



FACULTY OF SCIENCE

COUNCIL OF THE FACULTY OF SCIENCE

Notice of Meeting
Tuesday, November 14, 2017
at 3:00pm – 4:30pm
306 Lumbers

Agenda

1. Call to Order and Approval of Agenda
2. Chair's Remarks
3. Approval of Minutes of October 10, 2017 meeting
4. Business Arising
5. Inquiries and Communications
 - Senate Synopsis: Meeting of October 26, 2017
6. Dean's Report to Council
7. Associate Deans' and Bethune Master's Remarks
8. Reports from Science Representatives on Senate Committees
9. Reports from Standing Committees of Council
 - 9.1 Executive Committee – ratification of nominations for the 2017-18 student caucus (item for action)
 - 9.2 Science Curriculum Committee (items for consent)
10. Other Business
 - 10.1 Presentation: Steps/process for having program and curriculum changes approved, by Senate Secretariat
 - 10.2 Updating the current Strategic Research Plan (2013-18), feedback sought by Cora Young, Strategic Research Plan Advisory Committee
 - 10.2 Revisions to the T & P Policy and Procedures (item for information)



FACULTY OF SCIENCE

COUNCIL OF THE FACULTY OF SCIENCE

Tuesday, 10 October 2017
at 3:00pm – 4:30pm
306 Lumbers

Minutes

Attendance: D. Golemi-Kotra, J. Clark, R. Jayawardhana, T. Kelly, A. Mills, N. Nivillac, P. Delaney, P. Wilson, S. Morin, EJ Janse van Rensburg, M. Xu, D. Hossain, R. Nariani, J. Elwick, E. Hamm, K. M. Kroker, N. Madras, W. Tholen, M. McCall, S. Siyakatshana (Assistant Secretary)

Guest: B. Sheeller & H. McLellan

1. Call to Order and Approval of Agenda

The meeting was called to order and the Agenda was adopted as presented.

2. Chair's Remarks

Chair of Council, D. Golemi-Kotra welcomed members

to the Council meeting.

3. Approval of Minutes of September 12, 2017 meeting

Motion was moved, seconded and carried to approve the Minutes.

4. Business Arising

There was no business arising from the Minutes.

5. Inquiries and Communications

Council noted that the Senate Synopsis of Meeting of September 28, 2017.

6. Dean's Report to Council

Dean Jayawardhana informed Council that Kate Allen, a Science & Technology reporter at the Toronto Star, and Matt McGrath, Environment Correspondent at the BBC, have been selected as the inaugural York Science Communicators in Residence. Kate will be here October 10 – November 10, 2017, and Matt will be visiting January 15 - April 15, 2018. The Dean encouraged faculty members to reach out and interact with these reporters once they arrive on campus. He expressed his thanks and appreciation to the selection committee who worked hard to review a pool of high calibre candidates.

He reminded Council that the call for the second batch of York Science Fellowships was now online and the deadline for receiving applications was November 20, 2017. He noted that they are up to six fellowships and each faculty member can only host one new fellow per year and support up to three applicants.

The Dean congratulated Professor Tanya Da Sylva, Professor Paul Delaney and Professor Michael De Robertis who were successful in obtaining e-Campus Ontario Grants.

Dean Jayawardhana was happy to announce that the official Memorandum Of Understanding signing ceremony for the jointly funded appointment with Fermilab in the field of experimental neutrino physics was scheduled to take place on October 17th.

The Dean concluded his remarks by announcing the upcoming Library Series,

- October 11: Professor Patrick Hall - Quasar, Quasar, Burning Bright
- October 12: Professor John Moores - How to Get to Mars
- October 17 & November 16: George Conidis - The Social Habits of Galaxies
- November 11: Alexandra Terrana - The Secrets of Our Dark Universe
- November 14: Prof. Paul Delaney - Is Anyone Home?

7. Associate Deans' and Bethune Master's Remarks

Associate Dean Mills updated Council that the university instructed Senate to revisit the policy on religious accommodation to ensure that it complies with the Human Rights Act.

A.Mills was asked to inquire on whether or not there will be university wide consultation on the matter.

Associate Dean Morin reminded faculty that in order for their NSERC discovery grant to be internally reviewed, grants have to be submitted at the latest on October 13th. The final deadline for submission of their NSERC DG grant to the Faculty of Science is October 30th at 9:00am.

She added that the Faculty of Science research awards had been announced and the deadline for application was December 1st. She encouraged faculty members to participate in the nomination process and encourage colleagues to apply.

She also announced that the VPRI's office had announced that nominations for the President's research awards were now open and the deadline was November 24th at 5:00pm. Faculty members were encouraged to again participate in the nomination process.

Associate Dean Janse vanRensburg reminded faculty members who had returned from sabbatical leave to submit their reports by November 1, 2017.

8. Reports from Science Representatives on Senate Committees

There were no reports.

9. Reports from Standing Committees of Council

9.1 Science Curriculum Committee (item for consent)

The consent agenda items were approved by Council.

10. Other Business

10.1 Presentation: York Cares United Way Campaign, by Amanda Hickman – Senior Advancement Officer

Council noted that Amanda Hickman was unable to attend this meeting.

Adjournment of the meeting

A motion was moved, seconded and carried to approve adjournment of the meeting.

D. Golemi-Kotra
Chair of Council

S. Siyakatshana
Recording Secretary

The Senate of York University

Meeting Synopsis

The 638th Meeting of Senate
held on Thursday, October 26, 2017

Remarks

The Chair of Senate, Professor Lesley Beagrie of the Faculty of Health, greeted continuing and new Senators. She spoke of the celebration and inspiration characterizing Fall Convocation ceremonies and the installation of the President, welcomed new Vice-President Finance and Administration Carol McAulay to her first meeting of Senate, and expressed condolences on the passing of Professor Michael Michie, fondly remembered for his dedication and good cheer. A recent meeting of the Council of Ontario University Academic Colleagues reinforced the sense that York's collegial governance was a model of openness and positive interaction, and she encouraged Senators to preserve and enhance the space that has been created. Senators were encouraged to attend a roundtable sponsored by Enable York at 10:30 a.m. on Tuesday, November 7 in Room 519 Kaneff Tower

The President of York University, Rhonda Lenton, also recalled Professor Michie, stressing his contributions to Atkinson College and support for her when she served as its Dean. Recent incidents that have touched the University community, including a vehicular accident that claimed the life of a York graduate student, served as reminders that we need to be mindful of the safety and wellbeing of others.

President Lenton gave thanks for the enthusiasm and community spirit that made her installation so memorable and heartening. Pointing to the monthly Kudos report, she offered highlights that included the largest CFI grant ever received by the University, the election of alumnus Jagmeet Singh as leader of the federal NDP, and recognition garnered for new buildings on campus. Following up on questions raised in September, the President confirmed that York is working closely with the management of the new Quad residences to ensure the implementation of appropriate security protocols consistent with University norms, including coordination with the University's security team and Toronto Police Services.

Now that the Ministry of Advanced Education and Skills Development has signed Strategic Mandate Agreement II, it is time to consider how best to influence system-wide metrics for the next round while developing indicators that tell York's compelling story fully and well. York is a partner in three of the ten Canadian Innovation Supercluster Initiative applications approved for the final selection round, and the University is in talks with the Ministry of the Environment and Climate Change on the possibility of locating a new facility on the Keele campus, one that should have benefits for research activities and could be an anchor tenant for a research park. York has indicated interest in Toronto's Amazon bid, but in any event should assess and pursue opportunities in the areas of Artificial Intelligence and STEM disciplines.

The monthly "Kudos" report on the achievements of members of the York community can be accessed with other documentation for the meeting.

The Senate of York University

Meeting Synopsis

Academic Colleague to the Council of Ontario Universities

The Chair attended recent meetings of COU Colleagues and the Council on behalf of Professor David Leyton-Brown. She reported that discussions pivoted around the challenges associated with government-mandated change at Ontario universities. Strategies discussed in this regard included the role of Senate and the need for focused consultations at all levels to promote awareness of and appropriate responses to, directives from Queen's Park. The meetings also yielded early insights into the province's desire to increase STEM enrolments and develop an internationalization strategy. The Career Kick Start Strategy is now unfolding with the aim of promoting a highly skilled workforce.

Committee Member Elections

Senate elected candidates recommended by Senate Executive to serve on the Tenure and Promotions and Tenure and Promotions Appeals Committee.

Approvals

On a recommendation from the Executive Committee, Senate approved changes to the Senate Tenure and Promotions Document to provide for the inclusion of consideration of community engaged scholarship encompassing all three areas of professional responsibility. A revision was also made to Section F 3.3. (Dean's Letter), the intent of which is to address circumstances in which a file has been referred back to the Adjudicating Committee by the Senate Review Committee.

Senate approved recommendations of its Academic Standards, Curriculum and Pedagogy Committee to

- amend the Senate Policy on Sessional Dates and the Scheduling of Examinations provide for a four-day Fall Reading Week, effective FW 2018-2019 (ASCP also shared revised dates for 2018-2019 that reflected this change)
- change admission requirements for Bachelor of Education programs offered by the Faculty of Education
- establish a new field in Socio-Cultural and Policy Studies in Sport and Physical Activity in the Graduate Program in Kinesiology and Health Science, Faculty of Health / Faculty of Graduate Studies
- change admission requirement for the Master of Arts in Information Systems and Technology, School of Information Technology, Faculty of Liberal Arts & Professional Studies / Faculty of Graduate Studies

The Senate of York University

Meeting Synopsis

Major Reports

Under the auspices of the Academic Policy, Planning and Research Committee, Provost Lisa Philipps briefed Senate on enrolments and complement. The report is accessible from the Senate Meeting website.

Committee Information Items

Executive (Professor Franck van Breugel, Vice-Chair)

The Executive Committee's information items included the following:

- Senate committee vacancies and upcoming round of nominations
- Senate committee priorities for 2017-2018
- academic implications of the strike at Colleges of Applied Arts and Technology
- the Committee's response to an inquiry regarding Senate membership for students in the Faculty of Education and the need to adhere to rules concerning proxies and substitutes

Academic Policy, Planning and Research (Professor Thomas Loebel, Chair)

APPRC provided information on these items:

- progress on the Strategic Research Plan renewal process
- Markham Centre Campus planning
- the University Academic Plan and Engagement of Senate and the Collegium
- the development of questions for the Deans, Principal and University Librarian and variations in the proposed form of engagement
- major items expected in November

Academic Standards, Curriculum and Pedagogy (Professor Kim Michasiw, Chair)

ASCP advised that it is reviewing the Religious Observances section of the Senate Policy on Sessional Dates and the Scheduling of Examinations in anticipation of issuing clarifications on the process for seeking accommodations and the options available to instructors and students. The Committee will also transmit to APPRC a summary of its discussion of the Markham Centre Campus Governance Structure Options. Minor modifications to curriculum approved by ASCP at recent meetings were as follows:

Faculty of Environmental Studies

- waiver of Section 5c of the Senate Policy on Sessional Dates and the Scheduling of Examinations for ENV5 4800 3.0 Advanced Topics in Environment and Health to permit the intensive week-long course to be offered during February Reading Week at York's co-campus in Costa Rica

The Senate of York University

Meeting Synopsis

Faculty of Graduate Studies

- a change in the name of the specialization in History and Theory of Psychology to Historical, Theoretical, and Critical Studies of Psychology, Graduate Program in Psychology
- minor change to the requirements for the MA and PhD programs in Psychology, Clinical Psychology Specialization, Clinical Neuropsychology Sub-specialization
- minor change to requirements for the MA in Development Studies

Tenure and Promotions (Professor Simone Bohn, Co-Chair)

The Tenure and Promotions Committee presented its annual report on Tenure and Promotions for 2016-2017. In doing so the Chair stressed that the Committee has prioritized unit level standard reviews and feedback this year and will furnish updates to Senate. The Committee is also concerned about the following issues:

- some file preparations committee are evaluating rather than merely assembling and transmitting documentation
- unit standards not always shared with reviewers
- some Faculties are not following course evaluation guidelines regarding the need for student signatures

In response to questions the Chair confirmed that some units have guidelines for alternate stream applications that differ from the Senate framework. In cases of inconsistency standards have been turned back to the originating units.

Tenure and Promotions Appeals (Professor Parissa Safai, Chair)

The T&P Appeals Committee reported on the outcome of two cases that it had dealt with in 2016-2017.

Additional Information about this Meeting

Please refer to the full Senate agenda and supplementary material posted online with the October 26, 2017 meeting for details about these items.

<http://secretariat.info.yorku.ca/senate/meeting-agendas-and-synopses/>

November 2017 Meeting of Senate

Senate's next meeting will be held at 3:00 p.m. on **Thursday, November 23, 2017**.

