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 www.sfu.ca/grad

MEMORANDUM

ATTENTION Senate FROM Wade Parkhouse, Chair of Senate Graduate Studies Committee (SGSC) RE: Faculty of Science	DATE October 12, 2016 No. GS2016.27 and GS2016.34
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A handwritten signature in blue ink, appearing to read 'Wade Parkhouse', is written over the 'No.' field of the memorandum.

For information:

Acting under delegated authority at its meetings of September 12, 2016 and October 3, 2016, SGSC approved the following curriculum changes, **effective Summer 2017**:

Department of Earth Science

- a) Program change: Doctor of Philosophy in Earth Sciences

Department of Statistics and Actuarial Science

- a) New course: STAT 897 PhD Comprehensive Examination
- b) Course change (title, description): STAT 898
- c) Course change (title, other): STAT 899
- d) Program change: Doctor of Philosophy Statistics
- e) Editorial calendar change: Master of Science Actuarial Science
- f) Editorial calendar change: Master of Science Statistics
- g) Editorial calendar change: Graduate Diploma Financial Engineering

Department of Mathematics

- a) New course: APMA 995 PhD Oral Candidacy Exam
- b) Course change (grading basis): MATH 880



MEMO

Faculty of Science

ATTENTION Wade Parkhouse, Dean, Graduate Studies

FROM Peter Ruben, Associate Dean, Research and Graduate
Studies, Faculty of Science

RE Department of Earth Sciences Transfer Requirements Changes

DATE June 21, 2016

TIME 3:20 PM

The Department of Earth Sciences requests to change the requirements for students who seek to transfer from the MSc to the PhD program. These changes, detailed in the accompanying information, have my approval and that of the Faculty Graduate Studies Committee.

A handwritten signature in black ink, appearing to be "PR", is located below the text. The signature is stylized and includes a long horizontal line extending to the right.

SIMON FRASER UNIVERSITY

DEPARTMENT OF EARTH SCIENCES

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GWENN E FLOWERS

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Web: <http://www.sfu.ca/earth-sciences/people/faculty/flowers.html>

28 May 2016

MEMO: Graduate Program Change

Please find enclosed a filled template for a change to the calendar related to the transfer or admittance into the Earth Sciences PhD program without a Master's degree. The Earth Sciences Department has approved this change and wishes it to be considered by the SGSC.

A handwritten signature in black ink that reads "Gwenn Flowers". The signature is written in a cursive, flowing style.

Gwenn Flowers
Associate Professor and Graduate Program Chair
Department of Earth Sciences

Calendar Entry Change for Earth Sciences PhD Program

Summary of change:

The requirements for transfer from the MSc program into the PhD program (and direct admittance to the PhD program from a BSc) have been clarified and expanded.

Rationale for change:

A lack of governing philosophy and vague language in the former published requirements led to inconsistency in decisions to allow transfer into the PhD program across years as a function of the changing composition of the Graduate Committee, introducing an inherent source of inequity in the system. The proposed changes seek to clarify the requirements for transfer and provide a basis for the committee to judge applications more uniformly through time and with changing committee membership.

Effective term and year: Summer 2017

Will this change impact current students? If yes, what is the plan for current students?

No. N/A.

FROM	TO
<p>Admission Requirements</p> <p>Applicants normally will have completed a master's degree in science or engineering. Admission to the doctor of philosophy (PhD) program is governed by the minimum University requirements (see graduate general regulation 1.3.4).</p> <p>For students entering without a master's degree, the following additional requirements apply.</p> <p>Entry with a BSc or Equivalent Degree</p> <ul style="list-style-type: none"> • a 3.67 cumulative grade point average or equivalent first class standing • completion of a thesis or other scholarly work <p>Transfer from MSc to PhD Program</p> <ul style="list-style-type: none"> • at least 12 months in the Earth Sciences MSc program • a 3.67 cumulative grade point average • completion of a thesis or other scholarly work • approval of the student's supervisory committee and the departmental graduate program committee 	<p>Admission Requirements</p> <p>Applicants normally will have completed a master's degree in science or engineering. Admission to the doctor of philosophy (PhD) program is governed by the minimum University requirements (see graduate general regulation 1.3.4).</p> <p>For students entering without a master's degree, the following additional requirements apply.</p> <p>Entry with a BSc or Equivalent Degree</p> <ul style="list-style-type: none"> • <u>A cumulative grade point average of at least 3.67 or equivalent first-class standing</u> • <u>Evidence of research potential in the form of a scholarly work or portfolio of scholarly works (see Department of Earth Sciences website).</u> <p>Transfer from MSc to PhD Program</p> <p><u>Students who have excelled in their academic programs and who are judged to have outstanding research potential may apply for transfer directly from the MSc to the PhD program. The following are required:</u></p> <ul style="list-style-type: none"> • <u>At least 3 terms, and not more than 6 terms, in the Earth Sciences Master's program</u>

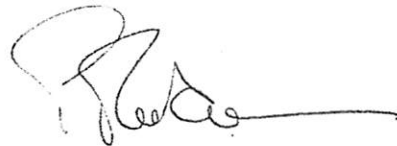
- A cumulative grade point average of at least 3.67 in the MSc program
- A record of strong performance as demonstrated in the student progress report
- Successful completion of the Master's colloquium as documented in the colloquium report
- Evidence of research potential in the form of a scholarly work or portfolio of scholarly works (see departmental website).
- A doctoral thesis proposal (see PhD program requirements)
- Approval of the student's supervisory committee in the form of a letter of recommendation from the senior supervisor and written approval of the committee members. The letter should address any perceived shortcomings in the application, including for example, a marginal GPA or a limited record of scholarly work.
- Approval of the departmental Graduate Studies Program Committee

Applicants should submit a cover letter, transcripts, student progress reports, their colloquium report, copies of the scholarly work(s) and a doctoral thesis proposal electronically to the Graduate Secretary. The letter from the supervisory committee should be submitted separately and confidentially.

