FOR S. 72-16
APPENDIX A

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Dr. G.H. Geen, Chairman
Department of Biological Sciences

From: Dr. S. Aronoff, S. A.
Dean of Science.

Subject: Bamfield Courses.

Date: January 6, 1972.

Dear Glen:

Gil Brett has forwarded to me on your behalf the outlines for the courses at Bamfield. I want to take the opportunity to have you thank the several staff members who were involved in the preparation of these notes; they are almost precisely the kind of thing I had hoped would emerge. While there is some obvious, but minor, overlap with our courses here on home base, I feel that both from the point of view of the heterogeneity of the student population and of the need for some review in every course, there need be no gross concern on this account. I am taking the liberty of having copies of these sent to the Secretary of the Senate for distribution to the members of the Senate so that an adequate basis will exist for the presentation on 10/JA/72.

I apologize again for the haste in which these had to be prepared, but I now have very few qualms in there presentation.

SA:dep

c.c. Mr. Evans, Secretary of Senate.

SIMON FRASER UNIVERSITY

MEMORANDUM

To Dr. S. Aronoff
Dean of Science

From Dr. G.H. Geen, Chairman
Department of Biological Sciences

Subject Bamfield Courses

Date December 31, 1971

I am enclosing outlines on the course material likely to be covered in the Bamfield Courses. Please note that the example outline for Marine Science 410 is slightly different than we propose. However, this expansion of time available would have no bearing on the number of contact hours or content.

/ct
Enclosures

G. G. Brett
for G.H. Geen,
Chairman.

Marine Benthic Algae MASC 420

Purpose: To introduce students to the diversity of marine algae, their biology and environment.

General Approach: Emphasis will be placed on field work and to a lesser extent laboratory exercises. Student projects, lectures and seminars will also be employed.

Specific Approach:

Field Work:

General observations and collections will be made at a variety of habitats, e.g., exposed and sheltered rocky intertidal and subtidal shores. Class exercises will be conducted in the field. The extent depends upon number of SCUBA diving students and tides. These will include -

Methods of determining seaweed quantities (transects, quadrats, photography).

Characterization of the algal physical environment

Definition of algal communities

Laboratory Exercises:

A large portion of the laboratory time will be spent identifying collected algae. This exercise introduces the student to the basic vegetative and reproductive morphology of the plants and emphasizes differences used to distinguish species. Other exercises include -

Pigment extraction - demonstrating biochemical differences used to separate major groups of algae.

Determination of caloric value and concentrations of major metabolites of selected algae (relates to food value).

Establishment of laboratory cultures using a variety of techniques (these are essential to most laboratory experimentation).

Determination of nutritional requirements.

Determination of toxic effects of major British Columbia pollutants (e.g., Kraft Mill effluent).

Student Projects:

The purpose of these is to allow the student to explore an area of interest - the research techniques and literature. The nature of the projects will depend upon facilities. However, emphasis will be placed on field oriented research.

Lectures and Seminars:

Lectures will include the following -

Classification - taxonomic
Classification - ecological
Classification - industrial
Diversity of form, reproduction, and metabolite production
Chromatic adaptation
Symbiosis
Distribution and dispersal
Mariculture

Seminars will be extracted from visiting and resident phycologists. Further, students will report on their projects.

Western Canadian Universities Marine Biological Society

Summer Course Program

Course Proposal: Marine Science 430 - Marine Ecology

Present Offerings in Ecology at SFU

The student at SFU is introduced to general ecological principles in General Ecology (204); the principles of animal ecology in 304, and terrestrial plant ecology in 404; the physics and chemistry of terrestrial and aquatic environments in 300; the principles of population dynamics of terrestrial animals (407); and the principle disciplines of marine biology in 424. In Field Ecology (409) the student applies ecological concepts to a specific freshwater ecosystem.