Science Student Caucus 2017 – 18

Alita Gideon	Biomedical Science
Chanhee Seo	Biology
Clarelle Gonsalves	Biomedical Science
Do Eon (Joshua) Lee	Biology
Joshua Parsons	Astrophysics
Karen Rowe	Mathematics For Commerce
Magdelina Yimesghen	Biomedical Science
Mohammad Kiumarsi	Biomedical science
Robert Cheung	Biology
Rushi Patel	Biomedical Sciences
Steven Spector	Biomedical Sciences
Thanusika Thuraiselvam	Biology

FACULTY OF SCIENCE

Science Curriculum Committee

AGENDA

1. Natural Science

- 1.1 Change in Existing Course – NATS 1515 3.0
- 1.2 New Course Proposal - NATS 1590 3.0
- 1.3 New Course Proposal – NATS 1795 6.0

2. Mathematics & Statistics

- 2.1 Change in degree requirements – BSc & BA Applied Math
- 2.2 Change in degree requirements – BSc & BA International Dual Degree
- 2.3 Change in degree requirements – BSc Mathematical Biology
- 2.4 Change in degree requirements – BSc & BA Math for Education
- 2.5 Change in degree requirements – BSc & BA Pure Math
- 2.6 Change in degree requirements – BSc & BA Statistics
- 2.7 Change to Existing Course – ISCI 1410 6.0
- 2.8 Change to Existing Course – MATH 1013 3.0
- 2.9 Change to Existing Course – MATH 1014 3.0
- 2.10 Change to Existing Course – MATH 1021 3.0
- 2.11 Change to Existing Course – MATH 1025 3.0
- 2.12 Change to Existing Course – MATH 1131 3.0
- 2.13 Change to Existing Course – MATH 1190 3.0
- 2.14 Change to Existing Course – MATH 1200 3.0
- 2.15 Change to Existing Course – MATH 1300 3.0
- 2.16 Change to Existing Course – MATH 1310 3.0
- 2.17 Change to Existing Course – MATH 1505 6.0
- 2.18 Change to Existing Course – MATH 1510 6.0
- 2.19 Change to Existing Course – MATH 1520 3.0
- 2.20 Change to Existing Course – MATH 1530 3.0
- 2.21 Change to Existing Course – MATH 1532 3.0
- 2.22 Change to Existing Course – MATH 1540 3.0
- 2.23 Change to Existing Course – MATH 1550 6.0
- 2.24 Change to Existing Course – MATH 1581 3.0
- 2.25 Change to Existing Course – MATH 2001 3.0

- 2.26 Change to Existing Course – MATH 2022 3.0
- 2.27 Change to Existing Course – MATH 2030 3.0
- 2.28 Change to Existing Course – MATH 2041 3.0
- 2.29 Change to Existing Course – MATH 2131 3.0
- 2.30 Change to Existing Course – MATH 2200 3.0
- 2.31 Change to Existing Course – MATH 2270 3.0
- 2.32 Change to Existing Course – MATH 2271 3.0
- 2.33 Change to Existing Course – MATH 2280 3.0
- 2.34 Change to Existing Course – MATH 2281 3.0
- 2.35 Change to Existing Course – MATH 2310 3.0
- 2.36 Change to Existing Course – MATH 2565 3.0
- 2.37 Change to Existing Course – MATH 2581 3.0
- 2.38 Change to Existing Course – MATH 3001 3.0
- 2.39 Change to Existing Course – MATH 3010 3.0
- 2.40 Change to Existing Course – MATH 4160 3.0
- 2.41 Change to Existing Course – MATH 4171 3.0
- 2.42 Change to Existing Course – MATH 4172 3.0
- 2.43 Merger of Three Year Degree Program
- 2.44 New Course Proposal – MATH 3333 3.0

3. Biology

- 3.1 New Course Proposal – BIOL 4720
- 3.2 Change to Existing Course – BIOL 1500 3.0
- 3.3 Change to Existing Course – BIOL 2021 3.0
- 3.4 Change to Existing Course – BIOL 3110 3.0
- 3.5 Change to Existing Course – BIOL 3150 4.0
- 3.6 Change to Existing Course – BIOL 4350 4.0

Changes to Existing Course

Faculty:

Department:

Natural Science

Date of Submission:

Sept 17/17

Course Number:

SC/NATS 1515 3.0

Effective Session:

2018/2019

Course Title:

Atmospheric Pollution

Type of Change:

- | | |
|--|--|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): added NCR | <input type="checkbox"/> |

Change From:

To:

The course commences with the evolution of the Earth's atmosphere from its creation and moves to its development to the present throughout several stages. The cyclical climate change of Earth has been due to changes in orbital obliquity, eccentricity and precession (related to the change of Earth's rotation axis, distance from the sun and rotation rate respectively). The course proceeds to examine the history of atmospheric pollution from natural causes such as volcanoes, natural fires, desert dust, etc., to pollution caused by humans prior to the industrial revolution arising from the burning of wood and the clearing of land. Subsequently, modern day pollution due to the burning of fossil fuels and production of other anthropogenic harmful chemicals will be discussed. Different forms of pollution such as manifested as smog and acid rain are discussed and past successes in dealing with these types of pollution are recounted. The course concludes with topics on new policies and technologies that can be considered to ameliorate the deleterious effects of atmospheric pollution, such as the usage of green energy (solar, wind, fuel cell, geo-thermal, biomass, etc.). Course credit exclusion: SC/NATS 1840 6.00, SC/NATS 1750 6.00.

The course commences with the evolution of the Earth's atmosphere from its creation and moves to its development to the present throughout several stages. The cyclical climate change of Earth has been due to changes in orbital obliquity, eccentricity and precession (related to the change of Earth's rotation axis, distance from the sun and rotation rate respectively). The course proceeds to examine the history of atmospheric pollution from natural causes such as volcanoes, natural fires, desert dust, etc., to pollution caused by humans prior to the industrial revolution arising from the burning of wood and the clearing of land. Subsequently, modern day pollution due to the burning of fossil fuels and production of other anthropogenic harmful chemicals will be discussed. Different forms of pollution such as manifested as smog and acid rain are discussed and past successes in dealing with these types of pollution are recounted. The course concludes with topics on new policies and technologies that can be considered to ameliorate the deleterious effects of atmospheric pollution, such as the usage of green energy (solar, wind, fuel cell, geo-thermal, biomass, etc.). Course credit exclusion: SC/NATS 1840 6.00, SC/NATS 1750 6.00.

NCR Note: No credit will be retained if this course is taken after successful completion of SC/CHEM 1000 3.00 or SC/CHEM 1001 3.00. Not open to any students enrolled in the Chemistry program.

Rationale:

This course includes chemical material and concepts (e.g. balancing chemical equations, radical interaction, basic chemical reactions, chemical states, equations of state...) and thus students with chemistry experience and/or in a chemistry stream will have an unfair advantage.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty:
Indicate all relevant
Faculty(ies)

Science

Department:
Indicate department and
course prefix (e.g.
Languages, GER)

Division of Natural Science, Department of Science and Technology Studies

**Date of
Submission:**

31 March 2017 (to be updated on submission)

Course Number:
Special Topics courses
Include variance (e.g.
HUMA 3000C 6.0,
Variance is "C")

NATS 1590

Var:

Academic Credit Weight:
Indicate both the fee, and
MTCU weight if different from
academic weight (e.g. AC=6,
FEE=8, MET=6)

3.0

Course Title:
The official name of
the course as it will
appear in the
Undergraduate
Calendar and on the
Repository

The Mathematics of Politics

Short Title:
Appears on any
documents where space
is limited - e.g.
transcripts and lecture
schedules - **maximum
40 characters**

Mathematics of Politics

With every new course proposal it is the Department's responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.

Brief Course Description:

Maximum 2000 characters

(approximately 300 words including spaces and punctuation).

The course description should be carefully written to convey what the course is about. It should be followed by a statement of prerequisites and co-requisites, if applicable. This description appears in the calendar. For editorial consistency, and in consideration of the various uses of the Calendars, verbs should be in the present tense (i.e., "This course analyzes the nature and extent of..." rather than "This course will analyze...")

Civil society is beset with questions of how to make collective decisions, divide resources, and respond to competition and conflict. How should we count the votes we cast to elect our representatives? How does the choice of selection process influence who leads our political parties? How can we apportion seats in parliament relative to provincial population? What is the best choice of opening bid in an auction? Why is it so hard to get governments of different nations to cooperate on climate change? Mathematics offers one important viewpoint on these questions. This course explores the mathematics of voting systems, social choice, and the theory of conflict (game theory).

NCR Note: Not open to students who have passed or are taking AP/ECON 4130 3.00, GL/ECON 4340 3.00

Generic Course Description:

This is the description of the "Parent / Generic course" for Special Topics courses under which variances of the "Generic" course can be offered in different years (Max. 40 words). Generic course descriptions are published in the calendar. List all degree credit exclusions, prerequisites, integrated courses, and notes below the course description.

Expanded Course Description:

Please provide a detailed course description, including topics / theories and learning objectives, as it will appear in supplemental calendars.

Topics: This course will introduce the application of mathematics and mathematical thinking to social choice problems, measures of political influence, fair-division problems, and game-theoretic models of conflict and competition. Students will require no prerequisite beyond Grade 11 Mathematics. There are four main topics:

1. Social choice: an introduction to voting systems
 - Introduction to different means of evaluating the collective social will. Given each individual's preferences between several alternatives, which methods exist to produce a collective decision?
 - Properties of voting systems. Different procedures for social choice have different properties. What are the main properties of interest (for example, the property of never producing a tie), which are present in which voting systems, and what are the relations between these properties?
 - Arrow's Impossibility Theorem. Is there an objectively ideal voting system?
2. Yes-No voting: deciding between two alternatives
 - Properties of yes-no voting systems. Which properties specific to choosing between two alternative merit attention?
 - What are the relationships between various properties of yes-no systems?
 - Which real-world institutions have which of these properties?
3. Game theory: modelling competition and conflict
 - Models for games. How do we mathematically model a one-move competition with no random element outside of the players' choices?
 - The Prisoner's Dilemma. A two-person game illustrating the challenges faced in many real-world collective action problems.
 - The mathematics of escalation. What are "sunk costs," and when does it make sense to try to recover them?
4. Fairness: measuring equity in the division of resources
 - How do several parties divide heterogeneous resources? Can we model fairness?
 - In a system of proportional allocation of indivisible units (e.g., seats in a parliament), how can we most fairly resolve "rounding?"
 - How can we quantify the degree of power or influence of a given position in a decision-making system?

Learning outcomes: Students will develop a mathematical understanding of fundamental questions in civic life. Students will

- Recognize several distinct systems of social choice, distinguish the properties these systems may or may not have, and identify the abstract relationships between these properties.
- Apply different social choice procedures to sets of preference data and compare the outcomes of these procedures.
- Evaluate social choice procedures in abstract, on the basis of which distinguished properties they do or do not hold.
- Recall and explain Arrow's Impossibility Theorem, and interpret its implications for social choice problems.
- Describe various models for simple games, and apply them to questions in politics, economics, and conflict.
- Identify various indices of political influence, and compute these indices in given contexts.
- Recognize certain designs for auctions, and distinguish their fundamental mathematical properties.
- Judge simple mathematical proofs, and distinguish between logical deduction and other forms of argument in the civic realm.
- Weigh the strengths and fundamental limitations of a mathematical approach to questions in politics.

Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged? Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components. Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

Students will achieve the learning outcomes through a combination of face-to-face instruction, guided readings, and hands-on assignments.

The face-to-face instruction will consist of 36 hours of lecture (3 hours per week), as well as individual help in regular office hours. The lectures themselves will be a hybrid of standard presentation-style with questions, and some active learning with in-class activities.

The readings will mostly be from the assigned text, with occasional supplemental readings provided from freely available sources.

The assignments will have an experiential orientation, with students gaining hands-on knowledge both of mathematics and of its communication. Exercises guide students through the practice of making mathematical arguments, and a group project will develop the capacity to engage in critical discourse in a team. Students will also directly engage in some mock elections, auctions, and games, to gain first-hand experience in how the mathematical ideas play out. Finally, students will complete a group project to more deeply explore some aspect of the course, and communicate the results.

Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).
2. Number of department members currently competent to teach the course.
3. Instructor(s) likely to teach the course in the coming year.
4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained **OR** in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. One offering of one section annually, in either the fall or winter term.
2. Any member of the Department of Mathematics and Statistics would be qualified to teach this course.
3. It is anticipated that Patrick Ingram would teach this course in its initial offering.
4. Students will have 36 contact hours with the instructor, through regular lectures, plus any attendance at office hours. The instructor would also be available through e-mail and telephone. Students will need an additional 4-6 hours weekly to complete the readings, exercises, and projects, for a total of 7-9 hours per week.

Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Students will be evaluated on the basis of:

1. Weekly assignments worth 25% of the grade.
2. A group project worth 10% of the grade
3. Two in-class tests, each worth 15% of the grade.
4. One final exam (in the exam period) worth 35% of the grade.

**Bibliography:
A READING LIST
MUST BE INCLUDED
FOR ALL NEW
COURSES**

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/ undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

**LIBRARY SUPPORT
STATEMENT MUST BE
INCLUDED.**

Most chapters of the following required text, which is available electronically through the York Library, will be covered:

Taylor, Alan D. and Pacelli, Allison M. (2008). Mathematics and Politics: Strategy, Voting, Power, and Proof, 2nd edition. New York: Springer.

Other Resources:

A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

This course will require standard resources for a class of its size. Specifically, a classroom with space for at least 150 students, a computer with projector, and a Moodle course page. Teaching assistants will also be required, in quantity depending on enrolment, to assist with marking of assignments and exams.

Course Rationale:

The following points should be addressed in the rationale: How the course contributes to the learning objectives of the program / degree. The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given. The expected enrolment in the course.

This course contributes to the objectives of general education in Natural Sciences at York by introducing students, with a minimum of prerequisites, to an area of mathematics relevant to their daily lives. In particular, students will learn to think critically about various questions in politics and public life and to engage in mathematical and quantitative reasoning around issues of social choice, fair division, and conflict. The content of the course is explicitly related to civic engagement, and part of the aim is to give both awareness of, and tools to critically discuss, important issues facing Canadian society today (including, but not limited to, electoral reform). More broadly, students who would not otherwise take a mathematics course will be introduced to mathematical reasoning and modes of thought, in a context more easily related to everyday experience. Practice in communicating mathematical ideas, both individually in writing and collaboratively in group discussions, develops key skills in critical debate.

Very minor overlap occurs with NATS 1500 - Statistics and Reasoning, in that both focus on mathematical modes of thought, but the courses are entirely divergent in content. Some content overlap will exist with ECON 4340 - Game Theory and Economics, although the overlapping material will be represented at a very different level, with different intended audience.

The expected enrolment is about 150 students, but the format of the class will be amenable to scaling.

Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

Dept: _____	_____		
_____	Signature (Authorizing cross-listing)	Department	Date
Dept: _____	_____		
_____	Signature (Authorizing cross-listing)	Department	Date
Dept: _____	_____		
_____	Signature (Authorizing cross-listing)	Department	Date

Accessible format can be provided upon request.

**STEACIE SCIENCE & ENGINEERING LIBRARY
YORK UNIVERSITY**

MEMORANDUM

To: Patrick Ingram, Course Instructor

From: John Dupuis, Natural Science Librarian

Re: NATS 1590 – Mathematics and Politics

Date: April 10, 2017

I have reviewed the course proposal for **NATS 1590 – Mathematics and Politics** and can state that the York University Libraries have the required resources to support this undergraduate level course.

Please be aware that the library offers the following services to help students with their research:

- A librarian can go to the classroom or tutorial and introduce students to the various resources available at the library including electronic journals and databases.
- A librarian can create a customized research resources webpage to help students with their assignments.

The following electronic resources licensed by the library may be of help to the students in this course:

- **Scholars Portal Journals** – a compendium of most of the scholarly articles that the Libraries subscribe to. This is very useful for undergrads finding scholarly articles in various topics.
- **Scholars Portal eBooks** -- A large collection of ebooks from a variety of publishers that cover a broad range of science and technology topics.
- **Research Library** and **Expanded Academic** are two general purpose scholarly article databases that cover science and technology issues from a broad, interdisciplinary context, including non-scholarly material.
- **Canadian Newsstand** and **Lexis Nexis Academic** are databases of contemporary newspapers, both Canadian and international.
- The Libraries also have online archives for **Scientific American** and other magazines.

Please note that the Steacie Library has an extensive collection of books and reference materials that are relevant to this course.

If you have any questions, please do not hesitate to contact me.

**COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY
TEMPLATE**

NEW COURSE PROPOSAL FORM

Faculty:
Indicate all relevant
Faculty(ies)

FSE

Department:
Indicate department and
course prefix (e.g.
Languages, GER)

Natural Science (NATS)

Date of Submission:

Apr 2017

Course Number:
Special Topics courses
Include variance (e.g.
HUMA 3000C 6.0,
Variance is "C")

SC/NATS 1795

Var:

Academic Credit Weight:
Indicate both the fee, and
MTCU weight if different from
academic weight (e.g. AC=6,
FEE=8, MET=6)

6.0

Course Title:
The official name of the
course as it will appear in
the Undergraduate
Calendar and on the
Repository

The Physics of Time and Timekeeping

Short Title:
Appears on any
documents where space
is limited - e.g.
transcripts and lecture
schedules - **maximum
40 characters**

The Physics of Time

With every new course proposal it is the Department's responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.

Brief Course Description:

Maximum 2000 characters
(approximately 300 words including spaces and punctuation).

The course description should be carefully written to convey what the course is about. It should be followed by a statement of prerequisites and co-requisites, if applicable. This description appears in the calendar.

For editorial consistency, and in consideration of the various uses of the Calendars, verbs should be in the present tense (i.e., "This course analyzes the nature and extent of..." rather than "This course will analyze...")

The concept of time has intrigued thinkers from all ages. The impact of measuring and marking time intervals on the development of human culture, and our understanding of the world around us, cannot be understated. The drive to measure and understand time led ancient peoples to a very sophisticated knowledge of the sky; from that knowledge emerged accurate calendars, as well as mathematics itself. We will look at how changing concepts of time and the technological accuracy of measuring time drove fundamental changes in physics, and deepened our understanding of the world around us. This course examines the history of physics through the lens of time. The first half of the course covers timekeeping methods, including the sky as a clock, mechanical clocks, and quartz and atomic clocks. The second half of the course focuses on modern issues of time including time perception, Einstein's revolutionary discoveries on the relative nature of time, and cosmic time.

NCR Note: This course is not open to any student who has passed or is taking SC/PHYS 1010 6.00, SC/PHYS 1410 6.00 or SC/PHYS 1420 6.00.

Generic Course Description:

This is the description of the "Parent/Generic course" for Special Topics courses under which variances of the "Generic" course can be offered in different years (Max. 40 words). Generic course descriptions are published in the calendar.

List all degree credit exclusions, prerequisites, integrated courses, and notes below the course description.

**Expanded Course
Description:**

Please provide a detailed course description, including topics/theories and learning objectives, as it will appear in supplemental calendars.

The first half of this course will cover timekeeping methods, from ancient cultures using the sky as a clock to modern atomic clocks. The second part of the course focuses on concepts of time in modern physics, including relativity and cosmology.

Celestial Timekeeping

- the sky as a calendar: motions of stars, Sun, Moon, planets
- ancient timekeeping monuments
- Antikythera mechanism
- timekeeping models of the Universe: Aristotle, Ptolemy, Copernicus, Kepler
- paradigm shifts in science and cosmological worldviews

Ancient Timekeeping

- gnomons; sundials; water clocks
- innovation of Ctesibius

Mechanical Timekeeping

- development of mechanical clocks (underlying physics: force, work, energy, momentum, torque, conservation of energy)
- physics of gears: meshing and paired
- escapement mechanisms; verge & foliot; Strasbourg Clock

Time, measurement and precision in science

- Galileo's mathematical descriptions of motion through time
- pendulum clock design: Galileo, Huygens; physics of pendula
- Foucault's pendulum; evidence for rotation of Earth
- Harrison's marine clock; the measurement of longitude
- Jupiter's moons as absolute timekeepers; measuring the speed of light

Newton & Time

- time becomes external; Clockwork Universe
- Newton's Laws based on notion of time
- absolute time and space
- Impact of technology on scientific and cultural worldviews

Quartz clocks

- microscopic structures: atoms, molecules, crystals
- piezoelectricity
- how quartz watches work; LCD clocks

Atomic Clocks

- properties of light; interaction of light & matter
- Cesium atomic clocks: mechanism, accuracy
- contemporary atomic clocks; fountain clocks

The Perception of Time

- brain's perception mechanisms
- circadian rhythms; isolation experiments of Michel Siffre
- time perception illusions; duration distortion; experiments of David Eagleman

Einstein & Time

- Special Relativity – time is no longer an absolute quantity; failure of simultaneity; time dilation; twin paradox
- General Relativity - curvature of spacetime and the running of clocks; world lines; relativistic corrections for GPS measurements
- black holes & time

Quantum Mechanics & Time

- concepts - uncertainty, entanglement; implications

Earth Time

- Geological History of Earth; Radioactive dating methods; deep time

Cosmic Time

- entropy & the arrow of time; Laws of thermodynamics
- the beginning of time: Big Bang
- multiverse models
- the end of time: dark matter, dark energy & the fate of the Universe
- time as an illusion /emergent time; work of Hawking, Smolin

Learning Outcomes

Upon successful completion of this course students should be able to:

- describe how the periodic nature of celestial phenomena were used to mark time by ancient cultures
- observe periodic motions of objects in the sky and describe why they occur
- create a timekeeping device which measures periodic phenomena or durations of time
- recognize how new technological advances in the measuring accuracy of time have impacted and driven fundamental changes in our understanding of physics and nature
- recognize how the methodology of Galileo, including his mathematical approach for studying change through time, with his improved precision measurements of time, underpins the modern scientific method
- describe the microscopic structure of matter, and how periodic phenomena at this scale are used to keep time
- compare the views on time by Newton and Einstein, and recognize how Einstein fundamentally changed the cosmic worldview
- describe historical experiments which have confirmed predictions of scientific theories and recognize how the constant interplay between theory and observation advances scientific knowledge
- identify parts of the brain and body involved in time perception
- experience and describe examples of duration distortion

Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).
2. Number of department members currently competent to teach the course.
3. Instructor(s) likely to teach the course in the coming year.
4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained **OR** in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

Face to face:

Three lecture hours per week.

Lectures serve to introduce ideas which students follow up with readings. Lectures include worksheets and in-class active learning exercises, to clarify concepts, encourage critical thinking and give students opportunities to engage with each other in discussions about course ideas.

The course director will hold weekly office hours.

Experiential Education:

Assignments will be geared for students to engage in hands-on activities, and then critically reflect on their experiences.

Examples of experiential learning could include:

Assignment 1: observing periodic phenomena in the sky in order to (re)connect students to observing natural phenomena, noticing patterns in nature and reflecting on how and why they occur.

Assignment 2: constructing a clock, to provide a creative and tactile means for students to engage in course material.

Assignment 3: visiting the Royal Ontario Museum, where students will engage with exhibits related to time and ancient objects, and further investigate select time phenomena, including cosmic timescales, and radioactive dating methods used for meteorites, prehistoric life and ancient artifacts.

1. 1 offering of 1 section per year

2. This course could be taught by faculty in the Department of Physics & Astronomy

3. R. Kingsburgh is expected to teach the course in the coming year.

4. 3 lecture hours per week, for a total of 72 lecture hours. Students will need to visit the Royal Ontario Museum for one assignment in their own time (free student admission on Tuesdays).

Students will need an additional 6-9 hours per week for readings and assignments.

Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Experiential Learning component: 40%

Divided into multiple assignments, such as:

10% Assignment 1: The sky as a clock

- observations documenting diurnal celestial motions
- practise the scientific method
- answer critical thinking questions based on observations

15% Assignment 2: Timekeeping project

- build a timekeeping device
- short research essay on a specific clock

15% Assignment 3: visit Royal Ontario Museum

- complete assignment based on exhibits related to time and ancient artifacts
- additional questions leading to extended research on radioactive dating techniques and/or select time topics

Exam component: 55%

Divided into multiple midterm and term exams, such as:

15% 2 Midterms

40% 2 Term exams (Fall and Winter)

Class participation component: 5%

5% Clicker or online quizzes

Bibliography:**A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES**

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale

As the course draws from many subjects and disciplines within science, no one textbook would suffice. Instead, online electronic resources including e-books and websites will be used, as well as recommended sources available in the York University Library.

Recommended:

Barbour, J. (2000). *The end of time: the next revolution in physics*. New York: Oxford University Press.

Greene, B. (2004). *The fabric of the cosmos: space, time, and the texture of reality*. New York: A.A. Knopff.

McCarthy, D.D. and Seidelmann, P.K. (2009). *Time: from Earth rotation to atomic physics*. Weinheim: Wiley.

*Frank, A. (2011). *About Time: Cosmology and Culture at the Twilight of the Big Bang*. Free Press.

*Smolin, L. (2013). *Time Reborn: from the crisis in physics to the future of the Universe*. Canada: Knopff

*Hammond, C. (2012). *Time Warped*. House of Anansi Press.

*Muller, R. (2016). *Now: The Physics of Time*. Norton.

* - not in York U Library; could be purchased

should be supplied.

**LIBRARY SUPPORT
STATEMENT MUST BE
INCLUDED.**

Online resources: (required)

Exactly what is time?

<http://www.exactlywhatistime.com/>

Ancient timekeeping methods:

<http://www.umich.edu/~lowbrows/reflections/1999/lsimmons.2.html>

Celestial motions:

http://www.opencourse.info/astronomy/introduction/03.motion_earth/

History of understanding the sky:

http://www.polaris.iastate.edu/EveningStar/Unit2/unit2_intro.htm

Physics of gears:

<http://resonanceswavesandfields.blogspot.ca/2011/03/understanding-mechanical-clock-part-i.html#torque>

Video on Harrison's marine clock ("The clock that changed the world"):

<https://www.youtube.com/watch?v=T-g27KS0yiY>

How a Foucault pendulum works:

<http://www.calacademy.org/products/pendulum/index.html>

How quartz watches work:

<http://www.capetowncorp.com/whatsnew/quartz.html>

Video on quartz watches (Engineer guy):

<http://www.engineerguy.com/videos/video-quartz-watch.htm>

Atoms:

http://www.kcvs.ca/martin/astro/au/unit2/61/chp6_1.html

Video on How atomic clocks work (Engineer guy):

<http://www.youtube.com/watch?v=p2BxAu6WZI8>

Brain Time (David Eagleman):

<http://edge.org/conversation/brain-time>

video on Special Relativity & Time; light clock (Brian Cox):

<http://www.youtube.com/watch?v=Mpw68rvF4pc>

video on the End of Time:

http://www.youtube.com/watch?v=GOa2L8_IAnQ

Other Resources:

A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

Normal classroom facilities, with computer, projector and blackboard for lecture presentations will suffice. Moodle will be used as the learning platform.

Teaching assistants/ markers will be needed to assist with grading assignments and exams.

Course Rationale:

The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

Natural Science provides a window on scientific concepts, methodologies and discoveries for the non-science student. This course gives an opportunity to study the history of physics and scientific revolutions from the viewpoint of time and timekeeping. A broad overview of many concepts in physics can thus be introduced to the Natural Science student. Time and timekeeping play major roles in many scientific revolutions, and help form the framework of modern physics. The nature of this course exposes students to scientific ideas and methodologies in astronomy, classical physics, atomic physics and quantum mechanics, cosmology, geology, and human perception. Educational objectives for Natural Science, of *breadth* and *interdisciplinarity* are achieved.

This course also promotes the development of *critical skills and critical thinking* by engaging students to search the scientific literature, communicate scientific ideas through writing, and engage in and apply observations and the scientific method. It promotes *independent learning* through the completion of assignments, and *creative thinking* in the Timekeeping assignment, where students will construct a clock. Assignments are geared to encompass experiential learning, and provide meaningful and engaging learning environments outside of the regular classroom.

The sections on celestial timekeeping and cosmic time will have some overlap with other NATS courses, however this course will focus on the role of observing periodic phenomena in the case of celestial timekeeping and larger concepts related to time and entropy (for example) when discussing the Big Bang.

Expected enrollment : 200 students

Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date
Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date
Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date

Accessible format can be provided upon request.

**STEACIE SCIENCE & ENGINEERING LIBRARY
YORK UNIVERSITY**

MEMORANDUM

To: Robin Kingsburgh, Course Instructor

From: John Dupuis, Natural Science Librarian

Re: NATS 17XX – The Physics of Time and Timekeeping

Date: April 28, 2017

I have reviewed the course proposal for **NATS 17XX – The Physics of Time and Timekeeping** and can state that the York University Libraries have the required resources to support this undergraduate level course.

Please be aware that the library offers the following services to help students with their research:

- A librarian can go to the classroom or tutorial and introduce students to the various resources available at the library including electronic journals and databases.
- A librarian can create a customized research resources webpage to help students with their assignments.

The following electronic resources licensed by the library may be of help to the students in this course:

- **Scholars Portal Journals** – a compendium of most of the scholarly articles that the Libraries subscribe to. This is very useful for undergrads finding scholarly articles in various topics.
- **Scholars Portal eBooks** -- A large collection of ebooks from a variety of publishers that cover a broad range of science and technology topics.
- **Research Library** and **Expanded Academic** are two general purpose scholarly article databases that cover science and technology issues from a broad, interdisciplinary context, including non-scholarly material.
- **Canadian Newsstand** and **Lexis Nexis Academic** are databases of contemporary newspapers, both Canadian and international.
- The Libraries also have online archives for **Scientific American** and other magazines.

Please note that the Steacie Library has an extensive collection of books and reference materials that are relevant to this course.

If you have any questions, please do not hesitate to contact me.

Dear Science Curriculum Committee,

Please find enclosed two sets of proposals.

The first set of proposals consists of the proposals for minor changes to our existing programs:

- *ChangeProgramProposal-AppliedMath.pdf*
- *ChangeProgramProposal-InternationalDualDegree.pdf*
- *ChangeProgramProposal-MathBio.pdf*
- *ChangeProgramProposal-MathEd.pdf*
- *ChangeProgramProposal-PureMath.pdf*
- *ChangeProgramProposal-Statistics.pdf*

These proposals mainly address the communications component of the Undergraduate Degree Level Expectations (UUDLES). Currently, most of our programs require the students to take Math 2031 1.00 to satisfy the UUDLES at 2000-level. Applied Mathematics requires their majors to take Math 3243 1.00 to satisfy the UUDLES at 3000-level.

Due to the difficulty of finding instructors to teach these 1-credit courses, the department has never offered Math 2031 and has offered Math 3243 only once in the past. While the department is currently working out the details for our affected programs, we have earmarked the following courses to fulfil the communications requirement of UUDLES:

- *Math 1200 for all first-year students*
- *Math 2022 for all second-year students*
- *Third year:*
 - *Math 3090 for students in Applied Mathematics;*
 - *Math 3001 for students in Mathematics;*
 - *Math 3050/52 for students in Mathematics for Education;*
 - *Math 3330 for Statistics students;*
- *any of the capstone courses 4090, 4939 or 4100 or by any proof based fourth year course for fourth year students.*

In order to have the changes reflected in the 2018-19 academic calendar, we are now proposing the removal of Math 2031 and Math 3243 from the requirements of our programs.

