

# SIMON FRASER UNIVERSITY

S.79-42

## MEMORANDUM

*Norman R. Reilly*

To..... Senate

From..... Norman R. Reilly, Chairman  
Senate Committee on  
Undergraduate Studies

Subject..... Bio-Science: New Course Proposals  
and Associated Changes in Degree  
Requirements

Date..... 1979-04-18

Action taken by the Senate Committee on Undergraduate Studies at its meeting on Tuesday April 10, 1979, gives rise to the following related motions:

### MOTION I

That Senate approve and recommend approval to the Board of Governors the introduction of the following new Bio-Science courses as well as the renumbering and title change of the existing course BISC 448-3 as outlined below and detailed in S79- :

- (1) New course: BISC 329-4 Introduction to Experimental Techniques;
- (2) New course: BISC 429-3 Experimental Techniques I: Separation Methods;
- (3) New course: BISC 439-3 Experimental Techniques II: Ecological Methods;
- (4) Course renumbering and title change of BISC 448-3 to BISC 449-3 Experimental Techniques III: Histochemistry;
- (5) New course: BISC 415-3 Ornithology;
- (6) Deletion of BISC 428-3, 438-3, 448-3, 409-3.

### MOTION II

That Senate approve and recommend approval to the Board of Governors that the Group I requirements for a Major (and therefore an honors) in Bio-Science be changed to:

3 courses from Group I - Cellular and Molecular Biology.  
These 3 courses are BISC 301-3, BISC 329-4 and one of BISC 429-3, 439-3 or 449-3.

NOTE: The change in the Group I requirements brings the total semester hours in Biological Sciences required for a Major to 54 hours (up from 50).

The previous Group I requirement read as follows: "2 courses from Group I - Cellular and Molecular Biology. These 2 courses are BISC 301-3 and one of BISC 428-3, 438-3, or 448-3".

### Time Waiver

Subject to the approval by Senate and the Board of Governors of the above courses the Senate Committee on Undergraduate Studies has approved the waiver of the time lag requirement in order that these courses can be offered in the semester 80-1. It was recognized that these courses should only be introduced if the required funding is obtained and that the request for that funding must be pursued by the department through the normal operating budget and equipment allocation channels available to the department.

## MEMORANDUM

H.M. Evans

Secretary, SCUS

Subject BISC New course proposals and  
course revision.

From N. Heath

Assistant to Dean of Science

Date 1979 03 28

At the meeting of 1979 03 13, the Faculty of Science approved the following motion,

"That the Faculty of Science approve the new course proposals,

BISC 329-4 Introduction to Experimental Techniques

BISC 429-3 Experimental Techniques I: Separation Methods

BISC 439-3 Experimental Techniques II: Ecological Methods

and the renumbering and title change of the existing course BISC 448-3 to

BISC 449-3 Experimental Techniques III: Histochemistry,

and forward these to SCUS for consideration and approval."

If approved by Senate, the new course will replace the existing courses, BISC 428-3, 438-3, and 409-3.

At the same meeting, a further motion was passed,

" That the Faculty of Science approve the new course proposal,

BISC 415-3 Ornithology

and forward it to SCUS for consideration and approval."

Supporting documents are attached.

Registrar's Note:

The changes to program regulations  
are shown in the attached  
calendar sheets

**RECEIVED**

MAR 3 1979

REGISTRAR'S OFFICE  
MAIL DESK

## Course Groupings

Biological Sciences upper division (300 and 400) courses are divided into three main groups as follows:

### Group I - Cellular and Molecular Biology

- BISC 301-3 Biochemistry-Intermediary Metabolism  
 BISC 302-3 Genetic Analysis *Introduction to Experimental Techniques*  
 BISC 401-3 Biochemistry-Regulatory Mechanisms  
 BISC 402-3 Molecular Genetics  
 BISC 403-3 Cell Physiology  
 BISC 404-3 Experimental Techniques I: *Separation Methods*  
 BISC 405-3 Experimental Techniques II: *Ecological Methods*  
 BISC 406-3 Experimental Techniques III: *Histochemistry*  
 BISC 407-3 Endocrinology  
 BISC 481-3 Biophysics

### Group II - The Biology of Organisms

- BISC 303-3 Microbiology  
 BISC 305-3 Animal Physiology  
 BISC 306-3 Invertebrate Biology  
 BISC 310-3 The Plants and Animals of British Columbia  
 BISC 316-3 Vertebrate Biology  
 BISC 317-3 Insect Biology  
 BISC 326-3 Biology of Non-vascular Plants  
 BISC 337-3 Comparative Morphology: Distribution and Evolution of Vascular Plants