Marine Science 430

The proposed course at the Bamfield Marine Station will provide an opportunity for a detailed study of specific marine ecosystems. Marine habitats in the Marine Station area range from highly estuarine to open sea; from protected mudflats to fully exposed rocky cliffs; and from the supralittoral to deep sea submarine canyons. The course will emphasize work in the field, with provision for simulating certain biotic and abiotic conditions in the laboratory. The effects of many ecological variables cannot be determined in a six week term. Each class as a group will initiate individual projects on one specific community. Class reports will be kept on file at the Station so that subsequent classes and individuals can continue work on the same communities over a period of years.

Course Description: Marine Science 430-6 Marine Ecology

An analytical approach to biotic associations in the marine environment. Opportunities will be provided for study of the intertidal realm in exposed and protected areas and of beaches and estuaries in the vicinity of the Bamfield Marine Station; plankton studies and investigations of the subtidal and benthic environments by diving and dredging are also emphasized.

Course level and credit

400 level course; open to graduate students and advanced undergraduate students. Enrollment limited to 20 students with selection by WCUMBS Committee of those most qualified. The course will have 10 hours of lecture and 15 hours of laboratory field work per week and is equivalent to an SFU 6 semester hour course.

Prerequisites

SFU Biology 204, 304, 300 or equivalent courses of consent of instructor. Biology 424 recommended.

Example of Outline for Marine Science 430

I. Physical, chemical and geological regimes in the Barkley Sound area.

- Salinity and temperature, climatology
- Dissolved gases
- Other chemical factors
- Water movements
- Sedimentology, petrology

II. Synoptic survey of major habitats (macro and meiofauna)

- Protected boulder and rock
- Semi-exposed boulder and granitic rock
- Exposed granitic and sandstone rock
- Mudflats, estuarine and non-estuarine, salt marshes
- Sandy beaches, semi-exposed and exposed
- Wharf pilings and floats
- Open sea ships and buoys
- Subtidal benthos--various depths and substrates
- Plankton (zoo, phyto, micro, etc.), neuston and pleuston
- Nekton

III. Associations and interactions in selected communities

- Population dynamics
- Behavioural interactions
- Physiological interactions
- Bioenergetics

IV. Initiate detailed analysis of one specific community

- Description
- Experimental manipulation
- Individual research projects

Western Canadian Universities Marine Biological Society

Summer Course Program

Course Proposal: Marine Science 410 - Marine Invertebrate Zoology

Present offerings in Invertebrate Biology at SFU

Invertebrate biology 306 introduces the student to the major types of non-chordate animals; basic plans of organization for each major group; and general concepts of phylogeny, behaviour, development and functional anatomy. In advanced invertebrate biology (418) the students as a group enter into a research project on a selected organism or community. Emphasis is placed on the research activities of an invertebrate biologist, and the principals and basic techniques of exploring a specific problem.

Marine Science 410 (6)

This course is designed to provide the advanced student with the tools, environments and time for an in-depth study of temperate water marine invertebrates. All major marine invertebrate groups are represented in the vicinity of the marine station. Lectures will incorporate three basic themes: diversity--major structural and functional trends and characteristics in each major taxon; continuity--phylogenetic models; functional integration--structural and developmental analogues.

Course Description: Marine Science 410-6 Marine Invertebrate Zoology

A survey of the marine phyla, with emphasis on the benthic fauna in the vicinity of the Bamfield Marine Station. The course includes lectures, laboratory periods, field collection, identification, and observation. Emphasis is placed on the study of living specimens in the laboratory and in the field.

Course Level and Credit

400 level course; open to graduate students and advanced undergraduate students. Enrollment limited to 20 students, selected by WCUMBS Committee from those most qualified. The course will have 10 hours of lecture and 15 hours of laboratory work per week and is equivalent to a 6 semester hour course at SFU.

Prerequisites

SFU Biology 306 or equivalent course or consent of instructor.

