

Questions regarding the Science Degree Proposal

NOTE: these observations were made on the draft submitted to Academic Council and reaffirmed in the draft submitted to the Board of Governors. As a result of this document, changes may have been made to subsequent drafts to hide the problems. However, the flaws are fundamental to the degree design and still exist.

MAJOR & MINOR COURSE REQUIREMENTS

(Part B, s. 3.2) Which institutions require a total of *only* 30 discipline credits (10 courses) for a four year science major?

(Part B, s. 3.3) Which institutions require a total of *only* 12 discipline credits (4 courses) for a four year science minor?

Zorbas' data for BC institutions (Tables 3.1 and 5.1, attached) indicates that 28 to 39 300⁺ level discipline credits for a science major and 14 to 18 300⁺ discipline credits for a science minor. (See MULTIDISCIPLINARY MAJORS for more on this issue.)

The information in s. 3.2 and 3.3 is flawed. These sections mix counting of junior and senior courses and do not specifically list courses at the 300⁺ level. Cross-Canada data needs to be collected, tabulated, fully disclosed to Science Council and science faculty, and then a decision made regarding the credits for MacEwan science majors and minors.

(Part B, s. 1.3) The MacEwan biological sciences major requires a lowly 6 discipline credits at the 400 level. The computing sciences major requires one 400 level 'project course'. *No other* MacEwan major has *any* requirement for 400 level courses. The following examples — direct from the examples in Appendix 2 — illustrate this problem for MacEwan proposed four year baccalaureate degrees:

Mathematics major, Physics minor: two 400 level courses

Mathematical Sciences major, Biological Sciences minor: two 400 level courses

Physical Sciences major, Statistics minor: ZERO 400 level courses

Computing Science major, Mathematics minor: one 400 level [project] course

Dr. Grant MacEwan was an environmentalist. MacEwan hosts the Environmental Studies Institute. A recent study found that over 50 % of MacEwan science students that transfer to the UofA obtained an environmental science degree. *Why isn't MacEwan proposing an environmental science degree?* N.B.: the biology department has proposed a biology degree with a specialization in environmental biology. This is not an 'environmental sciences' degree and, even then, addresses only a fraction of the environmental science spectrum.

MULTIDISCIPLINARY MAJORS

Science Council exclusively adopted the 'major + minor' degree model. Into that, however, they are attempting to fit multidisciplinary majors — majors that provide knowledge in more than one science discipline.

(Part B, s. 1.3.1–3, 1.3.6; Table 3.1) The science major requires at least 48 credits in the discipline. Students completing a biological science major require *only* 24 300⁺ discipline credits, *only* 15 300⁺ credits for a computer science major, 30 300⁺ credits for a mathematics major, and 12 300⁺ credits for a psychology major. (Most BC institutions require a minimum of 30 300⁺ discipline credits.)

(Part B, s. 1.3.4–5; Table 3.1) A student majoring in a multidisciplinary science (mathematical sciences or physical sciences) must take 12–18 100 level discipline credits and numerous 200 level credits as prerequisites to 300⁺ courses. In fact, *only* 12 300⁺ credits — divided amongst the two or three disciplines of the multidisciplinary degree — are required for a major! A lowly three 300⁺ credits (*one course at the 300⁺ level*) is required in one of the major degree disciplines!

The MacEwan multidisciplinary ‘major’ is a second rate version of a ‘general’ degree. General degrees are often composed of multiple minors. Zorbas’ data for BC institutions (Table 2.3) indicates 36 300⁺ discipline credits for a general science degree; these 36 credits are divided amongst the two or three science disciplines of the general degree. The MacEwan multidisciplinary science major requires *one-third* the number of 300⁺ discipline credits than students at most BC institutions: 12 vs. 36 discipline credits.

The following examples — direct from the examples in Appendix 2 — illustrate this problem.

Mathematical Sciences major, Biological Sciences minor

At the 300⁺ level: MAJOR: 3 MATH, 3 STAT courses (18 credits, 9 per discipline)
MINOR: 4 BIOL (12 credits)

**Students must take *more* 300⁺ courses in their minor than both disciplines of their major!

Physical Sciences major, Statistics minor

At the 300⁺ level: MAJOR: 2 CHEM, 4 PHYS courses (18 credits: 6 & 12 per discipline)
MINOR: 3 STAT (9 credits)

**Students must take *more* 300⁺ courses in their minor than one discipline of their major!

Biological Sciences major, Psychology minor

At the 300⁺ level: MAJOR: 5 BIOL, 2 GENE, 1 BICM courses (24 credits: 15, 6, & 3 per disc.)
MINOR: 3 PSYC (9 credits)

**Students must take *more* 300⁺ courses in their minor than two disciplines of their major!

MINORS

(Part B, s. 1.3.8–14; Table 5.1) Students completing MacEwan science minors require 25 % *less* discipline credits than students at most BC institutions: 24 vs. 30 discipline credits.

Students completing MacEwan science minors require *one-third* the number of 300⁺ discipline credits than students at most BC institutions: 6 vs. 18 discipline credits.

(Part B, s. 1.3.8) Students completing a chemistry minor at MacEwan require *zero* 300⁺ discipline credits. Dr. Sullivan stated this was because MacEwan Chemistry retained the same 200 level chemistry course structure as UofA. This begs the question: how many 300⁺ chemistry credits are required for a minor at UofA? (answer from p. 339 of the UofA calendar: six) Secondly, considering MacEwan minors in other disciplines: was their 200 level curricula modified to allow students to take six 300 level credits for a minor? How?

Summary: the requirements for a minor degree at MacEwan are *below* those at UofA and *substantially below* the remainder of Canada.