You will also find minor changes in these proposals, mostly replacing our old 6-credits courses (e.g. 3020, 3170 and 4170) with their 3-credit counterparts. Statistics is proposing to add a description of the accreditation of the Statistical Society of Canada to their “About” page in the academic calendar.

Programs involved are

- Applied Mathematics
- International Dual Degree in Mathematics and Statistics
- Mathematics
- Mathematical Biology
- Mathematic for Education
- Statistics

The above proposals have been approved by department council on October 24, 2017.

The second set of proposals (*Changes to Existing Course Forms.pdf*) deal with the changes to prerequisites, course credit exclusions and NCR notes for the following list of courses:

- ISCI 1410,
- 1013, 1014, 1021, 1025, 1131, 1190, 1200, 1300, 1310, 1505, 1510, 1520, 1530, 1532, 1540, 1550, and 1581
- 2001, 2015, 2022, 2030, 2041, 2200, 2270, 2271, 2280, 2281, 2310, 2565 and 2581.
- 3001 and 3010
- 4160, 4171 and 4172

The rationales of these changes include the addition of new math courses (e.g. ISCI 1401, 1402 and 1410); the removal of courses (1000, 1010, 1513, 1515, 1710, 1720, 1500, 1580, 2010, 3110, 3210 and 4570, and courses offered prior to 2009) that have not been offered since 2011 (seven years prior to 2018); and changing the 6-credit courses to their 3-credit counterparts.

More notable changes are:

- the prerequisites for some first-year courses from one Grade 12 math course to 12U Advanced Functions (MHF4U). The rationale lies in the believe that Advanced Functions better prepares our students for courses in discrete math and linear algebra than Grade 12 Data Management. Advanced Functions is a prerequisite for 12U Calculus and vectors, and it is an admissions requirement for all math majors from Ontario;
- the course descriptions of 1021 and 2022, resulted from the reorganization of topics in our linear algebra courses;
- the course title of 2280; and
- the course description of 4171.

These proposals have been approved by the department council on October 24, 2017. Economics have been notified for the changes involving ECON 1530 and ECON 1540.

Proposed Changes to the Specialized Honours, Honours Majors and Bachelors (BA and BSc) Requirements of the Applied Math Program in the Academic Calendar

Rationale:

- Math 2031 1.00 and Math 3243 1.00 were created to satisfy the communications component of UUDLE. Due to difficulty in finding instructors, Math 2031 has never been offered and Math 3243 has not been offered in recent years. While working on a new plan to implement the communications component of UUDLES, the department has earmarked Math 2022 3.00 and Math 3090 3.00 to fulfill the UUDLES at the second and third year level for applied mathematics. We propose to remove Math 2031 and Math 3243 from the Applied Math programs.
- The total number of math credits are changed accordingly.
- Our department has stopped offering Math 3170 6.00 which has been split to Math 3171 3.00 and Math 3172 3.00.

Change from	Changes	Change to
<p>Bachelor Program (BA and BSc)</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 1200 3.00; • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2031 1.00; • SC/MATH 2041 3.00; • SC/MATH 2270 3.00; • SC/MATH 2310 3.00; • SC/MATH 3241 3.00; • SC/MATH 3243 1.00; • SC/MATH 3271 3.00; • at least 6 additional credits selected from SC/MATH 3090 3.00, SC/MATH 3170 6.00, SC/MATH 3171 3.00, SC/MATH 3172 3.00, SC/MATH 3242 3.00, SC/MATH 3260 3.00, SC/MATH 3410 3.00, SC/MATH 4090 3.00, SC/MATH 4141 3.00, SC/MATH 4161 3.00; • additional elective credits, as required for an overall total of at least 90 credits, of which at least 18 	<p>Bachelor Program (BA and BSc)</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 1200 3.00; • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2031 1.00; • SC/MATH 2041 3.00; • SC/MATH 2270 3.00; • SC/MATH 2310 3.00; • SC/MATH 3241 3.00; • SC/MATH 3243 1.00; • SC/MATH 3271 3.00; • at least 6 additional credits selected from SC/MATH 3090 3.00, SC/MATH 3170 6.00, SC/MATH 3171 3.00, SC/MATH 3172 3.00, SC/MATH 3242 3.00, SC/MATH 3260 3.00, SC/MATH 3410 3.00, SC/MATH 4090 3.00, SC/MATH 4141 3.00, SC/MATH 4161 3.00; with SC/MATH 3090 3.00 recommended. • additional elective credits, as required for an overall total of at 	<p>Bachelor Program (BA and BSc)</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 1200 3.00; • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2041 3.00; • SC/MATH 2270 3.00; • SC/MATH 2310 3.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • at least 6 additional credits selected from SC/MATH 3090 3.00, SC/MATH 3171 3.00, SC/MATH 3172 3.00, SC/MATH 3242 3.00, SC/MATH 3260 3.00, SC/MATH 3410 3.00, SC/MATH 4090 3.00, SC/MATH 4141 3.00, SC/MATH 4161 3.00; with SC/MATH 3090 3.00 recommended. • additional elective credits, as required for an overall total of at least 90 credits, of which at least 18

<p>credits are at the 3000 level or higher.</p>	<p>least 90 credits, of which at least 18 credits are at the 3000 level or higher.</p>	<p>credits are at the 3000 level or higher.</p>
<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 2041 3.00; • SC/MATH 2270 3.00; • SC/MATH 3001 3.00; • SC/MATH 3241 3.00; • SC/MATH 3242 3.00; • SC/MATH 3243 1.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; • SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; • SC/MATH 4090 3.00; • at least nine additional credits selected from mathematics courses without second digit 5 at the 4000 level, for an overall total of at least 65 credits from major mathematics courses; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level. 	<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 2041 3.00; • SC/MATH 2270 3.00; • SC/MATH 3001 3.00; • SC/MATH 3241 3.00; • SC/MATH 3242 3.00; • SC/MATH 3243 1.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; • SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; • SC/MATH 4090 3.00; • at least nine additional credits selected from mathematics courses without second digit 5 at the 4000 level, for an overall total of at least 65 credits from major mathematics courses; SC/MATH 3090 3.00 is recommended. • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level. 	<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; • SC/MATH 2001 3.00; • SC/MATH 2041 3.00; • SC/MATH 2270 3.00; • SC/MATH 3001 3.00; • SC/MATH 3241 3.00; • SC/MATH 3242 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; • SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; • SC/MATH 4090 3.00; • at least nine additional credits selected from mathematics courses without second digit 5 at the 4000 level, for an overall total of at least 63 credits from major mathematics courses; SC/MATH 3090 3.00 is recommended. • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level.
<p>Honours BA Program</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; 	<p>Honours BA Program</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; 	<p>Honours BA Program</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • LE/EECS 1560 3.00;

<ul style="list-style-type: none"> • SC/MATH 2031 1.00; SC/MATH 2041 3.00; SC/MATH 2270 3.00; • SC/MATH 3241 3.00; one of SC/MATH 3242 3.00 or SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; SC/MATH 3243 1.00; SC/MATH 3271 3.00; • SC/MATH 4090 3.00; • nine additional credits at the 4000 level, selected from mathematics courses without second digit 5, for an overall total of at least 53 credits from major mathematics courses. 	<ul style="list-style-type: none"> • SC/MATH 2031 1.00; SC/MATH 2041 3.00; SC/MATH 2270 3.00; • SC/MATH 3241 3.00; one of SC/MATH 3242 3.00 or SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; SC/MATH 3243 1.00; SC/MATH 3271 3.00; • SC/MATH 4090 3.00; • nine additional credits at the 4000 level, selected from mathematics courses without second digit 5, for an overall total of at least 53 credits from major mathematics courses; SC/MATH 3090 3.00 is recommended. 	<ul style="list-style-type: none"> • SC/MATH 2041 3.00; SC/MATH 2270 3.00; • SC/MATH 3241 3.00; one of SC/MATH 3242 3.00 or SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; SC/MATH 3271 3.00; • SC/MATH 4090 3.00; • nine additional credits at the 4000 level, selected from mathematics courses without second digit 5, for an overall total of at least 51 credits from major mathematics courses; SC/MATH 3090 3.00 is recommended.
<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2041 3.00; SC/MATH 2270 3.00; • SC/MATH 3001 3.00; SC/MATH 3241 3.00; SC/MATH 3242 3.00; SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; SC/MATH 3243 1.00; SC/MATH 3271 3.00; • SC/MATH 4090 3.00; • at least nine additional credits selected from mathematics courses without second digit 5 at the 4000 level, for an overall total of at least 	<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2041 3.00; SC/MATH 2270 3.00; • SC/MATH 3001 3.00; SC/MATH 3241 3.00; SC/MATH 3242 3.00; SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; SC/MATH 3243 1.00; SC/MATH 3271 3.00; • SC/MATH 4090 3.00; • at least nine additional credits selected from mathematics courses without second digit 5 at the 4000 level, for an overall total of at least 	<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; SC/MATH 2041 3.00; SC/MATH 2270 3.00; • SC/MATH 3001 3.00; • SC/MATH 3241 3.00; SC/MATH 3242 3.00; SC/MATH 3260 3.00 or both SC/MATH 3171 3.00 and SC/MATH 3172 3.00; SC/MATH 3271 3.00; • SC/MATH 4090 3.00; • at least nine additional credits selected from mathematics courses without second digit 5 at the 4000 level, for an overall total of at least 63 credits from major mathematics courses;

65 credits from major mathematics courses;	65 credits from major mathematics courses; <u>SC/MATH 3090 3.00</u> is recommended.	<u>SC/MATH 3090 3.00</u> is recommended.
<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> the mathematics/statistics core (24 credits); SC/MATH 2031 1.00; <u>SC/MATH 2041 3.00</u>; <u>SC/MATH 2270 3.00</u>; <u>SC/MATH 3241 3.00</u>; one of <u>SC/MATH 3242 3.00</u>, <u>SC/MATH 3260 3.00</u> or both <u>SC/MATH 3171 3.00</u> and <u>SC/MATH 3172 3.00</u>; <u>SC/MATH 3243 1.00</u>; <u>SC/MATH 3271 3.00</u>; <u>SC/MATH 4090 3.00</u>; nine additional credits at the 4000 level, selected from mathematics courses without second digit 5, for an overall total of at least 53 credits from major mathematics courses; the course requirements for the second major or the minor if the program is an Honours Double Major or Major/Minor. 	<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> the mathematics/statistics core (24 credits); SC/MATH 2031 1.00; <u>SC/MATH 2041 3.00</u>; <u>SC/MATH 2270 3.00</u>; <u>SC/MATH 3241 3.00</u>; one of <u>SC/MATH 3242 3.00</u>, <u>SC/MATH 3260 3.00</u> or both <u>SC/MATH 3171 3.00</u> and <u>SC/MATH 3172 3.00</u>; SC/MATH 3243 1.00; <u>SC/MATH 3271 3.00</u>; <u>SC/MATH 4090 3.00</u>; nine additional credits at the 4000 level, selected from mathematics courses without second digit 5, for an overall total of at least 53 credits from major mathematics courses; <u>SC/MATH 3090 3.00</u> is recommended. the course requirements for the second major or the minor if the program is an Honours Double Major or Major/Minor. 	<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> the mathematics/statistics core (24 credits); <u>SC/MATH 2041 3.00</u>; <u>SC/MATH 2270 3.00</u>; <u>SC/MATH 3241 3.00</u>; one of <u>SC/MATH 3242 3.00</u>, <u>SC/MATH 3260 3.00</u> or both <u>SC/MATH 3171 3.00</u> and <u>SC/MATH 3172 3.00</u>; <u>SC/MATH 3271 3.00</u>; <u>SC/MATH 4090 3.00</u>; nine additional credits at the 4000 level, selected from mathematics courses without second digit 5, for an overall total of at least 51 credits from major mathematics courses; <u>SC/MATH 3090 3.00</u> is recommended. the course requirements for the second major or the minor if the program is an Honours Double Major or Major/Minor.

Proposed Changes to the Bachelor (BSc) and Specialized Honours (BSc) Requirements of the International Dual Degree in Mathematics and Statistics Program in the Academic Calendar

Rationale:

- Math 3020 6.00 has been split into Math 3021 3.00 and Math 3022 3.00.
- Math 3170 6.00 has been split into Math 3171 3.00 and Math 3172 3.00.
- SC/PHYS 1410 6.00 has been listed twice under General Education of the Specialized Honours BSc Program.

Change from	Changes	Change to
<p>Bachelor Program (BSc) B. Major Requirements:</p> <ul style="list-style-type: none"> • SC/MATH 3020 6.00; • SC/MATH 3170 6.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; 	<p>Bachelor Program (BSc) B. Major Requirements:</p> <ul style="list-style-type: none"> • SC/MATH 3020 6.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 3170 6.00; • SC/MATH 3171 3.00; • SC 3172 3.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; 	<p>Bachelor Program (BSc) B. Major Requirements:</p> <ul style="list-style-type: none"> • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 3171 3.00; • SC 3172 3.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00;
<p>Specialized Honours BSc Program A. General Education:</p> <ul style="list-style-type: none"> • foundational science: SC/PHYS 1410 6.00. science: SC/PHYS 1410 6.00. <p>B. Major Requirements:</p> <ul style="list-style-type: none"> • SC/MATH 3020 6.00; • SC/MATH 3170 6.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; 	<p>Specialized Honours BSc Program A. General Education:</p> <ul style="list-style-type: none"> • foundational science: SC/PHYS 1410 6.00. science: SC/PHYS 1410 6.00 <p>B. Major Requirements:</p> <ul style="list-style-type: none"> • SC/MATH 3020 6.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 3170 6.00; • SC/MATH 3171 3.00; • SC 3172 3.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00; 	<p>Specialized Honours BSc Program B. General Education:</p> <ul style="list-style-type: none"> • foundational science: SC/PHYS 1410 6.00. <p>B. Major Requirements:</p> <ul style="list-style-type: none"> • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 3171 3.00; • SC 3172 3.00; • SC/MATH 3241 3.00; • SC/MATH 3271 3.00; • SC/MATH 3410 3.00;

Proposed Changes to the Specialized Honours, Honours Majors, Honours Minor (BSc) Requirements of the Mathematical Biology Program in the Academic Calendar

Rationale:

- The Department has not offered Math 3050 in recent years, Math 3052 has been offered instead.
- Math 4170 6.00 has been split into Math 4171 3.00 and Math 4172 3.00.

