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www.sfu.ca/vpacademic**MEMORANDUM**

ATTENTION	Senate	DATE	June 19, 2013
FROM	Jon Driver, Vice-President, Academic and Provost, and Chair, SCUP	PAGES	1/1
RE:	Faculty of Science: Full Program Proposal for a Joint Honours in Chemistry and Molecular Biology and Biochemistry in the Departments of Chemistry and Molecular Biology and Biochemistry (SCUP 13-30)		

At its June 19, 2013 meeting, SCUP reviewed and approved the Full Program Proposal for a Joint Honours in Chemistry and Molecular Biology and Biochemistry in the departments of Chemistry and Molecular Biology and Biochemistry within the Faculty of Science, effective Spring 2014.

Motion:

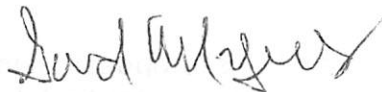
That Senate approve and recommend to the Board of Governors the Full Program Proposal for a Joint Honours in Chemistry and Molecular Biology and Biochemistry in the departments of Chemistry and Molecular Biology and Biochemistry within the Faculty of Science, effective Spring 2014.

c: D. Leznoff
I. Northwood

A handwritten signature in blue ink, appearing to read "Jon Driver".

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MEMORANDUM

ATTENTION	Senate Committee on University Priorities	DATE	June 7, 2013
FROM	Gordon Myers, Chair Senate Committee on Undergraduate Studies	PAGES	1/1
RE:	Faculty of Science (SCUS 13-25a)		

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of June 6, 2013, gives rise to the following recommendations:

Motion

That SCUP approve and recommend to Senate the Full Program Proposal for the Joint Honours in Chemistry and Molecular Biology and Biochemistry in the departments of Chemistry and Molecular Biology and Biochemistry within the Faculty of Science.

The relevant documentation for review by SCUP is attached.

PROPOSAL

Joint Honours in Chemistry, Molecular Biology and Biochemistry

Simon Fraser University

Executive Summary

A Joint Honours in Chemistry, Molecular Biology and Biochemistry has been developed and is proposed jointly by the two Departments in the Faculty of Science.

The intent of this proposal is to bring together the expertise from these three areas and to foster interdisciplinary training of highly motivated students in all three subjects, something not currently available in a comprehensive manner to SFU students; a significant research component is also included. Given the substantial importance of biotechnology, pharmaceutical and health sectors to the economy of B.C., this Joint Honours program will be attractive to students since it will prepare them to participate at the leading edge of these sectors; it will also form an excellent foundation for entry to professional health-related degrees and training. No analogous program is currently offered at other B.C. universities.

Based upon existing courses, this program can be mounted immediately with no requirement for new resources.

Background

Simon Fraser University has committed to expand its programming in new and emerging areas. The Joint Honours in Chemistry, Molecular Biology and Biochemistry is one such area, and will provide advanced interdisciplinary training in the fields of chemical, biotechnology, pharmaceutical and health sectors, all areas of importance to B.C. and Canadian society. The subject areas have always been strongly complementary and this Joint Honours will capitalize on strengths in both departments to educate students to answer biological questions using the tools of physical science, gain research experience, and will provide a credential that accurately reflects their broad experience and training at the interface of these disciplines.

Credential to be awarded:

Joint Honours, Chemistry, Molecular Biology and Biochemistry, B.Sc.

Location:

SFU, Burnaby Campus

Faculty/Department/School offering the new program:

Chemistry Department and Molecular Biology and Biochemistry Department,
Faculty of Science

Anticipated program start date:

Summer 2014

Description of proposed program:

a) Aims, goals, and/or objectives

The intent of this proposal is to bring together the expertise from Chemistry and Molecular Biology and Biochemistry to capitalize on strengths in both departments to foster interdisciplinary training of highly motivated students in the in all three disciplines, something not currently available in a comprehensive manner to SFU students. In particular, this Honours Program provides the students with substantial hands-on research experience in research laboratories in both departments. This program can be run with no requirements for new resources.

b) Anticipated contribution to mandate and strategic plan of the institution

The concept of the program is that it meets the needs of highly motivated students interested in immersion in Chemistry, Molecular Biology and Biochemistry. Graduates of the program will be trained to supply the needs of an increasingly important sector at the intersection of physical and life sciences, thereby relating to the increased development of interdisciplinary/cross-disciplinary experience and training. According to the BC Labour Market Outlook 2010-2020,¹ "the occupation group expected to experience the strongest growth in demand in the province is Health Occupations", followed closely by "Natural and Applied Sciences and Related Occupations". This Program will help to fill this key skills need in B.C.