200 LEVEL PRE-REQUISITES

(Appendix 3) Except for two in chemistry, two in biology, and one in mathematics, no other 300⁺ course requires multiple 200 level pre-requisites. In some cases, a 400 level course has, as a pre-requisite, *one* 200 level course.

I am specifically concerned that our supposed 300 and 400 level courses, having only one 200 level pre-requisite, are not actually at the 300⁺ level. I.e., they are 200 level courses numbered 300⁺, which will directly affect the *transferability* of courses and the *credibility* of the science degree program.

Many computing science courses (and a few others) fail to include the course title.

FACULTY

(Part B, s. 7.1, p. 89) What does the second-to-last column indicate? Why does it include only probationary and continuing faculty? Why is there no mention of the plethora of term and sessional science faculty, except in 8.1.1.3 (p. 87)? Why are the science *advisors* listed, and the continuing Arts faculty listed, but the *term* and *sessional* science instructional faculty not listed?

(Part B, s. 7.2) The first paragraph promotes hiring from UofA. As far as I understand, Quality Council identified this as a serious concern in the arts degree proposal: too much like a UofA clone, not enough diversity. Why does the science degree *promote* hiring from UofA? How does “this suggests something of the teaching climate at MacEwan.”? What does it suggest?

PREREQUISITES

(Appendix 4) BICM 200 and BIOL 201 list CHEM 161 as a prerequisite. CHEM 161 may be discontinued.

(Appendix 4) CMPT 3xx and 4xx: should there be a number and a description?

(Appendix 4) EASC 208, 221, & 226: what are their prerequisites?

‘CORE’ IN COMPUTING SCIENCE DEGREE

(Part B, s. 1.3.2, end of 2nd para.) “...have deliberately designed the program so that it does not force students to take all the core areas.” Does this refer to the ‘core’ defined in s. 1.2?

RESIDENCY

(Part B, s. 4.2) Based on this, is a person really able to obtain a MacEwan B.Sc. by completing first and second year at MacEwan and third and fourth at another institution?

‘SECOND TIER’ DEGREE?

(Part A, s. 2.5, last paragraph) *I AM VERY CONCERNED* that this proposal presents the MacEwan students as ‘second tier’ (65 to 75 % averages, 76 % being the UofA cutoff) and purposely prepared a ‘second tier’ degree for these students. There are so many things wrong with this ideology, I cannot discuss them all. The average entrance percentage of MacEwan science students ranges from 76 to 80 % (not far below UofA). If the MacEwan science degree is not at the same rigor as other post secondary institutions, ‘second tier’ will equal ‘second rate’ and the credibility of the program, institution, and graduates will be destroyed. Is this the legacy Dr. Grant MacEwan wanted?

How does the science degree proposal support the Educational Philosophy Statement, “...committed to scholarship and maintenance of high academic standards in meeting the learning needs of our students.”?

CONCLUSIONS

I fully support the *concept* of science degrees at MacEwan.

I believe that the MacEwan science degree proposal targets the *bottom* of the degree spectrum.

I am not prepared to support the *current* science degree proposal.

NOTES

1. Science Council is aware of the above concerns. I was a member of Science Council from its inception in September 2004 to October 2005. During that time, I routinely raised these and other concerns, and was pretty much ignored and my comments dismissed.

2. I received an early copy of the degree proposal to review for grammar and style. In the response, submitted mid-May 2006, I reiterated many of the above concerns.

3. I am fully aware that this degree proposal has been reviewed and passed at numerous internal and external levels prior to reaching Academic Council. I submit that few of these levels have the capacity to validate the degree against science programs at other institutions and relied on the expertise of the members of Science Council to prepare a quality degree. I humbly submit this process — relying on the expertise of internal and external content experts — was subverted. For example, questions raised at Science Council meetings were often ignored, outright dismissed, or treated with disdain. I have also been advised that the Science Curriculum Committee was explicitly directed to ensure the degree proposal ‘fit’ within the MacEwan structure and to *not* compare the degree proposal with other institutions. Finally, I note that my major concerns are with multidisciplinary degrees, and I do not know how critically external reviewers reviewed material outside their discipline.

The facts and questions presented above must be answered to ensure a first rate science degree program at MacEwan.

The following tables are extracted from John Zorbas's report, *Science Degree Granting by Alberta and British Columbia University Colleges*. The term 'upper-level' refers to 300⁺ level courses.

Table 2.3. Upper-level requirements for general degree – university colleges.

University college	Malaspina UC	Okanagan UC	Okanagan UC	UC Cariboo	UC Cariboo	UC Fraser Valley
Degree type	Double Minor	Option A	Option B	Alternative 1	Alternative 2	Double Minor
First area credits	18	18	18	18	18	14-18 ¹¹
Second area credits	18	18	6	18	6	14-18 ¹¹
Third area credits			6		6	

Table 3.1. General requirements for major degree – British Columbia.

Institution	Malaspina UC	Okanagan UC	UC Cariboo	UC Fraser Valley	SFU	UBC
Total credits	120	120	120	120	120	120
Upper-level credits	42	42	48	44	44	48
Science credits	Program Specific	78	72	Program Specific	Program Specific	72
Upper-level science credits	30	36	30-39	Program Specific	28	30
Non-science credits	12	18	18	6	12	18

Table 5.1. Discipline credits for science minor - British Columbia

Institution	Malaspina UC	Okanagan UC	UC Cariboo	UC Fraser Valley	SFU	UBC
Discipline credits	Program Specific	30	30	Program Specific	Program Specific	Program Specific
Upper-level discipline credits	18	18	18	14-18 ²⁸	14-15 ²⁹	18