Sciences Curriculum Committee
Proposals Reported for Information (Abbreviated Review)

January 30, 2020
2 Course Modifications:

**AST101H1: The Sun and Its Neighbours**

| Exclusions: | AST121H1, AST221H1. Also excluded are CIV100H1, CIV101H1, CIV102H1, any 100- or higher-series CHM/PHY courses taken previously or concurrently(with the exception of PHY100H1, PHY101H1, PHY201H1, PHY202H1, PHY205H1, PHY207H1, CHM101H1; and AP, IB, CAPE, and GCE Transfer Credits CHM101H1) |
| Rationale: | To bring the exclusion list in line with the practices of the rest of FAS courses. AST101H1 and AST201H1 are the only courses in the Faculty that carried exclusions to such secondary school transfer credits. Additionally some students were only made aware of their Transfer Credits after the course drop date, effectively rendering their AST101/201 course, which was in progress, for them as EXTRA. |
| Consultation: | |
| Resources: | |

**AST201H1: Stars and Galaxies**

| Exclusions: | AST121H1, AST210H1, AST221H1, AST222H1. Also excluded are CIV100H1, CIV101H1, CIV102H1 and any 100- or higher-series CHM or PHY courses taken previously or concurrently(with the exception of PHY100H1, PHY101H1, PHY201H1, PHY202H1, PHY205H1, PHY207H1, CHM101H1; and AP, IB, CAPE, and GCE Transfer Credits CHM101H1) |
| Rationale: | To bring the exclusion list in line with the practices of the rest of FAS courses. AST101H1 and AST201H1 are the only courses in the Faculty that carried exclusions to such secondary school transfer credits. Additionally some students were only made aware of their Transfer Credits after the course drop date, effectively rendering their AST101/201 course, which was in progress, for them as EXTRA. |
| Consultation: | |
| Resources: | |
1 Course Modification:

**BCH440H1: Protein Biosynthesis**

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<th>Title:</th>
<th>Protein Homeostasis <strong>Biosynthesis</strong></th>
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<td><strong>Abbreviated Title:</strong></td>
<td>Protein Homeostasis <strong>Biosynthesis</strong></td>
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**Description:**

**Previous:**
"The life of proteins: from birth to death". This course is presented as eight themes. 1. Structure, assembly, and evolution of the ribosome. 2. Messenger RNA synthesis, maturation, and localization. 3. Mechanisms and regulation of translation initiation. 4. Fidelity during translation elongation. 5. Translation termination and translation-mediated mRNA decay. 6. Nascent protein folding and molecular chaperones. 7. Protein aging, misfolding and disease. 8. Protein degradation via the ubiquitin proteasome system and autophagy. In addition to the lectures, groups of students will interpret a recent paper related to the lecture material to be formally presented during regular class hours.

**New:**

Protein homeostasis is dependent on the coordinated synthesis, folding, localization and degradation of the thousands of proteins in a living cell. This course deals with selected aspects of the process including: 1) mRNA synthesis, 2) ribosome structure and function, 3) translation initiation, elongation and termination, 4) protein folding and the role of chaperones, 5) protein degradation via the ubiquitin proteasome system and 6) protein aging and disease. The course will serve as a foundation for those with an interest in how cellular protein levels and conformations are maintained.

**Rationale:**
Updating course description to better reflect scope of course as currently envisioned. Phased retirement of past course coordinator (John Glover) and passing of the baton to Jim Rini. (Max 3 instructors total).

**Consultation:**
To be discussed at Life Sciences planning committee. Approved by undergraduate committee, Biochemistry. Part of trying to strategically plan for who to slot in where in the face of pending retirements and long-term educational goals.

**Resources:**
1 Course Modification:

**CHM328H1: Modern Physical Chemistry**

<table>
<thead>
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<th>Contact Hours:</th>
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<tr>
<td>Previous: <em>Lecture</em>: 24</td>
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<td>New: <em>Lecture</em>: 24 / <em>Tutorial</em>: 12</td>
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**Rationale:**
CHM328H1 is being brought in line with all of our other third-year courses that don't contain labs. Those courses, which were approved at an earlier meeting, all now have 12 hours of tutorial added to them. This was done after piloting this model in several third-year courses this year to great success and feedback from the students.

**Consultation:**

**Resources:**
2 Course Modifications/Revisions:

**CSC300H1: Computers and Society**

**Description:**

*Previous:*
Privacy and Freedom of Information; recent Canadian legislation and reports. Computers and work; employment levels, quality of working life. Electronic fund transfer systems; transborder data flows. Computers and bureaucratization. Computers in the home; public awareness about computers. Robotics. Professionalism and the ethics of computers. The course is designed not only for science students, but also those in social sciences or humanities.

*New:*
This course offers a concise introduction to ethics in computing, distilled from the ethical and social discussions carried on by today’s academic and popular commentators. This course covers a wide range of topics within this area including the philosophical framework for analyzing computer ethics; the impact of computer technology on security, privacy and intellectual property, digital divide, and gender and racial discrimination; the ethical tensions with Artificial Intelligence around future of work and humanity, the emerging role of online social media over voice, inclusion, and democracy; and the environmental consequences of computing.

**Prerequisites:**

*Previous:* Any half-course on computing

*New:* Any CSC half course.

**Rationale:**

We have updated the description to reflect the current version of the course which has been updated by a new faculty member.

**Consultation:**

Approved by DCS Undergraduate Committee - Nov 26, 2019

**Resources:**

**CSC458H1: Computer Networking Systems**

**Description:**

Computer networks with an emphasis on network systems, network programming, and applications. Networking An overview of networking basics: layering, routing, naming, congestion control and addressing, and the global Internet. Network systems design and programming: Internet design packet switching fundamentals, socket programming, protocols; congestion control, routing, and packet switching system fundamentals. Additional topics include network security: wireless networks, multimedia, web 2.0, software-defined networking, peer-to-peer networking, and online social networks.

**Rationale:**

We are updating the description to more clearly differentiate this course from the new CSC457 (also about computer networks.)