Change from	Changes	Change to
<p>Specialized Honours (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> • One of: SC/MATH 3050 6.00 or SC/MATH 3090 3.00 or SC/MATH 3171 3.00 or SC/MATH 3172 3.00 or SC/MATH 3242 3.00 or SC/MATH 3260 3.00 or SC/MATH 3271 3.00; • SC/MATH 4250 6.00; • 6 additional credits selected from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 60 credits from major mathematics courses; 	<p>Specialized Honours (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> • One of: SC/MATH 3050 6.00 or SC/Math 3052 6.00 or SC/MATH 3090 3.00 or SC/MATH 3171 3.00 or SC/MATH 3172 3.00 or SC/MATH 3242 3.00 or SC/MATH 3260 3.00 or SC/MATH 3271 3.00; • SC/MATH 4250 6.00; • 6 additional credits selected from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 60 credits from major mathematics courses; 	<p>Specialized Honours (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> • One of: SC/MATH 3050 6.00 or SC/Math 3052 6.00 or SC/MATH 3090 3.00 or SC/MATH 3171 3.00 or SC/MATH 3172 3.00 or SC/MATH 3242 3.00 or SC/MATH 3260 3.00 or SC/MATH 3271 3.00; • SC/MATH 4250 6.00; • 6 additional credits selected from SC/MATH 4090 3.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 60 credits from major mathematics courses;

<p>Honours (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> 6 additional credits selected from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 48 credits from major mathematics courses; <p>When the second major or the minor is either Biology or Kinesiology and Health Science:</p> <ul style="list-style-type: none"> 6 additional credits selected from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 48 credits from major mathematics courses; 	<p>Honours (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> 6 additional credits selected from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 48 credits from major mathematics courses; <p>When the second major or the minor is either Biology or Kinesiology and Health Science:</p> <ul style="list-style-type: none"> 6 additional credits selected from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 48 credits from major mathematics courses; 	<p>Honours (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> 6 additional credits selected from SC/MATH 4090 3.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 48 credits from major mathematics courses; <p>When the second major or the minor is either Biology or Kinesiology and Health Science:</p> <ul style="list-style-type: none"> 6 additional credits selected from SC/MATH 4090 3.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4271 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, for an overall total of at least 48 credits from major mathematics courses;
<p>Honours Minor (BSc)</p> <ul style="list-style-type: none"> 6 additional credits from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, MATH 4250 6.00; 	<p>Honours Minor (BSc)</p> <ul style="list-style-type: none"> 6 additional credits from SC/MATH 4090 3.00, SC/MATH 4170 6.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, MATH 4250 6.00; 	<p>Honours Minor (BSc)</p> <ul style="list-style-type: none"> 6 additional credits from SC/MATH 4090 3.00, SC/Math 4171 3.00, SC/Math 4172 3.00, SC/MATH 4430 3.00, SC/MATH 4431 3.00, MATH 4250 6.00;

Proposed Changes to the Specialized Honours, Honours Majors and Honours Minors (BA and BSc) Requirements of the Math for Education Program in the Academic Calendar

Rationale:

- Math 2031 1.00 was created to satisfy the communications component of UUDLES. Due to difficulty in finding instructors, Math 2031 has never been offered. While working on a new plan to implement the communications component of UUDLES, the department has earmarked Math 2022 3.00 to fulfill the UUDLES at the second year level. We propose to remove Math 2031 from the Math for Education Programs.
- Math 3020 6.00 has been split into Math 3021 3.00 and Math 3022 3.00.
- Our department has been offering Math 3141 3.00, a 3-credit version of Number Theory, instead of Math 3410 6.00 since Fall 2015.

Change from	Changes	Change to
<p>Specialized Honours (BA and BSc)</p> <ul style="list-style-type: none"> • SC/MATH 2031 1.00; one of SC/MATH 2001 3.00, SC/MATH 2131 3.00, SC/MATH 2270 3.00 or SC/MATH 2280 3.00; • nine additional mathematics credits without second digit 5, at the 3000 level or above, including at least three credits at the 4000 level, for a total of 55 credits in mathematics, of which at least 12 are at the 4000 level; 	<p>Specialized Honours (BA and BSc)</p> <ul style="list-style-type: none"> • SC/MATH 2031 1.00; one of SC/MATH 2001 3.00, SC/MATH 2131 3.00, SC/MATH 2270 3.00 or SC/MATH 2280 3.00; • nine additional mathematics credits without second digit 5, at the 3000 level or above, including at least three credits at the 4000 level, for a total of 55 54 credits in mathematics, of which at least 12 are at the 4000 level; 	<p>Specialized Honours (BA and BSc)</p> <ul style="list-style-type: none"> • one of SC/MATH 2001 3.00, SC/MATH 2131 3.00, SC/MATH 2270 3.00 or SC/MATH 2280 3.00; <p>nine additional mathematics credits without second digit 5, at the 3000 level or above, including at least three credits at the 4000 level, for a total of 54 credits in mathematics, of which at least 12 are at the 4000 level;</p>
<p>Honours Minors (BA and BSc)</p> <ul style="list-style-type: none"> • at least three credits above should be chosen from proof-based courses approved by the director, such as SC/MATH 2001 3.00, SC/MATH 3050 6.00 or SC/MATH 3052 6.00, SC/MATH 3020 6.00, SC/MATH 3140 6.00, SC/MATH 3260 3.00, SC/MATH 4160 3.00; 	<p>Honours Minors (BA and BSc)</p> <ul style="list-style-type: none"> • at least three credits above should be chosen from proof-based courses approved by the director, such as SC/MATH 2001 3.00, SC/MATH 3050 6.00 or SC/MATH 3052 6.00, SC/MATH 3020 6.00, SC/Math 3021 3.00, SC/MATH 3022 3.00, SC/MATH 3140 6.00, SC/MATH 3141 3.00, SC/MATH 3260 3.00, SC/MATH 4160 3.00; 	<p>Honours Minors (BA and BSc)</p> <ul style="list-style-type: none"> • at least three credits above should be chosen from proof-based courses approved by the director, such as SC/MATH 2001 3.00, SC/MATH 3050 6.00 or SC/MATH 3052 6.00, SC/Math 3021 3.00, SC/MATH 3022 3.00, SC/MATH 3141 3.00, SC/MATH 3260 3.00, SC/MATH 4160 3.00;
<p>Honours Majors (BA and BSc)</p>	<p>Honours Majors (BA and BSc)</p>	<p>Honours Majors (BA and BSc)</p>

<ul style="list-style-type: none"> • The mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; • SC/MATH 2031 1.00; • SC/MATH 3050 6.00 or SC/MATH 3052 6.00; • SC/MATH 4100 3.00; • at least 12 additional mathematics credits without second digit 5, at the 3000 or 4000 level. At least nine of these additional mathematics credits must be at the 4000 level. SC/MATH 4400 6.00 and one of SC/MATH 3090 3.00 or SC/MATH 4090 3.00 are recommended. • a total of 46 credits in mathematics is required, of which at least 12 will be at the 4000 level; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or above, at least 18 of which must be at the 4000 level. 	<ul style="list-style-type: none"> • The mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; • SC/MATH 2031 1.00; • SC/MATH 3050 6.00 or SC/MATH 3052 6.00; • SC/MATH 4100 3.00; • at least 12 additional mathematics credits without second digit 5, at the 3000 or 4000 level. At least nine of these additional mathematics credits must be at the 4000 level. SC/MATH 4400 6.00 and one of SC/MATH 3090 3.00 or SC/MATH 4090 3.00 are recommended. • a total of 46 45 credits in mathematics is required, of which at least 12 will be at the 4000 level; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or above, at least 18 of which must be at the 4000 level. 	<ul style="list-style-type: none"> • The mathematics/statistics core (24 credits); • LE/EECS 1560 3.00; • SC/MATH 3050 6.00 or SC/MATH 3052 6.00; • SC/MATH 4100 3.00; • at least 12 additional mathematics credits without second digit 5, at the 3000 or 4000 level. At least nine of these additional mathematics credits must be at the 4000 level. SC/MATH 4400 6.00 and one of SC/MATH 3090 3.00 or SC/MATH 4090 3.00 are recommended. • a total of 45 credits in mathematics is required, of which at least 12 will be at the 4000 level; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or above, at least 18 of which must be at the 4000 level.
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Proposed Changes to the Specialized Honours, Honours Majors and Bachelors (BA and BSc) Requirements of the Pure Math Program in the Academic Calendar

Rationale:

- Math 2031 1.00 was created to satisfy the communications component of UUDLES. Due to difficulty in finding instructors, Math 2031 has never been offered. While working on a new plan to implement the communications component of UUDLES, the department has earmarked Math 2022 3.00 to fulfill the UUDLES at the second year level. We propose to remove Math 2031 from the Pure Mathematics Programs.
- Math 4200 3.00 was created to satisfy the communications component of UUDLE. The course has never been offered. The department has decided to use any proof-based fourth year course to fulfill the fourth year communications requirement in UUDLE.

Change from	Changes	Change to
<p>Bachelor Program (BA and BSc)</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • SC/MATH 1300 3.00 or equivalent; SC/MATH 1310 3.00 or equivalent; SC/MATH 1021 3.00 or equivalent; SC/MATH 1200 3.00; • SC/MATH 2022 3.00 or equivalent; SC/MATH 2030 3.00; SC/MATH 2031 1.00; SC/MATH 2310 3.00; • SC/MATH 3010 3.00; • at least 9 additional credits in mathematics courses without second digit 5 at the 3000 level or higher, for an overall total of at least 34 credits in major mathematics courses; • additional elective credits, as required for an overall total of at least 90 credits, of which at least 18 credits are at the 3000 level or higher, including at least 12 credits in the major. 	<p>Bachelor Program (BA and BSc)</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • SC/MATH 1300 3.00 or equivalent; SC/MATH 1310 3.00 or equivalent; SC/MATH 1021 3.00 or equivalent; SC/MATH 1200 3.00; • SC/MATH 2022 3.00 or equivalent; SC/MATH 2030 3.00; SC/MATH 2031 1.00; SC/MATH 2310 3.00; • SC/MATH 3010 3.00; • at least 9 additional credits in mathematics courses without second digit 5 at the 3000 level or higher, for an overall total of at least 34 33 credits in major mathematics courses; • additional elective credits, as required for an overall total of at least 90 credits, of which at least 18 credits are at the 3000 level or higher, including at least 12 credits in the major. 	<p>Bachelor Program (BA and BSc)</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • SC/MATH 1300 3.00 or equivalent; SC/MATH 1310 3.00 or equivalent; SC/MATH 1021 3.00 or equivalent; SC/MATH 1200 3.00; • SC/MATH 2022 3.00 or equivalent; SC/MATH 2030 3.00; SC/MATH 2310 3.00; • SC/MATH 3010 3.00; • at least 9 additional credits in mathematics courses without second digit 5 at the 3000 level or higher, for an overall total of at least 33 credits in major mathematics courses; • additional elective credits, as required for an overall total of at least 90 credits, of which at least 18 credits are at the 3000 level or higher, including at least 12 credits in the major.

<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • SC/MATH 4200 3.00; • at least three additional credits in mathematics courses without second digit 5 at the 4000 level; • at least 15 additional credits in mathematics courses without second digit 5 for a total of at least 67 credits from major mathematics; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level. 	<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • SC/MATH 4200 3.00; • at least three six additional credits in mathematics courses without second digit 5 at the 4000 level; • at least 15 additional credits in mathematics courses without second digit 5 for a total of at least 67 66 credits from major mathematics; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level. 	<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • at least six additional credits in mathematics courses without second digit 5 at the 4000 level; • at least 15 additional credits in mathematics courses without second digit 5 for a total of at least 66 credits from major mathematics; • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level.
<p>Honours BA Program</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • SC/MATH 4200 3.00; • at least three additional credits in mathematics 	<p>Honours BA Program</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • SC/MATH 4200 3.00; • at least three six additional credits in 	<p>Honours BA Program</p> <ul style="list-style-type: none"> • LE/EECS 1560 3.00; • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • at least six additional credits in mathematics courses without second digit 5 at the 4000 level

<p>courses without second digit 5 at the 4000 level for a total of 52 credits from major mathematics courses;</p> <ul style="list-style-type: none"> • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level. 	<p>mathematics courses without second digit 5 at the 4000 level for a total of 52 51 credits from major mathematics courses;</p> <ul style="list-style-type: none"> • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level. 	<p>for a total of 51 credits from major mathematics courses;</p> <ul style="list-style-type: none"> • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or higher, at least 18 of which must be at the 4000 level.
<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • SC/MATH 4200 3.00; • at least three additional credits from major mathematics courses at the 4000 level; • at least 15 additional credits from major (i.e. without second digit 5) mathematics courses, or approved or equivalent courses, for a total of at least 67 credits from major mathematics courses; 	<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • SC/MATH 4200 3.00; • at least three six additional credits from major mathematics courses at the 4000 level; • at least 15 additional credits from major (i.e. without second digit 5) mathematics courses, or approved or equivalent courses, for a total of at least 67 66 credits from major mathematics courses; 	<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00; • SC/MATH 3021 3.00; • SC/MATH 3022 3.00; • SC/MATH 4011 3.00; • SC/MATH 4021 3.00; • at least six additional credits from major mathematics courses at the 4000 level; • at least 15 additional credits from major (i.e. without second digit 5) mathematics courses, or approved or equivalent courses, for a total of at least 66 credits from major mathematics courses;
<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; 	<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 2031 1.00; • SC/MATH 3001 3.00; 	<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; • SC/MATH 3001 3.00; • SC/MATH 3010 3.00;

<ul style="list-style-type: none"> • SC/MATH 3010 3.00; SC/MATH 3021 3.00; SC/MATH 3022 3.00; SC/MATH 4011 3.00; SC/MATH 4021 3.00; SC/MATH 4200 3.00; • at least three additional major (i.e. without second digit 5) mathematics credits at the 4000 level, for a total of at least 52 credits from major mathematics courses. • the course requirements for the second major or the minor. 	<ul style="list-style-type: none"> • SC/MATH 3010 3.00; SC/MATH 3021 3.00; SC/MATH 3022 3.00; SC/MATH 4011 3.00; SC/MATH 4021 3.00; SC/MATH 4200 3.00; • at least three six additional major (i.e. without second digit 5) mathematics credits at the 4000 level, for a total of at least 52 51 credits from major mathematics courses. • the course requirements for the second major or the minor. 	<ul style="list-style-type: none"> • SC/MATH 3021 3.00; SC/MATH 3022 3.00; SC/MATH 4011 3.00; SC/MATH 4021 3.00; • at least six additional major (i.e. without second digit 5) mathematics credits at the 4000 level, for a total of at least 51 credits from major mathematics courses. • the course requirements for the second major or the minor.
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Proposed Changes to the Specialized Honours, Honours Majors, Honours Minors and Bachelors (BA and BSc) Requirements of the Statistics Program in the Academic Calendar

Rationale:

- Math 2031 1.00 was created to satisfy the communications component of UUDLES. Due to difficulty in finding instructors, Math 2031 has never been offered. While working on a new plan to implement the communications component of UUDLES, the department has earmarked Math 2022 3.00 to fulfill the UUDLES at the second year level. We propose to remove Math 2031 from the Statistics Programs.
- The BA program was created while the Department of Mathematics and Statistics was in the Faculty of Arts. The B.S. was created when the Department moves to Faculty of Science. The description of the BA and BSc would be exactly the same. The BSc requirement is the newest version and created in the last UUDLE exercise for the Statistics program. Therefore, the BA. Program would follow exactly the same requirement. Any discrepancy between the description BA and BSc program should be rectified such that the description of the BA Statistics matches the description of BSC of all Statistics programs including minor, major, double major and special honours.
- In Honours Minors – first year calculus requirements should be 1300 and 1310.
- Add a description of accreditation by the Statistical Society of Canada.

