

S.74-29

SIMON FRASER UNIVERSITY

MEMORANDUM

To SENATE  
  
Subject MINOR PROGRAM IN BIOLOGICAL SCIENCES

From SENATE COMMITTEE ON UNDERGRADUATE STUDIES  
  
Date JANUARY 23, 1974

MOTION: "That Senate approve, as set forth in S.74-29,  
the proposed Minor Program in Biological  
Sciences."

# SIMON FRASER UNIVERSITY

S.74-29

## MEMORANDUM

To..... Senate

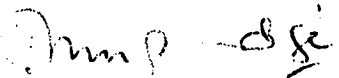
From..... Senate Committee on Undergraduate  
Studies

Subject..... MINOR PROGRAM IN  
BIOLOGICAL SCIENCES

Date..... 23 January, 1974

On the recommendation of the Faculty of Science the Senate Committee on Undergraduate Studies has approved, as set forth in SCUS 74-5, the proposed Minor Program in Biological Sciences and recommends approval to Senate.

It should be noted that this proposal was referred back to the Department of Biological Sciences by SCUS for clarification of the questions of providing alternatives to BISC 101 and 102 in the proposed program and of the student who has advanced in the major program without these courses but wishes to terminate with a minor for which they are not required. This clarification is included as SCUS 74-5.

  
I. Mugridge  
Chairman

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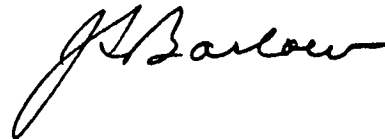
MEMORANDUM

To Senate Committee on Undergraduate Studies  
Subject MINOR PROGRAM IN BIO-SCIENCES

From J.S. Barlow, Chairman  
Faculty of Science Undergraduate Curriculum Committee  
Date December 28, 1973

The question of providing an alternative to BISC 101 and 102 in the proposed Minor Program in Biological Sciences, as is done for the major program, and the problem of the student who has progressed well along the major program without these courses but who wishes to terminate with a minor have been reconsidered by the Department of Bio-Sciences and the Faculty of Science Undergraduate Curriculum Committee. Attached you will find the decision of the Department of Bio-Sciences and full rationale which is supported by the Faculty of Science Undergraduate Curriculum Committee.

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# SIMON FRASER UNIVERSITY

## MEMORANDUM

To Dr. J. S. Barlow

Assoc. Dean of Science

Subject: A Minor Program in Biological Sciences

From Dr. A. L. Turnbull

Chairman, DUCC

Date November 30, 1973

- I. The Department of Biological Sciences proposed the following minor program,
1. Bisc 101-4 and 102-4. (Biology 11 and 12 from B.C. High Schools will not be accepted in lieu of Bisc 101 and 102 respectively).
  2. Any 14-18 hours of upper division credits for which students have obtained the necessary prerequisites.
- II. This proposal was considered by the Senate Committee on Undergraduate Studies and referred back to the Faculty of Science Curriculum Committee "with the request that consideration be given to the question of providing an alternative to Bisc 101 and 102 as is done for the major program; and to the problem of the student who has progressed well along the major program without these courses but who wishes to terminate with a minor".
- III. The Department of Biological Sciences Undergraduate Curriculum Committee has reconsidered the two 'problems' as requested by S.C.U.S. and reaffirms its conviction that Biology 11 and 12 are not adequate substitutes for Bisc 101 and 102 for the Minor Program for the following reasons:
- A. Problem 1.
- The reason for making Bisc 101 and 102 mandatory.
1. The Biological Sciences consist of a wide range of disciplines, each of which contributes an unique set of information to the understanding of life processes. Since its inception, the curriculum of this department has been designed to expose students to as wide a range of these disciplines as possible, on the principle that the nature of biological information cannot be appreciated or comprehended without an appreciation of its disparate sources.
- This principle has been implemented by two devices:
- a. Bisc 101 and 102 have been designed to provide an intensive survey of the disciplines that contribute to an understanding of life processes and the kinds of information they can supply.
  - b. The undergraduate curriculum ensures that 21 hours of upper division credits are distributed in a specific fashion among the main disciplinary areas, thus ensuring coverage of the main biological disciplines.
- Major students, who are subjected to the second of these two devices, are not compelled to undergo the first, though they are strongly advised to do so. Thus, if they have received an adequate preparation to enter the 200 level courses they are excused Bisc 101 and 102.