**Consultation:**
Computer Science (FAS), Department of

| Resources: |

Computer Networking faculty including professors for both CSC457 and CSC458.
Approved by DCS Undergraduate Committee - Nov 26, 2019
# Course Modifications:

## ESS205H1: Confronting Global Change

### Prerequisites:
- Previous:  
- New: Completion of at least 4.0 credits

### Rationale:

### Consultation:

### Resources:

## ESS262H1: Earth System Processes

### Abbreviated Title:
Earth System Sys Processes

### Description:

An introduction to how our planet works, focusing on physical processes that govern processes acting within the nature and composition of Earth system, with a particular emphasis on the dynamic nature of the planet. Topics include surface processes interactions between its components (e.g., hydrosphere, atmosphere, weathering biosphere and erosion, ocean solid Earth) at long and atmospheric circulation, weather short timescales. Lecture topics include pre-biotic and climate post-biotic atmosphere, crustal processes (e.g., thermohaline circulation of the oceans, plate tectonics, earthquakes the rock cycle, volcanoes regulation of paleoclimates, biogeochemical cycles), the global carbon cycle and earth-environment interactions (e.g., natural hazards, resource development, the terrestrial and sustainability) marine biosphere.

### Exclusions:
- Previous: JEG100H1
- New:

### Recommended Preparation:

PHY131H1/CHM138H1/BIO120H1. For Mineral Engineering students, recommended preparation is MAT186H1 and CHE112H1.

### Rationale:

The previous exclusion was based on the perceived overlap between JEG100 and ESS262. In discussion with students who took both courses, and with the instructors of both courses, we found that course content and delivery are sufficiently different to warrant the removal of the exclusion.

### Consultation:

Ugrad Chair in Geography.

### Resources:
### 3 Course Modifications:

**EEB255H1: Essentials of Biodiversity Science and Conservation Biology**

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<thead>
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<tr>
<td><strong>Previous:</strong> Lecture: 36</td>
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<tr>
<td><strong>New:</strong> Lecture: 24 / Tutorial: 6</td>
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**Rationale:**
The current instructor is taking over the course from the previous instructor and is making some changes with regards to the teaching of the course. She is hoping to add a debate assignment during a tutorial section. This course has been taught for a number of years with no revisions to its content and it was time to do this.

**Consultation:**
The current instructor had a meeting with the Associate Chair and after much discussion, it was agreed that the changes would greatly improve the content and instruction of the course. This was also discussed with the Undergraduate Administrator regarding scheduling for next year.

**Resources:**

**EEB268H1: Plant and Microbial Diversity**

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<tr>
<td><strong>Previous:</strong> Lecture: 24 / Practical: 15</td>
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<tr>
<td><strong>New:</strong> Lecture: 24 / Practical: 36</td>
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**Rationale:**

**Consultation:**
Undergraduate committee and instructor. The hours were incorrect in the calendar.

**Resources:**

**EEB384H1: Diversity of Amphibians and Reptiles**

**Description:**

Lectures and laboratories examine the natural history, morphology, behaviour, ecology, evolutionary relationships, and biogeography of amphibians (frogs and toads, salamanders, caecilians) and non-avian reptiles (turtles, the tuatara, lizards, snakes, and crocodilians). Ancillary fee of $25 to cover cost of arranging transportation for a live animal lab featuring living Ontario reptiles and amphibians. Students are also required field trip to purchase a $25 lab manual the Toronto Zoo.

**Rationale:**
The instructor tried a pilot live animal lab last year rather than the field trip to the zoo. He found it to be quite an effective learning experience for the students. The ancillary charge for the zoo trip is the same needed for the lab. The lab manual is now required as a companion piece with the practical sections. The charge of the lab manual will help offset the printing costs that the department will have to cover.

**Consultation:**
With the Chair and Undergraduate Chair, as well as other instructors who teach labs.

**Resources:**
2 New Focuses:

Focus in Data Analytics (Major)

Parent Program:

Description:

The Focus in Data Analytics (major) ensures that students gain proficiency in applied empirical economics. It provides students with hands-on exposure to the tools empirical economists use to build and analyze datasets - programming languages such as Python, and software programs to manage, statistically analyze, and visualize data such as Excel, GIS, Stata and R. The focus will also direct students to empirical economics courses that apply these tools in a wide variety of contexts.

Admission Requirements:

Enrolment Requirements:

Enrolment in the Economics Major program (ASMAJ1478) is required.

Completion Requirements:

1. CSC108H1/CSC148H1
2. ECO225H1/GGR272H1
3. ECO372H1
4. 1.0 FCE 300+ ECO elective courses from: ECO310H1, ECO324H1, ECO334H1, ECO336H1, ECO337H1, ECO339H1, ECO340H1, ECO374H1, ECO375H1
5. At least 0.5 FCE 400-level ECO course from: ECO401H1, ECO403H1, ECO404H1, ECO418H1, ECO439H1, ECO446H1, ECO466H1, ECO475H1, ECO499H1

Students may request that other courses not listed (such as temporary special topics courses) count towards the focus.

Proposal Description:

Relative to the ECO MAJ, this focus adds two additional required courses (1.0 FCE) - an introductory computer science course (e.g. CSC108H1) and one other 'tools' course - either a new second-year Data Tools for Economists course (ECO225H1) or an introductory GIS course offered by the Geography Department (GGR272H1). The first and second year economics requirements otherwise remain the same as for the ECO MAJ. The number of economics credits required at the 3rd and 4th year level remain the same as for the ECO MAJ, the focus differs in that one of the 1.5 FCE's required at the 300-level is the applied econometrics course (ECO372H1) in which students gain hands on experience with econometrics. Students are directed to fulfill the remaining 3rd year required credits (1.0 FCE) and the 0.5 FCE 400-level credit from a subset of courses that meet the goals of the program - they either practice or study applied empirical economics.

Rationale:

As part of our UTQAP review in 2018, we asked students about six different program changes they would recommend and the two changes that garnered the most support from students in the ECO MAJ included requiring the applied econometrics course (ECO372H1) and adding focuses (e.g., data analysis, development...). Students could answer "great idea, neutral or bad idea" and over 70 percent of students surveyed thought both of these changes were "great
The UTQAP reviewers encouraged the undergraduate program to integrate more hands-on experience for students, early in the program. Students taking this focus will acquire more research tools early in their degree. With training in computer science (CSC108H1) and better (early) data creation and visualization skills (ECO225H1 or GGR272H1), students will be better equipped to participate in hands-on empirical work - from creating new and innovative datasets to modelling and analyzing empirical findings.

