

SIMON FRASER UNIVERSITY

OFFICE OF THE VICE-PRESIDENT, ACADEMIC

MEMORANDUM

To: Senate

From: J. M. Munro, Chair
Senate Committee on Academic Planning

Subject: University College of the Fraser Valley -
Science 400

Date: March 13, 1995

Action undertaken by the Senate Committee on Undergraduate Studies and the Senate Committee on Academic Planning gives rise to the following motion:

Motion:

"That Senate approve and recommend to the Board of Governors, as set forth in S.95 -25 , the following new course to be offered at the University College of the Fraser Valley:

Science 400 History and Philosophy of Science."

J. M. Munro

**SIMON FRASER UNIVERSITY
MEMORANDUM**



To: A. Watt
Secretary to SCAP

From: C.H.W. Jones, Dean
Faculty of Science

Subject: **UCFV Science 400**

Date: March 2, 1995

The University College of the Fraser Valley offers an SFU B.Sc. degree in partnership with the Faculty of Science. As a required component of that programme, UCFV has proposed a course entitled the History and Philosophy of Science, which students will take at the upper division. This course was approved for offering at UCFV by our Faculty of Science Undergraduate Curriculum Committee on November 30, 1994 and by the Faculty at a meeting held on February 28, 1995. In order to facilitate a rapid consideration of this proposal it was forwarded to SCUS in January and received approval by that committee on January 10, 1995. The proposal is now forwarded to SCAP for its consideration.

C.H.W. Jones.
C.H.W. Jones

CHWJ:ln:Encl.

UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DEPARTMENT: NATURAL SCIENCE

DATE: June 1994

<u>Science 400</u>	<u>History and Philosophy of Science</u>	<u>3</u>
NAME & NUMBER OF COURSE	DESCRIPTIVE TITLE	UCFV CREDIT

CATALOGUE DESCRIPTION: This course is a required course in the B.Sc. program and is meant to be taken in the fourth year of the program. The course reflects on the nature of science and the way advances are made. The course examines scientific disputes and achievements: it explores science as a product and producer of history and culture. It examines what science is and what it is not, and what the responsibilities are of science and scientists to society.

COURSE PREREQUISITES: 80 credits applicable toward a B.Sc. degree

COURSE COREQUISITES: Students should be enrolled in the fourth year of a B.Sc. degree program.

HOURS PER TERM FOR EACH STUDENT	Lecture	39 hrs	Student Directed Learning		
	Laboratory	hrs	Other - specify:	-	hrs
	Seminar	hrs			hrs
	Field Experience	hrs			hrs
			TOTAL		HRS

UCFV CREDIT TRANSFER <input type="checkbox"/>	UCFV CREDIT NON-TRANSFER <input type="checkbox"/>	NON-CREDIT <input type="checkbox"/>
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TRANSFER STATUS (Equivalent, Unassigned, Other Details)

UBC credits _____

SFU credits _____

UVIC units _____

UNBC credits _____

OLA credits _____

Lillian Martin/Moira Gutteridge
COURSE DESIGNER

J.D. TUNSTALL Ph.D.
DEAN OF ACADEMIC STUDIES

Science 400

NAME & NUMBER OF COURSE

COURSES FOR WHICH THIS IS A
PREREQUISITE:

None

RELATED COURSES

All courses in the science degree program

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

TEXTS: Coursepack of readings: contemporary sources in philosophy of science; readings on the history and philosophy of a classic scientific dispute such as Darwinism; readings on gender issues in science; readings on social and cultural impact of science. Reading on a contemporary scientific dispute, researched by students, using newspapers, scientific periodicals, and government documents.

OBJECTIVES: The course is designed to give students an understanding of how scientists know what they know. Students will examine the ways in which science influences and is influenced by the society and world around it, and of the consequences for their own roles as scientists. Students should come away with questions, and with the ways to deal with those questions. By the end of the course, each student should be able to demonstrate sensitivity to the variety of world-views within which science must operate and to the social and professional pressures under which scientists must function. Each student should be aware of major controversies, trends, influences, and theories about what science is and be able to evaluate competing views. Each student should have developed an ethical position which clarifies his or her professional roles and responsibility.

