SFU **GRADUATE AND POSTDOCTORAL STUDIES**

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MEMORANDUM

ATTENTION Senate

DATE January 16, 2020

FROM Jeff Derksen,
Chair of Senate Graduate Studies
Committee (SGSC)

RE: Program Changes

For information:

Acting under delegated authority at its meeting of January 7, 2020, SGSC approved the following program changes, effective **Fall 2020**:

Faculty of Applied Sciences

School of Computing Science

   1) Program change (calendar revision): Computing Science MSc
   2) Program change (calendar revision): Computing Science PhD

Beedie School of Business

   3) Program change (calendar revision): Executive MBA

Faculty of Science

Department of Mathematics

   4) Program change (calendar revision): Applied and Computational Mathematics MSc
   5) Program change (calendar revision): Applied and Computational Mathematics PhD

Senators wishing to consult a more detailed report of curriculum revisions may do so on the Senate Docushare repository at https://docushare.sfu.ca/dsweb/View/Collection-12682

MEMORANDUM

Attention	Dr. Jeff Derksen	Date Dec 11, 2019
	Dean, Graduate Studies	
From	Dr. Parvaneh Saeedi	psaeedi@sfu.ca
	Faculty of Applied Science, Graduate Studies Committee	

Re: FAS-CMPT's Calendar changes- program requirements
~~and new course proposal - CMPT-700~~ .

The faculty of Applied Sciences Graduate Studies Committee would request for calendar changes ~~and a new course proposal~~ that have been approved by the School's Graduate Program Committee and presented for comment by all members of the School to be effective as of fall 2020.

Regards,
Parvaneh Saeedi

SFU

MEMO

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ATTENTION	Pavarneh Saeedi, Associate Director
FROM	Ghassan Hamarneh, Graduate Director
RE	Calendar changes- program requirements to support new Breadth requirements ~~New course proposal - CMPT 700~~
DATE	December 10, 2019

Please find attached the calendar changes and a new course proposal that have been approved by the School's Graduate Program Committee and presented for comment by all members of the School to be effective as of Fall 2020.

Summary and Rationale:
The proposed calendar changes have been submitted in order to simplify our current calendar entry and strengthen our programming. The former is based on regular feedback that our calendar is confusing and not instructive for students.

The current entry sets out breadth and other requirements for programs which, again, is confusing to students.

As well, the School has recently made numerous changes with respect to breadth requirements. In order to manage the updates, the new calendar entry sets out only program requirements (eg. total credits) and will include a link to our School website that will provide students with details of required course work for each program.

Please note that the School has a Breadth Committee that reviews course work completed by each student prior to graduation being recommended.

~~NEW COURSE PROPOSAL – effective Fall 2020~~

~~CMPT-700 — Technical Writing and Research Methods (3 units).~~

~~We designed the above course, with the primary motive of generating well-rounded computer scientists. Through this course, students will improve their writing and presentation skills, and dive into other topics that are not regularly covered in graduate courses.~~

If you have any questions or concerns, please let me know.

Ghassan Hamarneh
Graduate Chair, School of Computing Science

Calendar Entry Change for Master of Science - CMPT

Summary of change:
The existing Master of Science in Computing Science currently offers three options: a thesis option, a project option and a coursework option. The objective of the following updates are to simplify our calendar entry to allow for breadth requirement changes in response to regular and current student feedback that our calendar entry is not clear and concise.

Rationale for change:
To increase clarity and simplify our calendar entries as well as strengthen our program. The latter is in part achieved through the addition of a Technical Writing and Research   Communication course (CMPT 700) as a requirement for our thesis based students as this is lacking in our current programming.

Effective term and year: Fall 2020

Will this change impact current students? If yes, what is the plan for current students?
No, the new/updated breadth requirements will be effective as of Fall 2020. Current students will not be required to take CMPT 700, it would be an optional course for them.

FROM	TO
[...]	[...]
Admission Requirements	**Admission Requirements**
Applicants must satisfy the University admission requirements as stated in <u>Graduate General Regulations 1.3</u> in the SFU Calendar and have a bachelor's degree or the equivalent in computing science or a related field.	Applicants must satisfy the University admission requirements as stated in <u>Graduate General Regulations 1.3</u> in the SFU Calendar and have a bachelor's degree or the equivalent in computing science or a related field. **Direct admission is only permitted into the thesis option.**
Program Requirements	**Program Requirements**
~~All students are admitted to the thesis option and then transferred to the project or course option with consent. Any change to a student's program must be approved by the school's graduate program committee.~~	**This program consists of course work and the requirements from either a thesis, project or course option for a minimum of 30 units.**
	Course work must be selected in consultation with the supervisor or graduate program chair.
~~This program consists of course work, an~~	**Students must complete**

optional internship, and a thesis, project, or course option for a minimum of 30 units.

Students must complete one of

CMPT 705 - Design and Analysis of Algorithms (3)
CMPT 710 - Computational Complexity (3)

and two courses from two other areas

and one course from any area

and an additional three units of graduate courses or internship from Table 2 with approval of supervisor and Graduate Chair

and the requirements from one of the three options below.