**Impact:**

Students taking this focus will improve their research-readiness and attractiveness on the job market for junior economists, analysts and the like.

Computer Science: It will likely increase demand for CSC108H1 (or CSC148H1). Currently CSC108H1 does not fill immediately (when enrolment is opened), so there is capacity in CSC108H1. CSC108H1 also offers an on-line section, which also potentially eases any capacity concerns. In addition, the impact is not expected to be very marked because currently, without requiring any computer science in the ECO MAJ, 60 percent of our students graduate with some computer science course (i.e., CSC108H1 or higher) [information from Terry Lago]. This proportion had already been rising.

Geography: Listing GGR272H1 as an optional course students can take to fulfill a required program element will likely increase demand for this course, but in reality this will have little impact on GGR272H1 enrolment because the two sections of this course (one section offered in fall - in person, and one offered in the winter term, on-line) are full. I believe there was some capacity in this course in the fall when enrolment opened (it is offered both terms, one term is on-line), but the course likely filled to capacity (there are 31 available seats now with a capacity of 188) and there is a waiting list for the spring on-line version. If the Geography Department increases capacity in the future, they may draw more ECO MAJ students into their course. This may have positive spillovers, as students may continue with GGR courses - either pursuing a GGR GIS minor or exploring other GGR offerings. We will mount our own course (ECO225H1) to offer students another way to gain data analytic "tools." We expect most of our students to take our own course.

**Consultation:**

We surveyed students (recent graduates and senior undergraduates) as part of the UTQAP (2018); Economics Undergraduate Curriculum Committee and Sub-Committee (over summer and fall) - with representation from Rotman Commerce (Alex MacKay) and students; two department faculty meetings (spring, fall); Computer Science Associate Chair, Undergraduate (Michelle Craig) and Course Instructor for CSC108H1 (Jennifer Campbell); Geography Associate Chair, Undergraduate (Matt Farish) and Course Instructor for GGR272H1 (Don Boyes) and Course Instructor for GGR372H1 (Michael Widener); Dean's Office - Martha Harris, Poppy Lockwood (Vice-Dean, Strategy) and Pamela Klassen (Vice-Dean, Undergraduate).

**Resource Implications:**

No new staff required; no anticipated enrolment implications - we are not trying to grow our programs, but rather guide students who have expressed interest in acquiring empirical skills.

**Focus in Data Analytics (Specialist)**

**Parent Program:**

**Description:**

Students in the Economics Specialist program who undertake a Focus in Data Analytics will gain advanced ability in applied empirical economics. The Focus (for specialists) provides students with hands-on exposure to the tools empirical economists use to build and analyze datasets - programming languages such as Python, and software programs to manage, statistically analyze, and visualize data such as Excel, GIS, Stata and R. The Specialist Focus will also direct students to required and elective empirical economics courses that apply these tools in a wide variety of contexts.
**Enrolment Requirements:**

Enrolment in the Economics Specialist program (ASSPE1478) is required.

**Completion Requirements:**

1. CSC108H1/CSC148H1
2. ECO225H1/GGR272H1
3. ECO372H1
4. ECO374H1
5. ECO475H1
6. 2.0 FCE 300+ ECO elective courses from: ECO310H1, ECO324H1, ECO334H1, ECO336H1, ECO337H1, ECO339H1, ECO340H1 (or the 400-level courses listed below (#7)
7. 0.5 FCE 400-level ECO course from: ECO401H1, ECO403H1, ECO404H1, ECO418H1, ECO439H1, ECO446H1, ECO464H1, ECO466H1, ECO499H1

Students may request that other courses not listed (such as temporary special topics courses) count towards the focus.

**Proposal Description:**

Relative to the ECO SPE (ASSPE1478), this focus adds two additional required courses (1.0 FCE) - an introductory computer science course (e.g. CSC108H1) and one other 'tools' course - either a new second-year Data Tools for Economists course (ECO225H1) or an introductory GIS course offered by the Geography Department (GGR272H1). The first and second year economics requirements otherwise remain the same as for the ASSPE1478 program. In terms of upper year differences, this focus adds two third-year required courses (1.0 FCE) in econometrics - an applied course (ECO372H1) and a time series and forecasting course (ECO374H1) to the existing econometrics requirement (ECO375H1). At the fourth-year level, students in the focus will be required to take the advanced econometrics course (ECO475H1), which will require them to produce an original applied econometrics paper (using data). Lastly, students are directed to take half of the 4.0 FCE 300+ courses as well as the other 0.5 FCE 400-level course from a suite of applied empirical courses. The number of economics credits required at the 3rd and 4th year level remain the same as for the ASSPE1478 program.

**Rationale:**

As part of our UTQAP review in 2018, we asked students about six different program changes they would recommend and the two changes that garnered the most support from students in (any of the) ECO SPE programs included requiring the applied econometrics course (ECO372H1) and adding focuses (e.g., data analysis, development..). Students could answer "great idea, neutral or bad idea" and over 90 percent of specialist students surveyed (15 specialist students returned the survey) thought requiring applied econometrics courses was a 'great idea' and two-thirds thought adding a focus was a great idea. Focuses are likely less relevant to the specialist because the ECO requirements are quite substantial already. This new focus implements both of these changes. The UTQAP reviewers encouraged the undergraduate program to integrate more hands-on experience for students, early in the program. Students taking this focus will acquire more research tools early in their degree. With training in computer science (CSC108H1) and better (early) data creation and visualization skills (ECO225H1 or GGR272H1), students will be better equipped to participate in hands-on empirical work - from creating new and innovative datasets to modelling and analyzing empirical findings.

