

SIMON FRASER UNIVERSITY

MEMORANDUM

S.01-51

Amended by
Senate
9 July 01

To: Senate

From: Allan MacKinnon, Chair
Senate Committee on Undergraduate Studies

Subject: New Joint Major Program with Business Administration
Faculty of Science
Department of Molecular Biology and Biochemistry
(SCUS Reference 01 – 12b)

Date: June 21, 2001



Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of June 19, 2001 gives rise to the following motion:

MOTION

"That Senate approve and recommend approval to the Board of Governors the Joint Major in Molecular Biology and Biochemistry and Business Administration, as set forth in S. 01 -51 , effective 2002-3."

For Information

Acting under delegated authority, SCUS approved the following curriculum revisions:

- i. new courses:
 - MBB 432 – Advanced Molecular Biology Techniques
 - MBB 300 – Special Topics in Biotechnology and Business
- ii. changes to course number, title, prerequisite, credit hour, description and vector for the following:
 - from MBB311-2 to MBB 308-3 – Molecular Biology and Biochemistry Laboratory I and,
 - from MBB 312-2 to MBB 309-3 – Molecular Biology and Biochemistry Laboratory II
- iii. new co-op courses:
 - MBB 151 – Practicum I
 - MBB 251 – Practicum II
 - MBB 351 – Practicum III
 - MBB 451 – Practicum IV
 - MBB 452 – Practicum V

Any Senator wishing to consult the full report of curriculum revisions should contact Bobbie Grant, Senate Assistant at 291-3168 or email bgrant@sfu.ca

Proposal:
Joint Major in Molecular Biology and Biochemistry and Business Administration.

The Joint Major in MBB and Business Administration:

This will be a joint major program between the Department of Molecular Biology and Biochemistry and the Faculty of Business Administration (FBA) at SFU. The program is designed to offer undergraduate students in-depth combined training in Molecular Biology and Biochemistry (MBB) and in the basic areas of Business Administration pertinent to development and administration in emergent biotechnology enterprises. Molecular biology and biochemistry form the scientific and technological underpinnings of today's burgeoning biotechnology field while business administration enables the student in the fundamentals of economics, management, marketing, investment, and business law. Students will take most of the required coursework for BSc degrees in both MBB and the BBA. The Program requires 70 credits in MBB-related courses and 50 credits in Business-related ones; hence there is little flexibility in curriculum scheduling. Moreover, students are strongly encouraged to participate in the CO-OP program in which practical rotations in MBB and FBA will be available.

Students who complete the Program will graduate with a **BSc with a joint major in MBB and Business Administration**. Upon completion of the degree a diversity of career paths will be open to the students. We expect that many graduates will enter the workforce directly. Examples of such employment opportunities are:

- Pharmaceutical development companies
- Companies that offer products for molecular biology and biochemistry research (e.g., in marketing)
- Companies that do research and product development using molecular and cell biology and biochemical research techniques (e.g., in business development, product development, marketing, etc.)
- University-industry liaison offices and other technology-transfer firms
- Brokerage investment research
- Patent law research
- Venture capital firms
- Biotechnology consulting firms
- Publishing firms for biotech and science journals

MBB/Business graduates would also have opportunities to proceed to advanced graduate study in business (e.g., MBA program), law (e.g., biotechnology-patent law), medicine and allied health fields, public health (e.g., hospital administration), or science.

Rationale.

Biotechnology is an industry whose products and services depend upon discoveries and inventions made mainly by scientists trained in the areas of MBB. Biotechnology is a rapidly growing industry that has contributed greatly to the economic expansion of the US, particularly in states like California, and, to a lesser extent in Canada, particularly in the provinces of Ontario and Quebec. In recent years, biotechnology in British Columbia has expanded rapidly, and could potentially serve to compensate for the economic losses that will occur from declines in our natural-resource-based industries such as mining, forestry and the fisheries. With the development of Genome B.C., the Genome Sequencing Centre, and other major molecular

biological and biochemical research initiatives in B.C., the potential for business spin off is increasing exponentially.