Thesis Option

and a thesis

CMPT 898 - MSc Thesis (15)

Project Option

and two additional course from any area in Table 1

and an additional three units of graduate courses

and a project

CMPT 897 - MSc Project (6)

Course Option

and an additional 12 units of graduate courses

and portfolio

CMPT 896 - MSc Course Option Portfolio (0)

---

five graduate courses in Computing Science for a minimum of 15 units

and requirements from one of the options below

Thesis Option

students must complete

CMPT 700 – Technical Writing and Research Methods (3)

and a thesis
CMPT 898 - MSc Thesis (15)

Project Option

and three additional graduate courses in Computing Science for a minimum of nine units

and a project
CMPT 897 - MSc Project (6)

Course Option

and five additional graduate courses in Computing Science for a minimum of 15 units

and portfolio
CMPT 896 - MSc Course Option Portfolio (0)

NOTE: SFU students enrolled in the Accelerated Master's within the School of Computing Science may apply a maximum of nine graduate course units, taken while completing the bachelor's degree, towards the upper division undergraduate electives of the bachelor's program and the requirements of the master's degree. These courses need to be selected in consultation with the supervisor. For more information go to: https://www.sfu.ca/dean-gradstudies/future/academicprograms/AcceleratedMasters.html.

Breadth Requirements

For purposes of defining breadth requirements, courses are grouped into the five major areas shown in Table 1. Courses not related to the breadth requirements are shown in Table 2. Any courses completed outside the School of Computing Science must be approved by the student's supervisor and the director of the graduate program.

Table 1
Area I – Algorithms and Complexity Theory
CMPT 701 - Computability and Logic (3)
CMPT 705 - Design and Analysis of Algorithms (3)
CMPT 710 - Computational Complexity (3)
CMPT 711 - Bioinformatics Algorithms (3)
CMPT 813 - Computational Geometry (3)
CMPT 814 - Algorithmic Graph Theory (3)
CMPT 815 - Algorithms of Optimization (3)
CMPT 981 - Special Topics in Theoretical Computing Science (3)
Area II – Networks, Software and Systems
CMPT 745 - Software Engineering (3)
CMPT 771 - Computer Networks (3)
CMPT 777 - Formal Verification (3)
CMPT 816 - Theory of Communication Networks (3)
CMPT 886 - Special Topics in Operating Systems (3)
CMPT 982 - Special Topics in Networks and Systems (3)
Area III – Artificial Intelligence
CMPT 721 - Knowledge Representation and Reasoning (3)
CMPT 726 - Machine Learning (3)
CMPT 823 - Formal Topics - Knowledge Representation (3)
CMPT 825 - Natural Language Processing (3)

CMPT 827 - Intelligent Systems (3)
CMPT 983 - Special Topics in Artificial Intelligence (3)
Area IV - Databases, Data Mining and Computational Biology
CMPT 740 - Database Systems (3)
CMPT 741 - Data Mining (3)
CMPT 829 - Special Topics in Bioinformatics (3)
CMPT 843 - Database and Knowledge-base Systems (3)
CMPT 984 - Special Topics in Databases, Data Mining, Computational Biology (3)
Area V - Graphics, HCI, Vision and Visualization
CMPT 764 - Geometric Modelling in Computer Graphics (3)
CMPT 767 - Visualization (3)
CMPT 820 - Multimedia Systems (3)
CMPT 822 - Computational Vision (3)
CMPT 828 - Illumination in Images and Video (3)
CMPT 985 - Special Topics in Graphics, HCI, Visualization, Vision, Multimedia (3)
Table 2
CMPT 631 - Industrial Internship (3)
CMPT 889 - Special Topics in Interdisciplinary Computing (3)
CMPT 894 - Directed Reading (3)
CMPT 980 - Special Topics in Computing Science (3)

NOTE: SFU students enrolled in the Accelerated Master's within the School of Computing Science may apply a maximum of nine graduate course units, taken while completing the bachelor's degree, towards the upper division undergraduate electives of the bachelor's program and the requirements of the master's degree. These courses need to be selected in consultation with the supervisor. For more information go to: url

[...]

Other Information

[...]