**Impact:**

The Economics Specialist program is a very small program (cohort size of about 20 students). Hence we are not anticipating any significant impact on students or other academic units. Students taking this focus will improve their research-readiness and attractiveness on the job market for junior economists, analysts and the like. They will also be well prepared for graduate school (as with the specialist generally) and especially prepared to conduct research in an applied empirical economics field.
Computer Science: It will likely increase demand for CSC108H1 (or CSC148H1), but as noted the number of students is small and most already pick up a computer science course independent of the requirement. Currently CSC108H1 does not fill immediately (when enrolment is opened), so there is capacity in CSC108H1. CSC108H1 also offers an online section, which also potentially eases any capacity concerns. In addition, the impact is not expected to be very marked because currently, without requiring any computer science in economics programs, roughly 60 percent of our students graduate with some computer science course (i.e., CSC108H1 or higher) [information from Terry Lago]. In addition, the proportion of our students graduating with a CSC course has been rising steadily over at least the last four years (it was 38% in 2016).

Geography: Listing GGR272H1 as an optional course students can take to fulfill a required program element will likely increase demand for this course, but in reality this will have little impact on GGR272H1 enrolment because the two sections of this course (one section offered in fall - in person, and one offered in the winter term, on-line) are full. I believe there was some capacity in this course in the fall when enrolment opened (it is offered both terms, one term is on-line), but the course likely filled to capacity (there are 31 available seats now with a capacity of 188) and there is a waiting list for the spring on-line version. If the Geography Department increases capacity in the future, they may draw more ECO MAJ students into their course. This may have positive spillovers for geography, as students may continue with GGR courses - either pursuing a GGR GIS minor or exploring other GGR offerings. We will mount our own course (ECO225H1) to offer students another way to gain data analytic "tools". We expect most of our students to take our own course.

Consultation:
We surveyed students (recent graduates and senior undergraduates) as part of the UTQAP (2018); Economics Undergraduate Curriculum Committee and Sub-Committee (over summer and fall) - with representation from Rotman Commerce (Alex MacKay) and students; two department faculty meetings (spring, fall); Computer Science Associate Chair, Undergraduate (Michelle Craig) and Course Instructor for CSC108H1 (Jennifer Campbell); Geography Associate Chair, Undergraduate (Matt Farish) and Course Instructor for GGR272H1 (Don Boyes) and Course Instructor for GGR372H1 (Michael Widener); Dean's Office - Martha Harris, Poppy Lockwood (Vice-Dean, Strategy) and Pamela Klassen (Vice-Dean, Undergraduate).

Resource Implications:
No new staff required; no anticipated enrolment implications - we are not trying to grow our programs, but rather guide students who have expressed interest in acquiring empirical skills.

1 New Course:

ECO225H1: Data Tools for Economists

**Impact on Programs:**
This proposal triggers modifications in the unit's program(s)

**Contact Hours:**

* Lecture: 24  /  Tutorial: 12

**Description:**
This course explores unstructured data sources such as text files, webpages, weather data, social media posts, satellite imagery, and traffic data and how economists harness these types of data. It offers a practical introduction to: creating datasets from these types of sources (for example, via web scrapping and machine learning), linking data sources, and managing and visualizing these data (for example, via geospatial visualization).

**Prerequisites:**
ECO100Y1(67%)/(ECO101H1(63%), ECO102H1(63%))/ECO105Y1(80%); MAT133Y1(63%)/(MAT135H1(60%), MAT136H1(60%))/ MAT137Y1(55%)/MAT157Y1(55%); CSC108H1/CSC148H1

**Corequisites:**
**Exclusions:**

**Recommended Preparation:**

**Topics Covered:**
- creating datasets from unstructured sources (text files, webpages, weather data, social media posts, satellite imagery, and traffic data)
- tools for data creation, such as web scrapping and machine learning
- linking data sources
- summarizing and visualizing these data (geospatial visualization will be introduced)

**Methods of Assessment:**
- Data project; test, final exam

**Breadth Requirements:**
- The Physical and Mathematical Universes (5)

**Distribution Requirements:**
- Social Science

**Competencies:**
- *Communication*: notably; *Critical and Creative Thinking*: notably; *Information Literacy*: extensively
- *Quantitative Reasoning*: extensively; *Social and Ethical Responsibility*: notably

**Experiential Learning:**
- *Research*: none; *Other*: none

**Rationale:**
This course is a required* new course in the new Focuses in Data Analytics programs within the ECO MAJ and ECO SPE (ASMAJ1478 and ASSPE1478). Marshalling unstructured data from innovative sources such as the web, social media, and weather reports is a growing reality in economics and many other disciplines. This course will broaden our students' perspective on one of the building blocks of empirical analysis - the dataset itself - and expose them to the many creative approaches to data gathering. Students focusing on empirical economics currently receive strong training in econometrics - they learn how to use data to interpret empirical evidence, forecast and pose and answer causal questions, but we have not had a course focused on creating or visualizing datasets from unstructured sources. This course will give students hands on exposure to data creation, management, linkage and visualization and the economic studies that use these data sources.

*Students can take either this course or a GIS course from the Geography department. These two courses are not perfect substitutes - the GIS course will give students a more in-depth and focused introduction to GIS; the economics course will contain a briefer introduction to GIS in the context of data visualization but also address other sources of data creation.*

**Consultation:**
- ECO Undergraduate Curriculum Committee, Fall 2019. Also consulted with the Department of Computer Science.

**Resources:**
- Department will assume the resource requirements (e.g. TA support)
- **Budget Implications:** The academic unit will provide the resources required for this course from existing budget.

**Overlap with Existing Courses:**
- No overlap

**Programs of Study for Which This Course Might be Suitable:**

**Estimated Enrolment:**
- 100

**Instructor:**
- 13
4 Course Modifications:

**ENV316H1: Laboratory and Field Methods in Environmental Science**

**Description:**

This course focuses on methods of sampling and analyzing natural air, water and solid Earth materials for physical, chemical and biological properties that are relevant to current environmental issues. It will integrate approaches from chemistry, physics, geology and biology, and cover techniques in field sampling, laboratory analyses and analyses of large environmental data sets. Basic concepts related to quality control will be emphasized throughout the course: sample collection and storage methods, calibration of field and lab instruments, analyses in complex matrices, errors (accuracy, precision), and detection limits. This course is for students enrolled in the Environmental Science Major program, or permission of the Undergraduate Associate Director. A fee of $25 will approximately $15 may be charged for lab supplies, lab instrument charges and technical services field trip transportation.

