

**S.88-50**

**SIMON FRASER UNIVERSITY**

**MEMORANDUM**

**To:** Senate  
**From:** J.W.G. Ivany  
Chair, SCAP  
**Subject:** Department of Biological Sciences - Curriculum Changes  
**Date:** November 17, 1988

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

Motion:

that Senate approve and recommend approval to the Board of Governors as set forth in S.88-50 curriculum changes in the Department of Biological Sciences including:

New courses -      BISC 366-3 Plant Ecophysiology  
                          BISC 356-3 Plant Structure and Development - A  
  functional approach

Deletions -         BISC 330-3 The Terrestrial Environment - microclimate  
  and soil  
                          BISC 347-3 Physiology of Plant Nutrition and  
  Metabolism  
                          BISC 437-3 Plant Development and Morphogenesis

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

Department: Biological Sciences

1. Calendar Information

Abbreviation Code: BISC Course Number: 366 Credit Hours: 3 Vector: 3-0-4

Title of Course: Plant Ecophysiology

Calendar Description of Course:

The plants' physical environment and the physiological basis (mechanisms and principles) of the interaction between plants and their environment in relation to their survival and ecological distribution.

Nature of Course Lectures and Labs

Prerequisites (or special instructions):

Completion of <sup>lower</sup> 200 level core courses or permission of the Department

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

BISC 347 and 330.

2. Scheduling

How frequently will the course be offered? Once per year

Semester in which the course will first be offered? Fall 1989

Which of your present faculty would be available to make the proposed offering possible? Dr. Brooke, Dr. Lister, Dr. Rahe, Dr. Vidaver - Team taught

3. Objectives of the Course

Basic understanding of the dynamics of the plant environment and the physiological basis of the interactions between the plants and the environment in relation to their ecological distribution.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty - None

Staff - None

Library - None

Audio Visual - None

Space - None

Equipment - a) The normally expected replacement/updating of that required for the replaced courses.

5. Approval b) Soil analysis systems - approx. \$3,500.00

Date: 8/08/89  
G. W. Jones  
Department Chairman

19 April 89  
C. W. Jones  
Dean

11/15/88  
R. Smith  
Chairman, SCUS

Department of Biological Sciences, March 1988

BISC ~~366~~ <sup>366</sup> - PLANT ECOPHYSIOLOGY (3-0-4)

Course Content

- A. The plants' physical and biological environment.
  - 1. Nature and composition of soils; soil water, colloids, pH, and cation exchange.
  - 2. Soil dynamics and ecology; climate and geography of soils.
  - 3. Fertilizers; soil nitrogen, phosphorous, macro and micro nutrients, microbial ecology.
  - 4. Radiation, energy and gaseous fluxes and dynamics.
  
- B. Selected physiological processes of plants.
  - 5. Plant water relations; solutes, water potential, movement of water & solutes.
  - 6. Mineral nutrition; uptake, essential elements & function.
  - 7. Photobiological principles:
    - i) Photochemistry of photosynthesis - primary processes, the photosynthetic unit, photophosphorylation and reducing power.
    - ii) Photosynthetic carbon fixation; C<sub>3</sub>, C<sub>4</sub> and CAM.
    - iii) Productivity and photorespiration.
  
- C. Physiology of plants under stress.
  - 8. Stress factors - radiation, temperature, water & salts.
  - 9. Stress avoidance, tolerance & resistance.
  - 10. Adaptive strategies - morphological & physiological. Hardiness - temperature/drought.
  - 11. Physical damage: Wound healing, patterns of tissue repair/ replacement.