Other Information

Course Work

	Students are required to complete breadth requirements selected from five different areas. This is to be done in consultation with the supervisor or graduate program chair if the supervisor has not been appointed yet. For more information on breadth requirements and restrictions, see program website: _link to Computing Science website_
Supervisory Committee A supervisory committee consists of the student's supervisor, at least one other computing science faculty member, and others (typically faculty) as appropriate. The choice of supervisor should be made by mutual consent of the graduate student and faculty member based on commonality of research interests. The student and supervisor should consult on the remainder of the committee members. **Transfer from MSc to PhD Program** Students who are enrolled in the MSc program may apply to transfer to the doctor of philosophy (PhD) program after two terms and normally before the seventh term. Students must have a CGPA of 3.5 or above, completed 75% of the required master's course work and evidence must be provided that the student is capable of undertaking substantial original research. **Thesis Option** Students in the thesis option will demonstrate depth of knowledge in their research area through a thesis defence based on their independent work. Students should consult with their supervisory committee members, and formulate and submit a written thesis proposal for approval no later than the third term. Thesis students register in CMPT 898 during the terms in which they are conducting thesis research. **Project Option**	**Supervisory Committee** A supervisory committee consists of the student's supervisor, at least one other computing science faculty member, and others (typically faculty) as appropriate. The choice of supervisor should be made by mutual consent of the graduate student and faculty member based on commonality of research interests. The student and supervisor should consult on the remainder of the committee members. **Transfer from MSc to PhD Program** **As per GGR 1.3.7b,** students who are enrolled in the MSc program may apply to transfer to the doctor of philosophy (PhD) program after two terms and normally before the seventh term. Students must have a CGPA of 3.5 or above, completed 75% of the required master's course work and evidence must be provided that the student is capable of undertaking substantial original research. **Thesis Option** Students in the thesis option will demonstrate depth of knowledge in their research area through a thesis defence based on their independent work. Students should consult with their supervisory committee members, and formulate and submit a written thesis proposal for approval no later than the third term. Thesis students register in CMPT 898 during the terms in which they are conducting thesis research. **Under special circumstances, students in the thesis option, with approval of the graduate**

	program chair, may transfer to the course or project option.
Students in the project option will choose an area of specialization and submit a project report. Project topics may include a comprehensive survey of the literature of some computing science related research areas; implementation and evaluation of existing techniques/algorithms; development of interesting software/hardware applications. Project students register in CMPT 897 during the terms in which they are conducting project work. The project is examined as a thesis and will need to be submitted to the library as per Graduate General Regulation 1.11.	Project Option
	Students in the project option will choose an area of specialization and submit a project report. Project topics may include a comprehensive survey of the literature of some computing science related research areas; implementation and evaluation of existing techniques/algorithms; development of interesting software/hardware applications. Project students register in CMPT 897 during the terms in which they are conducting project work. The project is examined as a thesis and will need to be submitted to the library as per Graduate General Regulation 1.11.
~~Course Work~~	
~~The courses used to satisfy the breadth requirements must include either CMPT 705 or 710, unless the student already has credit for one of these courses (or equivalent) from a previous degree as determined by the graduate program breadth committee.~~	[...]
~~Only two special topics courses may be used toward satisfaction of breadth requirements, except with permission of the graduate program breadth committee.~~	
~~Any 700 division course used to satisfy the breadth requirement may be waived and replaced by an 800 division course. Students must produce convincing evidence to the graduate program committee that they have completed a comparable course or have comparable training in industry.~~	
[...]	

Calendar Entry Change for Doctor of Philosophy - CMPT

Summary of change: The objective of the following updates are to simplify our calendar entry to allow for breadth requirement changes in response to regular and current student feedback that our calendar entries are not clear and concise.

Rationale for change: To increase clarity and simplify our calendar entries as well as strengthen our program. The latter is in part achieved through the addition of a Technical Writing and Research   Communication course (CMPT 700) as a requirement for our thesis based students as this is lacking in our current programming.
Effective term and year: Fall 2020
Will this change impact current students? If yes, what is the plan for current students?   No, the new/updated breadth requirements will be effective as of Fall 2020. Current students will not be required to take CMPT 700, it would be an optional course for them.

FROM	TO
[...]	[...]
Admission Requirements	**Admission requirements**
Applicants must satisfy the University admission requirements as stated in <u>Graduate General Regulations 1.3</u> in the SFU Calendar ~~and have a master's degree or the equivalent in computing science or a related field, or have a bachelor's degree or the equivalent in computing science or a related field, with a cumulative grade point average of 3.5.~~	Applicants must satisfy the University admission requirements as stated in <u>Graduate General Regulations 1.3</u> in the SFU Calendar. **Students must hold a master's degree or the equivalent in Computer Science or another related field.**
At its discretion, the school's graduate admissions committee may recommend PhD admission to ~~students applying to the PhD program without a master's degree or equivalent in computing science or a related field.~~	At its discretion, the school's graduate admissions committee may recommend PhD admission **to exceptional students holding only a bachelor's degree or equivalent in computer science or a related field with a cumulative grade point average of at least 3.67.**
Program Requirements	**Program Requirements**
This program consists of course work and a thesis for a minimum of ~~18 units.~~	This program consists of course work and a thesis for a minimum of **21 units selected in consultation with the Graduate Chair or supervisor.**

Students will demonstrate breadth of knowledge, and the capacity to conduct original research through completion and defence of an original thesis. ~~If a student does not have an MSc in Computing Science (or equivalent), an additional five graduate courses will be required in consultation with the supervisor.~~

~~From Area I students must complete one of~~

~~CMPT 705 - Design and Analysis of Algorithms (3)~~
~~CMPT 710 - Computational Complexity (3)~~