- BISC 347-3 Physiology of Plant Nutrition and Metabolism  
 BISC 403-3 Microbial Ecology  
 BISC 408-3 Parasitic Associations  
 BISC 417-3 Entomology  
 BISC 418-3 Advanced Invertebrate Biology  
 BISC 430-3 Plant Pathology  
 BISC 437-3 Plant Development and Morphogenesis  
 BISC 447-3 Control and Regulation in Plants

### Group III - Population and Community Biology

- BISC 300-3 Physical and Chemical Aspects of the Environment  
 BISC 304-3 Animal Ecology  
 BISC 346-3 Biosystematics  
 BISC 400-3 Evolution  
 BISC 404-3 Plant Ecology  
 BISC 407-3 Population Dynamics  
 BISC 409-3 Field Ecology  
 BISC 410-3 Comparative Ethology  
 BISC 424-3 Marine Biology  
 BISC 432-3 Chemical Pesticides and the Environment  
 BISC 435-3 Introduction to Pestology

## GENERAL EDUCATION COURSES

### BISC 603-3 Ecology and the Population Explosion

The demographic and the ecological bases of the population explosion, its biological, economic, and sociological implications; possible solutions and their limitations; and its consequences for the future of mankind. (3-1-0)

*Prerequisites: Open to all students.*

### BISC 604-3 Biology and the Human Species

Principles and processes of general biology with emphasis on occurrences within and implications for the human species of: evolutionary processes; reproduction and inheritance; physiological and behavioural integration and control systems; ecological implications. (3-2-0)

*Prerequisites: Open to all students.*

## DESCRIPTION OF BIOLOGICAL SCIENCE COURSES (BISC)

**Note:** Prerequisites for any course may be waived with the approval of the Department.

### BISC 101-4 Introduction to Biology

The elementary facts and principles of biology; the fundamental properties and functions of micro-organisms, plants, and animals; their molecular, microscopic and visible structure. Instruction is by audio-tutorial methods. (2-1-4)

### BISC 102-4 Introduction to Biology

An introduction to the basic concepts of genetics, systematics, development and ecology, including both plants and animals. Instruction is by audio-tutorial methods. (2-1-4)

**Note:** BISC 101-4 and 102-4 need not be taken in any particular sequence.

BISC 101-4 and 102-4 may be taken concurrently.

### BISC 201-3 Cell Biology

A study of the properties and functions of cells and of their molecular constituents. (3-1-0)  
*Prerequisites: BISC 101-4 and 102-4, CHEM 104-3 and 105-3, CHEM 251-3 (may be taken concurrently).*

### BISC 202-3 Genetics

Principles and concepts of the transmission of genetic information treated comparatively in man, animal, plant and microbe. (3-1-0)  
*Prerequisites: BISC 101-4 and 102-4.*

### BISC 203-3 Developmental Biology

Comparative studies of growth and differentiation of cells, tissues and organs; embryology. (3-1-0)  
*Prerequisites: BISC 101-4 and 102-4.*

### BISC 204-3 Introduction to Ecology

An introduction to biotic - environmental relationships and dynamics; ecological concepts; population dynamics; variation, adaptation and evolution. (3-1-0)  
*Prerequisites: BISC 101-4 and 102-4.*

## Program for Majors

Students majoring in Biological Sciences will be required to obtain the following credits or standing in the subjects: courses, or electives shown to fulfil the requirements for the B.Sc. degree:

| Courses in Biological Sciences                                                                                                                                                                                                                                  | Semester hours    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| BISC 101-4 Introduction to Biology                                                                                                                                                                                                                              | 4                 |
| BISC 102-4 Introduction to Biology                                                                                                                                                                                                                              | 4                 |
| BISC 201-3 Cell Biology                                                                                                                                                                                                                                         | 3                 |
| BISC 202-3 Genetics                                                                                                                                                                                                                                             | 3                 |
| BISC 203-3 Developmental Biology                                                                                                                                                                                                                                | 3                 |
| BISC 204-3 Introduction to Ecology                                                                                                                                                                                                                              | 3                 |
| <b>Three</b>                                                                                                                                                                                                                                                    |                   |
| Four courses from Group I — Cellular and Molecular Biology.<br><del>These two courses are BISC 301-3 and one of BISC 428-3, 434-3, 444-3, 458-3 or 448-3.</del><br><del>BISC 324-4</del><br><del>BISC 424-3, 434-3, 444-3, 458-3, 448-3</del><br><del>1/C</del> | 12                |
| Four courses from Group II — The Biology of Organisms. One course from BISC 306-3 and 316-3; one course from BISC 326-3 and 337-3; one course from BISC 303-3, 306-3, 316-3, 317-3, 326-3, and 337-3; AND one course from BISC 305-3 and 347-3.                 | 12                |
| Two courses from Group III — Population and Community Biology. The courses in Group III are BISC 300-3, 304-3, 400-3 and 404-3.                                                                                                                                 | 6                 |
| Two additional courses chosen from courses listed in the Biological Sciences section of the calendar, numbered 300 or above.                                                                                                                                    | $\frac{6}{50-54}$ |
| <b>Total Semester Hours in Biological Sciences</b>                                                                                                                                                                                                              | <b>30-34</b>      |
| <b>Courses from the Faculty of Science (Non-BISC)</b>                                                                                                                                                                                                           |                   |
| CHEM 104-3 General Chemistry I                                                                                                                                                                                                                                  | 3                 |
| CHEM 105-3 General Chemistry II                                                                                                                                                                                                                                 | 3                 |
| CHEM 115-2 General Chemistry Laboratory                                                                                                                                                                                                                         | 2                 |
| CHEM 251-3 Organic Chemistry I                                                                                                                                                                                                                                  | 3                 |
| CHEM 256-2 Organic Chemistry Laboratory I                                                                                                                                                                                                                       | 2                 |
| MATH 101-3 Introduction to Statistics                                                                                                                                                                                                                           | 3                 |
| MATH 154-3 Calculus I for the Biological Sciences                                                                                                                                                                                                               | 3                 |
| MATH 155-3 Calculus II for the Biological Sciences                                                                                                                                                                                                              | 3                 |
| PHYS 101-3 General Physics I                                                                                                                                                                                                                                    | 3                 |
| PHYS 102-3 General Physics II                                                                                                                                                                                                                                   | 3                 |
| <b>Total Semester Hours (non-BISC) in Faculty of Science</b>                                                                                                                                                                                                    | <b>28</b>         |

### Electives

A minimum of 6 semester hours of electives in subjects taken in Arts, Education (excluding EDUC 401, 402, and 405) or Interdisciplinary Studies.

6

A further ~~36~~ <sup>32</sup> hours of electives in subjects offered by any department or program in the University (excluding EDUC 401, 402, and 405) of which at least ~~14~~ <sup>14</sup> semester hours must be in courses numbered 300 or above. English or a Foreign Language is recommended. MATH 302 is highly recommended.

10

**Total Semester Hours of Electives**

$$\frac{36}{42} \quad \frac{32}{38}$$

**Total Semester Hours**

120

Students awarded advance standing in Biology, Chemistry, Mathematics, or Physics and, therefore, not required to achieve the total semester hours shown for each subject, must still obtain a total of 120 semester hours by taking other courses that will meet the above requirements.

### Recommended Program for Majors

Although there are many variations, the following is a typical program for the first four semesters:

|                |                                                                                                                                                                                                                                                                                            |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Level 1</b> | BISC 102-4 Introductory Biology<br>CHEM 104-3 General Chemistry<br>CHEM 115-2 General Chemistry Laboratory<br>MATH 154-3 Calculus I for the Biological Sciences<br>Elective                                                                                                                |
| <b>Level 2</b> | BISC 101-4 Introductory Biology<br>CHEM 105-3 General Chemistry II<br>MATH 155-3 Calculus II for the Biological Sciences<br>PHYS 101-3 General Physics I<br>Elective<br><b>Note:</b> BISC 101-4 and 102-4 need not be taken in any particular sequence and may also be taken concurrently. |
| <b>Level 3</b> | Two of: BISC 201-3 Cell Biology<br>BISC 202-3 Genetics<br>BISC 203-3 Developmental Biology<br>BISC 204-3 Introduction to Ecology<br>CHEM 251-3 Organic Chemistry I<br>CHEM 256-2 Organic Chemistry Laboratory I<br>PHYS 102-3 General Physics II                                           |

# SIMON FRASER UNIVERSITY

## MEMORANDUM

|                                                            |                                                                  |
|------------------------------------------------------------|------------------------------------------------------------------|
| o Dr. J. M. Webster,<br>Dean of Science.                   | From Dr. M. Mackauer, Chairman,<br>Dept. of Biological Sciences. |
| Subject New Techniques Courses<br>BISC 329, 429, 439, 449. | Date March 8, 1979.                                              |

The new sequence of techniques courses was developed with the following main objectives:

- (1) To update instruction in biological analysis and measurement techniques;
- (2) To provide all Biology majors and honours students with an adequate level of expertise in methodology; and
- (3) To design a course format that would enable meeting objectives (1) and (2) without increasing the requirements for instructional staff or space.