In Canada, progress in Biotechnology has been impeded by the lack of a critical mass of people who are knowledgeable in the areas of MBB and business. There has been a dearth of people who can, for example, evaluate intellectual property content of MBB research for venture capitalists, who can understand the market for a given biotechnology research product, or who can help negotiate licensing agreements concerning biotechnological intellectual property, who can effectively manage the operation of emergent biotechnological businesses. This lack of expertise has contributed materially to the slow growth of the industry relative to growth in the US.

To our knowledge, there are no programs in Canada that address this need for in-depth cross-training in business/economics and biotechnology. Yet Canadian universities, with their strength in scientific and business training, are in an excellent position to offer a huge contribution to the future workforce in biotechnology in Canada. There is a Business Admin minor for any Science major at the University of Alberta that requires only 24 to 36 total units of business website: <http://www.ualberta.ca/SCIENCE/degprogs/busminor.html>. Brock University and Carleton University offer programs in applied science that completely lack business components: <http://www.brocku.ca/registrar/1999/undergrad/faculties/biotec.html>, <http://www.admissions.carleton.ca/cuuc/programs/Biotechnology.html>. Finally there are lab technology based proposed programs in Biotechnology at UBC and BCIT.

Simon Fraser University is uniquely qualified to take a leadership role in offering a program that prepares students for a future in Biotechnology. SFU has outstanding programs in both MBB and Business Administration, and many students who are able to excel under the pressures of a rigorous academic schedule. Moreover, unlike many Canadian Universities, SFU's medium size and history of administrative innovation and interdisciplinary approaches facilitate the cross-Faculty cooperation necessary to quickly mount high-impact novel programs such as this. Moreover, the MBB/Business degree will be easy to implement since it is based on existing courses and expertise. Since this is essentially a joint-major proposal only approvals internal to SFU would have to be obtained.

Initial queries by a few of the Department of MBB faculty of the students in their upper-level courses, as to whether they would welcome a MBB/Business degree program, were met with a positive response. For example, over half of the ~40 students in Dr. Scott's MBB 426 (Immunology) course indicated that, had they had the opportunity, they would have been interested in a joint program.

Requirements to mount a MBB/Business Joint Degree at SFU.

- Establishment of the undergrad coordinating committee between Business Administration and the Department of Molecular Biology and Biochemistry. Committee membership would consist of the Director of the Undergraduate Program in Business Administration and a designate from that Faculty plus the Chair of the Departmental Undergraduate Curriculum Committee and designate from the Department of Molecular Biology and Biochemistry.
- Determination of entrance requirements for this program. Students will be accepted directly into the Joint Majors program from high school. The Coordinating Committee will screen applicants and set the level and number of admissions per year. Initially, the number of students admitted will be limited to 25 per year. Requests for transfer to the Joint Major whether from SFU students or from students from other colleges/universities will be subject to the recommendation of the Coordinating Committee.

- Innovation of one new service course MBB 3XX (1-1-0). Introduction to Business and Biotechnology. This course will be comprised of a series of presentations by guest speakers with expertise in keystone areas of business applicable to the emergence of biotech companies. Subjects to be covered would include:
 1. patents in Biotechnology (how to read claims, parts of a patent, continuations, abandonment, etc.)
 2. contracts in Biotechnology (what goes into a contract, how to read one and how to negotiate one)
 3. intellectual property (what is IP, and when does one decide when an invention or discovery constitutes IP)
 4. the steps involved in putting a patent in place, and timeline
 5. how Biotechnology IP is evaluated
 6. how Biotechnology is financed
 7. the role of the venture capitalist
 8. how a Biotechnology start-up company is created (business plan, financing, marketing, etc.).