Change from	Changes	Change to
	<p>Please add to the “About” tab after “Operations Research”: Accredited by the <u>Statistical Society of Canada</u>, York's Statistics program provides students with the basic conceptual tools and the practical training to analyze data and explain it, skills that have applications in a multitude of areas. Students completing our accredited list of courses will satisfy the education requirements of the Associate Statistician professional designation (A.Stat.) conferred by the Statistical Society of Canada. This professional qualification leads, after experience, to the designation of Professional Statistician (P. Stat.)</p>	Accredited by the <u>Statistical Society of Canada</u> , York's Statistics program provides students with the basic conceptual tools and the practical training to analyze data and explain it, skills that have applications in a multitude of areas. Students completing our accredited list of courses will satisfy the education requirements of the Associate Statistician professional designation (A.Stat.) conferred by the Statistical Society of Canada. This professional qualification leads, after experience, to the designation of Professional Statistician (P. Stat.)
Bachelor of Arts Program (BA) <ul style="list-style-type: none"> • SC/MATH 2022 3.00; SC/MATH 2030 3.00; 	Bachelor of Arts Program (BA) <ul style="list-style-type: none"> • SC/MATH 2022 3.00; SC/MATH 2030 3.00; 	Bachelor of Arts Program (BA) <ul style="list-style-type: none"> • SC/MATH 2022 3.00; SC/MATH 2030 3.00;

<p>SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 2310 3.00;</p> <ul style="list-style-type: none"> at least three additional credits in mathematics courses at the 3000 or 4000 level with third digit 3, and three additional credits at the 3000 level or higher in mathematics without second digit 5, for a total of at least 40 credits from major mathematics courses; 	<p>SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 2310 3.00;</p> <ul style="list-style-type: none"> at least three additional credits in mathematics courses at the 3000 or 4000 level with third digit 3, and three additional credits at the 3000 level or higher in mathematics without second digit 5, for a total of at least 40 39 credits from major mathematics courses; 	<p>SC/MATH 2131 3.00; SC/MATH 2310 3.00;</p> <ul style="list-style-type: none"> at least three additional credits in mathematics courses at the 3000 or 4000 level with third digit 3, and three additional credits at the 3000 level or higher in mathematics without second digit 5, for a total of at least 39 credits from major mathematics courses;
<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> LE/EECS 1560 3.00; the mathematics/statistics core (24 credits); SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 3001 3.00; SC/MATH 3330 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00; SC/MATH 4330 3.00; SC/MATH 4939 3.00; SC/MATH 4730 3.00; three additional credits in mathematics courses at the 4000 level with third digit 3; 	<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> LE/EECS 1560 3.00; the mathematics/statistics core (24 credits); SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 3001 3.00; SC/MATH 3330 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00; SC/MATH 4330 3.00; SC/MATH 4939 3.00; SC/MATH 4730 3.00; three additional credits in mathematics courses at the 4000 level with third digit 3; nine additional credits from major (second digit not 5) mathematics courses, for a total of at least 66 credits from major mathematics courses. 	<p>Specialized Honours BA Program</p> <ul style="list-style-type: none"> LE/EECS 1560 3.00; the mathematics/statistics core (24 credits); SC/MATH 2001 3.00; SC/MATH 2131 3.00; SC/MATH 3001 3.00; SC/MATH 3330 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00; SC/MATH 4330 3.00; SC/MATH 4939 3.00; SC/MATH 4730 3.00; three additional credits in mathematics courses at the 4000 level with third digit 3; nine additional credits from major (second digit not 5) mathematics courses, for a total of at least 66 credits from major mathematics courses.
<p>Honours BA Program</p> <ul style="list-style-type: none"> LE/EECS 1560 3.00; the mathematics/statistics core (24 credits); SC/MATH 2031 1.00; 	<p>Honours BA Program</p> <ul style="list-style-type: none"> LE/EECS 1560 3.00; the mathematics/statistics core (24 credits); SC/MATH 2031 1.00; 	<p>Honours BA Program</p> <ul style="list-style-type: none"> LE/EECS 1560 3.00; the mathematics/statistics core (24 credits); SC/MATH 2131 3.00;

<ul style="list-style-type: none"> • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3132 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4939 3.00; • SC/MATH 4730 3.00; • three additional credits in mathematics courses at the 4000 level with third digit 3. 	<ul style="list-style-type: none"> • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3132 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4939 3.00; • SC/MATH 4730 3.00; • three additional credits in mathematics courses at the 4000 level with third digit 3. 	<ul style="list-style-type: none"> • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3132 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4939 3.00; • SC/MATH 4730 3.00; • three additional credits in mathematics courses at the 4000 level with third digit 3.
<p>Honours Minor Program BA):</p> <ul style="list-style-type: none"> • first-year calculus (six credits at the 1000 level without second digit 5); • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4730 3.00. 	<p>Honours Minor Program BA):</p> <ul style="list-style-type: none"> • first-year calculus (six credits at the 1000 level without second digit 5); • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4730 3.00. <p>*Note: SC/MATH 1025 3.00 will be accepted in this program, but is not recommended.</p>	<p>Honours Minor Program BA):</p> <ul style="list-style-type: none"> • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4730 3.00. <p>*Note: SC/MATH 1025 3.00 will be accepted in this program, but is not recommended.</p>
<p>Honours Minor Program BSc):</p> <ul style="list-style-type: none"> • first-year calculus (six credits at the 1000 level without second digit 5); • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; 	<p>Honours Minor Program BSc):</p> <ul style="list-style-type: none"> • first-year calculus (six credits at the 1000 level without second digit 5); • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3430 3.00; 	<p>Honours Minor Program BSc):</p> <ul style="list-style-type: none"> • SC/MATH 1300 3.00; • SC/MATH 1310 3.00; • SC/MATH 1021 3.00; • SC/MATH 1131 3.00; • SC/MATH 2022 3.00; • SC/MATH 2030 3.00; • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; • SC/MATH 3131 3.00; • SC/MATH 3430 3.00; • SC/MATH 4330 3.00; • SC/MATH 4730 3.00.

<p>SC/MATH 4730 3.00.</p> <p>*Note: SC/MATH 1025 3.00 will be accepted in this program, but is not recommended.</p>	<ul style="list-style-type: none"> • SC/MATH 4330 3.00; SC/MATH 4730 3.00. <p>*Note: SC/MATH 1025 3.00 will be accepted in this program, but is not recommended.</p>	<p>*Note: SC/MATH 1025 3.00 will be accepted in this program, but is not recommended.</p>
<p>Bachelor Program (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> • SC/MATH 1021 3.00; SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; • SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 2310 3.00; • SC/MATH 3131 3.00; SC/MATH 3330 3.00; • at least three additional credits in mathematics courses with third digit 3 at the 3000- or 4000-level, and three additional credits in mathematics courses without second digit 5 for a total of at least 40 credits from major mathematics courses. 	<p>Bachelor Program (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> • SC/MATH 1021 3.00; SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; • SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 2310 3.00; • SC/MATH 3131 3.00; SC/MATH 3330 3.00; • at least three additional credits in mathematics courses with third digit 3 at the 3000- or 4000-level, and three additional credits in mathematics courses without second digit 5 for a total of at least 40 39 credits from major mathematics courses. 	<p>Bachelor Program (BSc) B. Major requirements:</p> <ul style="list-style-type: none"> • SC/MATH 1021 3.00; SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; • SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2131 3.00; SC/MATH 2310 3.00; • SC/MATH 3131 3.00; SC/MATH 3330 3.00; • at least three additional credits in mathematics courses with third digit 3 at the 3000- or 4000-level, and three additional credits in mathematics courses without second digit 5 for a total of at least 39 credits from major mathematics courses.
<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; • SC/MATH 3001 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; 	<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; • SC/MATH 3001 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; 	<p>Specialized Honourss BSc Program B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2001 3.00; SC/MATH 2131 3.00; • SC/MATH 3001 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3330 3.00;

<ul style="list-style-type: none"> • SC/MATH 3330 3.00; SC/MATH 3430 3.00; SC/MATH 4330 3.00; SC/MATH 4730 3.00; SC/MATH 4939 3.00; • three additional credits from 4000-level mathematics courses with third digit 3; • nine additional credits from major (second digit not 5) mathematics courses, for a total of at least 67 credits from major mathematics courses. 	<ul style="list-style-type: none"> • SC/MATH 3330 3.00; SC/MATH 3430 3.00; SC/MATH 4330 3.00; SC/MATH 4730 3.00; SC/MATH 4939 3.00; • three additional credits from 4000-level mathematics courses with third digit 3; • nine additional credits from major (second digit not 5) mathematics courses, for a total of at least 67 66 credits from major mathematics courses. 	<ul style="list-style-type: none"> • SC/MATH 3430 3.00; SC/MATH 4330 3.00; SC/MATH 4730 3.00; SC/MATH 4939 3.00; • three additional credits from 4000-level mathematics courses with third digit 3; • nine additional credits from major (second digit not 5) mathematics courses, for a total of at least 66 credits from major mathematics courses.
<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2031 1.00; SC/MATH 2131 3.00; • SC/MATH 3330 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00; • SC/MATH 4330 3.00; SC/MATH 4730 3.00; SC/MATH 4939 3.00; • three additional credits from 4000-level mathematics courses with third digit 3 for an overall total of at least 52 credits from major mathematics courses; • the course requirements for the second major or the minor if the program is an Honours Double Major or Major/Minor. 	<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2031 1.00; SC/MATH 2131 3.00; • SC/MATH 3330 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00; • SC/MATH 4330 3.00; SC/MATH 4730 3.00; SC/MATH 4939 3.00; • three additional credits from 4000-level mathematics courses with third digit 3 for an overall total of at least 52 51 credits from major mathematics courses; • the course requirements for the second major or the minor if the program is an Honours Double Major or Major/Minor. 	<p>Honours BSc Major B. Major requirements:</p> <ul style="list-style-type: none"> • the mathematics/statistics core (24 credits); • SC/MATH 2131 3.00; • SC/MATH 3330 3.00; SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3430 3.00; • SC/MATH 4330 3.00; SC/MATH 4730 3.00; SC/MATH 4939 3.00; • three additional credits from 4000-level mathematics courses with third digit 3 for an overall total of at least 51 credits from major mathematics courses; • the course requirements for the second major or the minor if the program is an Honours Double Major or Major/Minor.

Changes to Existing Course

Faculty: Science

Department:

Mathematics & Statistics

Date of Submission:

October 25, 2017

Course Number:

ISCI 1410 6.00

Effective Session:

Fall 2018

Course Title:

Integrated Science (Mathematics)

Type of Change:

- | | |
|--|---|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

This course primarily examines foundational topics in mathematics, through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in SC/ISCI 1110 6.00, SC/ISCI 1210 6.00, and SC/ISCI 1310 6.00. This course is Drop by Permission only. Course Credit Exclusion: SC/ISCI 1401 3.00, SC/ISCI 1402 3.00, SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1505 6.00

To:

This course primarily examines foundational topics in mathematics, through the lens of contemporary issues in science, integrating disciplinary knowledge, skills and values from biology, chemistry, physics, and mathematics and statistics. Registration in this course requires simultaneous registration in SC/ISCI 1110 6.00, SC/ISCI 1210 6.00, and SC/ISCI 1310 6.00. This course is Drop by Permission only. Course Credit Exclusion: SC/ISCI 1401 3.00, SC/ISCI 1402 3.00, SC/MATH 1013 3.00, SC/MATH 1014 3.00, **SC/MATH 1300 3.00, SC/MATH 1310 3.00, SC/MATH 1505 6.00, SC/MATH 1550.**

Rationale:

Add CCE courses.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Introduction to the theory and applications of both differential and integral calculus. Limits. Derivatives of algebraic and trigonometric functions. Riemann sums, definite integrals and the Fundamental Theorem of Calculus. Logarithms and exponentials, Extreme value problems, Related rates, Areas and Volumes. Prerequisite: ~~SC/MATH 1515 3.00~~ or SC/MATH 1520 3.00, or a high school calculus course. Course credit exclusions: ~~SC/MATH 1000 3.00~~, SC/MATH 1300 3.00, SC/MATH 1505 6.00, ~~SC/MATH 1513 6.00~~, SC/MATH 1530 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, AP/ECON 1530 3.00; SC/ISCI 1401 3.00.

To:

Introduction to the theory and applications of both differential and integral calculus. Limits. Derivatives of algebraic and trigonometric functions. Riemann sums, definite integrals and the Fundamental Theorem of Calculus. Logarithms and exponentials, Extreme value problems, Related rates, Areas and Volumes. Prerequisite: SC/MATH 1520 3.00, or 12U Calculus and Vectors (MCV4U) or equivalent. Course credit exclusions: SC/MATH 1300 3.00, SC/MATH 1505 6.00, SC/MATH 1530 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, AP/ECON 1530 3.00, SC/ISCI 1401 3.00 and SC/ISCI 1410 6.00.

Rationale:

Remove courses not offered for more than 7 years in prerequisites and CCEs. Clarify high school prerequisite. Add ISCI 1410 to CCE.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

To:

Calculus in Polar Coordinates. Techniques of Integration. Indeterminate Forms. Improper Integrals. Sequences, infinite series and power series. Approximations. Introduction to ordinary differential equations. Prerequisite(s): One of ~~SC/MATH 1000 3.00~~, SC/MATH 1013 3.00, SC/MATH 1300 3.00, ~~or SC/MATH 1513 6.00~~; for non-science students only, six credits from SC/MATH 1530 3.00 and SC/MATH 1540 3.00, SC/MATH 1550 6.00, AP/ECON 1530 3.00 and AP/ECON 1540 3.00. Course credit exclusions: ~~SC/MATH 1010 3.00~~, SC/MATH 1310 3.00, SC/MATH 1505 6.00, GL/MATH/MODR 1940 3.00, SC/ISCI 1402 3.00.

Calculus in Polar Coordinates. Techniques of Integration. Indeterminate Forms. Improper Integrals. Sequences, infinite series and power series. Approximations. Introduction to ordinary differential equations. Prerequisite(s): One of SC/MATH 1013 3.00, SC/MATH 1300 3.00, GL/MATH 1901 3.00, or **SC/ISCI 1401 3.00** ; for non-science students only, six credits from SC/MATH 1530 3.00 and SC/MATH 1540 3.00, SC/MATH 1550 6.00, AP/ECON 1530 3.00 and AP/ECON 1540 3.00. Course credit exclusions: SC/MATH 1310 3.00, SC/MATH 1505 6.00, GL/MATH/MODR 1940 3.00, SC/ISCI 1402 3.00, **SC/ISCI 1410 6.00**.

