

SIMON FRASER UNIVERSITY

S.06-113

Senate Committee on University Priorities Memorandum

TO: Senate

FROM: John Waterhouse
Chair, SCUP
Vice President, Academic

RE: Faculty of Science: New Streams in
Earth Sciences (SCUP 06 - 41)

DATE: September 22, 2006

At its September 22, 2006 meeting SCUP reviewed and approved the proposal from the Faculty of Science for three undergraduate course concentration streams (Geology, Environmental Geoscience and General). The creation of the proposed streams represents a re-alignment of existing courses. Further documentation is attached.

Motion

That Senate approve and recommend to the Board of Governors, the proposal for changes to the Earth Sciences Major and Minor programs to include the addition of three new streams: Geology, Environmental Geoscience, and General.

encl.

c: D. Marshall

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate Committee on University Priorities
From: Christine MacKenzie, Chair
Senate Committee on Undergraduate Studies
Subject: Curriculum Revisions
Faculty of Science, Earth Science (SCUS 06-21b)
Date: 19 July 2006



Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of 26 June 2006 gives rise to the following motion:

Motion:

"that SCUP approve and recommend to Senate changes to the Earth Sciences Major and Minor programs to include the addition of three new streams (Geology, Environmental Geoscience, General)."

The relevant documentation for review by SCUP is attached.

New Earth Science streams

As part of an ongoing curriculum review, the Department of Earth Science (EASC) has developed 3 undergraduate course concentration streams (Geology, Environmental Geoscience, and General streams) for EASC majors. The streaming of the program was endorsed by the recent external review (2004) of the department.

Streaming is aimed at clarifying for students how certain course groupings will lead to different types of careers. Streaming also aligns the EASC program with the academic qualifications listed by the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), the professional licensing agency in this province. Many other provinces in Canada also require professional accreditation. By streaming, students complete a common lower division cadre of courses. In the upper division, they select the area of specialization (Geology or Environmental Geoscience) with required and elective courses that facilitate the student's passage to a B.Sc. permitting professional registration.

The General stream is more flexible and aimed at students not intending to practice as professional geoscientists or who are not seeking accreditation. The General stream will facilitate joint major programs and thus attract students from other disciplines. Transcripts will indicate the course concentration that was successfully completed by the student.

Changes to the EASC Major Program

From:

Major Program

Lower Division Requirements (56 credit hours)

CHEM 121-4 General Chemistry and Laboratory I

CHEM 122-2 General Chemistry II

CHEM 126-2 General Chemistry Laboratory II

EASC 101-3 Physical Geology

EASC 201-3 Stratigraphy and Sedimentation

EASC 202-3 Introduction to Mineralogy

EASC 203-3 Paleontology

EASC 204-3 Structural Geology I

EASC 205-3 Introduction to Petrology

EASC 206-1 Field Geology I

EASC 207-3 Introduction to Applied Geophysics

EASC 208-3 Introduction to Geochemistry

EASC 210-3 Historical Geology

GEOG 213-3 Geomorphology

MATH 151-3 Calculus I

MATH 152-3 Calculus II

STAT 101-3 Introduction to Statistics

and one of

PHYS 101-3 General Physics I*

PHYS 120-3 Modern Physics and Mechanics

and one of

PHYS 102-3 General Physics II*

PHYS 121-3 Optics, Electricity and Magnetism

and one of

PHYS 130-2 General Physics Laboratory*

PHYS 131-2 Physics Laboratory I

*with a grade of B or better

Upper Division Requirements

Students must complete a minimum of 39 credit hours as defined below.

The following 18 required credit hours:

EASC 301-3 Igneous and Metamorphic Petrology

EASC 302-3 Sedimentary Petrology

EASC 303-3 Environmental Geoscience

EASC 304-3 Hydrogeology

EASC 306-3 Field Geology II

EASC 309-3 Global Tectonics

plus three credit hours chosen from:

EASC 406-3 Field Geology III**

EASC 416-3 Field Methods in Hydrogeology**

plus 18 additional credit hours chosen from:***

EASC 307-3 Applied Geophysics

EASC 313-3 Introduction to Soil and Rock Engineering

EASC 317-3 Global Geophysics

GEOG 313-4 Geomorphology II

EASC 401-3 Mineral Deposits

EASC 402-3 Sedimentology

EASC 403-3 Quaternary Geology

EASC 404-3 Structural Geology II

EASC 406-3 Field Geology III

EASC 408-3 Regional Geology of Western Canada

EASC 409-3 Rivers: Environments & Engineering

EASC 410-3 Groundwater Geochemistry and Contaminant Transport

EASC 411-3 Terrain Analysis

EASC 412-3 Advanced Geochemistry

EASC 413-3 Resource Geotechnics

EASC 416-3 Field Techniques in Hydrogeology

EASC 417-3 Seismology

EASC 418-1 Terrain Stability: Assessment and Mitigation

EASC 419-1 Forest Harvesting Technology

EASC 420-3 Petroleum Geology

EASC 491-1 Directed Reading*

EASC 492-2 Directed Reading*

EASC 493-3 Directed Reading*

*students may only complete a maximum of three hours from a combination of EASC 491, 492, or 493

**students completing both EASC 406 and 416 may use three credit hours towards the 18 additional credit hours in the upper division requirement.