MEMO

ATTENTION Senate Graduate Studies Committee | TEL
FROM Peter Ruben, Chair, Faculty of Science Graduate Program Committee
RE Calendar change and new course, Statistics and Actuarial Sciences
DATE September 7, 2016 | TIME 1:03 PM

The Faculty Graduate Studies Committee in the Faculty of Science approves the calendar changes and new comprehensive PhD exam in the Department of Statistics and Actuarial Sciences. These changes are required to insure compliance with the degree audit program. Please forward the forms to SGSC for approval.





New Graduate Course Proposal

Please save the form before filling it out to ensure that the information will be saved properly.

Course Subject (eg. PSYC)	STAT	Number (eg. 810)	897	Units (eg. 4)	0
Course title (max 100 characters including spaces and punctuation) PhD Comprehensive Exam					
Short title (for enrollment/transcript - max 30 characters)					
Course description for SFU Calendar * Candidates must pass a general examination and may not complete the general exam more than twice. This exam is normally completed within two terms of initial PhD enrolment.					
Rationale for introduction of this course to ensure breadth in the discipline of Statistics to show completion of this requirement on the transcript					
Effective term and year Summer 2017			Course delivery (eg 3 hrs/week for 13 weeks)		
Frequency of offerings/year once per year			Estimated enrollment/offering 8		
Equivalent courses (These are previously approved courses that replicate the content of this course to such an extent that students should not receive credit for both courses.)					
Prerequisite and/or Corequisite ** STAT PhD students					
Criminal record check required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, then add this requirement as a prerequisite.					
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus					
Course Components <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Research <input type="checkbox"/> Practicum <input type="checkbox"/> Online <input checked="" type="checkbox"/> Exam					
Grading Basis <input type="checkbox"/> Letter grades <input checked="" type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> In Progress/Complete			Capstone course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Repeat for credit? *** <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Total completions allowed? <u>2</u>		Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Combined with an undergrad course? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, identify which undergraduate course and what the additional course requirements are for graduate students:					

* Course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description.

** If a course is only available to students in a particular program, that should be stated in the prerequisite.

*** This mainly applies to a Special Topics or Directed Readings course.

RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course All faculty
Additional faculty members, space, and/or specialized equipment required in order to offer this course


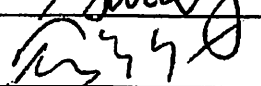
CONTACT PERSON

Department / School / Program Statistics & Actuarial Science	Contact name Sadika Jungic	Contact email sjungic@sfu.ca
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DEPARTMENTAL APPROVAL

REMINDER: New courses must be identified on a cover memo and confirmed as approved when submitted to FGSC/SGSC. Remember to also include the course outline.

Non-departmentalized faculties need not sign

Department Graduate Program Committee Tim Swartz	Signature 	Date AUG 18.2016
Department Chair Tom Loughin	Signature 	Date AUG 18.2016

LIBRARY REVIEW

Library review done? YES

Course form, outline, and reading list must be sent by FGSC to lib-courseassessment@sfu.ca for a review of library resources.

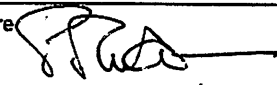
OVERLAP CHECK

Overlap check done? YES N/A


The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content. An overlap check is not required for some courses (ie. Special Topics, Capstone, etc.)

FACULTY APPROVAL

This approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

Faculty Graduate Studies Committee (FGSC) Peter Ruben	Signature 	Date 7 Sept 2016
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SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee (SGSC) W Parkhouse	Signature 	Date Oct 3, 2016
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ADMINISTRATIVE SECTION (for DGS office only)

Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: 6
 Financial Aid Progress Units: 6

Theoretical Statistics

Preamble: The purpose of this examination is to test the candidate's understanding of the theory behind statistical inference techniques. Successful candidates will be able to demonstrate a solid understanding of distribution theory and the ideas underlying the construction of estimators, confidence limits, and hypothesis tests. This includes both frequentist and elementary Bayesian theory and exact and basic asymptotic inference. The main emphasis will be on frequentist theory.

Examination Organization: The aids that are permitted are at the discretion of the examination committee. In the past, the examination has been closed book. In the absence of specific instructions from the examiners to the contrary, candidates should prepare for a closed book examination.

The syllabus for this examination is covered in the combination of STAT 450 and 801. Candidates who are unsure of their preparation for this examination are advised to take either or both of these courses. The Bayesian component is treated in more detail in STAT 460.