More generally, research in this area seeks answers to biological questions using the tools of physical science and has the potential to transform many areas of human endeavour. A NRC (US) report² indicates that "further research at this intersection not only will advance our understanding of the fundamental questions of science, but will also significantly impact public health, technology and stewardship of the environment for the benefit of society." Such conclusions are relevant not just for the US but for Canada as well, and this Joint Honours will prepare SFU students to participate at the leading edge of this sector, with the added benefit of completing substantial research courses in both the CHEM and MBB Departments.

¹ BC Labour Market Outlook 2010-2020, Government of B.C.

² "Research at the Intersection of the Physical and Life Sciences", National Research Council (US) Committee on Research at the Intersection of the Physical and Life Sciences, Washington (DC): National Academies Press (US); 2010.

c) Target audience

The proposed curriculum will graduate Science majors with backgrounds in Chemistry, Molecular Biology and Biochemistry. By combining these areas of expertise these students will fill an emerging niche that is often occupied by people with post-graduate degrees in a specialized discipline. Students interested in working primarily in the areas of biotechnology and pharmaceuticals either as laboratory workers or as management liaisons, or in government (e.g. Health, Agriculture) would gain a significant competitive advantage with this unique degree. Training in the critical area of genetic engineering would also be enhanced with this proposed program.

In addition graduates of this Honours program will be very well prepared for advanced degrees in these areas. The substantial research component that is included in this Honours degree (vs. the proposed Joint Majors program) in particular prepares students for either working in the field or moving to post-graduate degrees.

d) Content and summary of requirements for graduation

Content Lower Division (LD) Requirements

Lower Division Requirements: 65-66 Units

Breakdown: 31 CHEM, 6 MBB and 28-29 other. Note that the "other" includes 11 units of BISC courses. MBB does not offer 100 level courses.

Upper Division (UD) Requirements

Chemistry UD Requirements: 24 - 27 required units (including the research course CHEM 481-5). MBB UD Requirements: 24 - 27 required units (including the research course MBB 491-5), (the three unit difference depends on whether students take CHEM 360 or MBB 323)

Total Minimum Requirements including Electives

Subtotal: 65-66 Lower Division, 60 Upper Division, 125-126 units

LD or UD Electives: Students will supplement the specified courses to satisfy WQB graduation requirements

Total: Minimum 132 credits overall

Minimum GPA of 3.0 to be awarded an Honours degree

University Breadth Requirement:

The B-Sci requirement is included in the required coursework, as per the WQB policy regarding Joint Majors/Honours. The 12 B-SocSci and B-Hum units will be required to complete the total breadth requirements and fulfilled with elective courses.

University Writing Intensive Requirement:

Both the lower and upper-division requirements will be included in the required coursework.

Co-Operative Education

Optional. Administered through the Science co-op coordinators. Many students in these fields obtain relevant summer jobs outside of the Co-op program.

e) Delivery Methods

Since the program is based upon existing courses, the standard delivery methods already in place on campus - Lecture/Lab/Tutorial - will be used.

f) Linkages between learning outcomes and curriculum design

The learning outcomes are to train students for proficiency in the areas of Chemistry, Molecular Biology and Biochemistry for placement in the rapidly expanding biotechnology and pharmaceutical industries, and/or related government agencies. A work experience/work place term is NOT required for degree completion, however a research course component is an integral part of this Joint Honours program.

g) Distinctive characteristics

The partnership of Chemistry and Molecular Biology and Biochemistry (MBB) in a Joint Honours degree is an obvious expression of the linkages between the three disciplines and will help bring students (and faculty) in the two Departments closer together. The proposed new Joint Honours will benefit students (and faculty) who have otherwise been pursuing their interests through major/minor combinations. These interests are better accommodated by this focused program which delivers the content centered at the interface of these three areas, as well as encouraging research interactions between the two Departments via undergraduate research experience.

h) Anticipated completion time

Four to five years.

i) Enrolment plan for the length of the program

This degree program may be attractive to high-school students who have a strong interest in both chemistry and the life sciences. Admitted Science students can declare this Joint Honours degree at any time. Students in other programs at SFU or via transfer from other post-secondary institutions may opt to pursue this program following consultation with Chemistry and/or MBB advisors.

The Chemistry department will have primary administrative oversight of the program.

We have informally surveyed current SFU Science students regarding their potential interest in this Joint Major and Honours program. From this exercise, it is clear that there is significant interest on both sides for such a program. We

estimate the initial enrolment to be about 10 students but there is a large potential to increase once it has become established.