**Rationale:**

Clarifying that the course is for students enrolled in the Environmental Science Major program, while allowing for students not in this program to request enrolment, which would be contingent on available space in the course, and the academic preparation of the student.

**Consultation:**

**Resources:**

**ENV452H1: Environmental Science Seminar**

**Description:**

Scientists from within and external to the university share and discuss challenges, findings and opportunities. Specific topics (and speakers) vary from year to year but may draw from rehabilitation techniques, contaminants in our environment, environmental health, impacts on landscapes and communities, biodiversity, water, and modelling of environmental processes. This course is for students enrolled in the School of the Environment, Environmental Science Major BSc program, or permission of the Undergraduate Associate Director.

**Prerequisites:**

**Previous:** ENV316H1 / ENV334H1/ENV337H1, completion of 12 FCE of courses, and enrolment in a School of the Environment BSc program; or permission of the Undergraduate Associate Director

**New:** Completion of 12 FCE of courses, including ENV316H1 / ENV334H1/ENV337H1

**Rationale:**

Moving a portion of the stated prerequisites that is more of an enrolment control to the end of the course description.

**Consultation:**

Consultation between the School and Arts & Science Governance in December 2019 and January 2020.

**Resources:**

**ENV492H1: Independent Studies Project**

**Description:**
A research project or selected topic in an area of environment not otherwise available in the Faculty, meant to develop skills in independent study of interdisciplinary topics. This course is restricted to students enrolled in a School of the Environment program. A written proposal co-signed by the student and supervisor must be submitted for approval by the Academic Associate Director of the School normally one month prior to commencing the course. Not eligible for CR/NCR option.

**Prerequisites:**
Completion of 14.0 FCE including ENV221H1/ENV222H1; and enrolment in a School of the Environment program

**Rationale:**
Moving a portion of the stated prerequisites that is more of an enrolment control to the end of the course description.

**Consultation:**
Consultation between the School and Arts & Science Governance in December 2019 and January 2020.

**Resources:**

**ENV493H1: Independent Studies Project**

**Description:**

A research project or selected topic in an area of environment not otherwise available in the Faculty, meant to develop skills in independent study of interdisciplinary topics. This course is restricted to students enrolled in a School of the Environment program. A written proposal co-signed by the student and supervisor must be submitted for approval by the Academic Associate Director of the School normally one month prior to commencing the course. Not eligible for CR/NCR option.

**Prerequisites:**
Completion of 14.0 FCE including ENV221H1/ENV222H1; and enrolment in a School of the Environment program

**Rationale:**
Moving a portion of the stated prerequisites that is more of an enrolment control to the end of the course description.

**Consultation:**
Consultation between the School and Arts & Science Governance in December 2019 and January 2020.

**Resources:**
### 2 Course Modifications:

#### GGR101H1: Ancient Civilizations and their Environments

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<th>Title:</th>
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<th>New: Histories of Environmental Change</th>
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<td>This is a simple name change reflecting the outdated</td>
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<tr>
<td></td>
<td>title of the previous version. A number of different</td>
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<tr>
<td></td>
<td>titles were debated, but the key variable -- as the</td>
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<tr>
<td></td>
<td>course description, unchanged for now, suggests -- is</td>
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<tr>
<td></td>
<td>&quot;environmental change.&quot; 'Histories' may lead to some</td>
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<tr>
<td></td>
<td>questions among science-focused students, but (a)</td>
<td></td>
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<tr>
<td></td>
<td>the course is clearly a BR=4 and (b) the other key</td>
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<tr>
<td></td>
<td>variable is time. This is largely a course about the</td>
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<tr>
<td></td>
<td>environmental past, and social responses to broad</td>
<td></td>
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<tr>
<td></td>
<td>ecological shifts.</td>
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<tr>
<td><strong>Consultation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undergraduate Committee, Department of Geography and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planning; instructor for Winter 2020 (Dr. C. Avendano).</td>
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</table>

**Resources:**

#### GGR308H1: Canadian Arctic and Subarctic Environments

<table>
<thead>
<tr>
<th><strong>Abbreviated Title:</strong></th>
<th>Can Cdn Arctic and &amp; Subarctic Env Envts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended Preparation:</strong></td>
<td></td>
</tr>
<tr>
<td>Previous:</td>
<td></td>
</tr>
<tr>
<td>New:</td>
<td>JEG100H1</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Include JEG100 as recommended prep to give students a</td>
</tr>
<tr>
<td></td>
<td>n idea of the background they should have to take this</td>
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<tr>
<td></td>
<td>course.</td>
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</table>

**Consultation:**

Instructor and Associate Chair, Undergraduate

**Resources:**
1 Course Modification:

**INS240Y1: Ecological Interactions: Intro to Indigenous and Western Sciences**

<table>
<thead>
<tr>
<th>Contact Hours:</th>
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</thead>
<tbody>
<tr>
<td><strong>Previous:</strong> Lecture: 48 / Practical: 72</td>
</tr>
<tr>
<td><strong>New:</strong> Lecture: 72 / Practical: 72</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Rationale:</th>
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<table>
<thead>
<tr>
<th>Consultation:</th>
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<table>
<thead>
<tr>
<th>Resources:</th>
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</table>
1 Course Modification:

**MGY440H1: Virus-Host Interactions**

<table>
<thead>
<tr>
<th>Abbreviated Title:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus-Host Virus-Cell Interactions</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Rationale:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is a one-word editorial change to make the abbreviated course title the same as the actual course title.</td>
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<table>
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<tr>
<th>Consultation:</th>
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<table>
<thead>
<tr>
<th>Resources:</th>
</tr>
</thead>
</table>