Primary References: The syllabus for this examination is entirely covered in the following references:

1. The material on probability theory is contained in chapters 1 through 5 of the text, *Introduction to Mathematical Statistics*, fourth edition, by R. V. Hogg and A. T. Craig (MacMillan).
2. With one minor exception, the material on statistical theory is contained in the text, *Statistical Inference*, by S. D. Silvey (Chapman and Hall). The topics in chapters 8 and 9 in this text are not included in the syllabus. The use of hypothesis tests to construct confidence limits is not covered by Silvey. Candidates will be responsible for the ideas discussed in section 5.3A (pp. 177-182) of the text by Bickel and Doksum in the list below.

Candidates are responsible for all the material contained in the above references.

Supplementary References: The following references, though not essential, may provide a useful, alternate exposition.

1. Bickel, P. J., and Doksum, K. 1977. *Mathematical Statistics: Basic ideas and Selected Topics*. Holden-Day.
2. Box, G. E. P., and Tiao, G. C. 1973. *Bayesian Inference in Statistical Analysis*. Addison-Wesley.
3. Cox, D. R., and Hinkley, D. V. 1974. *Theoretical Statistics*. Chapman and Hall.
4. DeGroot, M. 1970. *Optimal Statistical Decisions*. McGraw-Hill.
5. Mood, A. M., Graybill, F. A., and Boes, D. C. 1974. *Introduction to the Theory of Statistics*, third edition. McGraw-Hill.

Detailed Syllabus

1. Distribution Theory.

- The probability axioms and derived rules.
- Discrete and continuous random variables.
- Cumulative distribution and density functions.
- Expectation, moments, and moment generating functions.
- Chebyshev's inequality

2. Joint Distribution Theory.

Joint, conditional, and marginal distributions.
Stochastic independence.
Covariance and correlation.

3. Special Distributions.

The binomial and multinomial distributions.
The Poisson distribution.
The normal and bivariate normal distributions.
The gamma, chi-squared, t-, and F-distributions.
The uniform and exponential distributions.
Relationships amongst all of the above.

4. Transformations of Random variables.

Transformations of one or two random variables.
Deriving the t- and F-distributions.
The use of Jacobians and moment generating functions.
Expectations of functions of random variables.

5. Asymptotic Distribution Theory.

Three types of convergence: almost sure, in probability, and in distribution.
The central limit theorem.
The law of large numbers.
Using the moment generating function.
Theorems on limiting distributions.

6. Point Estimation.

Sufficiency and completeness.
The exponential family.
The Rao-Blackwell theorem.
Minimum variance unbiased estimators.
Estimating equations.
Fisher's information.
The Cramer-Rao inequality and generalization.
Efficiency.
Least squares and weighted least squares.
The Gauss-Markov theorem.
Least squares and the normal distribution.
Maximum likelihood estimation.
Asymptotic distributions for MLE's.
Consistency and efficiency of MLE's.

7. Interval Estimation.

The frequentist interpretation of confidence sets.
Using pivotals in constructing confidence sets.
Asymptotic confidence intervals for MLE's.

8. Hypothesis testing.

Power and size of a test.
Most powerful tests.
Likelihood ratio tests and the Neyman-Pearson Lemma.
Simple and composite hypotheses.
Uniformly most powerful tests.
Unbiased and invariant tests.

Uniformly most powerful unbiased or invariant tests.
Asymptotic theory for likelihood ratio tests.
Large-sample alternatives to likelihood ratio tests.
Using hypothesis tests to construct confidence sets.
(Not covered by Silvey.)

9. The Bayesian Approach.

Prior and posterior distributions.
Bayesian confidence intervals.
Bayesian hypothesis testing.

10. Basic Decision Theory.

Decision functions.
Loss, risk, and Bayes risk.
Minimax decision functions.
Admissibility.
The Bayes solution.



Graduate Course Change

Attach a separate document if more space is required.

Course Subject/Number	STAT 898	Units	6	Effective Term and Year	Summer 2017
Course Title	MSc Thesis/Project				
Rationale for Change:	The MSc program has always required a project examined as per GGR 1.9.1. The change in the title reflects that although the project is examined like a thesis, students are completing a project.				

Proposed Changes (Check all that apply)

Course number
 Units*
 Title
 Description
 Prerequisite
 Other equivalency

Complete only the fields to be changed

FROM	TO
Course Subject/Number	Course Subject/Number
Units	Units*
Course Title MSc Thesis/Project	Course Title (max 100 characters) MSc Project
Course Short Title	Course Short Title (max 30 characters)
Description	Description Students are required to submit and successfully defend a project based on a statistical analysis problem or on the development of new statistical methodology. The project is examined as a thesis and must be submitted to the library.
Prerequisite	Prerequisite
Other remove the equivalency of MATH 898 to STAT 898	Other

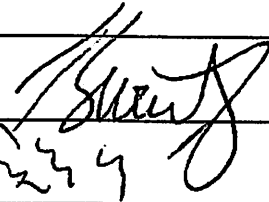
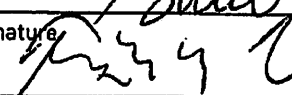
* Program requirements may need to be revised when course units are changed. Please review the calendar and submit any relevant program revisions resulting from this course change.