Rationale:

Add equivalent prerequisite and CCEs. Remove courses not offered in 7 years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|---|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input checked="" type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

~~Linear equations, matrices, Gaussian elimination, determinants and vector spaces. This course covers material similar to that in SC/MATH 2221 3.00 but at a more advanced level. Required in Specialized Honours statistics and in all applied mathematics, mathematics and mathematics for commerce programs except the BA Program in Mathematics for Commerce. Prerequisite: One 12U or OAC mathematics course or equivalent. Course credit exclusions: SC/MATH 1025 3.00, SC/MATH 2021 3.00, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00.~~

To:

Systems of linear equations, matrix algebra, determinants and diagonalization, vector geometry, and the vector space \mathbb{R}^n . Prerequisite: 12U Advanced Functions (MHF4U) or equivalent. Course credit exclusions: SC/MATH 1025 3.00, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00.

Rationale:

- There are exactly three 4U "math" courses in Ontario. Data Management, Advanced Functions, and Calculus with Vectors. Advanced Functions is a prerequisite for Calculus with Vectors. Data Management is a course with some probability, data organization and presentation, and statistics - it would be better described as a grade 12 statistics course, not a grade 12 mathematics course. Data Management alone does not prepare students for Math 1021.
- Math 2221 has not been offered in recent years, students will not know the contents of this course.
- Math 1021 is required in all math programs.
- Reorganization of topics between Math 1021 and Math 2022.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Topics include spherical and cylindrical coordinates in Euclidean 3-space, general matrix algebra, determinants, vector space concepts for Euclidean n-space (e.g. linear dependence and independence, basis, dimension, linear transformations etc.), an introduction to eigenvalues and eigenvectors. Prerequisites: ~~One 12U or OAC mathematics course~~ or equivalent. Course credit exclusions: SC/MATH 1021 3.00, ~~SC/MATH 2021 3.00~~, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00.

To:

Topics include spherical and cylindrical coordinates in Euclidean 3-space, general matrix algebra, determinants, vector space concepts for Euclidean n-space (e.g. linear dependence and independence, basis, dimension, linear transformations etc.), an introduction to eigenvalues and eigenvectors. Prerequisites: **12U Advanced functions (MHF4U)** or equivalent. Course credit exclusions: SC/MATH 1021 3.00, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00.

Rationale:

- Remove courses not offered in 7 years.
- Clarify prerequisite: There are exactly three 4U "math" courses in Ontario. Data Management, Advanced Functions, and Calculus with Vectors. Advanced Functions is a prerequisite for Calculus with Vectors. Data Management is a course with some probability, data organization and presentation, and statistics - it would be better described as a grade 12 statistics course, not a grade 12 mathematics course. Data Management alone does not prepare students for Math 1025.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Displaying and describing distributions; relations in categorical data; Simpson's paradox and the need for design; experimental design and sampling design; randomization; probability laws and models; central limit theorem; statistical inference including confidence intervals and tests of significance; matched pairs; simulation. Prerequisite: At least one 12U mathematics course or ~~OAC in mathematics~~ is recommended. Course credit exclusion: SC/MATH 2560 3.00, SC/MATH 2930 3.00, GL/MATH/MODR 1610 3.00, SC/BIOL 2060 3.00. ~~Prior to Fall 2009: Course credit exclusion: AK/AS/SC/MATH 2560 3.00.~~

To:

Displaying and describing distributions; relations in categorical data; Simpson's paradox and the need for design; experimental design and sampling design; randomization; probability laws and models; central limit theorem; statistical inference including confidence intervals and tests of significance; matched pairs; simulation. Prerequisite: At least one 12U mathematics course or **equivalent** is recommended. Course credit exclusion: SC/MATH 2560 3.00, SC/MATH 2930 3.00, GL/MATH/MODR 1610 3.00, SC/BIOL 2060 3.00.

Rationale:

Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Mathematics & Statistics

Date of Submission:

October 25, 2017

Course Number:

1190 3.00

Effective Session:

Fall 2018

Course Title:

Introduction to Sets and Logic

Type of Change:

- | | | | |
|-------------------------------------|---|--------------------------|---|
| <input checked="" type="checkbox"/> | in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> | in cross-listing |
| <input type="checkbox"/> | in course number/level | <input type="checkbox"/> | in degree credit exclusion(s) |
| <input type="checkbox"/> | in credit value | <input type="checkbox"/> | regularize course (from Special Topics) |
| <input type="checkbox"/> | in title (max. 40 characters for short title) | <input type="checkbox"/> | in course format/mode of delivery * |
| <input type="checkbox"/> | in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> | retire/expire course |
| <input type="checkbox"/> | other (please specify): | <input type="checkbox"/> | |

Change From:

Topics include logic, sets, functions, relations, modular arithmetic and applications of elementary number theory, proof techniques, induction. Prerequisite: ~~One 12U or OAC mathematics course~~ or equivalent, or SC/MATH 1710 6.00. NCR Note: This course may not be taken for degree credit by any student who has passed any 3000- or higher-level mathematics course. Course credit exclusion: GL/CSLA/MATH/MODR 1650 3.00.

To:

Topics include logic, sets, functions, relations, modular arithmetic and applications of elementary number theory, proof techniques, induction. Prerequisite: **Advanced Functions (MHF4U) or equivalent, or SC/MATH 1510 6.00, or GL/MATH 1670 6.00** or SC/MATH 1710 6.00. NCR Note: This course may not be taken for degree credit by any student who has passed any 3000- or higher-level mathematics course. Course credit exclusion: GL/CSLA/MATH/MODR 1650 3.00.

Rationale:

There are exactly three 4U "math" courses in Ontario. Data Management, Advanced Functions, and Calculus with Vectors. Advanced Functions is a prerequisite for Calculus with Vectors. Data Management is a course with some probability, data organization and presentation, and statistics - it would be better described as a grade 12 statistics course, not a grade 12 mathematics course. Data Management alone does not prepare students for Math 1190.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Mathematics & Statistics

Date of Submission:

October 25, 2017

Course Number:

1200 3.00

Effective Session:

Fall 2018

Course Title:

Problems, Conjectures, and Proofs

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Extended exploration of elementary problems leading to conjectures, partial solutions, revisions, and convincing reasoning, and hence to proofs. Emphasis on problem solving, reasoning, and proving. Regular participation is required. Prerequisite: 12U Advanced Functions (MHF4U) ~~or Advanced Functions and Introductory Calculus (MCB4U)~~. Course credit exclusion 2200 3.00. NCR note: Not open to any student who is taking or has passed a MATH course at the 3000 level or higher.

To:

Extended exploration of elementary problems leading to conjectures, partial solutions, revisions, and convincing reasoning, and hence to proofs. Emphasis on problem solving, reasoning, and proving. Regular participation is required. Prerequisite: 12U Advanced Functions (MHF4U) ~~or equivalent~~. Course credit exclusion 2200 3.00. NCR note: Not open to any student who is taking or has passed a MATH course at the 3000 level or higher.

Rationale:

Clarify prerequisite: MCB4U is the older version of MHF4U, in the 2000-2006 curriculum.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

To:

Limits, derivatives with applications, antiderivatives, fundamental theorem of calculus, beginnings of integral calculus. Prerequisite: ~~SC/MATH 1515 3.00~~ SC/MATH 1520 3.00 or SC/MATH 1710 6.00 or ~~a high school calculus course~~. Course credit exclusions: ~~SC/MATH 1000 3.00~~, SC/MATH 1013 3.00, SC/MATH 1505 6.00, ~~SC/MATH 1513 6.00~~, SC/MATH 1530 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, AP/ECON 1530 3.00; SC/ISCI 1401 3.00.

Limits, derivatives with applications, antiderivatives, fundamental theorem of calculus, beginnings of integral calculus. Prerequisite: SC/MATH 1520 3.00 or SC/MATH 1710 6.00, or 12U Calculus and Vectors (MCV4U) or equivalent. Course credit exclusions: SC/MATH 1013 3.00, SC/MATH 1505 6.00, SC/MATH 1530 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, AP/ECON 1530 3.00; SC/ISCI 1401 3.00, ~~SC/ISCI 1410 6.00~~.

Rationale:

Remove courses not offered for seven years and clarify prerequisites.
Add ISCI 1410 as CCE.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

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|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Transcendental functions, differential equations, techniques of integration, improper integrals, infinite series. Prerequisite(s): One of ~~SC/MATH 1000 3.00~~, SC/MATH 1013 3.00, SC/MATH 1300 3.00, ~~or SC/MATH 1513 6.00~~; or, for non-science students only, six credits from SC/MATH 1530 3.00 and SC/MATH 1540 3.00, SC/MATH 1550 6.00, AP/ECON 1530 3.00 and AP/ECON 1540 3.00. Course credit exclusions: ~~SC/MATH 1010 3.00~~, SC/MATH 1014 3.00, SC/MATH 1505 6.00, GL/MATH/MODR 1940 3.00, SC/ISCI 1402 3.00.

To:

Transcendental functions, differential equations, techniques of integration, improper integrals, infinite series. Prerequisite(s): One of SC/MATH 1013 3.00, SC/MATH 1300 3.00, GL/MATH 1901, SC/ISCI 1401 3.00; for non-science students only, six credits from SC/MATH 1530 3.00 and SC/MATH 1540 3.00, SC/MATH 1550 6.00, AP/ECON 1530 3.00 and AP/ECON 1540 3.00. Course credit exclusions: SC/MATH 1014 3.00, SC/MATH 1505 6.00, GL/MATH/MODR 1940 3.00, SC/ISCI 1402 3.00, ~~SC/ISCI 1410 6.00~~.

Rationale:

Remove courses not offered in the last seven years and add ISCI 1410 as exclusion.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

A presentation of the elements of single-variable differential and integral calculus, elementary linear algebra and introductory probability and statistics. This course is designed to provide a comprehensive mathematical background for students of the biological and social sciences. Emphasis is placed on basic mathematical skills and their applications. Prerequisite: ~~At least one 12U or OAC mathematics course~~ or SC/MATH 1510 6.00. Course credit exclusions: ~~SC/MATH 1000 3.00, SC/MATH 1010 3.00, SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1300 3.00, SC/MATH 1310 3.00, SC/MATH 1513 6.00, SC/MATH 1530 3.00, SC/MATH 1540 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, GL/MATH/MODR 1940 3.00, AP/ECON 1530 3.00, AP/ECON 1540 3.00, SC/ISCI 1401 3.00, SC/ISCI 1402 3.00.~~

To:

A presentation of the elements of single-variable differential and integral calculus, elementary linear algebra and introductory probability and statistics. This course is designed to provide a comprehensive mathematical background for students of the biological and social sciences. Emphasis is placed on basic mathematical skills and their applications. Prerequisite: ~~12U Advanced Functions (MHF4U) or equivalent,~~ or SC/MATH 1510 6.00. Course credit exclusions: SC/MATH 1013 3.00, SC/MATH 1014 3.00, SC/MATH 1300 3.00, SC/MATH 1310 3.00, SC/MATH 1530 3.00, SC/MATH 1540 3.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00, GL/MATH/MODR 1940 3.00, AP/ECON 1530 3.00, AP/ECON 1540, SC/ISCI 1401 3.00, SC/ISCI 1402 3.00, ~~SC/ISCI 1410 6.00.~~

Rationale:

- Remove courses not offered for seven years.
- Clarify prerequisite: There are exactly three 4U "math" courses in Ontario. Data Management, Advanced Functions, and Calculus with Vectors. Advanced Functions is a prerequisite for Calculus with Vectors. Data Management is a course with some probability, data organization and presentation, and statistics - it would be better described as a grade 12 statistics course, not a grade 12 mathematics course. Data Management alone does not prepare students for Math 1505

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Designed for the student whose mathematical background is weak and who wishes to take further courses in mathematics. Topics include algebraic equations and inequalities; simple sequences and series; analytic geometry; trigonometry; functions, including algebraic, exponential, logarithmic and trigonometric functions. Prerequisites: ~~Ontario Grade 11 Functions or Functions & Relations (new curriculum) or Grade 12 Advanced Mathematics (old curriculum)~~. NCR Note: May not be taken by any student who has taken or is currently taking another university course in mathematics or statistics except for ~~SC/MATH 1500 3.00 or SC/MATH 1515 3.00 or~~ SC/MATH 1520 3.00. Course credit exclusions: SC/MATH 1710 6.00, GL/ITEC/MATH/MODR 1670 6.00.

To:

Designed for the student whose mathematical background is weak and who wishes to take further courses in mathematics. Topics include algebraic equations and inequalities; simple sequences and series; analytic geometry; trigonometry; functions, including algebraic, exponential, logarithmic and trigonometric functions. Prerequisites: **11U Functions**. NCR Note: May not be taken by any student who has taken or is currently taking another university course in mathematics or statistics **including ECON 1530 3.00 and ECON 1540 3.00**, except for SC/MATH 1520 3.00. Course credit exclusions: SC/MATH 1710 6.00, GL/ITEC/MATH/MODR 1670 6.00.

Rationale:

Clarify prerequisite. Add equivalent course to NCR note.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Elements of vectors in 2- and 3-space including dot products, cross products, lines, and planes; elements of differential calculus including limits and derivatives. Designed for student who have not taken (or who have performed inadequately in) Ontario high school calculus. Prerequisite: One of: MATH 1510 6.00, ~~an OAC mathematics course,~~ 12U Advanced Functions (MHF4U), or equivalent; or permission of the department. This course may be taken at the same time as the second half of MATH 1510 6.00. ~~Course credit exclusions: SC/MATH 1513 6.00, SC/MATH 1515 3.00.~~ NCR Note: May not be taken by any student who has passed or is currently taking another university course in calculus, with the exception of students taking SC/MATH 1550 6.00 concurrently.

To:

Elements of vectors in 2- and 3-space including dot products, cross products, lines, and planes; elements of differential calculus including limits and derivatives. Designed for students who have not taken (or who have performed inadequately in) Ontario high school calculus. Prerequisite: One of: MATH 1510 6.00, ~~GL/MATH 1670,~~ 12U Advanced Functions (MHF4U) or equivalent, or permission of the department. This course may be taken at the same time as the second half of MATH 1510 6.00. NCR Note: May not be taken by any student who has passed or is currently taking another university course in calculus ~~or AP/ECON 1530 3.00 or AP/ECON 1540 3.00,~~ with the exception of students taking SC/MATH 1550 6.00 concurrently.