~~and two courses from two other areas~~

~~and three additional graduate units~~

~~and a thesis~~

~~CMPT 899 - PhD Thesis (6)~~

~~Breadth Requirements~~

~~For purposes of defining breadth requirements, courses are grouped into the five major areas shown in Table 1 below. Courses not related to the breadth requirements are shown in Table 2. Any courses completed outside the School of Computing Science must be approved by the student's supervisor and the director of the graduate program.~~

~~Table 1~~

~~Area I – Algorithms and Complexity Theory~~

~~CMPT 701 - Computability and Logic (3)~~
~~CMPT 705 - Design and Analysis of Algorithms (3)~~
~~CMPT 710 - Computational Complexity (3)~~
~~CMPT 711 - Bioinformatics Algorithms (3)~~
~~CMPT 813 - Computational Geometry (3)~~
~~CMPT 814 - Algorithmic Graph Theory (3)~~
~~CMPT 815 - Algorithms of Optimization (3)~~
~~CMPT 981 - Special Topics in Theoretical Computing Science (3)~~

Students will demonstrate breadth of knowledge, and the capacity to conduct original research through completion and defence of an original thesis.

Students must complete

CMPT 700 – Technical Writing and Research Communication (3) *
(or 3)

and

four graduate courses in Computing Science for a minimum of 12 units

and a thesis

CMPT 899 - PhD Thesis (6)

Students without an MSc or equivalent

complete additional five graduate courses in Computing Science for a minimum of 15 units selected in consultation with the Graduate Chair or supervisor.

*Students may not be required to repeat this course if they received a credit for it during the master's program

Area II – Networks, Software and Systems

CMPT 745 - Software Engineering (3)
CMPT 771 - Computer Networks (3)
CMPT 777 - Formal Verification (3)
CMPT 816 - Theory of Communication Networks (3)
CMPT 886 - Special Topics in Operating Systems (3)
CMPT 982 - Special Topics in Networks and Systems (3)

Area III – Artificial Intelligence

CMPT 721 - Knowledge Representation and Reasoning (3)
CMPT 726 - Machine Learning (3)
CMPT 823 - Formal Topics - Knowledge Representation (3)
CMPT 825 - Natural Language Processing (3)
CMPT 827 - Intelligent Systems (3)
CMPT 983 - Special Topics in Artificial Intelligence (3)

Area IV – Databases, Data Mining and Computational Biology

CMPT 740 - Database Systems (3)
CMPT 741 - Data Mining (3)
CMPT 829 - Special Topics in Bioinformatics (3)
CMPT 843 - Database and Knowledge-base Systems (3)
CMPT 984 - Special Topics in Databases, Data Mining, Computational Biology (3)

Area V – Graphics, HCI, Vision and Visualization

CMPT 764 - Geometric Modelling in Computer Graphics (3)
CMPT 767 - Visualization (3)
CMPT 820 - Multimedia Systems (3)
CMPT 822 - Computational Vision (3)
CMPT 828 - Illumination in Images and Video (3)
CMPT 985 - Special Topics in Graphics, HCI, Visualization, Vision, Multimedia (3)

Table 2

CMPT 889 - Special Topics in Interdisciplinary
Computing (3)
CMPT 894 - Directed Reading (3)
CMPT 980 - Special Topics in Computing Science
(3)

[...]

Other Information

Transfer from MSc to PhD Program

Students enrolled in the MSc program may apply
to transfer to the doctor of philosophy (PhD)
program after two terms and normally before the
seventh term. Students must have a CGPA of 3.5
or above, completed 75% of the required
master's course work and evidence must be
provided that the student is capable of
undertaking substantial original research.

Breadth Requirement

PhD students may enter the Computing Science
graduate internship but may not count it towards
the breadth requirement. Only two special topics
courses may be used toward satisfaction of
breadth requirements, except with permission of
the graduate program breadth committee.

Depth Seminar

[...]

Other Information

Course Work

**Students are required to complete breadth
requirements selected from five different areas.
This is to be done in consultation with the
supervisor or graduate program chair if the
supervisor has not been appointed yet. For more
information on breadth requirements and
restrictions, see program website:** *link to
Computing Science website*

Transfer from MSc to PhD Program

As per GGR 1.3.7b, students enrolled in the MSc
program may apply to transfer to the doctor of
philosophy (PhD) program after two terms and
normally before the seventh term. Students must
have a CGPA of 3.5 or above, completed 75% of
the required master's course work and evidence
must be provided that the student is capable of
undertaking substantial original research.

[...]

Students demonstrate depth of knowledge in their research area through a public depth seminar, which may be scheduled at any time following the completion of breadth requirements. Typically this is between the fifth and seventh term in the program; a recommendation is made by the graduate breadth committee, in proportion to the amount of course work required to satisfy the breadth requirement.

The examining committee consists of the supervisory committee and one or two additional examiners recommended by the examining committee, and approved by the graduate program committee. The depth exam centers on the student's research area. The examining committee, in consultation with the student, specifies the examination topics. The student prepares a written survey and gives a public depth seminar; the oral exam follows, and then the committee evaluates the student's program performance. The committee's evaluation is diagnostic; specifying additional work in weak areas if such exists. A second depth exam or withdrawal from the program may be recommended in extreme cases.