REMINDER: All course changes must be identified on a cover memo and confirmed as approved when submitted to FGSC and SGSC.

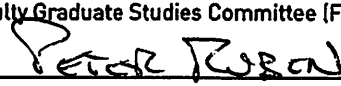

CONTACT PERSON

Department / School / Program Statistics & Actuarial Science	Contact name Sadika Jungic	Contact email sjungic@sfu.ca
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DEPARTMENTAL APPROVAL

Department Graduate Program Committee Tim Swartz	Signature 	Date AUG 18 2016
Department Chair Tom Loughin	Signature 	Date AUG 18 2016

FACULTY APPROVAL

Faculty Graduate Studies Committee (FGSC) 	Signature 	Date 7 Sept 2016
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SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee (SGSC) 	Signature 	Date Oct 3/16
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ADMINISTRATIVE SECTION (for DGS office only)

Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____



Graduate Course Change

Attach a separate document if more space is required.

Course Subject/Number	STAT 899	Units	6	Effective Term and Year	Summer 2017
Course Title	PhD Thesis/Project				
Rationale for Change:	more accurate title				

Proposed Changes (Check all that apply)

Course number
 Units*
 Title
 Description
 Prerequisite
 Other see below

Complete only the fields to be changed

FROM	TO
Course Subject/Number	Course Subject/Number
Units	Units*
Course Title PhD Thesis/Project	Course Title (max 100 characters) PhD Thesis
Course Short Title	Course Short Title (max 30 characters)
Description	Description
Prerequisite	Prerequisite
Other remove the equivalency of MATH 899 to STAT 899.	Other

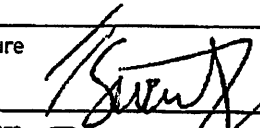
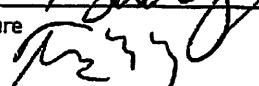
* Program requirements may need to be revised when course units are changed. Please review the calendar and submit any relevant program revisions resulting from this course change.

REMINDER: All course changes must be identified on a cover memo and confirmed as approved when submitted to FGSC and SGSC.


CONTACT PERSON

Department / School / Program Statistics & Actuarial Science	Contact name Sadika Jungic	Contact email sjungic@sfu.ca
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DEPARTMENTAL APPROVAL

Department Graduate Program Committee Tim Swartz	Signature 	Date AUG 18.2016
Department Chair Tom Loughin	Signature 	Date AUG 18.2016

FACULTY APPROVAL

Faculty Graduate Studies Committee (FGSC) Peter Kuban	Signature 	Date 7 Sept 2016
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SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee (SGSC) W. Parkhouse	Signature 	Date Oct 3/16
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ADMINISTRATIVE SECTION (for DGS office only)

Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____



Please note:

To view the Summer 2016 Academic Calendar go to <http://www.sfu.ca/students/calendar/2016/summer.html>

Statistics and Actuarial Science | Faculty of Science
Simon Fraser University Calendar | Fall 2016

Statistics

DOCTOR OF PHILOSOPHY

Program Requirements

A candidate will generally obtain at least 30 units beyond those for the bachelor's degree. Of these, at least 22 will be from graduate courses. The remaining eight may be from graduate courses or from those 400 division undergraduate courses that may be completed for credit for the BSc in statistics. Students who hold an MSc in statistics are deemed to have earned 18 of the 22 graduate units and four of the eight undergraduate or graduate units required.

Examination

Candidates normally pass a general examination covering a broad range of senior undergraduate statistics material. A candidate ordinarily may not complete the general exam more than twice. This exam is normally completed within four full-time terms of initial PhD enrolment.

Thesis

Students submit and successfully defend a thesis that will embody a significant contribution to statistical knowledge.

See the graduate general regulations for further information and regulations.

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, as listed above.

REVISED
CALENDAR ENTRY

Statistics

DOCTOR OF PHILOSOPHY

Description of Program

The doctor of philosophy in statistics provides in depth training in the discipline of statistics with the goal of developing research expertise. The program is designed to allow a student to specialize in a particular area of statistics.

Admission Requirements

Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar.

Program Requirements

This program consists of courses, a comprehensive exam, and a thesis.

Students must complete a minimum of two graduate courses
(approved by the senior supervisor and graduate program chair)

and a comprehensive exam
STAT 897- Comprehensive Exam (0)

and a thesis
STAT 899 - PhD Thesis (6)

Comprehensive Exam

Candidates must pass a general examination and may not complete the general exam more than twice. This exam is expected to be completed at the end of the second term of initial PhD enrolment.

Program Length

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

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.



Please note:

To view the Summer 2016 Academic Calendar go to <http://www.sfu.ca/students/calendar/2016/summer.html>

Statistics and Actuarial Science
Simon Fraser University Calendar | Fall 2016

Actuarial Science

MASTER OF SCIENCE

Admission Requirements

Graduate General Regulations Section 1.3 for further information.

Applicants whose first language is not English normally submit the Test of English as a Foreign Language (TOEFL) results.