The current techniques courses (BISC 428, 438, 448) are critical components of the Biological Sciences undergraduate curriculum, but they have lost much of their instructional value since their introduction more than 10 years ago. This has happened as a result of a combination of factors, including inadequate space, lengthy turn-around times between experiments, and limited instrumentation. Because of limitations on space and equipment, enrolment in each course has been effectively limited to about 25 students per semester.

The Department considers it essential that all Biology students are provided an opportunity for gaining expertise in the use and interpretation of standard measurement techniques. The new course Introduction to Experimental Techniques (BISC 329-4) is intended to provide such an opportunity; the course will be required of all Biology students and will have an estimated enrolment of about 100 students per annum or about 50 students in each of 2 out of 3 semesters. From the uniform basis provided by this course, students will specialise at the 400-level by selecting 1 of 3 courses in either Separation Methods (BISC 429-3), Ecological Methods (BISC 439-3) or Histochemistry (BISC 449-3); each of the 400-level courses is expected to accommodate an enrolment of about 25-30 students per annum.

To allow for the higher enrolment in BISC 329 we propose to introduce a fixed time-period laboratory consisting of 2 sections of two 3-hr periods each; each section will accommodate 25 students. These periods will be scheduled for afternoon leaving the morning free as before; however, students may use, if necessary, the morning periods for completing laboratory exercises.

Although the Department does not now have available space for the fixed-time schedule format, such space will become available with completion of Phase IV. The expected higher enrolment in BISC 329 will create requirements for additional and updated equipment. Much of the initial cost of instrumentation will be offset, over time, by savings in supervisory staff that would become needed with current courses and course format.

Dr. J. M. Webster...

March 8, 1979

The new 400-level courses represent modification of existing courses that will be dropped from the calendar, if the new system is approved. Thus, the new courses will not require additional space, but they will require new or updated equipment. (It should be noted that similar expenditures will be required for maintaining the current courses viable.) As each of the 400-level courses will be offered, on average, once per year with an estimated enrolment of about 25-30 students, we propose to continue with an open-laboratory format; that format provides students with maximum flexibility for scheduling their times while minimising requirements for duplicate equipment.

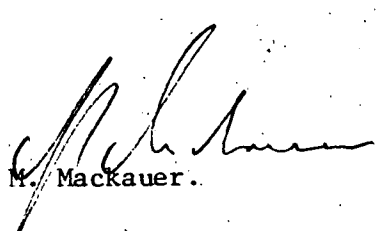
The new courses will not create requirements for new faculty, support staff, or other services, that is, unless enrolments should increase substantially above our current estimates. However, the new courses will require funding over a period of about 3 years at levels measurably above current requirements. A precise estimate of the total costs involved in changing over to the new experimental techniques courses cannot be given; however, a reasonable estimate of the initial costs is \$30 - \$40,000, with perhaps additional annual expenditures of \$10 - \$15,000/annum over the next 3 years. For example, no significant costs are involved in changing over from BISC 448 to BISC 449.

BISC 329 will require some major items such as UV-Vis spectrophotometer with variable slit accessories, coulombmetric  $\text{Cl}^-$  titration apparatus, bomb colorimeters, pH meters, etc. Other essential equipment is on hand.

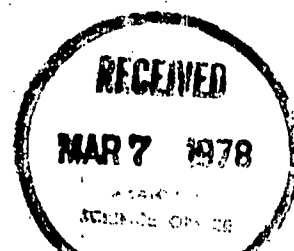
BISC 429 will require updating of current and worn-out equipment including rotors for ultracentrifuge, fraction collectors, spectrophotometer; other equipment on hand.

BISC 439 will require sampling apparatus including grabs, dredges, corers, nets, telemetry equipment, sables, drying ovens, calipers, etc; part of equipment on hand.