Thesis Proposal

The student, in consultation with the supervisory committee, formulates and submits, for approval, a written thesis proposal consisting of a research plan and preliminary results. The student gives a seminar and defends the originality and feasibility of the proposed thesis to the supervisory committee. The thesis proposal is normally presented and defended within three terms of the depth examination.

Thesis Defence

Regulations specifying the examining committee composition and procedures for the final public thesis defence are in the graduate general regulations.

~~Supervisory Committee~~ ~~A supervisory committee consists of the student's supervisor, at least one other computing science faculty member, and others (typically faculty) as appropriate. The choice of supervisor should be made by mutual consent of the graduate student and faculty member based on commonality of research interests. The student and supervisor should consult on the remainder of the committee members.~~ [...]	

SFU BEEDIE SCHOOL OF BUSINESS

Memo to SGSC

To: Senate Graduate Studies Committee
From: Andrew Gemino Associate Dean, Graduate Programs
Re: Curriculum revisions to Executive MBA and MSc Finance
Date: December 12, 2019

The following curriculum revisions have been approved by the Beedie School of Business and are forwarded to the Senate Graduate Studies Committee for approval. These curriculum items should be effective for Fall 2020.

Please include them on the next SGSC agenda.

- ~~New Course: BUS 675, 604, 618~~
- ~~Course changes — BUS 730 Title and Description Change~~
- Program Change: EMBA

Thank you for your attention herein. Should you have any questions or concerns, please do not hesitate to contact me.

Dr. Andrew Gemino
Professor, Management Information Systems
Associate Dean, Graduate Programs, Beedie School of Business

Calendar Entry Change for [Name of Program]

Summary of change:
Adding BUS 600, BUS 618, BUS 675 to the list of courses for EMBA IBL stream
Rationale for change:
New courses being added to the list
Effective term and year: Fall 2020
Will this change impact current students? If yes, what is the plan for current students? Students may started taking new courses as of Fall 2020.

FROM	TO
Program Requirements [...]	Program Requirements [...]
EMBA in Indigenous Business and Leadership (IBL)	EMBA in Indigenous Business and Leadership (IBL)
Students in the EMBA IBL cohort complete a minimum of 56 units from the following	Students in the EMBA IBL cohort complete a minimum of 56 units from the following
BUS 603 - Structure and Change in Organizations (4) BUS 606 - Finance (4) BUS 607 - Strategy (4) BUS 610 - Directed Studies in Business Administration (2) BUS 611 - Directed Studies in Business Administration (4) BUS 612 - Directed Studies in Business Administration (4) BUS 615 - Marketing (4) BUS 616 - Philosophy of Management (4) BUS 621 - Information Technology and Organizational Transformation (4) BUS 632 - Operations Management (4) BUS 633 - Topics in Sustainability (4) BUS 634 - Policy and Governance (4)	**BUS 600 - Orientation (0)** BUS 603 - Structure and Change in Organizations (4) BUS 606 - Finance (4) BUS 607 - Strategy (4) BUS 610 - Directed Studies in Business Administration (2) BUS 611 - Directed Studies in Business Administration (4) BUS 612 - Directed Studies in Business Administration (4) BUS 615 - Marketing (4) BUS 616 - Philosophy of Management (4) **BUS 618 - Indigenous Business Management (4)** BUS 621 - Information Technology and Organizational Transformation (4)

BUS 637 - Marketing Management (2)
BUS 638 - Marketing Strategy (2)
BUS 639 - Financial Statement Analysis (2)
BUS 640 - Managerial Accounting (2)
BUS 643 - Entrepreneurship (2)
BUS 644 - Entrepreneurial Finance (2)
BUS 645 - Capstone Simulation (2)
BUS 646 - Managing Innovation (2)
BUS 647 - Entrepreneurship and Innovation (4)
BUS 650 - Business Ethics (2)
BUS 651 - Managerial Economics (4)
BUS 652 - Special Topics in Business Administration (3)
BUS 653 - Special Topics in Business Administration (2)
BUS 654 - Special Topics in Business Administration (2)
BUS 655 - Special Topics in Business Administration (2)
BUS 660 - Special Topics in Business Administration (4)
BUS 661 - Special Topics in Business Administration (4)
BUS 662 - Negotiations (2)
BUS 663 - Special Topics in Business Administration (4)
BUS 664 - New Ventures (4)
BUS 670 - Accounting for Decision Making (4)
BUS 681 - Leadership and Teamwork (4)
BUS 689 - Special Topics in Business Administration (3)
BUS 691 - Business, Community and Government (4)
BUS 696 - Applied Project (6)
BUS 699 - Orientation Retreat (0) *

* BUS 699 is a prerequisite for all courses in this program

[...]