Program Requirements

The MSc in Actuarial Science requires a total of 36 units consisting of a 6 unit project and a further 30 units of course work of which at least 24 must be at the graduate level. Students who have completed the undergraduate Actuarial Science major or honours program at SFU or have received approval of the Graduate Chair based on an equivalent program, are required to complete 24 graduate course units plus 6 project units for a total of 30 units in total for a master's degree.

Normally these courses must include

STAT 830 - Statistical Theory I (4)

and at least two of

ACMA 820 - Stochastic Analysis of Insurance Portfolios (4)

ACMA 821 - Advanced Actuarial Models (4)

ACMA 822 - Risk Measures and Ordering (4)

and at least two of

ACMA 850 - Actuarial Science: Selected Topics (4)

STAT 850 - Linear Models and Applications (4)

STAT 851 - Generalized Linear Models and Discrete Data Analysis (4)

STAT 852 - Modern Methods in Applied Statistics (4)

STAT 853 - Applications of Statistical Computing (4)

STAT 855 - Lifetime Data Analysis (4)

STAT 856 - Longitudinal Data Analysis (4)

STAT 857 - Space-Time Models (4)

STAT 890 - Statistics: Selected Topics (4)



Program Length

This MSc program is expected to take 6 semesters. Typically, the course work takes four semesters, and the project, including the defense, is expected to require up to two semesters. Those without strong undergraduate backgrounds may be required to take certain undergraduate courses in the Department in addition to the program requirements.

Project

All students submit and successfully defend a 6 unit project (STAT 898-6) based on an actuarial science problem. See the Graduate General Regulations Section 1.10 for further information.

Diploma in Financial Engineering

The Diploma in Financial Engineering is designed for students in the MSc program who would like to develop applied skills in the field of finance.

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, as listed above.

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REVISED
CALENDAR ENTRY

Actuarial Science

MASTER OF SCIENCE

Description of Program

The master of science (MSc) in actuarial science program provides advanced education and research training that prepares students for a career in industry or to continue on to PhD studies. The program offers exposure to current applied and theoretical topics generally not covered by the professional exam syllabus. Students have the opportunity to gain work experience through co-operative education.

Admission Requirements

Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar.

Program Requirements

This program consists of required courses, elective courses, and a project for a minimum of 36 units (at least 24 units of course work must be at the graduate level). Undergraduate courses used to meet the program requirements, if any, will not be included in the program cumulative grade point average (CGPA). Students who have completed the undergraduate actuarial science major or honors program at SFU, or have received approval of the graduate program chair based on an equivalent program, are required to complete 24 graduate course units plus 6 project units for 30 units in total.

Students complete

STAT 830 - Statistical Theory I (4)

and two of

ACMA 820 - Stochastic Analysis of Insurance Portfolios (4)

ACMA 821 - Advanced Actuarial Models (4)

ACMA 822 - Risk Measures and Ordering (4)

and two of

ACMA 850 - Actuarial Science: Selected Topics (4)

STAT 850 - Linear Models and Applications (4)

STAT 851 - Generalized Linear Models and Discrete Data Analysis (4)

STAT 852 - Modern Methods in Applied Statistics (4)

STAT 853 - Applications of Statistical Computing (4)

STAT 855 - Lifetime Data Analysis (4)

STAT 856 - Longitudinal Data Analysis (4)

STAT 857 - Space-Time Models (4)

STAT 890 - Statistics: Selected Topics (4)

and four additional graduate units

Other courses may be substituted for these courses with senior supervisor and graduate program chair approval.

REVISED CALENDAR ENTRY

and a project
STAT 898 - MSc Project (6)

All students are required to submit and successfully defend a project based on an actuarial science problem. The project is examined as a thesis and must be submitted to the library. See the Graduate General Regulations Section 1.10 and 1.11 for further information.

Program Length

Students are expected to complete the program requirements in five terms. The course work typically takes three terms, and the project, including the defence, usually takes two terms.

Other Information

Diploma in Financial Engineering

The Diploma in Financial Engineering is designed for students in the MSc program who would like to develop applied skills in the field of finance.

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.



SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

STUDENT SERVICES
Fall Calendar

Please note:

To view the Summer 2016 Academic Calendar go to <http://www.sfu.ca/students/calendar/2016/summer.html>

Statistics and Actuarial Science
Simon Fraser University Calendar | Fall 2016

Statistics

MASTER OF SCIENCE

The master of science (MSc) program offers exposure to a wide range of statistical techniques and provides experience in the application of statistical methods. It teaches statistical expertise for careers in either theoretical or applied statistics.

The MSc program in statistics combines applied and theoretical training in state of the art statistical methodology, hands-on consulting experiences, a project in data analysis or in the development of new statistical methodology, and the opportunity to gain work experience through co-operative education. The program prepares graduates for careers as statisticians in industry, government, consulting, and research organizations. In addition, graduates receive the foundational training to continue on to PhD studies.

Admission Requirements

See the Graduate General Regulations Section 1.3 for further information.

Applicants whose first language is not English normally submit English language competency test results. Simon Fraser University Graduate Programs accepts the following tests:

- TOEFL (Test of English as a Foreign Language)
- IELTS (International English Language Testing Systems)
- PTE Academic (Pearson Test of English Academic)

Applicants with degrees in areas other than statistics are encouraged to apply provided they have some formal training in statistical theory and practice.