In summary, by introducing a 2-tiered system of experimental techniques courses, the Department hopes to provide Biology students with adequate exposure to basic up-to-date procedures of biological analysis and measurement. We believe that such learning will enhance the employment opportunities of Biology students and, indirectly, contribute to the development of quantitatively oriented inter-departmental programs. From a budgetary point of view, we expect that the initial cost of equipment will be offset, to a large degree, by the increased efficiency in handling higher enrolments.

  
M. Mackauer.

MM/ms  
cc C. L. Kemp



## Changes in the technique courses in Biological Sciences

When the programme in Biological Sciences was established, one of the principal features was the development of three Technique Courses (BISC 428-3, 438-3, and 448-3). These courses have served the Department and the students well. However, the courses are now showing their age and appear to be inappropriate in their present form. As a result the Department is proposing a revised offering in Experimental Techniques.

One basic requirement is that students in modern Biology must be aware of, and be able to adapt or apply directly, a wide variety of techniques to biological problems. These techniques must be accessible, useful, and appropriately placed in the biological context. We adopted the following guidelines. First, all biologists must be versatile in various measurement techniques and in the handling and interpretation of the resulting data. Second, biologists should have sufficient technical expertise in the specific area of their interest to be able to conduct and interpret experiments in these areas.

As a consequence we propose the introduction of a basic measurement course (BISC 329-4) as a required course for all Biology Majors and Honours students. This course will, in addition, serve as a prerequisite of a second level (required) Technique course in a more restricted area. There are to be three such courses (BISC 429-3, BISC 439-3 and BISC 449-3) from among which students select one. In order to reduce the impact of the new courses on our resources the current Technique courses BISC 428 and BISC 438 and the Field Ecology course (BISC 409) will be dropped.

The reorganization will involve the following curriculum changes:

|                      |                           |
|----------------------|---------------------------|
| Introduce BISC 329-4 | Drop BISC 428-3 and 438-3 |
| Introduce BISC 429-3 | Drop BISC 428-3, 438-3    |
| Introduce BISC 439-3 | Drop BISC 409-3           |
| Renumber BISC 449-3  | from BISC 448-3           |

The educational benefits are clear. A student will be introduced first, to the basic measurement techniques used by biologists (applied to biological problems), and second, the students will be provided an opportunity for increasing their technical expertise in an area relevant to the area of emphasis in their undergraduate biology programme.

The laboratories for BISC 329-4 will be taught in a fixed time format in order to reduce the demands on laboratory space and teaching support staff. However, in order to realize these savings some funds will be required to update and expand equipment required for hands-on experience by the students. Due to the reorganization of the material covered in BISC 429-3 and BISC 439-3 equipment costs will be a factor in the ability of Biological Sciences to offer these up-dated and reorganized Technique Courses.

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SENATE COMMITTEE ON UNDERGRADUATE STUDIES  
NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 329 Credit Hours: 4 Vector: 2-2-6

Title of Course: Introduction to Experimental Techniques

Calendar Description of Course:

This course is designed to introduce students to basic measurement methods and instrumentation as used in modern biology.

Nature of Course Lecture and Laboratory. See attached sheet.

Prerequisites (or special instructions): At least 60 hours credit in Biological Sciences and completion of Physics, Chemistry and Mathematics requirements for a B.Sc. degree in Biology (see pg. 368).

What course (courses), if any, is being dropped from the calendar if this course is approved: BISC 428-3 and BISC 438-3.

2. Scheduling

How frequently will the course be offered? Twice/year

Semester in which the course will first be offered?

80-1

Which of your present faculty would be available to make the proposed offering possible? Drs. Burr, Lister, Smith, and Baillie.

3. Objectives of the Course

Please see attached page.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

} see memorandum from M. Mackauer to J. Webster dated 79-03-08.

5. Approval

Date: 25 May 1971

Michael Lauer  
Department Chairman

John Burr  
Dean

Chairman, SCUS

NEW COURSE PROPOSAL BISC 329-3: supplementary information.

1. Nature of Course:

Note: The tutorial component of the course will immediately precede each laboratory period and will form part of the laboratory session. This relationship is necessary to ensure that the students have an appropriate technical introduction to each laboratory and have an opportunity for follow-up discussions of the observations.