BUS 632 - Operations Management (4)
BUS 633 - Topics in Sustainability (4)
BUS 634 - Policy and Governance (4)
BUS 637 - Marketing Management (2)
BUS 638 - Marketing Strategy (2)
BUS 639 - Financial Statement Analysis (2)
BUS 640 - Managerial Accounting (2)
BUS 643 - Entrepreneurship (2)
BUS 644 - Entrepreneurial Finance (2)
BUS 645 - Capstone Simulation (2)
BUS 646 - Managing Innovation (2)
BUS 647 - Entrepreneurship and Innovation (4)
BUS 650 - Business Ethics (2)
BUS 651 - Managerial Economics (4)
BUS 652 - Special Topics in Business Administration (3)
BUS 653 - Special Topics in Business Administration (2)
BUS 654 - Special Topics in Business Administration (2)
BUS 655 - Special Topics in Business Administration (2)
BUS 660 - Special Topics in Business Administration (4)
BUS 661 - Special Topics in Business Administration (4)
BUS 662 - Negotiations (2)
BUS 663 - Special Topics in Business Administration (4)
BUS 664 - New Ventures (4)
BUS 670 - Accounting for Decision Making (4)
BUS 675- Indigenous Economies (4)
BUS 681 - Leadership and Teamwork (4)
BUS 689 - Special Topics in Business Administration (3)
BUS 691 - Business, Community and Government (4)
BUS 696 - Applied Project (6)

[…]

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MEMORANDUM

ATTENTION	Senate Graduate Studies Committee	**DATE**	December 11, 2019
FROM	Michael Silverman, Associate Dean of Research and Graduate Studies	**PAGES**	1
RE:	Program changes to the MSc/PhD in Applied and Computational Mathematics		

The following curriculum items have been approved by the Faculty of Science and are forwarded to the Senate Graduate Studies Committee for approval. These curriculum items should be effective for **Fall 2020**. Please include them on the next SGSC agenda.

Department of Mathematics

Program change to MSc in Applied and Computational Mathematics

Program change to PhD in Applied and Computational Mathematics

~~New course: APMA 940~~

Please see attached memo from N. Itlen, Graduate Chair, Mathematics, for details.

Michael A. Silverman, Ph.D.
Faculty Graduate Chair

MEMO

To: Michael Silverman
From: Department of Mathematics Graduate Studies Committee
Re: Program changes to the MSc/PhD in Applied and Computational Mathematics
Date: December 9, 2019

The following program changes and new course have been approved by the Department of
Mathematics:

- ~~Introduction of new course APMA 940 — Mathematics of Data Science~~
- Revision to the APMA MSc program that aims to:
    o Expand the list provided for the "breadth" course requirements to include additional
      course choices as well as introducing two new course groups (in discrete mathematics
      and mathematics of data).
    o Reduce the course unit requirements in the thesis option from 24 to 22.
    o Eliminate the existing project option and replace it with a course work option.
- Revision to the APMA PhD program that cleans up the Calendar description to account
  for some existing errors/inconsistencies as well as to ensure consistency with the new
  APMA MSc program description.

Nathan Ilten

Nathan Ilten

Graduate Chair, Department of Mathematics

Calendar Entry Change for
Applied and Computational Mathematics (APMA) Master of Science

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Summary of change: This is a major revision to the APMA MSc program that aims to:
- Expand the list provided for the "breadth" course requirements to include additional course choices as well as introducing two new course groups (in discrete mathematics and mathematics of data).
- Introduce one new graduate course, APMA 940 – Mathematics of Data Science.
- Reduce the course unit requirements in the thesis option from 24 to 22.
- Eliminate the existing project option and replace it with a course work option.

Rationale for change: The courses listed for the "breadth" requirement have been expanded and updated to reflect recent advances in the discipline (in areas such as data science, machine learning, genomics, etc.) as well as to better cover the research interests of recent faculty hires in these areas. The organization into five course groups has been made more explicit and the formatting is now consistent with the department's MATH MSc program. The new course APMA 940 has been introduced to support this expansion. We expect that this revised program should be more attractive to potential graduate students and improve our ability to attract the best students.

The 2-unit reduction in the course unit requirement for the thesis option is meant to allow students to take without penalty up to two 3-unit graduate-level courses (that is, either 700-level cross-listed courses or grad courses outside of MATH/STAT). This is consistent with our removing a previous restriction on grad courses cross-listed at the undergraduate level.

The existing project option is under-utilized and requirements are not clearly defined, so it has been eliminated in favour of a new course work option, where the requirements and transfer procedures are clearly stated.

Effective term and year: Fall 2020

Will this change impact current students? No
If yes, what is the plan for current students?

FROM	TO
Applied and Computational Mathematics Master of Science The Master of Science (MSc) in Applied and Computational Mathematics offers advanced education and research training in ~~applied analysis, computation and mathematical modelling~~. Students admitted to the program will complete one of two program options.	**Applied and Computational Mathematics Master of Science** The Master of Science (MSc) in Applied and Computational Mathematics offers advanced education and research training in **modern applied mathematics**. Students admitted to the program will complete one of two program options.