Program Requirements

The MSc in Statistics requires a total of 36 units consisting of a 6 unit project and a further 30 units of course work, of which at least 24 must be at the graduate level. Students who have completed the undergraduate Statistics major or honours program at SFU or have received approval of the Graduate Chair based on an equivalent program, are required to complete 24 graduate course units plus 6 project units for a total of 30 units in total for a master's degree.

Normally these courses must include

STAT 811 - Statistical Consulting I (2)

STAT 812 - Statistical Consulting II (2)

STAT 830 - Statistical Theory I (4)

STAT 850 - Linear Models and Applications (4)

STAT 851 - Generalized Linear Models and Discrete Data Analysis (4)

STAT 852 - Modern Methods in Applied Statistics (4)

STAT 853 - Applications of Statistical Computing (4)

Project

All students submit and successfully defend a 6 unit project (STAT 898-6) based on a statistical analysis problem or on the development of new statistical methodology. See the Graduate General Regulations Section 1.10 for further information.

Program Length

Students with a good undergraduate background in statistics will normally complete the course work in four terms or fewer. The project, including the defense, is expected to require up to two terms. Students with backgrounds in other disciplines, or with an inadequate background in statistics, may be required to complete certain undergraduate courses in the department in addition to the requirements listed above.

Diploma in Financial Engineering

The Diploma in Financial Engineering is designed for students in the MSc program who would like to develop applied skills in the field of finance.

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, as listed above.

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Statistics

MASTER OF SCIENCE

Description of Program

The master of science (MSc) in statistics program offers exposure to a wide range of statistical techniques and provides experience in the application of statistical methods. It teaches statistical expertise for careers in either theoretical or applied statistics.

The MSc program in statistics combines applied and theoretical training in state of the art statistical methodology, hands-on consulting experiences, a project in data analysis or in the development of new statistical methodology, and the opportunity to gain work experience through co-operative education. The program prepares graduates for careers as statisticians in industry, government, consulting, and research organizations. In addition, graduates receive the foundational training to continue on to PhD studies.

Admission Requirements

Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar. Applicants with degrees in areas other than statistics are encouraged to apply provided they have some formal training in statistical theory and practice.

Program Requirements

This program consists of required courses and a project for a minimum of 30 units. Students with backgrounds in other disciplines, or with an inadequate background in statistics, may be required to complete two undergraduate courses in addition to the program requirements for a minimum of 36 units. The undergraduate courses will not be included in the program cumulative grade point average (CGPA).

Students complete all of*

STAT 811 - Statistical Consulting I (2)

STAT 812 - Statistical Consulting II (2)

STAT 830 - Statistical Theory I (4)

STAT 850 - Linear Models and Applications (4)

STAT 851 - Generalized Linear Models and Discrete Data Analysis (4)

STAT 852 - Modern Methods in Applied Statistics (4)

STAT 853 - Applications of Statistical Computing (4)

* Other courses may be substituted for these courses with senior supervisor and graduate program chair approval.

and a project

STAT 898 - MSc Project (6)

All students are required to submit and successfully defend a project based on a statistical analysis problem or on the development of new statistical methodology. The project is examined as a thesis and must be submitted to the library. See the Graduate General Regulations Section 1.10 and 1.11 for further information.

Program Length

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Students are expected to complete the program requirements in four to five terms.

Other Information

Diploma in Financial Engineering

The Diploma in Financial Engineering is designed for students in the MSc program who would like to develop applied skills in the field of finance.

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.

MEMORANDUM

TO: Wade Parkhouse, Dean and Associate Provost, Graduate and Postdoctoral Studies

FROM: Ian McCarthy, Associate Dean, Beedie School of Business

DATE: September 13, 2016

RE: Graduate Diploma in Financial Engineering – Editorial Revisions



The Graduate Diploma in Financial Engineering (GDFE) is a joint program between the Beedie School of Business, and the Department of Statistics and Actuarial Science.

The Beedie School of Business approves the editorial revisions to the calendar put forth to the Senate Graduate Studies Committee by the Department of Statistics and Actuarial Science with respect to this program.

Cc. Melanie Trotto

AD/ad



SIMON FRASER UNIVERSITY
ENGAGING THE WORLD

STUDENT SERVICES
Fall Calendar

Please note:

To view the Summer 2016 Academic Calendar go to <http://www.sfu.ca/students/calendar/2016/summer.html>

Business

Simon Fraser University Calendar | Fall 2016

Financial Engineering

GRADUATE DIPLOMA

The Graduate Diploma in Financial Engineering is designed for graduate students in the Department of Statistics and Actuarial Science who would like to develop applied skills in the field of finance, and for students in the M.Sc. Finance program seeking to deepen their theoretical understanding of relevant statistical and mathematical concepts so as to prepare students for careers in quantitative finance.