Example of Outline for Marine Science 410

	Labs and Lectures	Class Field Trips	Technical Support
June 14	Introduction, Porifera	0940 .2 rocky intertidal and wharf-sponges	dive demo. and hexact. sponges
June 15	Mesozoa, Hydrozoa	1025 .9 rocky intertidal and wharf-hydroids, anthoz.	dive hydroids, anth. Octopus, Rossia
June 16	Anthozoa	----------	
June 19	Scyphozoa, Ctenophora	plankton-scyphozoa, hydromedusae, ctenophores	dive-stauromed.
June 20	Turbellaria	wharf-turbellaria	dive-insterstit. & symb. turb.
June 21	Nemertea	wharf-hoplonemertea	dive-nemertea
June 22	Rotifera, Kinorhyncha Gastrotricha	----------	dive-gastrotrichs dredge-kinorhynchs
June 23	Endoprocta, Nematoda	wharf endoprocts, nemas	----------
June 26	Asteroids, Ophiuroids	0730 1.2 rocky intertid. ast. and oph.	dive-ast. and oph. dredge " "
June 27	Echinoids, Holothuroids Crinoids	0805 1.1 rocky intertid. eoids, holothuroids	dive-echinoids & holothuroids, crinoids
June 28	Pogonophora, Hemichordata Urochordata	0840 1.0 rocky intertid. and wharf-ascidians	dive-ascidians plankton-thaliac.
June 29	Ectoprocts	0915 1.1 rocky intertid. ectoprocts, chitons wharf-ectoprocts	dive-ectoprocts
June 30	Cephalochordates, Priapulids, Chaetognaths	----------	plankton-chaet. dredge-priap.
July 3	Phylogeny	----------	
July 4	Phoronida, Brachiopoda	----------	dive-brachs.
July 5	Polyplacophora, Aplacophora, Scaphopoda	dredge-molluscs	dive-molluscs
July 6	Lamellibranchs	wharf-bivalves	dredge-gastrop.
July 7	Gastropoda, Cephalopoda	0425 1.2 rocky intertidal gastropods	seine-Rossia
July 10	Polychaetes	0705 -.1 rocky intertidal polychaetes, sipuncs	dive-polychaetes
July 11	Polychaetes, Sipunculids	0755 -.1 mudflats-polych.	interstit.-archian. and-polychaetes
July 12	Pycnogonids, lower Crustacea	0835 .2 rocky intertidal copepods, pycnogonids cirripds	plankton-crustac.
July 13	Lower malocostraca	0915 .7 peracaridans decapods-rocky intertid.	dive-malacostraca
July 14	Decapoda, phylogeny	----------	
July 17	Final exam		

S.72-16

SIMON FRASER UNIVERSITY

MEMORANDUM

To SENATE

From

Subject NEW COURSE PROPOSAL - BIOLOGICAL SCIENCES: MARINE SCIENCE 400, 410, 420, 430

Date DECEMBER 22, 1971

MOTION: "That Senate approve, subject to satisfactory administrative arrangements being made, the new course proposals as set forth in S.72-16, for offering at Bamfield:

Marine Science 400-6 Directed Studies

Marine Science 410-6 Marine Invertebrate Zoology

Marine Science 420-6 Marine Phycology

Marine Science 430-6 Marine Ecology."

S 72-16

SIMON FRASER UNIVERSITY

MEMORANDUM

To: SENATE

From: SENATE UNDERGRADUATE STUDIES COMMITTEE

Subject: NEW COURSE PROPOSALS - BIOLOGICAL SCIENCES: MARINE SCIENCE 400, 410, 420, 430

Date: DECEMBER 22, 1971

The Senate Committee on Undergraduate Studies approved, subject to satisfactory administrative arrangements being made, the new course proposals for Marine Science 400, 410, 420, 430, as set forth in SCUS 71-30, and recommends approval to Senate.

SCUS 71-30

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Mr. H. Evans,
Secretary of Senate.

From: B.L. Funt,
Dean of Science.

Subject: New Course Proposal
WCUMBS - Paper F-71-8

Date: March 10, 1971.

The attached new course proposals for the Department of Biological Sciences represent the first offerings proposed from this University in conjunction with WCUMBS (Western Canadian Universities Marine Biological Society). The proposals outlined in paper F-71-8 were considered by the Undergraduate Curriculum Committee of the Faculty of Science and recommended to the Faculty for approval. They were considered and approved on behalf of Faculty by the Executive Committee at its meeting of March 10th and are recommended to Senate for approval.