Admission Requirements	Admission Requirements
Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar. ~~Applicants normally submit scores in the aptitude section and the appropriate advanced section of the Educational Testing Service's graduate record examinations (GRE).~~ Applicants with backgrounds in areas other than mathematics (~~e.g. a bachelor's degree, or its equivalent, in engineering or physics~~) may be considered suitably prepared for these programs.	Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar. **Applicants with backgrounds in areas other than mathematics (for example, a bachelor's degree or its equivalent in a related discipline such as statistics, engineering or physics) may be considered suitably prepared for these programs. Direct admission is only permitted into the thesis option.**
Program Requirements	**Program Requirements**
~~This program consists of required courses, elective courses, and a thesis for a minimum of 36 units.~~	**This program consists of course work and requirements from either a thesis option for a minimum of 34 units or course option for a minimum of 32 units.**
~~Students must complete one of~~	**All course work is subject to approval by the supervisory committee and the departmental graduate studies committee.**
~~APMA 900 Asymptotic Analysis of Differential Equations (4)~~ ~~APMA 901 Partial Differential Equations (4)~~	**Students must complete**
~~and one of~~	**a breadth requirement consisting of four courses from at least three different groups listed below**
~~APMA 920 Numerical Linear Algebra (4)~~ ~~APMA 922 Numerical Solution of Partial Differential Equations (4)~~	**and an additional 6 units of graduate course work***
~~and one of~~	**and the requirements from one of the two options below**
~~APMA 930 - Computational Fluid Dynamics (4)~~ ~~APMA 935 - Analysis and Computation of Models (4)~~	***students who only complete 15 units of course work in the breadth requirement, must complete an additional unit of graduate course work**
~~and at least one other course from the courses listed above that has not already been completed~~	**Thesis Option**
~~and an additional eight graduate units~~	**and a thesis**

and either the thesis or project option

Thesis Option

and a thesis

MATH 898 - MSc Thesis (12)

Project Option

and an additional 4 graduate units

and a project

MATH 880 - MSc Project (6)

NOTE: SFU students enrolled in the Accelerated master's degree program within the Department of Mathematics may apply a maximum of 10 graduate course units, taken while completing the bachelor's degree, towards the upper division undergraduate electives of the bachelor's program and the requirements of the master's degree. For more information go to: http://www.sfu.ca/dean-gradstudies/future/academicprograms/AcceleratedMasters.html.

MATH 898 - MSc Thesis (12)

Course Option

and an additional 10 units of graduate course work

Groups

Group 1: Analysis and Differential Equations

APMA 900 – Asymptotic Analysis of Differential Equations (4)
APMA 901 – Partial Differential Equations (4)
APMA 905 – Applied Functional Analysis (4)
MATH 831 – Real Analysis I (4)

Group 2: Computational Methods

APMA 920 – Numerical Linear Algebra (4)
APMA 922 – Numerical Solution of Differential Equations (4)
APMA 923 – Numerical Methods in Continuous Optimization (4)

Group 3: Mathematical Modelling and Applications

APMA 930 – Computational Fluid Dynamics (4)
APMA 935 – Analysis and Computation of Models (4)
APMA 990 – Special Topics in Applied Mathematics (4)
CMPT 711 – Bioinformatics Algorithms (3)

Group 4: Discrete Mathematics

MATH 808 – Advanced Linear Programming (4)
MATH 820 – Graph Theory (4)
MATH 821 – Combinatorics (4)
MATH 827 – Selected Topics in Discrete Mathematics (4)

Program Length

Students are expected to complete the
program requirements ~~in six terms.~~

Other Information

~~Cross-listed Courses~~

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

Thesis

~~The thesis normally involves a significant
computational component which is submitted
and defended at an oral examination.~~

~~Project~~

~~The project normally involves a significant
computational component and requires a
project report and a final presentation. The~~

Group 5: Mathematics of Data

APMA 940 – Mathematics of Data Science (4)
STAT 830 – Statistical Theory I (4)
STAT 831 – Statistical Theory II (4)

NOTE: SFU students enrolled in the
Accelerated master's degree program within the
Department of Mathematics may apply a
maximum of 10 graduate course units, taken
while completing the bachelor's degree, towards
the upper division undergraduate electives of the
bachelor's program and the requirements of the
master's degree. For more information go
to: http://www.sfu.ca/dean-
gradstudies/future/academicprograms/
AcceleratedMasters.html.

Program Length

Students are expected to complete the program
requirements **within six terms in the thesis
option and five terms in the course option.**

Other Information

Course Work

**As per Graduate General Regulation 1.4.2,
enrolment in courses from outside the
Department of Mathematics requires
approval of the course instructor.**

Satisfactory Progress

**A cumulative grade point average (CGPA) of
at least 3.5 is required to maintain good
standing in the thesis stream. Any student
unable to maintain the CGPA of at least 3.5
after their first two terms will be required to
transfer at that time into the course option.**

~~project component is normally completed within one term.~~ **Academic Requirements within the Graduate General Regulations** All graduate students must satisfy the academic requirements that are specified in the Graduate General Regulations, as well as the specific requirements for the program in which they are enrolled.	**Thesis** **The thesis is submitted and assessed by the student's examining committee as per GGR 1.10.** **Academic Requirements within the Graduate General Regulations** All graduate students must satisfy the academic requirements that are specified in the Graduate General Regulations, as well as the specific requirements for the program in which they are enrolled.

