



Office of Graduate Studies and Postdoctoral Fellows

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MEMORANDUM

ATTENTION Senate
 FROM Wade Parkhouse, Dean of Graduate
 Studies
 RE: Faculty of Science

DATE 05 March 2014
 No. GS2014.11

For information:

Acting under delegated authority at its meeting of 3 March 2014, SGSC approved the following curriculum revision:

Effective: Fall 2014

- a) Department of Mathematics [GS2014.11]
 Applied and Computational Mathematics
1. MSc Program: Core Course Requirements
 - i) Decrease total units to 24
 - ii) Increase optional courses to: additional 8 graduate units
 - iii) Create a thesis option with 24 course units plus a thesis
 - iv) Revise the project option:
Add 4 additional units to bring total to 28 units
 - v) Resultant calendar changes
 2. PhD program: Program Requirements
 - i) Decrease course work to 24 units
 - ii) Optional courses:
Increase to: additional 8 graduate units
Remove option to choose from 400 division undergraduate courses

MEMO

Faculty of Science

ATTENTION Wade Parkhouse, Dean, Graduate Studies

FROM Peter Ruben, Associate Dean, Faculty of Science

RE Major Program Change - Mathematics

DATE February 14, 2014

TIME 4:22 PM

The graduate program in the Department of Mathematics seeks to make major program changes to the APMA MSc Program. No new courses will be required. These changes are intended to be included in the next Calendar. The Graduate Program Committee in the Faculty of Science reviewed and approved the proposed changes. The proposed changes have my approval.



P. Ruben

Proposal for a
Major Change to APMA MSc Program

in the Department of Mathematics

November 13, 2013

1 Summary of proposed program change.

The current APMA MSc program description lists only a project option, although most of our MSc students write a thesis. The proposed change is intended to provide explicitly for two options:

- *Project option:* with a slightly increased course unit requirement over the current 26 units.
- *Thesis option:* with a slight decrease in the current course unit requirement.

No new courses have been introduced as a result of this program change, since students may register in either MATH 880-6 (MSc Project) or MATH 898-6 (MSc Thesis), both of which already exist. In addition to this change, a few spelling, grammar and punctuation errors have also been corrected.

A minor alteration is also required to the APMA PhD program description, only as regards the prerequisite graduate coursework from the MSc.

2 How changes will affect the existing program.

Changes to prerequisites.

No changes required for MSc program prerequisites. The PhD program prerequisites are based on the MSc thesis option course unit requirements and so require a minor adjustment.

Total courses required.

For the APMA MSc thesis option: 24 course units plus a thesis (decreased by 2 units).

For the APMA MSc project option: 28 course units plus a project (increased by 2 units).

Impact on students currently in the program.

None. Changes will only take effect for students entering the program in Fall 2014 or later.

3 Justification for the change.

There are two main motivations for this program change:

- The calendar currently only lists a project option for the APMA MSc, and yet most of our students actually complete the equivalent of a thesis. We are therefore introducing a thesis option with similar core course requirements.
- Compared with other MSc programs in applied mathematics across Canada, the course unit requirements in the APMA MSc are high for a thesis option and low for a project option (see Appendix A). We are therefore adjusting the course units required for both options.

- We have removed mention of 400-level undergraduate courses being permitted in the course unit count for both the MSc and PhD programs. Several years ago, we cross-listed all 400-level applied mathematics courses as 700-level graduate courses, and since then we have expected that all APMA graduate students register in the corresponding 700-level course. Therefore, this change can be considered as simply a correction of a past oversight.

Benefit to the program.

There are several benefits to this program change:

- Providing an explicit thesis option to our students, which is currently not there.
- Differentiating between the project and thesis options, which will provide a clarity that is currently lacking.
- Adjusting the course unit requirements so that they are consistent with other comparable graduate programs in Canada.
- Allowing thesis students to more easily complete their program within two years, which is the expected completion time in our department.

Benefit to students currently enrolled in the program.

This change will only affect students entering in Fall 2014 or later.

4 Changes to calendar entries.

FROM:

Applied and Computational Mathematics Master of Science

Admission Requirements

Applicants normally submit scores in the aptitude section and an appropriate advanced section of the Educational Testing Service's graduate record examinations. Applicants with backgrounds in areas other than mathematics (for example, a bachelor's degree or its equivalent in engineering or physics) may be considered suitably prepared for these programs.

