

SIMON FRASER UNIVERSITY

S.80-89

MEMORANDUM

To Senate

From Senate Committee on

Undergraduate Studies

Subject New Course Proposal:
BISC 422-3 (Population Genetics)

Date 1980-06-18

Action taken by the Senate Committee on Undergraduate Studies at its meeting of 17 June 1980 gives rise to the following motion:

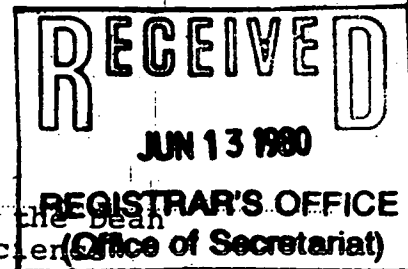
MOTION

That Senate approve and recommend approval to the Board of Governors, as set forth in S80-89, the proposed new course BISC 422-3 (Population Genetics).

J. K. Birch

SIMON FRASER UNIVERSITY

MEMORANDUM



H.M. Evans, Registrar
and Secretary, Senate
Committee on Undergraduate
Studies

From N. Heath
Assistant to the Dean
Faculty of Science

Subject NEW COURSE PROPOSAL BISC 422-3

Date 1980 06 12

At the meeting of 1980 06 05, the Faculty of Science approved the following motion:

"That the proposed new course BISC 422-3, Population Genetics, described in F-80-0, be approved and forwarded to SCUS and Senate for consideration and approval."

The document referred to in the motion is attached. In addition I attach a memorandum from M. Deutsch concerning the adequacy of the Library's collection, and memoranda relating to course overlap.

NH/mgj
Attachments



N. Heath

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 422 Credit Hours: 3 Vector: 3-1-0

Title of Course: POPULATION GENETICS

Calendar Description of Course: Theoretical and experimental aspects of inheritance at the population level. Topics include Hardy-Weinberg, one- and two-locus selection theory, introduction to quantitative genetics, and Fisher's fundamental theorem of natural selection.

Nature of Course Lecture and Tutorial

Prerequisites (or special instructions): BISC 202-3, MATH 101-3 and MATH 154-3. (Note: MATH 151-3 or 157-3 may be used instead of MATH 154-3).

What course (courses), if any, is being dropped from the calendar if this course is approved: No courses to be dropped

2. Scheduling

How frequently will the course be offered? One semester/year

Semester in which the course will first be offered? 1981-3

Which of your present faculty would be available to make the proposed offering possible? Dr. A. T. Beckenbach

3. Objectives of the Course

Population genetics examines the interface between genetics, ecology and evolution. The objectives are three-fold:

- 1) to provide an understanding of the basic theoretical and experimental results of population genetics;
2) to extend these results to the inheritance of quantitative characters, and
3) to develop some of the current controversies, such as the selectionist/naturalist argument, group selection and the evolution of altruism controversy.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas: } nothing additional

- Faculty
Staff
Library
Audio Visual
Space
Equipment

5. Approval

Date: 21 Aug 80 11 June '80 JUN 17 80
Department Chairman Dean Chairman, SCUS

Outline of Course

Population Genetics

Equal emphasis will be placed on the theoretical and experimental aspects of population genetics. Topics will include one- and two-locus theory, introduction to quantitative genetics and Fisher's fundamental theorem of natural selection, with examples drawn from recent studies with plants and animals including man. Sufficient theory will be covered to allow critical analysis of the selectionist-neutralist controversy, altruism and group selection, and the IQ controversy.

- I Introduction: the realm of population genetics
- II Mathematical models in population biology - general ideas
- III Hardy - Weinberg Equilibrium - the absence of disturbing factors
 - one locus and two alleles
 - the Wahlund Effect
 - more than two alleles
 - equilibrium for two loci; linkage
- IV Selection
 - one locus and two alleles
 - more than two alleles
 - population subdivision, Levene's model
 - more than one locus; general effects
 - Altruism and Group selection; the evolution of sex
- V Inbreeding and finite population size
 - Sewall Wright's approach
 - the probability approach
 - drift
- VI Genetic Structure of Natural Populations
 - history: the classical versus the balance views
 - selectionists versus neutralists
- VII Mutation and Migration
- VIII Quantitative Genetics - the nature of quantitative variation
 - comparison to classical population genetics
 - genotypic and phenotypic values
 - average effect of a gene
 - variance components
 - heritability
 - Fisher's fundamental theorem of natural selection
- IX Sociobiology and the IQ Controversy.

TEXT: SPIESS, 1977. Genes in Populations. Wiley

A Classification of Selected Books in Population Genetics

History:

Provine 1971. The Origins of Theoretical Population Genetics. University of Chicago Press.