3. Objectives of the course:

The primary objective of the course is to introduce Biology students to basic measurement techniques at a point in their academic development prior to taking major laboratory courses. The student will be exposed to basic instrumentation and methods that have application at several levels of experimental biology. This course will be a prerequisite to fourth year Biology courses in microtechnique (BISC 449), ecological methods (BISC 439), and separation methods (BISC 429). In addition, the methods learned in the proposed course will enable the Biology undergraduate to undertake appropriate laboratory exercises in courses such as BISC 424, BISC 437, BISC 447, BISC 490, 491, 492.

Our intent is to institute a third year experimental technique course as a required course for all biology majors and honours students. This course will concern itself with methods and instrumentation applicable at all levels of biology. It draws heavily on the information now covered in BISC 428 and BISC 438. Consequently, there will be a revamp of the 4th year experimental techniques courses excepting BISC 448 which is a natural unit and will be maintained as BISC 449. Refer to the course proposal forms for BISC 429 and BISC 439 for information regarding the 4th year experimental techniques course revisions.

The introductory experimental technique course (BISC 329) is designed to alleviate two deficiencies in the present undergraduate program in the Biological Sciences. First, under the present program Biology students enrolled in upper levels Biology courses lack knowledge of basic measurement methods and are often inefficient at the lab bench. As a result, there is a great deal of duplication in upper level lab courses in which basic measurement methods must be taught. Second, in the special case of independent research semesters (BISC 490-92) much time may be squandered by the student learning basic methodology. The introduction of BISC 329-4 and the requirement of an additional technique course will further improve the B.Sc. in the Biological Sciences.

Lecture and Laboratory Topics

1. Data measurement, reduction and presentation.  
Measurement errors, application of simple statistics, introduction to APL, notebook preparation, etc.
2. Application of electronic instrumentation to biology. Voltage measurement, transducers, amplifiers and recorders applied to nerve-muscle preparation.
3. pH measurement of biological solutions; buffers and buffering property of blood.

## NEW COURSE PROPOSAL BISC 415-3: supplementary information

### Rationale

This course is intended to focus attention on a group of vertebrates the study of which has led to many advances in ecology. By the third year, our undergraduates have had many basic courses that deal with some aspect of biology, such as physiology, genetics, and developmental biology. This approach, although logical, does not emphasize the integration of these important aspects of biology into living organisms. The proposed course draws together knowledge gained through exposure to many different fields of biology, culminating in a better understanding of birds as functional units of the environment.

This course has been offered as a Special Topics course to good response by students. The Department is now in a position to recognize both student and faculty interest by proposing Ornithology as a regular component of their undergraduate offering.

### BISC 415 - Ornithology - Selected Topics

1. Introduction, classification, origin of North American birds
  2. Feathers - types, development, maintenance, feather tracts
  3. Molt - plumage change, molt patterns, energy requirements of molt, timing
  4. Flight - mechanisms, wing shapes and ecology, energy requirements
  5. Sense organs - touch, smell, sound, vision
  6. Vocalization and territory - types of sound, song learning, ecology of sound.
  7. Basic morphology - circulation, respiration, digestion and food habits, excretion and reproduction (egg formation, photoperiodical and physiological adaptations, timing of egg laying)
  8. Reproduction and ecology - eggs, nests, clutch size and its regulation, physiology of incubation, incubation period, hatching, fledging, mortality
  9. Nest parasitism - occurrence, adaptations
  10. Migration - why migrate?, origin, physiology and behavior, timing, direction, orientation
  11. Management and conservation
-

Supplementary information BISC 329-3 (continued)

4. Amperometry and polarography. Measurement of  $\text{Cl}^-$  conc. of crustacean blood. Oxygen-electrode applied to respirometry.
  5. Introduction to research microscopy. Optimization of phase and bright-field techniques.
  6. Photometry. Measurement of light intensity and spectral distribution in lab and field.
  7. Absorption spectrophotometry. Special attention to spectra of biological materials and measurement in tissues.
  8. Fluorescence spectrophotometry. ATP measurement using the luciferin/luciferase system. Spectrophotofluorometry of neural transmitters(catecholamines).
  9. Radiation safety, characteristics of radioisotopes.  $\alpha, \beta$  particles, gamma and X-radiation decay rates, half-lives, specific activity.
  10. Measurements of radiation, Geiger-Muller tubes, scalars, scintillation counters; quenching, shielding, efficiency.
  11. Autoradiography, stripping film, emulsion, exposure and development.
  12. Measurement of osmotic pressure of biological fluids.
  13. Measurements of heat and temperature. Bomb calorimetry for application to measurement of caloric flow in ecosystems.
-

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 429 Credit Hours: 03 Vector: 1-1-6

Title of Course: Experimental Techniques I: Separation Methods.