LABORATORY SESSIONS - will include the following topics:

- 1. Soil: texture, water holding capacity, cation exchange and pH.
- 2. Determination/assessment of radiant energy, heat energy and gaseous fluxes in macro- and micro-climates.
- 3. Water potential, osmosis, plasmolysis. Transpiration and evaporative demand.
- 4. Mineral uptake distribution and nutrition, <sup>32</sup>P transport in xylem and phloem, hydroponics.
- 5. Photosynthesis:
  - a) factors affecting - radiation flux, water potential, CO<sub>2</sub>-O<sub>2</sub> concentrations,
  - b) chlorophyll fluorescence,
  - c) photorespiration and dark respiration.
- 6. Translocation, distribution and allocation of photoassimilates.
- 7. Plants' physiological response to and mechanism of reaction to induced stress.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: BIOLOGICAL SCIENCES

Abbreviation Code: BISC Course Number: 356 Credit Hours: 3 Vector: 3-0-4

Title of Course: PLANT STRUCTURE AND DEVELOPMENT - A FUNCTIONAL APPROACH

Calendar Description of Course:

Interaction of internal regulatory mechanisms and environmental factors in plant morphogenesis; Anatomy-cell differentiation, development and growth of vegetative and reproductive organs

Nature of Course Lectures and Labs

Prerequisites (or special instructions): Completion of <sup>lower</sup> 200 level core course requirements or permission of Department.

What course (courses), if any, is being dropped from the calendar if this course is approved: BISC 437 and 447

2. Scheduling

How frequently will the course be offered? Once per year

Semester in which the course will first be offered? Fall 1989

Which of your present faculty would be available to make the proposed offering possible? Team taught: Srivastava, Fisher, Lister, Rahe and Vidaver

3. Objectives of the Course

Basic understanding of the interaction of internal regulatory mechanisms and environmental factors in relation to plant anatomy, growth, development and cell differentiation and the completion of their life cycles.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty - None

Staff - None

Library - None

Audio Visual - None

Space - None

Equipment - The normally expected replacement/updating of that required for the replaced courses.

5. Approval

Date: 8/03/29

19 April 88

11/15/88

Colin M. Johnson  
Department Chairman

CHU. Jones  
Dean

P. Senft  
Chairman, SCUS

<sup>356</sup>  
BISC 926-PLANT STRUCTURE AND DEVELOPMENT - A FUNCTIONAL APPROACH (3-0-4)

Course Content

1. Seed and Seedling; Plant cell and tissue types  
Complex tissues - xylem and phloem.
2. Secondary growth in stems and roots; structure of wood transport of water and minerals.
3. Conifer wood; properties of wood, secondary phloem, periderm, aeration.
4. The leaf as a photosynthetic organ; adaptations for gas exchange, translocation of photoassimilates.
5. Sexual reproduction in flowering plants, photoperiodism, phytochrome  
Florigen concept.
6. Fruit and seed set; sexual reproduction in conifers, seed structure, dormancy.
7. Hormonal regulation of plant growth and development;
  - a) Auxins and auxin mediated responses
  - b) Gibberellins & gibberellin responses
  - c) Cytokinins
  - d) Ethylene
  - e) ABA
  - f) Mechanisms of hormone action.
8. Environmental triggers for plant growth & development;  
photomorphogenesis, phytochrome and GA.
9. Tropisms; Photo-, Geo-, Thigmo-
10. Perception of Temperature; vernalisation, dormancy, sprouting.  
Mechanisms and the biological clock, Circadian rhythms.

LABORATORY SESSIONS

1. Seedling morphology; cells-tissues, roots & stems.
2. Secondary growth; roots & stems, dicot woods.
3. Conifer wood; water/mineral transport.
4. Leaf anatomy; stomatal function.
5. Photoinduction in Xanthium, pollination, floral structure.
6. Ethylene in fruit ripening; structure fruits and seeds
7. Hormone bioassays: Auxins & Gibberellins
8. Cytokinins - bud break, root initiation  
Ethylene - Ethrel in isodiametric growth  
ABA - effect on root & shoot growth
9. Phytochrome, GA; germination
10. Tropisms: Auxin blocks, Avena curvature  
Thigmotropism - Mimosa
11. Vernalisation, scarification - seeds.  
Biological clock - Oxalis sp.

Change: "that the pre-requisite for BISC 408-3 Parasitic Associations be changed from sixth semester standing in Biological Sciences" to "BISC 304 Animal Ecology and BISC 306 SENATE COMMITTEE ON UNDERGRADUATE STUDIES NEW COURSE PROPOSAL FORM - CHANGE ONLY Invertebrate Biology are recommended".