B. Funt

BLF/lr

enclosure.

F-71-8

NEW COURSE PROPOSALS: WCUMBS - BIOLOGICAL SCIENCES

At the meeting of the Academic Committee of WCUMBS of November 5, 1970, agreement was reached that courses in Marine Science 400, 410, 420 and 430 should be offered by the participating universities and included in their university calendars. Course descriptions are included on the enclosure.

Dr. Geen in his letter of December 29th (attached) reviewed the steps which the participating universities were taking to implement this proposal.

The course submissions 400, 410, 420 and 430 have been considered and approved by the Undergraduate Curriculum Committee at its meeting of February 22nd. They are now recommended to Faculty for approval.

It should be noted that the courses will be given in rotation by the members of the academic faculties of the consortium of universities cooperating on the WCUMBS Marine Station at Bamfield. Furthermore, the students in any of the courses will represent a mix of students from all of the participating universities.

:la

B. L. Funt

APPROVED BY THE EXECUTIVE COMMITTEE OF THE FACULTY OF SCIENCE ON BEHALF OF THE FACULTY OF SCIENCE ON MARCH 10, 1971.

SIMON FRASER UNIVERSITY

MEMORANDUM

Dean Funt	From Dr. G. H. Geen
Dean of Science	Biological Sciences
Subject W.C.U.M.B.S. courses	Date December 29, 1970

I am enclosing the appropriate documents which describe four new courses to be offered at the Bamfield Marine Station. These courses have been approved by the Department of Biological Sciences and are being forwarded to you for consideration by the Faculty of Science.

Let me review briefly the status of the Bamfield Marine Station so that these courses may be considered in the proper context.

1. Five Universities (Alberta, Calgary, Victoria, B. C. and S. F. U.) have jointly purchased an old cable station in the village of Bamfield with the intent of developing a marine station for teaching and research.

2. A society (Western Canadian Universities Marine Biological Society) has been formed by the parent universities to operate the station.

3. The members of the Society have now applied to the National Research Council of Canada for a Negotiated Development Grant to assist in the development of this facility.

4. Four undergraduate courses have now been proposed by the Society for consideration at each of the parent universities. It is our hope that each University will recognize these courses for credit toward their degrees.

5. These courses will run for 6 - 7 weeks. Students will only be able to take one course at a time. It is recommended that these courses carry 6 semester hours credit in view of the load associated with these courses (probably 1 - 2 lectures/ day, and 1 lab per day).

6. Control of the courses offered at the Bamfield Marine Station is ensured by the presence of at least one academic from each parent University on the Marine Station Management Council.

If any further questions arise I would be pleased to provide the necessary information.

Yours truly,

Glen H. Geen
Acting Head

GHG:kmb
Encls.

SIMON FRASER UNIVERSITY

FACULTY OF SCIENCE

NEW COURSE PROPOSAL

I CALENDAR INFORMATION

Department: Biological Sciences

Course Number: MASC 400, 410, 420, 430

Title: see attached

Sub-title or Description:

Credit Hours: 6

Vector Description:

Pre-requisite(s): Permission of the instructor

II ENROLMENT AND SCHEDULING

Estimated Enrolment: 24 total per course, mainly from participating universities.

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and Spring):
Initially in summer semester, and probably on a split semester basis.

When course will first be offered: 72-2

III JUSTIFICATION

A. What is the detailed description of the course including differentiation from lower level courses, from similar courses in the same department and from courses in other departments in the University?
Detailed description is attached. Marine Science 410, 420, and 430 will deal with subject matter that we deal with only superficially or not at all on our campus. Overlap will not be a problem.

B. What is the range of topics that may be dealt with in the course?
See attached.

C. How does this course fit the goals of the department?

Marine biology is one of the major areas of specialization in the Department of Biological Sciences.

D. How does this course affect degree requirements?

Any of these courses may be taken for upper level credit towards the B.Sc. (Biology).

E. What are the calendar changes necessary to reflect the addition of this course?

Minor editorial changes in Biological Sciences section plus the addition of a description of the Bamfield courses at the end of the Biological Sciences section of the calendar.