3 New Courses:

**PHL354H1: Philosophy of Mathematics**

<table>
<thead>
<tr>
<th>Contact Hours:</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lecture:</em> 36</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platonism versus nominalism, the relation between logic and mathematics, implications of Gödel's theorem, formalism and intuitionism.</td>
</tr>
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<table>
<thead>
<tr>
<th>Prerequisites:</th>
</tr>
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<tbody>
<tr>
<td>PHL245H1/MAT157Y1 and a full course in PHL/CSC/MAT</td>
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<table>
<thead>
<tr>
<th>Corequisites:</th>
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<table>
<thead>
<tr>
<th>Exclusions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHL346H1, PHL346H5, PHL344H5, PHL354H5</td>
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<table>
<thead>
<tr>
<th>Recommended Preparation:</th>
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<table>
<thead>
<tr>
<th>Breadth Requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thought, Belief and Behaviour (2)</td>
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<table>
<thead>
<tr>
<th>Distribution Requirements:</th>
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</thead>
<tbody>
<tr>
<td>Humanities</td>
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<table>
<thead>
<tr>
<th>Competencies:</th>
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</thead>
<tbody>
<tr>
<td><em>Communication:</em> slightly; <em>Critical and Creative Thinking:</em> extensively; <em>Information Literacy:</em> none</td>
</tr>
<tr>
<td><em>Quantitative Reasoning:</em> extensively; <em>Social and Ethical Responsibility:</em> none</td>
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</table>

<table>
<thead>
<tr>
<th>Experiential Learning:</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Research:</em> none; <em>Other:</em> none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rationale:</th>
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<tbody>
<tr>
<td>We are jointly reviewing our logic and philosophy of science curriculum with the UTM Philosophy department and we are both seeking to renumber a few courses so that our curriculum is more closely aligned. Many students incorrectly believed that this course fit with the logic curriculum as it was number closely with our other intermediate logic courses (345, 347, 348 and 349). We are moving it to PHL354H1 which is where are other philosophy of science courses are currently listed (PHL355, 356, 357).</td>
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<table>
<thead>
<tr>
<th>Consultation:</th>
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<tbody>
<tr>
<td>STG Philosophy Curriculum Committee, and STG/UTM Logic Faculty</td>
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<tr>
<th>Resources:</th>
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<tbody>
<tr>
<td><em>Budget Implications:</em> The academic unit will provide the resources required for this course from existing budget.</td>
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<table>
<thead>
<tr>
<th>Overlap with Existing Courses:</th>
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<table>
<thead>
<tr>
<th>Programs of Study for Which This Course Might be Suitable:</th>
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<tbody>
<tr>
<td>Philosophy; Mathematics</td>
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<thead>
<tr>
<th>Estimated Enrolment:</th>
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20
PHL445H1: Metalogic

**Contact Hours:**
*Seminar:* 36

**Description:**
A continuation of PHL345H1, this is a course in the mathematical study of logic, also known as metalogic. We will investigate and prove theorems about logical systems. Topics covered may include: important results in metalogic, second and higher-order logic, or lambda-calculus.

**Prerequisites:**
PHL345H1/MAT309H1; 4.0 credits in philosophy

**Corequisites:**

**Exclusions:**
PHL445H5; PHLD51H3

**Recommended Preparation:**

**Topics Covered:**
Topics covered may include: foundational results in first-order metalogic, including Gödel's incompleteness theorem; the lambda calculus and higher-order logic; algebraic logic; non-classical logics.

**Methods of Assessment:**
This course will assess students using a combination of in-class tests, take-home assignments and possibly an exam.

**Breadth Requirements:**
Thought, Belief and Behaviour (2)

**Distribution Requirements:**
Humans

**Competencies:**
*Communication:* slightly; *Critical and Creative Thinking:* extensively; *Information Literacy:* slightly
*Quantitative Reasoning:* extensively; *Social and Ethical Responsibility:* none

**Experiential Learning:**
*Research:* none; *Other:* none

**Rationale:**
As stated in the rationale for the PHL345 changes, a problem that we have with our logic offerings is that while PHL345 was labelled as an intermediate course in logic, because we did not have a 4th year course in logic PHL345 was actually being taught at an advanced level. Since we are proposing to alter PHL345 to be truly intermediate, we wish to add PHL445 to the calendar as a genuinely advanced course in logic. This will be attractive to students who are deeply interested in mathematical logic. We have carefully considered what mathematical logic is being taught at the Mathematics Department. As such, the selection of topics for PHL445 go beyond what the Mathematics Department currently offers, and as such should be appealing for mathematics students as well.

**Consultation:**
Proposal sent to the Department of Mathematics for review.
### Resources
- **Budget Implications:** The academic unit will provide the resources required for this course from existing budget.

### Overlap with Existing Courses:

### Programs of Study for Which This Course Might be Suitable:
- Philosophy

### Estimated Enrolment:
- 20

### Instructor:
- Michael Caie

---

### PHL447H1: Seminar in Philosophical Logic

#### Contact Hours:
- **Seminar:** 36

#### Description:
Advanced discussion of some topic in philosophical logic.

#### Prerequisites:
- PHL245H1/MAT157Y1; one of PHL246H1/PHL345H1/PHL347H1/PHL445H1/MAT309H1; 4.0 credits in philosophy

#### Corequisites:

#### Exclusions:

#### Recommended Preparation:

#### Topics Covered:
Topics covered may include: model theory and its philosophical significance; non-classical logic and philosophical arguments for classical and non-classical logics; modal logic and philosophical applications of modal logic; applications of higher-order logic to metaphysics.

#### Methods of Assessment:
This seminar will assess students using a combination of tests, take-home assignments and possibly a final exam.

#### Breadth Requirements:
- Thought, Belief and Behaviour (2)

#### Distribution Requirements:
- Humanities

#### Competencies:
- **Communication:** slightly; **Critical and Creative Thinking:** extensively; **Information Literacy:** slightly
- **Quantitative Reasoning:** extensively; **Social and Ethical Responsibility:** none

#### Experiential Learning:
- **Research:** none; **Other:** none

#### Rationale:
Phl451 is currently titled “Seminar in Logic/Philosophy of Language.” A problem with this is that students would often register hoping for one of the options, but then they would get the other. This is problematic as a seminar in, say, advanced topics in decision theory, falls nicely under the label of Logic, but has little to do with Language. As such, our proposal is to split this course into two: Phl447 will be a Seminar in Logic, while Phl451 will remain but be renamed to be solely a Seminar in Philosophy of Language. This will fix an unnecessarily confusing problem for both our students and instructors.