Biological Emphasis:

- Dobzhansky, 1970. Genetics of the Evolutionary Process. Columbia Univ. Press.
Ford 1975. Ecological Genetics. Methuen Press.
Grant, 1963. The Origins of Adaptations. Columbia U. Press.
---, 1971. Plant Speciation. Columbia U. Press.
---, 1975. Genetics of Flowering Plants. Columbia U. Press.
Lewontin, 1974. The Genetic Basis of Evolutionary Change. Columbia U. Press.
Mayr, 1963. Animal Species and Evolution. Harvard U. Press.
---, 1970. Populations, Species and Evolution. Harvard U. Press.
Stebbins, 1950. Variation and Evolution in Plants. Columbia U. Press.
Wallace, 1968. Topics in Population Genetics. Norton Press.
Wright, 1977. Evolution and the Genetics of Populations. Vol. 3. Experimental Results and Evolutionary Deductions.
---, 1978. Vol. 4 Variability Within and Among Natural Populations. Univ. of Chicago Press.

Theoretical Emphasis:

- Edwards, 1977. Foundations of Mathematical Genetics. Cambridge U. Press.
Elandt-Johnson, 1971. Probability Models and Statistical Methods of Genetics. Wiley
Ewens, 1969. Population Genetics. Methuen Press.
Fisher, 1930. The Genetical Theory of Natural Selection. Dover.
Haldane, 1932. The Causes of Evolution. Cornell U. Press.
Kimura and Ohta, 1971. Theoretical Aspects of Population Genetics. Princeton U. Press.
Malecot, 1969. The Mathematics of Heredity. Freeman Press.
Moran, 1962. The Statistical Processes of Evolutionary Theory. Oxford U. Press.
Nei, 1975. Molecular Population Genetics and Evolution. North-Holland Press.
Wright, 1968. Evolution and the Genetics of Populations. Vol. 1. Genetic and Biometric Foundations.
---, 1969. Vol. 2. The Theory of Gene Frequencies. Univ. of Chicago Press.

Quantitative Genetics:

- Falconer, 1960. Quantitative Genetics. Ronald Press.
Kempthorne, 1957. An Introduction to Genetic Statistics. Iowa State U. Press.
Lerner, 1954. Genetic Homeostasis. Dover Press.
Mather and Jinks, 1971. Biometrical Genetics. Cornell U. Press.
Mather, 1978. Fundamentals of Biometrical Genetics.

General Textbooks:

- Cavalli - Sforza and Bodmer, 1971. The Genetics of Human Populations. Freeman Press.
Crow and Kimura, 1970. An Introduction to Population Genetics Theory. Harper & Row.
Jacquard, 1974. The Genetic Structure of Populations. Springer Verlag.
Li, 1976. First Course in Population Genetics. Boxwood Press.

BISC. 422 - Journals

Genetics

Can. J. Genet. and Cytology

Amer. Natur.

Theor. Pop. Biol.

Evolution

Hereditas

Heredity

J. of Heredity

Amer. J. Human Genet.

Biometrics

Biometrika

Missing: Evolutionary Theory (New Journal)

Series: Annual Review of Genetics

Annual Review of Ecology and Systematics

Annals of Human Genetics

SIMON FRASER UNIVERSITY

MEMORANDUM

7-1-8

To Andrew Beckenbach
Biosciences

From Marvin Deutsch
Library

Subject

Date 31 March 1980

The Library's book, journal, & index/abstract
collections can adequately support
Bioscience 422 Population Genetics.

Dr. M. Widsen, Faculty of Education,
Dr. J. Dickinson, Kinesiology
Dr. E. W. Roberts, L. L. & L.

New Course BISC 422-3

Dr. M. Mackauer, Chairman,
Dept. of Biological Sciences.

April 2, 1980.

I am enclosing herewith a new course proposal (Population Genetics, BISC 422-3) for consideration of course overlap.

If I do not hear from you by April 18 I will assume that there is no overlap and submit the proposal to our Faculty Undergraduate Curriculum Committee.


M. Mackauer.

MM/ms
Encl.

SIMON FRASER UNIVERSITY

F-1-8

MEMORANDUM

To..... Mr. N. Heath,
Administrative Assistant,
Faculty of Science.
Subject... New Course Proposals
BISC 311, 422, 650, 651, 652.

From..... Dr. M. Mackauer, Chairman,
Dept. of Biological Sciences.
Date..... May 28, 1980.

I thought you might wish to have copies of the attached memoranda from Sheila Roberts, Secretary of the Faculty of Arts Curriculum Committee.

Copies of the above course proposals were sent to the Faculty of Arts, Education and Interdisciplinary Studies for consideration of course overlap. Please note that I asked for a reply by 18 April, failing that, I would assume the absence of overlap. A reply was received only from the Faculty of Arts and Education.


M. Mackauer.

MM/ms
Encls.

MAY 28 1980

OFFICE OF STUDENT
OFFICE

SIMON FRASER UNIVERSITY

MEMORANDUM

Dr. M. Mackauer, Chairman
Department of Biological Sciences
Subject: BISC 311 and 422
From: Sheila Roberts, Secretary
Faculty of Arts Curriculum Committee
Date: May 21, 1980

The Faculty of Arts Curriculum Committee at its meeting of May 8, 1980, considered BISC 311 and 422 in terms of overlap and found no substantial overlap with the courses offered in the Faculty of Arts

Sheila Roberts

S. Roberts

c.c. H.M. Evans

SR/md

MAY 22 1980