F. What course, if any, is being dropped from the calendar if this course is approved?

N/A.

G. What is the nature of student demand for this course?

Likely to be high judging from the experience of other marine laboratories.

H. Other reasons for introducing the course.

These courses provide an excellent opportunity to make use of the unique and rich plant and animal populations of the open coast of British Columbia.

IV BUDGETARY AND SPACE FACTORS

A. Which faculty will be available to teach this course?

N/A. Faculty recruited by the Western Canadian Universities Marine Biological Society will offer these courses.

B. What are the special space and/or equipment requriements for this course?

Space and equipment will be provided by the Western Canadian Universities Marine Biology Society at the Bamfield Marine Station.

C. Any other budgetary implications of mounting this course:

Costs associated with these courses should be covered by student fees.

APPROVAL - Faculty Curriculum Committee: February 22, 1970

Faculty: March 10, 1971

Senate:

The Academic Committee of WCUMBS met at UBC at 2:00 p.m., November 5, 1970. Present were J. R. Nursall (Alberta), N. J. Wilimovsky (UBC), R. Hartland-Rowe (Calgary), G. H. Geen (SFU) and W. G. Fields (U.Vic).

The discussion centred on proposals for courses to be offered at Bamfield Marine Station, as outlined in the Feasibility Study (Oct. 1969) on pp 105-107. A preliminary outline of opinions had been gathered by mail beforehand.

It was agreed that the courses as outlined and described were satisfactory for inclusion in university calendars. The courses are as follows:

Marine Science 400 - Directed Studies. A course of directed studies under the supervision of a member of faculty. The study will involve a research project approved by the supervisor in the field of interest of the student, and will be designed to take maximum advantage of the laboratory and/or field opportunities offered by the Bamfield Marine Station.

Marine Science 410 - Marine Invertebrate Zoology. A survey of the marine phyla, with emphasis on the benthic fauna in the vicinity of the Bamfield Marine Station. The course includes lectures, laboratory periods, field collection, identification, and observation. Emphasis is placed on the study of living specimens in the laboratory and in the field.

Marine Science 420 - Marine Phycology. A survey of the marine algae with emphasis on the benthic forms in the vicinity of the Bamfield Marine Station. The course includes lectures, laboratory periods, field collection, identification, and observation. Emphasis is placed on the study of living specimens in the laboratory and in the field.

Marine Science 430 - Marine Ecology. An analytical approach to biotic associations in the marine environment. Opportunities will be provided for study of the intertidal realm in exposed and protected areas and of beaches and estuaries in the vicinity of the Bamfield Marine Station; plankton studies and investigations of the subtidal and benthic environments by diving and dredging are envisaged.

The title "Marine Science" is retained to distinguish these as courses offered at Bamfield rather than at any one of the participating universities. "Marine Science" also allows for extension of the offerings into fields other than biology if that proves to be desirable.

It is expected that in years following, as it becomes feasible, additional courses will be made available, e.g. Ichthyology, Comparative Physiology, Comparative Embryology, Marine Macrobiology.

It is not expected that all courses will be given in any one year.

These courses are intended as senior undergraduate courses, available as well to graduate students.

It is intended that the courses be the equivalent of full courses (U. Alberta; U. Calgary) or 3 credit courses (UBC, U.Vic) or 6 credit courses (SFU). The courses will have a content of about 150 hours. They will be offered during the period May - August.

Permission to register in these courses may be obtained from The Director of the Bamfield Marine Station, to whom application should be made. Information concerning course prerequisites and application procedures may be obtained from participating departments.

It is expected that a separate section to outline the offerings in Marine Science will be established in the calendar of each of the participating universities, in the form best suited to the requirements of the individual universities.

In certain instances departments probably will establish equivalence between Marine Science courses and their own offerings, e.g. Marine Science 410 - Marine Invertebrate Zoology may be taken to be equivalent to Zoology xyz at one institution.

It is hoped that representatives will seek the earliest possible inclusion of Bamfield material in their calendars.

The Committee will have to explore the position of universities re the status of instructors at Bamfield and the application of credits.