**Consultation:**
A copy of this proposal has been sent to the Department of Mathematics for review.

**Resources:**

- **Budget Implications:** The academic unit will provide the resources required for this course from existing budget.

**Overlap with Existing Courses:**

**Programs of Study for Which This Course Might be Suitable:**
- Philosophy

**Estimated Enrolment:**
- 20

**Instructor:**
- Michael Cae/Franz Huber
10 Course Modifications:

**PSY203H1: Psychological Research**

**Contact Hours:**
- **Previous:** Lecture: 36
- **New:** Practical: 36

**Exclusions:**
- **Previous:** PSY309H1/PSY319H1/PSY329H1/PSY339H1/PSY359H1/PSY369H1/PSY379H1/PSY389H1
- **New:**

**Rationale:**
Course offered for first time this year; department now feel the exclusions should be changed to recommended preparation.

**Consultation:**
Consultation occurred between instructor and Associate Chair.

**Resources:**

**PSY260H1: Learning and Plasticity**

**Exclusions:**
- PSYB38H3 PSY360H5/PSYB45H3

**Rationale:**
PSY360H5 is no longer a course at UTM. PSYB38H3 has replaced PSYB45H3 now (so PSYB45H3 should be deleted as well).

**Consultation:**
No consultation, just found out through UTM and UTSC calendars.

**Resources:**

**PSY319H1: Developmental Laboratory**

**Recommended Preparation:**
- **Previous:**
- **New:** PSY203H1

**Rationale:**
Department wanted to change PSY203H1 from exclusion to recommended preparation.

**Consultation:**
Consultation occurred between instructor and Associate Chair.

**Resources:**

**PSY329H1: Social Psychology Laboratory**

**Recommended Preparation:**
- **Previous:**
- **New:** PSY203H1

**Rationale:**

Department wanted to change PSY203H1 from exclusion to recommended preparation.

Consultation:

Resources:

### PSY330H1: Psychometrics

**Title:**
- **Previous:** Psychometrics
- **New:** Psychological Measurement

**Abbreviated Title:**
- **Previous:** Psychometrics
- **New:** Psychological Measurement

**Description:**

This course focuses on the development of concepts and evaluation of psychological measures, including methods for the measurement of knowledge, abilities, attitudes, interests and personality traits. We will discuss theoretical and methodological issues in psychological measurement: reliability, covering important concepts such as reliability and validity and how these affect the interpretation of test scores and research findings; norms; observational methods; structured tests; interview; projective techniques. There will be some discussion of the application of psychological measures to various settings and the ethics of psychological assessment. Not a course in test administration.

**Exclusions:**
- PSY331H5/PSYC37H3

**Rationale:**

Modifying the course title and description to make it more accessible to students and better reflect what is covered in the course.

**Consultation:**
- Internal

**Resources:**

### PSY339H1: Individual Differences Laboratory

**Recommended Preparation:**
- **Previous:**
- **New:** PSY203H1

**Rationale:**

Department wanted to change PSY203H1 from exclusion to recommended preparation.

**Consultation:**
- Consultation occurred between instructor and Associate Chair.

**Resources:**

### PSY359H1: Human Neuroimaging Laboratory

**Recommended Preparation:**
- **Previous:**

---

25
New: PSY203H1

Credit/No Credit Option:
  Previous: Yes
  New: No

Rationale:
  Department wanted to change PSY203H1 from exclusion to recommended preparation.

Consultation:
  Consultation occurred between instructor and Associate Chair.

Resources:
  Budget Implications: The academic unit will provide the resources required for this course from existing budget.

PSY369H1: Psychobiology Laboratory

Recommended Preparation:
  Previous:
  New: PSY203H1

Rationale:
  Department wanted to change PSY203H1 from exclusion to recommended preparation.

Consultation:
  Consultation occurred between instructor and Associate Chair.

Resources:

PSY379H1: Human Memory and Learning Laboratory

Recommended Preparation:
  Previous:
  New: PSY203H1

Rationale:
  Department wanted to change PSY203H1 from exclusion to recommended preparation.

Consultation:
  Consultation occurred between instructor and Associate Chair.

Resources:

PSY389H1: Perception Laboratory

Recommended Preparation:
  Previous:
  New: PSY203H1

Rationale:
  Department wanted to change PSY203H1 from exclusion to recommended preparation.

Consultation:
  Consultation occurred between instructor and Associate Chair.

Resources:
1 Minor Program Modification:

Actuarial Science Major

Completion Requirements:

Note: The following completion requirements will be in effect for students enrolling in Spring 2019. For students enrolling in the Spring 2018 enrolment period, consult the requirements stated in the 2017-18 Calendar:

(8.5 full courses or their equivalent)

First Year:
1. MAT137Y1 (63%)/MAT157Y1 (60%)
2. MAT223H1/MAT240H1 (should be taken in first year, enforced as a prereq for MAT237Y1)

To be completed before the end of Second Year:
3. STA130H1 (strongly recommended to be taken in students should complete this course by the end of the first year, due to priority enrollment given to first-year students Fall Semester of Second Year)
4. CSC108H1/CSC120H1/CSC121H1/CSC148H1

Higher Years:
5. ACT240H1, ACT245H1, ACT247H1, ACT348H1, ACT370H1
6. MAT237Y1/MAT257Y1
7. STA257H1, STA261H1
8. ACT451H1, ACT452H1, STA302H1

STA314H1 is strongly recommended.

NOTES:

• In order to enroll in ANY 300- or 400-level ACT course, the minimum grade of C must be obtained in each of ACT240H1, ACT245H1 and ACT247H1. The enrolment requirements and the prerequisites for all ACT courses will be strictly enforced.
• Students who have an interest in pursuing studies in mathematical finance should consider taking MAT244H1, MAT336H1/MAT337H1 and APM346H1.
• Students interested in actuarial practices should consider taking ACT371H1, ACT372H1, ACT470H1, ACT471H1, ACT473H1, ACT475H1.