It should be noted that we do not consider Biology 11 and 12 as identical to Bisc 101 and 102. But we do accept them as an adequate preparation for the 200 level courses, and we accept them provided that the student subsequently follows the majors program.

Minors students are not subjected to the second device. Therefore they are required to undergo the first, i.e. to take Bisc 101 and 102.

We consider that 21 hours of upper division diversification is minimal for our major students who will ultimately take much more biology. Minor students, who at best will receive a very scant exposure to biology, could not achieve the same end with less.

Bisc 101 and 102 provide in 8 hours the breadth of experience that would require 21 hours of upper division courses. The depth of Bisc 101 and 102, of course, is much less than that provided by upper division courses, but depth is one of the values that is sacrificed in the minor program.

Moreover, we do not consider it desirable to compel minors students to diversify their studies in the upper divisions. They will have little enough opportunity to learn any significant portion of biology in 14-18 hours. It is far better to permit them to expend these 14-18 hours achieving depth in some particular discipline that fits their needs and interests. By ensuring that they receive the essential elements of breadth in Bisc 101 and 102 they are free to pursue their own interests in the upper division.

2. All biological information is derived from empirical experimentation. Experience in acquiring, analysing, interpreting, and integrating empirical data is an essential part of biology and is necessary to foster an appreciation and understanding of biological information.

Thus we require all students in biology to undertake laboratory courses in which such experience can be gained.

Because of the disparate nature of the disciplines that make up the biological sciences, there are gross differences in the experimental procedures that are employed and in the kinds of information that are revealed. Totally different conceptual models are required to interpret data from different disciplines.

Thus we feel that just laboratory experience per se is not enough. Laboratory exercises must include a wide range of experiences distributed over a range of disciplines so that differences in the nature of information contributed by each is appreciated.

There are only two courses in the curriculum that provide such a range of experiments - Bisc 101 and 102.

All other laboratory courses are unidisciplinary. A wide range of such courses would be needed to provide the same breadth of experiences.

#### B. Problem 2.

Biology majors who have progressed well along the major program but who wish to terminate with a minor.

This case constitutes an exception to normal student procedure.

Undoubtedly a number of other exceptions to normal procedure could be anticipated, and still others will arise that cannot be anticipated.

We do not think it is possible to legislate for all possible exceptions to normal procedures, and we do not think it is wise to try to do so.

Exceptional circumstances can be dealt with by exceptional dispensations, Senate has made provisions for waiving course requirements in situations such as this.

In general we recognize no incongruity in requiring students who abandon a majors program in favour of a miners program to achieve the necessary breadth of experience by undertaking Bisc 101 and 102.

Note that Bisc 101 and 102 are open to challenge, as are all biology courses.

For these reasons we feel that it is necessary to retain Bisc 101 and 102 as required courses in the Minor Program.

As the Minor Program is now proposed it is simple, flexible, and permits students maximal freedom of choice. Any modifications to this simple concept would only add complexity and restrictions. Any attempt to define upper division alternatives to Bisc 101 and 102 would restrict possible alternatives to a single set. If, however, we remain silent on this matter Senate has made available alternatives outside this document by which hardships and injustices can be rectified.



A. L. Turnbull

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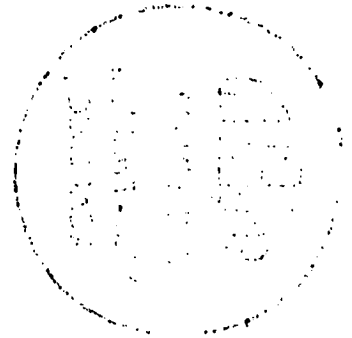
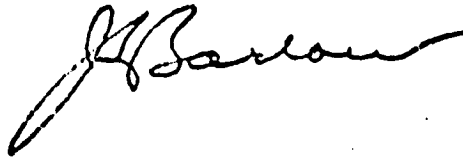
SCUS 73-29

MEMORANDUM

Senate Committee on	From	J.S. Barlow
Undergraduate Studies		Associate Dean of Science
Subject: MINOR IN BIOLOGICAL SCIENCES	Date	June 28, 1973

The attached Minor in Biological Sciences was approved by the Faculty of Science at its meeting of June 26, 1973, and is now submitted to you for approval.