METHODS: Students will examine one historical and one contemporary scientific dispute in detail, as a means to explore scientific controversy and understand it within its social, historical, and philosophical context.

The course will provide a central strand of lectures, panel discussions, class presentations, and seminars organized around the major themes of the course. One instructor will be responsible for co-ordinating the course, arranging the lectures or discussions, and leading the seminars. Members of the science faculty or visiting scientists will serve as lecturers or panelists to examine the nature and depth of theoretical disagreements in science. Science faculty may also serve as advisors on individual projects and papers in their fields of expertise. The lectures and panel discussions will expose students to a variety of scientific and philosophical perspectives, by giving students an opportunity to hear their instructors and other guest speakers reflect on the nature of science and on the puzzles and concerns they have faced as scientists. Members of the philosophy and history faculty will introduce students to key concepts in the philosophy and history of science, and lead students through the analysis of a historical dispute such as Darwinism. The course co-ordinator will be responsible for directing seminar discussions to provide for reflection on and evaluation of these perspectives.

Students will select, research, report on, and analyze a contemporary scientific dispute, paralleling what they learn in examining the historical dispute.

STUDENT EVALUATION PROCEDURE:

- 30% 2-3 seminar presentations
- 45% 3 written reports/essays, including a literature review and one essay on an ethical issue
- 25% 1 term paper or final exam

3.

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COURSE CONTENT

The first few weeks of the course will provide an overview of the different philosophical approaches to science: reductionism, realism, conventionalism, followed by a historical perspective on the 2nd stage of the industrial revolution as scientific and social revolution.

The remainder of the course will explore one historical scientific dispute in detail examining the theoretical dispute and using it as a vehicle to explore four key themes:

1. Cultural Perspectives of Progress

This would be a presentation of competing perspectives on the value of science.

Strong proponents of the scientific method would speak to how science answers questions about how natural phenomena work and how science has led to progress. Others will question why we need such answers; why should we care. These questions will be put in the context of alternate views of progress held by others cultures.

2. Scientific Controversies - Historical and Present Day

Hopefully, students will come to understand that scientific progress is not linear, but rather progress is achieved not only by bringing forth new ideas but also by discarding old ones, no matter how well established they are, if they don't agree with observation.

Other One focus of this section could be on historical and present day concepts of disease. Historical examples include 19th century ideas of nostalgia, kleptomania and hysteria; more modern ones are chronic fatigue syndrome, causes of AIDS and mental illness. controversies include the phlogiston theory, the caloric, the ether, the heliocentric solar system, cold fusion, polywater, dark matter, global warming, the big bang theory and birth control.

3. Social Controversies that are Responses to Scientific Issues

The purpose here is to allow students to achieve some understanding of how science impacts on society and of the social responsibility of the scientist. Historical issues could include; IQ and race, the thalidomide tragedy and its aftermath, alchemy, and cultural imperialism and the denial of pagan knowledge. Current issues include, genetic engineering, water purification, fertility issues, breast cancer studies and nuclear power.

4. Gender Issues in Science

We will study why science has generally been a male prerogative and how this has influenced the way science is done. Also we will study the historical contributions of women which are now becoming more recognized and current trends such as ecofeminism.

Paralleling this discussion, students will choose from a list of contemporary disputes (selected according to availability of resource people and library material) and will explore this dispute together through readings, presentations and discussions, analyzing it using all the major themes of the course.

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Format/Sequence:

13 weeks, 26 90-minute sessions: either 30 minute lecture followed by discussion, or alternating 90-minute lecture/panel discussion and 90-minute seminar.

We will concentrate on each of the 4 theme units for 3 weeks/6 sessions each, with each theme being explored by ways which raise historical, cultural, and ethical issues.

Instructor:

The course will be overseen by Moira Gutteridge who would be present for all lectures and/or panel discussion and seminars. She would present the introduction to philosophy of science. She would be responsible for ensuring the continuity and focus of the course. Eric Davis would present the historical perspective.

Other resource people will be drawn from our science and mathematics departments as well as anthropology and political science for example, Lillian Martin on gender issues in science, Kathleen Lawry on eco-feminism and environmental issues, Rob Woodside and/or George McGuire on historical scientific controversies.