***EASC 300 and 400 level Special Topics courses may also be used as credit towards the 18 additional credit hours.

Other Requirements

Students must also complete six additional upper division credit hours in the Faculty of Science or physical geography. These courses may be used toward the minor's requirements in another department. Students who intend to apply for registration with APEGBC may be required to complete additional courses that are not required for the major. Seek advice from the department.

Honors Program

This BSc program offers a wider cross-section of discipline-related courses while providing an opportunity for independent research. Entry requires a 3.00 or higher CGPA, and permission of the department. This program has the same requirements as for the major except for the following additional requirements.

- maintenance of a minimum GPA of 3.00

- a minimum of 60 credit hours of 300 and 400 level EASC or physical geography courses, or related courses approved by the department. Students are strongly advised to select courses in consultation with advisors and considering career goals.
- completion of appropriate electives to achieve a final total of at least 132 credits hours, including at least 12 credit hours from outside the Faculty of Science
- the completion of EASC 499

Minor Program

Students must complete the following two courses.

EASC 101-3 Physical Geology

EASC 210-3 Historical Geology

and at least three of

EASC 201-3 Stratigraphy and Sedimentation

EASC 202-3 Introduction to Mineralogy

EASC 203-3 Paleontology

EASC 204-3 Structural Geology

EASC 205-3 Introduction to Petrology

EASC 207-3 Introduction to Applied Geophysics

EASC 208-3 Introduction to Geochemistry

plus 14 credit hours in any 300 and 400 level EASC courses excluding EASC 491, 492, 493 and 499.

To:

Major Program

The department offers 3 course streams leading to course concentrations: the Geology Stream, the Environmental Geoscience Stream, and the General Earth Sciences Stream. The Geology Stream and the Environmental Geoscience Stream are designed to permit students to register as a Geologist or Environmental Geoscientist, respectively, in the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC), the governing body in British Columbia that regulates the practice of geoscience in the province. All students intending to practice as a geoscientist in British Columbia must be licensed by APEGBC, and are strongly advised to pursue one of these two streams. Many other provinces in Canada also require professional licensing. Students not intending to practice as professional geoscientists, or who are not seeking accreditation may choose to pursue the General Earth Sciences Stream. The General Earth Sciences Stream may best accommodate some joint majors programs. Students should seek the ~~advice~~ of a departmental program advisor.

Advice

Lower Division Requirements

Students in all streams must complete a minimum of 54 credit hours as follows.

all of

CHEM 121-4 General Chemistry and Laboratory I

CHEM 122-2 General Chemistry II

CHEM 126-2 General Chemistry Laboratory II

EASC 101-3 Physical Geology

EASC 201-3 Stratigraphy and Sedimentation

EASC 202-3 Introduction to Mineralogy

EASC 204-3 Structural Geology I

5.

7

EASC 205-3 Introduction to Petrology
EASC 206-2 Field Geology I
EASC 207-3 Introduction to Applied Geophysics
EASC 208-3 Introduction to Geochemistry
EASC 210-3 Historical Geology
GEOG 213-3 Geomorphology
MATH 151-3 Calculus I OR MATH 150-4 Calculus I
MATH 152-3 Calculus II
STAT 101-3 or STAT 201-3

and one of

PHYS 120-3 Mechanics and Modern Physics
PHYS 125-3 Mechanics and Special Relativity
PHYS 101-3 General Physics I*

and one of

PHYS 121-3 Optics, Electricity and Magnetism
PHYS 126-3 Electricity, Magnetism and Light
PHYS 102-3 General Physics II*

and one of

PHYS 130-2 General Physics Laboratory*
PHYS 131-2 Physics Laboratory I

*with a grade of B or better

Upper Division Requirements

Students are encouraged to select their upper division elective courses in consultation with an academic advisor, as APEGBC has specific groupings of elective courses for each stream, respectively.

Geology Stream (at least 42 credit hours as follows):

a minimum of 24 required credit hours chosen from:

all of:

EASC 301-3 Igneous and Metamorphic Petrology
EASC 302-3 Sedimentary Petrology
EASC 306-3 Field Geology II
EASC 309-3 Global Tectonics
EASC 310-3 Paleontology
EASC 312-3 Stratigraphy

and at least one of:

EASC 303-3 Environmental Geoscience
EASC 304-3 Hydrogeology
EASC 313-3 Introduction to Soil and Rock Engineering
EASC 403-3 Quaternary Geology

and at least one of

EASC 406-3 Field Geology III
EASC 416-3 Field Techniques in Hydrogeology

plus a minimum of 18 credit hours chosen from:

- EASC 300-3 Selected Topics in Earth Sciences
- EASC 303-3 Environmental Geoscience
- EASC 304-3 Hydrogeology
- EASC 307-3 Applied Geophysics
- EASC 313-3 Introduction to Soil and Rock Engineering
- EASC 314-3 Principles of Glaciology
- EASC 317-3 Global Geophysics
- EASC 400-3 Selected Topics in Earth Sciences
- EASC 401-3 Mineral Deposits
- EASC 402-3 Sedimentology
- EASC 403-3 Quaternary Geology
- EASC 404-3 Structural Geology II
- EASC 406-3 Field Geology III
- EASC 408-3 Regional Geology of Western Canada
- EASC 410-3 Groundwater Geochemistry and Contaminant Transport
- EASC 411-3 Terrain Analysis
- EASC 412-3 Advanced Geochemistry
- EASC 413-3 Resource Geotechnics
- EASC 416-3 Field Techniques in Hydrogeology
- EASC 417-3 Seismology
- EASC 420-3 Petroleum Geology
- EASC 421-3 Volcanology
- EASC 491-1 Directed Readings*
- EASC 492-2 Directed Readings*
- EASC 493-3 Directed Readings*

Environmental Geoscience Stream (at least of 44 credit hours as follows):

A minimum of 29 required credit hours chosen from:

all of:

- EASC 303-3 Environmental Geoscience
- EASC 304-3 Hydrogeology
- EASC 306-3 Field Geology II
- EASC 313-3 Introduction to Soil and Rock Engineering
- EASC 403-3 Quaternary Geology
- GEOG 311-4 Hydrology
- GEOG 317-4 Soil Science

and at least one of:

- EASC 301-3 Igneous and Metamorphic Petrology
- EASC 302-3 Sedimentary Petrology
- EASC 309-3 Global Tectonics
- EASC 310-3 Paleontology

and at least one of

EASC 406-3 Field Geology III

EASC 416-3 Field Techniques in Hydrogeology

plus a minimum of 15 credit hours chosen from:

EASC 300-3 Selected Topics in Earth Sciences

EASC 301-3 Igneous and Metamorphic Petrology

EASC 302-3 Sedimentary Petrology

EASC 307-3 Applied Geophysics

EASC 309-3 Global Tectonics

EASC 310-3 Paleontology

EASC 312-3 Stratigraphy

EASC 314-3 Principles of Glaciology

EASC 317-3 Global Geophysics

GEOG 313-4 Geomorphology II

EASC 400-3 Selected Topics in Earth Sciences

EASC 401-3 Mineral Deposits

EASC 402-3 Sedimentology

EASC 404-3 Structural Geology II

EASC 406-3 Field Geology III

EASC 408-3 Regional Geology of Western Canada

EASC 410-3 Groundwater Geochemistry and Contaminant Transport

EASC 411-3 Terrain Analysis

EASC 412-3 Advanced Geochemistry

EASC 413-3 Resource Geotechnics

EASC 416-3 Field Techniques in Hydrogeology

EASC 417-3 Seismology

EASC 418-1 Terrain Stability

EASC 419-1 Forest Harvesting Technology

EASC 420-3 Petroleum Geology

EASC 421-3 Volcanology

EASC 491-1 Directed Readings*

EASC 492-2 Directed Readings*

EASC 493-3 Directed Readings*

GEOG 412-4 Glacial Processes and Environments

General Earth Sciences Stream (at least 36 credit hours as follows):

The following 6 required credit hours:

EASC 306-3 Field Geology II

and at least one of

EASC 406-3 Field Geology III

EASC 416-3 Field Techniques in Hydrogeology

plus a minimum of 30 other upper division EASC credit hours.

*students may only complete a maximum of 3 credit hours from a combination of EASC 491, 492, or 493.

Other Requirements:

Students in the Geology Stream must also complete at least 2 additional credit hours in the Faculty of Science or in Physical Geography at the upper division level. These courses may be used toward the minor requirements in another department. Some of these courses may also satisfy APEG BC requirements.

Students in the General Earth Sciences Stream must also complete at least 8 additional credit hours in the Faculty of Science or Physical Geography at the upper division level. These courses may be used toward the minor requirements in another department.

In addition, of the 120 credit hours required for graduation, students are required to complete 6 credits of Writing (W), 6 credits of Quantitative; and 24 credits of Breadth, including 18 credits of Designated Breadth (6 credits of Social Sciences, 6 credits of Humanities, and 6 credits of Sciences), and 6 credits of Undesignated Breadth (UB) taken outside the student's major program. Several of these WQB courses are satisfied within the major program.

Honors Program

This BSc program offers a wider cross-section of discipline-related courses while providing an opportunity for independent research. Entry into the honors requires a CGPA of 3.00 or higher (B standing), and permission of the department. This program has the same requirements as for the major except for the following additional requirements.

- maintenance of a minimum 3.00 CGPA
- completion of a minimum of 60 credit hours of 300 and 400 level EASC or Physical Geography courses, or related courses approved by the department. Students are strongly advised to select courses in consultation with advisors and in consideration of their career goals.
- completion of appropriate electives to achieve a final total of at least 132 credits hours, including at least 12 credit hours from outside the Faculty of Science
- the completion of EASC 499

Minor Program

Students completing a minor in Earth Science are subject to the general regulations of the faculty in which they are registered. For an Earth Science Minor, students must complete a minimum of 15 upper division credit hours in Earth Science (EASC 300 level and above), together with all prerequisites.