Calendar Description of Course:

Theory and practice of analytical and preparative separation methods in biology.

Nature of Course Lecture & Laboratory

Prerequisites (or special instructions):

Department. *Students with credit for BISC 428-3 must take this course for full credit.*  
BISC 329, or permission of the  
What course (courses), if any, is being dropped from the calendar if this course is approved: BISC 428-3 and BISC 438-3.

2. Scheduling

How frequently will the course be offered? Once/year

Semester in which the course will first be offered? 80-1

Which of your present faculty would be available to make the proposed offering possible? Drs. Lister, Smith, Burr and Baillie

3. Objectives of the Course

The objective of this course is to expose advanced undergraduate students to the methods of cell, organelle, and macromolecular separation and analysis used in contemporary experimental biology. This will be accomplished by student participation in open lab in which specific techniques will be applied to selected research problems.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

see memorandum from M. Mackauer to J. Webster dated 79-03-08.

5. Approval

Date: Nov. 23, 1971

[Signature]  
Department Chairman

[Signature]  
Dean

[Signature]  
Chairman, SCUS

## NEW COURSE PROPOSAL BISC 429-3: supplementary information

### Rationale

This course will be a combination of several areas currently presented in BISC 428 and BISC 438. With the introduction of a third year level "Measurements" course, (BISC 329-4), this fourth year course can concentrate on separation methods and techniques used in modern biology. This course will be of particular use to students interested in molecular biology, genetics, cell biology, and physiology. The techniques will also be relevant to the analysis of environmental molecular pollutants.

This course will be presented as an open lab supplemented with (1) lectures to provide the theoretical background for the laboratory exercises and (2) tutorials to provide the necessary technical background and follow-up discussions of the laboratory exercises.

The lab projects will cover the following areas:

- I Electrophoretic methods:
    - a) Theories of electrophoresis
    - b) Classical methods: cellulose acetate and the separation of plasma proteins
    - c) Modern electrophoretic methods:
      - i) Immunoelectrophoresis
      - ii) Polyacrylamide and agarose electrophoresis media: use of specific protein denaturants, SDS, urea, etc.
      - iii) Isoelectric focusing
      - iv) Two-dimensional electrophoresis
  - II Chromatographic techniques:
    - a) Paper and thin-layer chromatography
    - b) Ion exchange methods
    - c) Gel filtration
    - d) Affinity chromatography
  - III Sedimentation and centrifugation techniques
    - a) Theories of sedimentation
    - b) Cellular separation on basis of size and density
    - c) Cell organelle isolation; sucrose gradients, and preparative differential centrifugation
    - d) Macromolecular characterization, sedimentation velocity, and sedimentation equilibrium methods
    - e) Density gradient centrifugation; rate zonal, and isopycnic methods
-

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 439 Credit Hours: 3 Vector: 1-1-6

Title of Course: Experimental Techniques II: Ecological Methods

Calendar Description of Course:

Field and laboratory techniques in ecology.

Nature of Course Laboratory course with field sessions.

Prerequisites (or special instructions):

BISC 204, 329 or permission of Department ; BISC 310, 304 and 404 are recommended.

What course (courses), if any, is being dropped from the calendar if this course is approved: BISC 409.

2. Scheduling

How frequently will the course be offered? Once/year during summer or fall semester

Semester in which the course will first be offered? 80-1

Which of your present faculty would be available to make the proposed offering possible? Drs. Brooke, Dill, Geen, Hartwick, Mathewes, Sadleir, Verbeek. The course will be team-taught to give a balanced presentation of plant and animal problems.

3. Objectives of the Course

To provide instruction in the methods of collecting, analysing, and presenting ecological data.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

see memorandum from M. Mackauer to J. Webster dated 79-03-08.

5. Approval

Date: Nov. 23, 1971

[Signature]  
Department Chairman

[Signature]  
Dean

[Signature]  
Chairman, SCUS

1. Calendar InformationDepartment: BIOLOGICAL SCIENCESAbbreviation Code: BISC Course Number: 449 Credit Hours: 3 Vector: 1-1-6Title of Course: Experimental Techniques III Histochemistry

Calendar Description of Course:

Current Title: Experimental Techniques III

## Nature of Course

Prerequisites (or special instructions):

*Students with credit for BISC 448-1 cannot take this course for further credit.*

What course (courses), if any, is being dropped from the calendar if this course is approved: BISC 448

2. Scheduling

How frequently will the course be offered?