Core Course Requirements

Normally courses that are cross-listed as undergraduate courses cannot be used to satisfy graduate course requirements.

Beyond all the courses the student completed for the bachelor's degree, the candidate will complete ~~26 units, normally during five terms, that is comprised of~~ **24 units that consist of one of**

APMA 900 - Asymptotic Analysis of Differential Equations (4)

APMA 901 - Partial Differential Equations (4)

and one of

APMA 920 - Numerical Linear Algebra (4)

APMA 922 - Numerical Solution of Partial Differential Equations (4)

and one of

APMA 930 - Computational Fluid Dynamics (4)

APMA 935 - Analysis and Computation of Models (4)

and at least one other course from the above course lists that has not already been completed

~~and an additional seven graduate units~~

~~and a further three units which may be chosen from either graduate or 400 division undergraduate courses~~

and an additional eight graduate units.

Project

~~In addition, the student completes a project involving a significant computational component, and submits and successfully defends a project report. This project should be completed within approximately one term.~~

Thesis Option

In addition to the core course requirements, the student should complete a satisfactory thesis normally involving a significant computational component, which is submitted and defended at an oral examination.

Project Option

In addition to the core course requirements, the student completes a further 4 units of graduate coursework. The student should also complete a project that normally involves a significant computational component, and requires a project report and a final presentation. The project component should normally be completed within one term, during which the student should register in MATH 880-6.

Academic Requirements within the Graduate General Regulations

All graduate students must satisfy the academic requirements that are specified in the graduate general regulations (residence, course work, academic progress, supervision, research competence requirement, completion time, and degree completion), as well as the specific requirements for the program in which they are enrolled, as shown above.

TO:

**Applied and Computational Mathematics
Master of Science**

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FROM:

Applied and Computational Mathematics Doctor of Philosophy

Admission Requirements

Applicants normally submit scores in the aptitude section and an appropriate advanced section of the Educational Testing Service's graduate record examinations. Applicants with backgrounds in areas other than mathematics (for example, a bachelor's degree or its equivalent in engineering or physics) may be considered suitably prepared for these programs.

Program Requirements

PhD candidates must complete a further eight graduate units beyond the ~~MSc requirements~~ **MSc core course requirements** shown below.

Candidates who are admitted to the PhD program without an MSc are required to obtain credit or transfer credit for an amount of course work equivalent to that obtained by students with an MSc.

Core Course Requirements

Normally courses that are cross-listed as undergraduate courses cannot be used to satisfy graduate course requirements.

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and at least one other course from the above course lists that has not already been completed

~~and an additional seven graduate units.~~

~~and a further three units which may be chosen from either graduate or 400 division undergraduate courses~~

and an additional eight graduate units.

Candidacy Examination

Students pass an oral candidacy exam given by the supervisory committee before the end of the fourth full time term. The exam consists of a proposed thesis topic defence and supervisory committee questions about related proposed research topics. The exam follows submission of a written PhD research proposal and is graded pass/fail. Those with a fail will complete a second exam within six months. A student failing twice will normally withdraw.

Thesis

A PhD candidate must submit and defend a thesis based on his/her original work that embodies a significant contribution to mathematical knowledge.

Academic Requirements within the Graduate General Regulations

All graduate students must satisfy the academic requirements that are specified in the graduate general regulations (residence, course work, academic progress, supervision, research competence requirement, completion time, and degree completion), as well as the specific requirements for the program in which they are enrolled, as shown above.

TO:

**Applied and Computational Mathematics
Doctor of Philosophy**

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Appendix: Comparison to other applied math programs in Canada.

Below is a comparison of the SFU APMA MSc with other programs in Applied Mathematics at selected Canadian universities. SFU course counts were obtained by assuming that the majority of courses taken are four-unit graduate courses, although students are permitted up to two three-unit courses at the 700 (undergraduate, cross-listed) level.

SFU (current program, assuming 1 course $\approx$ 4 units):

- 7 courses plus a project
- 7 courses plus a thesis

SFU (after changes):

- 7-8 courses plus a project
- 6 courses plus a thesis

UBC:

- 9 courses plus an essay
- 8 courses plus a 2-course thesis
- 6 courses plus a 4-course thesis

York:

- 4 courses plus a thesis

McGill:

- 8 courses plus a 4-course project
- 6 courses plus a 6-course thesis

Alberta:

- 8 courses plus a 2-course project
- 6 courses plus a thesis

McMaster:

- 7 courses plus a project
- 6 courses plus a thesis