Description of Proposed Changes:

Rationale:
In the summer of 2019 we experienced the first round of STA130 enrollment after the course became mandatory for both actuarial science major and specialist program. The Statistics undergraduate programs had also gone through major modification during 2018-2019 academic year and STA130 has become mandatory for all their programs as well. As a result, STA130 had more than 500 students on the waitlist after both sections for both semesters (i.e. 2 in Fall and 2 in Winter) were completely filled. Students in our program who tried to enroll in STA130 in their second year were told there was no space for them. I had to make special arrangements for those students to continue our program without STA130. I had consulted with Prof. Bethany White, Associate Chair of Undergraduate Studies in Statistics. She told me that there was no option other than making special arrangements for my students (and they will never take STA130). She also had to do the same for many statistics students (so did Prof. Nathan Taback, Director of Data Science program). Prof. White hopes a new section can be added next year (2020-2021) but she said it would depend on (1) whether there will be funding for an extra section; (2) whether there will be teaching resource at the statistics program. She feels it is very likely going forward we will have to continue to make special arrangements for...
Statistical Sciences (FAS), Department of

students who cannot enroll in STA130 after their first year. Therefore, I want to put the warning in the Calendar to strongly encourage students to take this course in their first year, when they still have the first-year enrollment priority.

Impact:

Consultation:

Resource Implications:

6 Course Modifications/Revisions:

**ACT460H1: Stochastic Methods for Actuarial Science**

**Description:**

Applications of the lognormal distribution, Brownian motion, geometric Brownian motion, martingales, Itos lemma limma, stochastic differential equations, interest rate models, the Black-Scholes model, volatility, value at risk, conditional tail expectation.

**Rationale:**
Correcting spelling error.

**Consultation:**
Undergraduate Chair, ACT

**Resources:**

**STA490Y1: Statistical Consultation, Communication, and Collaboration**

**Prerequisites:**

STA303H1, STA304H1/STA305H1, STA355H1(Permission of Instructor: An application is required to be considered for this course instructor. Information about this special enrolment course as well as a link to the online application form Priority is available on the Department of Statistical Sciences website. Priority will be given to students who complete the application during the priority enrolment period the summer before the course is offered and who are completing all requirements of the Specialist in Statistical Science: Methods and Practice or the Applied Statistics Specialist that academic year specialist program.)

**Rationale:**
This will make the process of accessing STA490 clearer for students and we will have access to student information (via applications) earlier in the course enrolment period to help inform course projects and partnerships.

**Consultation:**
The instructor of the course (Alison Gibbs) was consulted about this, and the Associate Chair met with Tamara Jones, Martha Harris, Tom MacKay and Terry Lago to discuss the needs of this course and the plan to convert it from an AE to an A course.

**Resources:**
Instructor

**STA492H1: Seminar in Statistical Science**

**Prerequisites:**

STA355H1(Permission of instructor. An application is required to be considered for this course. Information about this
special enrolment course as well as a link to the online application form. Priority is available on the Department of Statistical Sciences website. Priority will be given to students who complete the application during the priority enrolment period the summer before the course is offered and who are completing all requirements of the Specialist in Statistical Science: Theory and Methods or the Statistics Specialist that academic year.

Rationale:
This will make the process of accessing STA492 clearer for students and we will have access to student information (via applications) earlier in the course enrolment period to help inform the research areas to emphasize in the course.

Consultation:
The Associate Chair met with Tamara Jones, Martha Harris, Tom MacKay and Terry Lago to discuss the needs of STA490 (the capstone course in the other Statistics Specialist) and the plan to convert it from an AE course to an A course.

Resources:
Instructor

STA220H1: The Practice of Statistics I

Exclusions:

Rationale:
STA250H1 is a retired course so it should not be included as an exclusion. This will update the calendar based on current offerings.

Consultation:
The Statistics Undergraduate Committee was consulted.

Resources:

STA248H1: Statistics for Computer Scientists

Prerequisites:
STA237H1/STA247H1/STA257H1/STA256H5/STAB52H3; CSC148H1/CSCA48H3/CSC148H5

Exclusions:

Rationale:
STA237H1 and STA247H1 are similar STA course sequences geared towards different student audiences (i.e., STA247 for students also in CS programs and STA238 for Statistics Majors or Minors). Students with the appropriate CS prerequisite should be able to take STA248 after taking STA237, just as students can take STA238 after STA247. STA250H1 is a retired course so it should not be included as an exclusion.
This will update the calendar based on current offerings and align STA prerequisites between STA238 and STA248.

Consultation:
The Statistics Undergraduate Committee was consulted.

Resources:
STA255H1: Statistical Theory

Description:

This course deals with the mathematical aspects of some of the topics discussed in STA220H1. Topics include discrete and continuous probability distributions, conditional probability, expectation, sampling distributions, estimation and testing, the linear model (Note: STA255H1 does not count as a distribution requirement course).

Rationale:

STA250H1 is a retired course so it should not be included in the description. STA220 is the appropriate course to include here. This will update the calendar based on current offerings.

Consultation:

The Statistics Undergraduate Committee was consulted.

Resources:
2 Course Modifications:

**VIC159H1: Vic One Hundred Special Topics Seminar**

<table>
<thead>
<tr>
<th>Exclusions:</th>
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<tbody>
<tr>
<td><strong>Previous:</strong> Innis One, Munk One, New One, SMC One, Trinity One, UC One, Vic One, Woodsworth One; No more than another 0.5 FCE from 199 seminars or Vic One Hundred.</td>
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<tr>
<td><strong>New:</strong></td>
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<table>
<thead>
<tr>
<th>Rationale:</th>
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<tbody>
<tr>
<td>For greater clarity for students and consistency with other units across the Faculty of Arts and Science, Victoria College is removing exclusions on FYF and VIC100 courses.</td>
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<tr>
<td>Resources:</td>
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**VIC159Y1: Vic One Hundred Special Topics Seminar**

<table>
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<tbody>
<tr>
<td><strong>Previous:</strong> Innis One, Munk One, New One, SMC One, Trinity One, UC One, Vic One, Woodsworth One; 199 seminars or other Vic One Hundred seminar.</td>
</tr>
<tr>
<td><strong>New:</strong></td>
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<table>
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