Semester in which the course will first be offered?

Which of your present faculty would be available to make the proposed offering possible?

3. Objectives of the Course

Rationale for the change: The realignment of the Experimental Techniques courses in Biological Sciences has resulted in name and number changes of the other courses in this group. In order to have a consistent number and name sequence the changes noted above are proposed.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

5. ApprovalDate: Nov. 23, 1974Richard  
Department ChairmanNS Hunt  
Dean

Chairman, SCUS

# SIMON FRASER UNIVERSITY

## MEMORANDUM

To..... Dr. J. M. Webster,

..... Dean of Science.

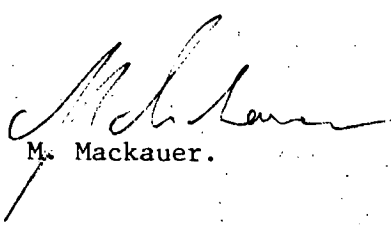
Subject..... BISC 415 (Ornithology)

From..... Dr. M. Mackauer, Chairman,

..... Dept. of Biological Sciences.

Date..... March 7, 1979.

With reference to the proposal to introduce a new course Ornithology (BISC 415-3), I do not expect that approval of the course will create any new requirements for faculty, staff, space or similar support. There may be, from time to time, requirements for laboratory supplies or minor equipment. As the course has been given twice as a Special Topics course with enrolments of 48 and 14 students in 1977-1 and 1978-3, respectively, I would anticipate an average enrolment of about 20-25 students at a course frequency of once per year.

  
M. Mackauer.

MM/ms

cc C. L. Kemp



SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 415

Credit Hours: 3 Vector: 2-0-4

Title of Course: Ornithology

Calendar Description of Course:

An introduction to the biology of birds, with an emphasis on their reproduction, morphology, behaviour, and ecology.

Nature of Course Lectures, laboratories and occasional field trips

Prerequisites (or special instructions):

BISC 304-3 or BISC 316-3

What course (courses), if any, is being dropped from the calendar if this course is approved:

None

2. Scheduling

How frequently will the course be offered? Once/year

Semester in which the course will first be offered? 80-1

Which of your present faculty would be available to make the proposed offering possible? Dr. N. Verbeek

3. Objectives of the Course

To provide advanced undergraduate students with an understanding of the biology of birds. This will be achieved through a series of lectures on a wide range of topics. Laboratories will emphasize classification, identification, and morphology of North American birds, behaviour, and ecology. Field trips will provide practical experience in field identification, behaviour studies and ecology of birds.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

See attached memo from M. Mackauer to J.M. Webster of 79 03 07.

5. Approval

Date: Nov. 27 1978

M. Mackauer  
Department Chairman

R. A. Hall  
Dean

Chairman, SCUS

## NEW COURSE PROPOSAL BISC 415-3: supplementary information

### Rationale

This course is intended to focus attention on a group of vertebrates the study of which has led to many advances in ecology. By the third year, our undergraduates have had many basic courses that deal with some aspect of biology, such as physiology, genetics, and developmental biology. This approach, although logical, does not emphasize the integration of these important aspects of biology into living organisms. The proposed course draws together knowledge gained through exposure to many different fields of biology, culminating in a better understanding of birds as functional units of the environment.

This course has been offered as a Special Topics course to good response by students. The Department is now in a position to recognize both student and faculty interest by proposing Ornithology as a regular component of their undergraduate offering.

### BISC 415 - Ornithology - Selected Topics

1. Introduction, classification, origin of North American birds
  2. Feathers - types, development, maintenance, feather tracts
  3. Molt - plumage change, molt patterns, energy requirements of molt, timing
  4. Flight - mechanisms, wing shapes and ecology, energy requirements
  5. Sense organs - touch, smell, sound, vision
  6. Vocalization and territory - types of sound, song learning, ecology of sound.
  7. Basic morphology - circulation, respiration, digestion and food habits, excretion and reproduction (egg formation, photoperiodical and physiological adaptations, timing of egg laying)
  8. Reproduction and ecology - eggs, nests, clutch size and its regulation, physiology of incubation, incubation period, hatching, fledging, mortality
  9. Nest parasitism - occurrence, adaptations
  10. Migration - why migrate?, origin, physiology and behavior, timing, direction, orientation
  11. Management and conservation
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