The surveyed interest of existing students indicates that this Joint Program will be a specific program offering that can target a new student audience resulting in increased enrolment into SFU programs.

j) Policies on student evaluation (degree requirements)

As per general regulations of the University and the Faculty of Science.

k) Policies on faculty appointment (minimum qualifications)

All continuing faculty have a Ph.D. or equivalent.

l) Policies on program assessment

All academic units at SFU are subject to external review every seven years.

m) Level of support and recognition from other post-secondary institutions (including plans for admission and transfer within BC) and relevant regulatory or professional bodies

As per SFU's transfer credit procedures, students may transfer from BC colleges or universities to enroll into this program.

n) Evidence of student interest and labour market demand

We have informally surveyed current SFU Science students regarding their potential interest in this Joint Major or Honours program. From this exercise, it is clear that there is significant interest for such a program. Incorporating the principles of the physical sciences to understand the operation of living systems is one of the next frontiers in Science, particularly with applications to society. The earlier referenced 2010 NRC report urges academic institutions to accelerate this cross-disciplinary education. There should be an enormous demand in many areas such as pharmaceutical development, other aspects of medicinal chemistry, environmental technology and genetic engineering for a graduate with a degree combining the physical and life sciences, as outlined in general in the aforementioned BC Labour Market Outlook 2010-2020 report.

o) Summary of resources (faculty members, space, and equipment) required and available to implement the program

No additional resources are required. The program can be accommodated with present courses and faculty.

p) Brief description of any program and associated resources that will be reduced or eliminated when the new program is introduced

None.

q) List of faculty members teaching/supervising, what percentage of their teaching will be devoted to the program, and their areas of specialization

All faculty in both departments will contribute to this program as part of their normal teaching load. All courses required for this Joint Honours are already offered on a regular basis by the two Departments.

r) For a program where the intention is to charge a premium fee, a budget developed in collaboration with the dean of the faculty.

This is not a premium fee program.

s) Related programs at SFU and other British Columbia post-secondary institutions

There is no analogous program at SFU. The closest related program would be a Double Major in CHEM/MBB or a Major/Minor combination, neither of which would provide the extensive research component that is inherent to the Joint Honours. The Major/Minor has also quite a different balance. This proposed Joint Honours focuses on the key courses that a student anticipating entering the labour force after graduation would need to be "fluent" in the areas of Chemistry, Bio-chemistry and Molecular Biology, and incorporates a substantial research component above and beyond the analogous proposed Joint Major program.

At UBC, there is no analogous program. As at SFU, UBC has separate "Chemistry" and "Biochemistry and Molecular Biology" Departments, however the focus of the latter is very biochemical. The closest that could be achieved would be the Combined Honours degree in Chemistry/Biochemistry or Chemistry/Biology, both of which have an extremely low flexibility and are much more "biochemistry" or "biology" focused than the more interdisciplinary offering of this proposed Joint Honours, which includes a substantial Molecular Biology component. One more extremely important difference is that the proposed research component for this proposed Joint Honours program is much more substantial and interdisciplinary (with research courses in both MBB and CHEM areas included) than for UBC's Combined Honours programs.

At Univ. Victoria, there are separate "Chemistry" and "Biochemistry and Microbiology" Depts. There is no Honours program that encompasses both Departments, and the Combined Majors in "Chemistry/Biochemistry" and "Chemistry/Microbiology" both have a much larger focus on microbiology than this proposed Joint Honours and, critically, no research component.

Name, title, phone number and e-mail address of the institutional contact person in case more information is required.

Daniel Leznoff, Professor and Chair of Undergraduate Studies Committee, Department of Chemistry, 778-782-4887, dleznoff@sfu.ca. Ingrid Northwood, Senior Lecturer and Chair, Undergraduate Curriculum Committee, Department of Molecular Biology and Biochemistry, 778-782-3536, inorthwo@sfu.ca.

Proposed Calendar Description - Faculty of Science

This Bachelor of Science (BSc) honours program is offered jointly by the Department of Chemistry and Department of Molecular Biology and Biochemistry. Entry requires permission of both Departments.

Lower Division Requirements

Students complete the same lower division requirements as those specified for the major program.

Upper Division Requirements (at least 51 units)

Students complete the same upper division requirements as those specified for the major program and

- CHEM 481-5 Undergraduate Research
- MBB 491-5 Undergraduate Research

and

- At least 3 additional units of upper-division CHEM and 3 additional units of upper-division MBB

Electives

In addition to the above, students complete

- courses chosen to fulfill the WQB requirements
- upper division courses from any faculty to total at least 60 upper division units
- electives at any division from any faculty to provide 132 units as required for the degree.