1. Calendar Information Department: Biological Sciences

Abbreviation Code: BISC Course Number: 408 Credit Hours: 3 Vector: 2-0-3

Title of Course: PARASITIC ASSOCIATIONS

Calendar Description of Course:

Same

Nature of Course Same

Prerequisites (or special instructions): change to

BISC 304 and BISC 306 are recommended.

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

2. Scheduling

How frequently will the course be offered? Same

Semester in which the course will first be offered? Same

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

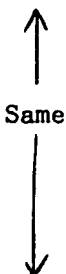
3. Objectives of the Course

Same

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. Approval

Date: 8/04/88 19 April 88 11/15/88

[Signature] [Signature] [Signature]

Department Chairman Dean Chairman, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM - CHANGE ONLY

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 426 Credit Hours: 3 Vector: 2-

Title of Course: BIOLOGY OF SEAWEEDS

Calendar Description of Course:

The contemporary biology of seaweeds is reviewed. Emphasis is on the comparative adaptability of seaweeds inhabiting different environments. Students may be required to complete a research project.

Nature of Course Advanced, with laboratory, field, lecture and student participant components.

Prerequisites (or special instructions):

BISC 326  Weekend field trips will be required.

*or permission of Department*

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

This course has been offered four times as Special Topics BISC 471.

2. Scheduling

How frequently will the course be offered? Alternate years

Semester in which the course will first be offered? 1988-1

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

3. Objectives of the Course

1. To expose students to advanced concepts in the biology of an important group of non-vascular plants (strengthens our botany programme).
2. To balance our marine biology programme. This course would parallel BISC 406 (advanced invertebrates).
3. To prepare students for careers in areas related to marine plant resources (aquaculture and resource management) or graduate training.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty None

Staff None

Library None

Audio Visual None

Space None

Equipment None

5. Approval

Date:

*88/04/11*

*19 April 88*

*11/15/88*

*[Signature]*

*CHW. Jones*

*[Signature]*

Department Chairman

Dean

Chairman, SCUS

CHANGE: "BISC 326 Biology of non-vascular plants, change vector from 2-0-3 to 2-0-4".

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM - CHANGE ONLY

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 326 Credit Hours: 3 Vector: 2-0-4

Title of Course: BIOLOGY OF NON-VASCULAR PLANTS

Calendar Description of Course:  
SAME

Nature of Course SAME

Prerequisites (or special instructions):

SAME

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

SAME

2. Scheduling

How frequently will the course be offered? SAME

Semester in which the course will first be offered? SAME

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

SAME

3. Objectives of the Course

SAME

4. Budgetary and Space Requirements (for information only) SAME

What additional resources will be required in the following areas:

- Faculty
  - Staff
  - Library
  - Audio Visual
  - Space
  - Equipment
- ↑  
↓
- SAME

5. Approval

Date: 10/11

19 April 77

11/15/82

[Signature]

CHU Jones

[Signature]

Chairman

Dean

Chairman, SCUS



change: "that the vector of BISC 329 introduction to Experimental techniques be changed from 2-2-6 to 2-0-8".

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

~~NEW~~ COURSE PROPOSAL FORM - CHANGE ONLY

1. Calendar Information

Department: Biological Sciences

Abbreviation Code: BISC Course Number: 329 Credit Hours: 4 Vector: 2-0

Title of Course: INTRODUCTION TO EXPERIMENTAL TECHNIQUES

Calendar Description of Course:

Same

Nature of Course Same

Prerequisites (or special instructions):

Same

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

Same

2. Scheduling

How frequently will the course be offered? Same

Semester in which the course will first be offered? Same

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

3. Objectives of the Course

Same

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

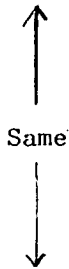
Staff

Library

Audio Visual

Space

Equipment



5. Approval

Date:

08/04/11

19 April 77

11/15/88

Calif. Mike Jones  
Department Chairman

CHU. Jones  
Dean

R. Samuels  
Chairman, SCUS