Program Requirements

Students must complete a total of 22 units of graduate coursework, including:

BUS 814 - Derivative Securities I (3)

BUS 818 - Derivative Securities II (3)

Minimally one (1) of the following courses:

ACMA 815 - Rate of Return Models (2)

ACMA 820 - Stochastic Analysis of Insurance Portfolios (4)

Minimally two (2) of the following courses:

ACMA 816 - Stochastic Claims Processes (2)

STAT 830 - Statistical Theory I (4)

STAT 831 - Statistical Theory II (4)

STAT 832 - Applied Probability Models (4)

STAT 843 - Functional Data Analysis (4)

STAT 853 - Applications of Statistical Computing (4)

Minimally one (1) of the following courses:

BUS 805 - Financial Economics II (3)

BUS 810 - Fixed Income Security Analysis and Portfolio Management (3)

BUS 857 - Numerical Methods (3)

BUS 864 - Credit Risk Management (3)

BUS 865 - Market Risk Management (3)

and one or more elective courses from the above lists to meet the overall minimum required units.

Students may apply some courses completed for one credential towards this credential as outlined in graduate regulation 1.7.6. Normally this would mean that students must complete minimally four (4) additional courses to be awarded this diploma beyond their MSc.

For those with limited background in finance/economics, preparatory courses offered by the Beedie School of Business may be required.

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, as listed above.

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Financial Engineering

GRADUATE DIPLOMA

Description of Program

The graduate diploma in financial engineering is designed for graduate students in the Department of Statistics and Actuarial Science who would like to develop applied skills in the field of finance, and for students in the MSc finance program seeking to deepen their theoretical understanding of relevant statistical and mathematical concepts so as to prepare students for careers in quantitative finance.

Admission Requirements

Applicants must satisfy the University admission requirements as stated in Graduate General Regulations 1.3 in the SFU Calendar.

Program Requirements

The program consists of required courses and elective courses for a minimum of 22 units. For those students with a limited background in finance/economics, preparatory courses offered by the Beedie School of Business may also be required.

Students must complete all of

BUS 814 - Derivative Securities I (3)

BUS 818 - Derivative Securities II (3)

and one of

ACMA 815 - Rate of Return Models (2)

ACMA 820 - Stochastic Analysis of Insurance Portfolios (4)

and two of

ACMA 816 - Stochastic Claims Processes (2)

STAT 830 - Statistical Theory I (4)

STAT 831 - Statistical Theory II (4)

STAT 832 - Applied Probability Models (4)

STAT 843 - Functional Data Analysis (4)

STAT 853 - Applications of Statistical Computing (4)

and one of

BUS 805 - Financial Economics II (3)

BUS 810 - Fixed Income Security Analysis and Portfolio Management (3)

BUS 857 - Numerical Methods (3)

BUS 864 - Credit Risk Management (3)

BUS 865 - Market Risk Management (3)

and one or more elective courses from the above lists to meet the overall minimum required units

Students may apply some courses completed for one credential towards this credential as outlined in graduate regulation 1.7.6. Normally students must complete a minimum of four additional courses beyond their MSc program to be awarded this diploma.

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CALENDAR ENTRY

Program Length

Students are expected to complete the program requirements in one to two terms past the expected time to complete the master's program.

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.

MEMO

ATTENTION Senate Graduate Studies Committee | TEL
FROM Peter Ruben, Chair, Faculty of Science Graduate Program Committee
RE New course, Mathematics
DATE September 13, 2016 | TIME 10:06 AM

The Faculty Graduate Studies Committee in the Faculty of Science approves the new comprehensive PhD exam in the Department of Mathematics. This course is required to insure compliance with the degree audit program. Please forward the form to SGSC for approval.





New Graduate Course Proposal

Please save the form before filling it out to ensure that the information will be saved properly.

Course Subject (eg, PSYC)	APMA	Number (eg, 810)	995	Units (eg, 4)	0
Course title (max 100 characters including spaces and punctuation) PhD Oral Candidacy Exam					
Short title (for enrollment/transcript - max 30 characters) PhD Oral Candidacy Exam					
Course description for SFU Calendar * An open oral candidacy exam given by the supervisory committee. The exam consists of a proposed thesis topic defence by the student and supervisory committee questions about related proposed research topics. The exam follows submission of a written PhD research proposal. Graded on a Satisfactory/Unsatisfactory basis. Students who fail will either successfully complete a second exam within six months or withdraw from the program.					
Rationale for introduction of this course In order to have this requirement formalized as a step in program requirements,					
Effective term and year Summer 2017			Course delivery (eg 3 hrs/week for 13 weeks) 0		
Frequency of offerings/year 3			Estimated enrollment/offering 3		
Equivalent courses (These are previously approved courses that replicate the content of this course to such an extent that students should not receive credit for both courses.) N/A (but similar to Math stream MATH 879 - PhD Thesis Proposal)					
Prerequisite and/or Corequisite ** Applied Mathematics PhD stream students only. Must be completed within first six terms of the program.					
Criminal record check required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, then add this requirement as a prerequisite.					
Campus where course will be taught <input checked="" type="checkbox"/> Burnaby <input type="checkbox"/> Surrey <input type="checkbox"/> Vancouver <input type="checkbox"/> Great Northern Way <input type="checkbox"/> Off campus					
Course Components <input type="checkbox"/> Lecture <input type="checkbox"/> Seminar <input type="checkbox"/> Lab <input type="checkbox"/> Research <input type="checkbox"/> Practicum <input type="checkbox"/> Online <input checked="" type="checkbox"/> EXAM					
Grading Basis <input type="checkbox"/> Letter grades <input checked="" type="checkbox"/> Satisfactory/Unsatisfactory <input type="checkbox"/> In Progress/Complete			Capstone course? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Repeat for credit? *** <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Total completions allowed? <u>2</u>		Repeat within a term? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Required course? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Final exam required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Additional course fees? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Combined with an undergrad course? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, identify which undergraduate course and what the additional course requirements are for graduate students:					

* Course descriptions should be brief and should never begin with phrases such as "This course will..." or "The purpose of this course is..." If the grading basis is satisfactory/unsatisfactory include this in the description.