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A MINOR

IN BIOLOGICAL SCIENCES

Lower Division Courses

BiSc. 101-4 Introduction to Biology

BiSc. 102-4 Introduction to Biology

Note: in the minor program B.C. High School Biology 11 & 12 will not be accepted as equivalent to BiSc. 101 & 102, because the laboratory experience of the latter courses is deemed essential to the abbreviated exposure to biology in the minor program.

Upper Division Courses

14-18 credit hours in upper *division* Biology courses (numbered 300 and above) for which the student has acquired the necessary prerequisites.



## RATIONALE FOR THE MINOR PROGRAM

The minor portion of a major - minor degree is obviously something less than a major. But it should be something different than a watered-down, lesser, and easier form of a major program.

We have concluded that a minor in biology should make no attempt to prepare second-rate biologists, and we have dropped all pretense of doing so. Instead we have aimed at doing one of two things:

- (a) to provide non-biology majors with a practical, "natural history" appreciation of living forms and processes;
- (b) to provide non-biology majors with an opportunity to develop some narrow area of special interest in biology.

In our eyes the minor program is supplementary to a major program in some other discipline. It does not stand on its own. It permits a student who is receiving his principal education elsewhere to amplify his understanding of his principal discipline by gaining some insights into a different discipline which is based on other values, other precepts, and other methodologies.

The Biology minor is designed to permit students from other disciplines to enter into significant biological studies as readily as possible. It is our assumption that students who wish to minor in biology wish to study biological subjects. Within the context of the biology minor the other sciences will be of peripheral concern. Students opting for a biology minor will fall into two broad categories:

(a) students majoring in another science;

(b) students from Arts, Education and Interdisciplinary Studies, The former receive basic sciences within their major program. The latter would find the elements of other sciences useful but non-essential. Though many upper levels biology courses require prerequisites in other sciences, there are many that do not. We insist that biology majors take most of the latter group, and the rest are highly recommended options. These are not courses that have been diluted to cater to unprepared students. They are courses that start from their own classical premises

and develop philosophies and concepts that are in no way derivative of the other sciences, and they are valid and essential components of biological training.

We see no reason why these subjects, which form coherent and useful blocks of information, should not be readily available as supplements to major degrees in other disciplines. In fact, they are so pertinent to living in and understanding our general social environment we could be considered negligent in not making them more available earlier.

Upper Levels Biological Sciences Courses Available with BiSc. 101 & 102

- 303-3 Microbiology
- 316-3 Vertebrate Biology
- 317-3 Insect Biology
- 326-3 Biology of non-Vascular Plants
- 336-3 Biology of Vascular Plants
- 346-3 Biosystematics (317, 326 or 336)
- 400-3 Evolution (3 years Biology recommended)
- 417-3 Entomology (317)
- 428-3 Experimental Techniques I
- 438-3       "               "        II
- 448-3       "               "        III
- 435-3 Introduction to Pestology
- 424-3 Marine Biology (326 or 306, 300 recommended)

A selection of 5-6 of these courses would provide 15-18 semester hours

A coherent survey of the forms, diversity, classification, and life associations of living organisms could be:

303, 316, 317, 326, 336, 400.

A useful overview of the marine environment could be:

303, 326, 424, 346, 400.

A useful practical program in methodology could be:

303, 346, 328, 338, 348.

Depending on the interest of the student others of these courses could be substituted in any of the suggested sequences. Thus we do not wish to designate any specific associations of courses as prescribed sequences. Rather we would permit the student to follow his own interests even if this seemed to us to be somewhat incoherent. We have some faith in the judgement of students to select courses rationally.

The requirements we have set out are minimal. If a student wishes to broaden his opportunities one or two additional prerequisites open up additional subject areas to him.

e.g. BiSc. 204 opens up the ecology series,  
304, 407, 409, 430.

BiSc. 202 opens up genetics, 302, 402.

BiSc. 203 opens up invertebrate and marine biology.  
306, 424, 400, 410, 420, 430.

We maintain that the minors program we recommend opens up significant and useful areas of Biological study, and leaves open the option of increasing the number of lower levels prerequisites, and prerequisites from other sciences if the student wishes to broaden the subject material available to him.