomas offers courses in the Sciences. These courses can be taken either as science courses or as courses in Science and Technology Studies. Students ought to note that these courses are not deemed to be suitable prerequisites for upper level science courses at UNB.

### **BIOL/STS-1503. Principles of Biology I**

This course introduces students to the study of life. Topics include the scientific method, biological molecules, cell structure and function, energy flow, respiration, and photosynthesis.

### **BIOL/STS-1513. Principles of Biology II**

This course examines mitosis, meiosis, and genetics. Surveys the structure, function, and evolution of the kingdoms of life. Discusses the basics of ecology, culminating in ecological interactions and the impact of humans on the planet.

### **GEOL/STS-1713. Science, Technology and the Earth**

The course introduces various elements of basic science using the Earth as its laboratory. Earth Science is well suited for this purpose. Topics are varied and include: the origin of the Earth; gravity, density and seismic waves and what they can tell us about the Earth; physical properties of minerals and what they can tell us about atomic structure; energy sources; water resources; wastes; life in the context of creationism and evolution. Lectures are augmented by online and hands-on exercises and a self-lead field trip.

In addition to the courses listed immediately above, students may use any courses in the Sciences to count toward the Minor, Major and Honours in Science and Technology Studies. Students may apply more than one methods course toward their Major or Honours only with the approval of the Program Director.

## Courses at the University of New Brunswick

The University of New Brunswick offers a number of courses in the Sciences and courses that fall under the description of Science and Technology Studies but are offered by departments such as history and sociology. St. Thomas students who wish to register for any of the courses described immediately above may do so only with the approval of the Director of Science and Technology Studies and the approval of the Registrar's Office.

*NOTE: Not all courses listed are offered each year. Please consult with the Director for more information about current and planned course offerings.*