Calendar Entry Change for
Applied and Computational Mathematics (APMA) Doctor of Philosophy

Summary of change: This is a minor revision to the APMA PhD program that cleans up the Calendar description to account for some existing errors/inconsistencies as well as to ensure consistency with the new APMA MSc program description.
Rationale for change: This revision addresses the following issues: - The expected time to completion for the thesis proposal requirement is much closer to 6 terms in practice (rather than the 4 terms in the previous description).   - There was an error in a recent Calendar update that neglected to mention the "breadth" prerequisite in terms of previous graduate course work.   - Some wording has been changed to ensure consistency with the revised APMA MSc program description.
Effective term and year: Fall 2020
Will this change impact current students? No   *If yes, what is the plan for current students?*

FROM	TO
Applied and Computational Mathematics Doctor of Philosophy	**Applied and Computational Mathematics Doctor of Philosophy**
The Doctor of Philosophy (PhD) in Applied and Computational Mathematics is a program intended for those who wish to develop advanced independent research skills. Candidates pursue a research-intensive program leading to a substantial contribution to knowledge in a particular area of applied ~~and~~ computational mathematics.	The Doctor of Philosophy (PhD) in Applied and Computational Mathematics is a program intended for those who wish to develop advanced independent research skills. Candidates pursue a research-intensive program leading to a substantial contribution to knowledge in a particular area of applied **or** computational mathematics.
Admission Requirements	**Admission Requirements**
Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar. ~~Applicants normally submit scores in the aptitude section and the appropriate advanced section of the Educational Testing Service's graduate record examinations (GRE).~~ Applicants with backgrounds in areas other than mathematics ~~(e.g. a bachelor's degree, or its equivalent, in engineering or physics)~~ may be considered suitably prepared for ~~these programs.~~	Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar. Applicants with backgrounds in areas other than mathematics **(for example, a master's degree or its equivalent in a related discipline such as statistics, engineering or physics)** may be considered suitably prepared for **this program. Applicants are normally expected to have completed previous graduate-level course work that is**

Program Requirements

This program consists of ~~courses, a~~ candidacy examination, and a thesis for a minimum of 20 units.

Students must complete

a minimum of eight ~~graduate units in Mathematics~~

and ~~a~~ candidacy exam

APMA 995 - PhD Oral Candidacy Exam (0)

and a thesis

MATH 899 - PhD Thesis (12)

Students who are admitted to the PhD program without ~~an MSc are also required to take a minimum of additional 24 units which is equivalent to that obtained by students with an MSc.~~

Program Length

Students are expected to complete the program requirements in four years.

Other Information

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 oral exam ~~follows~~ submission of a written PhD research proposal and is graded 'Satisfactory' ~~or~~ 'Unsatisfactory'.

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equivalent to the APMA MSc breadth requirement.

Program Requirements

This program consists of **course work, an oral** candidacy examination, and a thesis for a minimum of 20 units.

Students must complete:

a minimum of eight **units in mathematics or a related discipline, chosen in consultation with the supervisory committee and the departmental graduate studies committee**

and **an oral** candidacy exam

APMA 995 - PhD Oral Candidacy Exam (0)

and a thesis

MATH 899 - PhD Thesis (12)

Students who are admitted to the PhD program without **having previously taken at least four graduate-level courses equivalent to the APMA MSc breadth requirement may be required to complete additional graduate course work.**

Program Length

Students are expected to complete the program requirements in four years.

Other Information

Candidacy Examination

Students pass an oral candidacy exam **administered** by the supervisory committee before the end of the **sixth** term. The **oral** exam consists of a **defence of a proposed thesis topic and the supervisory committee poses questions related to the proposed**

~~Those who are graded~~ 'Unsatisfactory' will complete a second exam within six months. A student who cannot obtain 'Satisfactory' after two attempts will normally be ~~withdrawn~~ from the program.

Thesis

~~A PhD candidate must submit and defend~~ a thesis based on their 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, as well as the specific requirements for the program in which they are enrolled.

research. The oral exam **is held following** submission of a written PhD research proposal and is graded **on a Satisfactory/ Unsatisfactory basis. Students who receive** 'Unsatisfactory' will complete a second exam within six months. A student who cannot obtain 'Satisfactory' after two attempts will normally be **required to withdraw** from the program.

Thesis

This program requires the student to complete a thesis based on their original work that embodies a significant contribution to mathematical knowledge. **The completed thesis is assessed by the student's examining committee at an oral examination as per GGR 1.10.**

Academic Requirements within the Graduate General Regulations

All graduate students must satisfy the academic requirements that are specified in the Graduate General Regulations, as well as the specific requirements for the program in which they are enrolled.