** If a course is only available to students in a particular program, that should be stated in the prerequisite.

*** This mainly applies to a Special Topics or Directed Readings course.

RESOURCES

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Faculty member(s) who will normally teach this course Sr. Supervisor & Committee; Approved by current Graduate Program Chair & Department Chair
Additional faculty members, space, and/or specialized equipment required in order to offer this course N/A

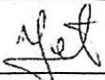

CONTACT PERSON

Department /-School / Program Mathematics - Applied Mathematics	Contact name Razvan Fetecau	Contact email van@sfu.ca
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DEPARTMENTAL APPROVAL

REMINDER: New courses must be identified on a cover memo and confirmed as approved when submitted to FGSC/SGSC. Remember to also include the course outline.

Non-departmentalized faculties need not sign

Department Graduate Program Committee Razvan Fetecau	Signature 	Date Aug. 30, 2016.
Department Chair Manfred Trummer	Signature 	Date Sep 1, 2016

LIBRARY REVIEW

Library review done? YES

Course form, outline, and reading list must be sent by FGSC to lib-courseassessment@sfu.ca for a review of library resources.

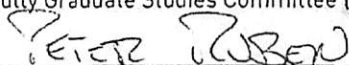

OVERLAP CHECK

Overlap check done? YES N/A


The course form and outline must be sent by FGSC to the chairs of each FGSC (fgsc-list@sfu.ca) to check for an overlap in content. An overlap check is not required for some courses (ie. Special Topics, Capstone, etc.)

FACULTY APPROVAL

This approval indicates that all the necessary course content and overlap concerns have been resolved, and that the Faculty/Department commits to providing the required Library funds and any other necessary resources.

Faculty Graduate Studies Committee (FGSC) 	Signature 	Date 12 Sept 2016
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SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee (SGSC) Wade Parkhouse	Signature 	Date Oct 17/16
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ADMINISTRATIVE SECTION (for DGS office only)

Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: 6
 Financial Aid Progress Units: 6

MEMO

ATTENTION Senate Graduate Studies Committee | TEL
FROM Peter Ruben, Chair, Faculty of Science Graduate Program Committee
RE Minor course changes, Mathematics
DATE September 19, 2016 | TIME 12:42 PM

The Faculty Graduate Program Committee reviewed and approved the minor course change for Math 880, changing the grading basis from Normal to ~~SAS~~ *P/LO*. Please recommend this change to SGSC for approval.





Graduate Course Change

Attach a separate document if more space is required.

Course Subject/Number	MATH 880	Units	6	Effective Term and Year	Summer 2017
Course Title	MSc Project				
Rationale for Change:	More appropriate to gauge whether Project was In Progress or Completed (IP/CO), as concluding step of obtaining a MSc degree.				

Proposed Changes (Check all that apply)

Course number
 Units*
 Title
 Description
 Prerequisite
 Other Grading Basis

Complete only the fields to be changed

FROM	TO
Course Subject/Number	Course Subject/Number
Units	Units*
Course Title	Course Title (max 100 characters)
Course Short Title	Course Short Title (max 30 characters)
Description	Description
Prerequisite	Prerequisite
Other Normal Grading Basis	Other In Progress/ Completed (IP/CO)

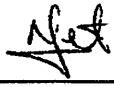
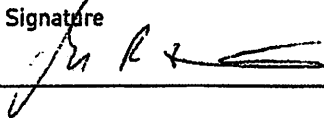
* Program requirements may need to be revised when course units are changed. Please review the calendar and submit any relevant program revisions resulting from this course change.

REMINDER: All course changes must be identified on a cover memo and confirmed as approved when submitted to FGSC and SGSC.

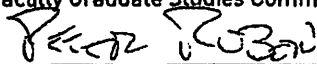

CONTACT PERSON

Department / School / Program Mathematics	Contact name Razvan Fetecau	Contact email van@sfu.ca
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DEPARTMENTAL APPROVAL

Department Graduate Program Committee Razvan Fetecau	Signature 	Date Sep. 9, 2016
Department Chair M TRUMHER	Signature 	Date July 12, 2016

FACULTY APPROVAL

Faculty Graduate Studies Committee (FGSC) 	Signature 	Date 19 Sept 2016
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SENATE GRADUATE STUDIES COMMITTEE APPROVAL

Senate Graduate Studies Committee (SGSC) Wade Parkhouse	Signature 	Date Oct 17/16
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ADMINISTRATIVE SECTION (for DGS office only)

Course Attribute: _____
 Course Attribute Value: _____
 Instruction Mode: _____
 Attendance Type: _____

If different from regular units:
 Academic Progress Units: _____
 Financial Aid Progress Units: _____