Lower Division Requirements for Joint Major in MBB and Business Administration

Lower Division - MBB

MBB	221-3	Cell Biol. & Biochem
	222-3	Molec. Biol. & Biochem.
BISC	101-4	Intro Biology I
	102-4	Intro Biology II
	202-3	Genetics
CHEM	121-4	General Chem & Lab I
	122-2	General Chem II
	126-2	General Lab II
	281-4	Organic Chem & Lab I
	282-2	Organic Chem II
	286-2	Organic Lab II
MATH	151-3 or 154-3	Calculus I
	152-3 or 155-3	Calculus II
PHYS	120-3 or 101-3	Physics I
	121-3 or 102-3	Physics II

Lower Division - Business

BUEC	232-3	Econ & Bus Statistics
BUS	251-3	Financial Accounting I
	254-3	Manag. Acctg. I
	272-3	Behavior in Organizations
ECON	103-3	Microeconomics
	105-3	Macroeconomics
	ENGL One 3-credit courses	
		or Phil

Upper Division Requirements for Joint Major in MBB and Business Administration

Upper Division - Science

MBB	308-3	Molec. Biol Biochem. Lab I
	309-3	Molec. Biol Biochem. Lab II
	321-3	Intermediate Metabolism
	322-3	Molecular Physiology
	432-3	Adv. MBB Lab
		Or BISC 457-3, Plant . Mol Bio. Biotech
	3XX-1	Intro. Business & Biotech..
	AND ONE OF THE FOLLOWING:	
		MBB 423-3 Protein Struct. & Function.
		MBB 426-3 Immunology
	MBB 435-3 Genomic Analysis	
BISC	331-3	Molecular Biology
	303-3	Microbiology

Upper Division - Business

BUS	303-3	Bus., Society & Ethics
	312-4	Business Finance
	343-3	Intro to Marketing
	347-3	Consumer Behavior OR Another Marketing Course
	374-3	Organizational Theory / OR
	381-3	Intro Hum. Resources Mgt.
	360-3	Business Communication
	393-3	Commercial Law
	477-4	New Ventures Planning
BUEC	333-3	Econ & Bus. Stat II

MBB COURSE PREREQUISITES
SFU Calendar 2000-2001

Course	Prerequisite	Corequisite
Bisc 101 Bisc 102		
Bisc 202	Bisc 101 & 102	
Chem 121	Chem 121	
Chem 122	Chem 121	Chem 122
Chem 126	Chem 121	Chem 122
Chem 281	Chem 281	
Chem 282	Chem 281	
Chem 286	Chem 281	Chem 282
BISC 303	MBB 221	
BISC 331	BISC 202 MBB 222	
MBB 221	Bisc 101	Chem 281 ^d (or 150)
MBB 222	MBB 221	Chem 282 ^d (or 250)
MBB 308 ^a	MBB 222 Chem 282, 286	
MBB 309 ^b	Chem 286	MBB 321
MBB 321	MBB 222 Chem 282	
MBB 322	MBB 222 Chem 282	
MBB 432 ^c	MBB 311, 312 or MBB 308, 309	
MBB 423	BISC 331, MBB 321 or 322	
MBB 426	MBB 322	
MBB 435	BISC 202, 331	

^a MBB 308 will replace MBB 311

^b MBB 309 will replace MBB 312

^c MBB 432 is a new advanced molecular biology lab course.

^d Recommend that listed course precede its 'corequisite'

BUSINESS COURSE PREREQUISITES
SFU Calendar 2000-2001

Course	Prerequisite	Corequisite
BUEC 232	MATH 157	MATH 157
BUS 251	15 CREDIT HOURS	
BUS 254	BUS 251	
BUS 272	15 CREDIT HOURS	
BUS 303	60 CREDIT HOURS	
BUS 312	BUS 254, 60 CREDIT HOURS	
BUS 343	60 CREDIT HOURS	
BUS 347	BUS 343	
BUS 374	BUS 272, 60 CREDIT HOURS	
BUS 381	BUS 272, 60 CREDIT HOURS	
BUS 360	60 CREDIT HOURS	
BUS 393	60 CREDIT HOURS	
BUS 477	BUS 312, BUS 343	
BUEC 333	ECON 103, 105, & BUEC 232	