Rationale:

Clarify prerequisite and add equivalent course. Clarify NCR note. Correct grammar.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Introduces and develops topics in differential calculus and integral calculus with applications to marginal analysis and profit maximization. Prerequisite: **Grade 12U Advanced Functions** or equivalent. Prerequisites/Co-requisites: AP/ECON 1000 3.00 or AP/ECON 1010 3.00, or equivalent. Recommended completion: highschool calculus or equivalent. Course credit exclusions: ~~SC/MATH 1000 3.00~~, SC/MATH 1013 3.00, SC/MATH 1300 3.00, SC/MATH 1505 6.00, SC/MATH 1513 6.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00. Note: Acceptable course substitutes are available in the Calendar.

To:

Introduces and develops topics in differential calculus and integral calculus with applications to marginal analysis and profit maximization. Prerequisite: **12U Advanced Functions (MHF4U)** or equivalent. Prerequisites/Co-requisites: AP/ECON 1000 3.00 or AP/ECON 1010 3.00, or equivalent. Recommended completion: high school calculus or equivalent. Course credit exclusions: SC/MATH 1013 3.00, SC/MATH 1300 3.00, SC/MATH 1505 6.00, SC/MATH 1513 6.00, SC/MATH 1550 6.00, GL/MATH/MODR 1930 3.00. Note: Acceptable course substitutes are available in the Calendar.

Rationale:

Clarify prerequisites.
Remove courses not offered for 7 years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

An introduction to statistics with an emphasis on concepts and applications relevant in the Business and Society program. Students learn basic and practical statistical techniques to explore and analyze data. Emphasis is placed on statistical reasoning and the critical interpretation of statistical information such as that seen in the media and journals. NCR note: SC/MATH 1532 3.00 may not be taken for credit by any student who has successfully completed or is concurrently enrolled in SC/MATH 1131 3.00, SC/MATH 2560 3.00, SC/ MATH 2570 3.00, SC/MATH 2930 3.00, SC/BIOL 2060 3.00 or equivalents.^^Course credit exclusions: ~~AK/MATH 1720 3.00~~; SC/NATS 1500 3.00.

To:

An introduction to statistics with an emphasis on concepts and applications relevant in the Business and Society program. Students learn basic and practical statistical techniques to explore and analyze data. Emphasis is placed on statistical reasoning and the critical interpretation of statistical information such as that seen in the media and journals. NCR note: SC/MATH 1532 3.00 may not be taken for credit by any student who has successfully completed or is concurrently enrolled in SC/MATH 1131 3.00, **SC/MATH 2565 3.00**, SC/MATH 2560 3.00, SC/ MATH 2570 3.00, SC/MATH 2930 3.00, SC/BIOL 2060 3.00 or equivalents. Course credit exclusions: SC/NATS 1500 3.00.

Rationale:

Remove courses not offered in the past seven years.
Add Math 2565 in NCR note.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Introduces and develops topics in comparative statics of general function models and matrix algebra with applications to input-output models, unconstrained and constrained optimization with applications to microeconomic and macroeconomic models, and elements of linear programming with applications to decision-making in economics. Prerequisite: AP/ECON 1530 3.00 **or equivalent**. Prerequisites/Co-requisites: AP/ECON 1000 3.00 or AP/ECON 1010 3.00, or equivalent. Note: No credit will be retained for this course for students who have successfully completed or who are currently enrolled in SC/MATH 1021 3.00, SC/MATH 1025 3.00, or SC/MATH 2221 3.00. Course credit exclusions: SC/MATH 1505 6.00, SC/MATH 1550 6.00, GL/MATH/MODR 2650 3.00. Note: Acceptable course substitutes are available in the Calendar.

To:

Introduces and develops topics in comparative statics of general function models and matrix algebra with applications to input-output models, unconstrained and constrained optimization with applications to microeconomic and macroeconomic models, and elements of linear programming with applications to decision-making in economics. Prerequisite: **SC/MATH 1530 3.00 or AP/ECON 1530 3**. Prerequisites/Co-requisites: AP/ECON 1000 3.00 or AP/ECON 1010 3.00, or equivalent. **NCR** Note: No credit will be retained for this course for students who have successfully completed or who are currently enrolled in SC/MATH 1021 3.00, SC/MATH 1025 3.00, or SC/MATH 2221 3.00. Course credit exclusions: SC/MATH 1505 6.00, SC/MATH 1550 6.00, GL/MATH/MODR 2650 3.00. Note: Acceptable course substitutes are available in the Calendar.

Rationale:

Clarify prerequisites. Clarify "Note" is NCR.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

This course is designed to provide a mathematical background for students in the BBA Honours program. It is also suitable for the bachelor program in mathematics for commerce, but should not be taken by those who intend to major in any other program in mathematics or statistics or in computer science. It includes calculus, matrix algebra and elements of optimization with applications to management. Prerequisite: ~~SC/MATH 1515 3.00~~ or SC/MATH 1520 3.00 (may also be taken as a first-term corequisite), or ~~a high school calculus course~~. Course credit exclusions: SC/MATH 1000 3.00, SC/MATH 1013 3.00, SC/MATH 1300 3.00, SC/MATH 1505 6.00, SC/MATH 1513 6.00, SC/MATH 1530 3.00, SC/MATH 1540 3.00, GL/MATH/MODR 1930 3.00, AP/ECON 1530 3.00, AP/ECON 1540 3.00. NCR Note: This course may not be taken by any student who has passed or is taking SC/MATH 1021 3.00, SC/MATH 1025 3.00, ~~SC/MATH 2021 3.00~~, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00 or equivalent.

To:

This course is designed to provide a mathematical background for students in the BBA Honours program. It is also suitable for the bachelor program in mathematics for commerce, but should not be taken by those who intend to major in any other program in mathematics or statistics or in computer science. It includes calculus, matrix algebra and elements of optimization with applications to management. Prerequisite: SC/MATH 1520 3.00 (may also be taken as a first-term corequisite), or **12U Calculus and Vectors (MCV4U) or equivalent**. Course credit exclusions: SC/MATH 1013 3.00, SC/MATH 1300 3.00, SC/MATH 1505 6.00, SC/MATH 1530 3.00, SC/MATH 1540 3.00, GL/MATH/MODR 1930 3.00, **SC/ISCI 1401 3.00, SC/ISCI 1410 6.00**, AP/ECON 1530 3.00, AP/ECON 1540 3.00. NCR Note: This course may not be taken by any student who has passed or is taking SC/MATH 1021 3.00, SC/MATH 1025 3.00, SC/MATH 2221 3.00, GL/MATH/MODR 2650 3.00 or equivalent.

Rationale:

Clarify prerequisite. Remove courses not offered for 7 years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

This course is an introduction to interest rates (simple, compound), annuities (ordinary, due, deferred), amortization (mortgages, other debts), sinking funds, bonds (face value, bond rate, price, yield rate) and depreciation (straight line, constant percentage). Prerequisite: Ontario Grade 11 mathematics or equivalent. Course credit exclusion: SC/MATH 2580 6.00, GL/MATH 2680 6.00. Prior to Fall 2009: Course credit exclusion: AK/AS/MATH 2580 6.00, GL/MATH 2680 6.00.

To:

This course is an introduction to interest rates (simple, compound), annuities (ordinary, due, deferred), amortization (mortgages, other debts), sinking funds, bonds (face value, bond rate, price, yield rate) and depreciation (straight line, constant percentage). Prerequisite: Ontario Grade 11 mathematics or equivalent. Course credit exclusion: SC/MATH 2580 6.00, GL/MATH 2680 6.00. Prior to Fall 2009: Course credit exclusion: AK/AS/MATH 2580 6.00, GL/MATH 2680 6.00, **SC/MATH 2280 3.00.**

Rationale:

The course contents of MATH 2280 3.00 overlaps in most parts with those of MATH 1581 3.00. CCE for each other in both directions seem to be necessary.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Axioms for, and properties of, the real numbers; sequences; functions of a real variable, continuity, and differentiation. Rigorous definitions of convergence and limit underpin a proof-based treatment of the subject material. Intended for Honours students in Mathematics. Prerequisites: SC/MATH 1200 3.00, SC/MATH 1310 3.00 or permission of the instructor. Course credit exclusion: ~~SC/MATH 3110 3.00~~, GL/MATH 3320 3.00. ~~NCR note: MATH 2001 3.00 is not open to any student who has passed MATH 1010 3.00~~ Prior to Fall 2009: Prerequisites: ~~AS/SC/MATH 1200 3.00, AS/SC/MATH 1300 3.00~~. Course credit exclusion: ~~AK/AS/SC/MATH 3110 3.00~~. ~~NCR note: MATH 2001 3.00 is not open to any student who has passed MATH 1010 3.00~~

To:

Axioms for, and properties of, the real numbers; sequences; functions of a real variable, continuity, and differentiation. Rigorous definitions of convergence and limit underpin a proof-based treatment of the subject material. Intended for Honours students in Mathematics. Prerequisites: SC/MATH 1200 3.00, SC/MATH 1310 3.00 or ISCI 1402 3.00 or ISCI 1410 6.00, or permission of the instructor. Course credit exclusion: GL/MATH 3320 3.00.

Rationale:

Remove courses not offered in the past seven years.
Add ISCI courses to prerequisites.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|---|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input checked="" type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

~~Inner product spaces, linear transformations, eigenvalues, diagonalization, least squares, quadratic forms and Markov chains. Similar to MATH 2222 3.00 but at a more advanced level. Required in Specialized Honours applied mathematics, Specialized Honours statistics and in all mathematics and mathematics for commerce programs except the BA program in mathematics for commerce. Prerequisite: one of SC/MATH 1021 3.00, SC/MATH 2021 3.00, GL/MATH/MODR 2650 3.00 or permission of the course coordinator. Course credit exclusions: SC/MATH 2222 3.00, GL/MATH/MODR 2660 3.00. Prior to Fall 2009: Prerequisite: AK/AS/SC/MATH 1021 3.00, AS/SC/MATH 2021 3.00, GL/MATH/MODR 2650 3.00 or permission of the course coordinator. Course credit exclusions: AK/AS/SC/MATH 2222 3.00, GL/MATH/MODR 2660 3.00.~~

To:

Vector spaces, linear transformations, change of basis, orthogonality, inner product spaces and canonical forms. Prerequisite: one of SC/MATH 1021 3.00, SC/MATH 2021 3.00, GL/MATH/MODR 2650 3.00 or permission of the course coordinator. Course credit exclusions: SC/MATH 2222 3.00, GL/MATH/MODR 2660 3.00.

Rationale:

- Reorganization of topics in Math 1021 and Math 2022.
- Math 2222 was last offered in 2012-2013, current students will not know the contents of Math 2222.
- Math 2022 is required in all math programs
- Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Introduction to the theory of probability as preparation for further study in either mathematical or applied probability and statistics. Topics include probability spaces, conditional probability, independence, random variables, distribution functions, expectation, Chebyshev's inequality, common distributions, moment-generating functions and limit theorems. Prerequisite: One of ~~SC/MATH 1010 3.00~~, SC/MATH 1014 3.00, SC/MATH 1310 3.00. ~~Prior to Fall 2009: Prerequisite: One of AS/SC/MATH 1010 3.00, AS/SC/MATH 1014 3.00, AK/AS/SC/MATH 1310 3.00.~~

To:

Introduction to the theory of probability as preparation for further study in either mathematical or applied probability and statistics. Topics include probability spaces, conditional probability, independence, random variables, distribution functions, expectation, Chebyshev's inequality, common distributions, moment-generating functions and limit theorems. Prerequisite: One of SC/MATH 1014 3.00, SC/MATH 1310 3.00, **SC/ISCI 1402 3.00, SC/ISCI 1410 6.00.**

Rationale:

Remove courses not offered in the past seven years.
Add ISCI courses to prerequisites.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

An introduction to symbolic computing in the Maple environment. Topics from single-variable differential and integral calculus, including simple ordinary differential equations, are covered. Both mathematical understanding and applications are emphasized. Three lecture hours, open laboratory hours. One term. Three credits. Prerequisites: ~~LE/CSE 1540 3.00~~ or equivalent computing experience; ~~SC/MATH 1010 3.00~~ or SC/MATH 1014 3.00 or SC/MATH 1310 3.00. Prior to Summer 2013: Prerequisites: SC/CSE 1540 3.00 (formerly COSC) or equivalent computing experience; ~~SC/MATH 1010 3.00~~ or SC/MATH 1014 3.00 or SC/MATH 1310 3.00. ~~Prior to Fall 2009: Prerequisites: AK/AS/SC/CSE 1540 3.00 (formerly COSC) or equivalent computing experience; AS/SC/MATH 1010 3.00 or AS/SC/MATH 1014 3.00 or AK/AS/SC/MATH 1310 3.00.~~

To:

An introduction to symbolic computing in the Maple environment. Topics from single-variable differential and integral calculus, including simple ordinary differential equations, are covered. Both mathematical understanding and applications are emphasized. Three lecture hours, open laboratory hours. One term. Three credits. Prerequisites: **LE/EECS 1560 3.00** or equivalent computing experience; SC/MATH 1014 3.00 or SC/MATH 1310 3.00 or **SC/ISCI 1401 3.00** or **SC/ISCI 1410 6.00**. Prior to Summer 2013: Prerequisites: SC/CSE 1540 3.00 (formerly COSC) or equivalent computing experience; SC/MATH 1014 3.00 or SC/MATH 1310 3.00..

Rationale:

- Change CSE 1540 to EECS 1560 because EECS 1560 is the required course for all math majors.
- Add ISCI courses to prerequisites.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Mathematics & Statistics

Date of Submission:

October 25, 2017

Course Number:

2131 3.00

Effective Session:

Fall 2018

Course Title:

Introduction to Statistics II

Type of Change:

- | | | | |
|-------------------------------------|---|--------------------------|---|
| <input checked="" type="checkbox"/> | in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> | in cross-listing |
| <input type="checkbox"/> | in course number/level | <input type="checkbox"/> | in degree credit exclusion(s) |
| <input type="checkbox"/> | in credit value | <input type="checkbox"/> | regularize course (from Special Topics) |
| <input type="checkbox"/> | in title (max. 40 characters for short title) | <input type="checkbox"/> | in course format/mode of delivery * |
| <input type="checkbox"/> | in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> | retire/expire course |
| <input type="checkbox"/> | other (please specify): | <input type="checkbox"/> | |

Change From:

This course is a continuation of MATH 2030 3.00. It provides students with an introduction to statistical methods with an emphasis on applications using continuous probability models. Prerequisites: SC/MATH 1131 3.00; SC/MATH 2030 3.00; SC/MATH 2015 3.00 or SC/MATH 2310 3.00. ~~Prior to Fall 2009: Prerequisites: AK/AS/SC/MATH 1131 3.00; AK/AS/SC/MATH 2030 3.00; AS/SC/MATH 2015 3.00 or AK/AS/SC/MATH 2310 3.00.~~

To:

This course is a continuation of MATH 2030 3.00. It provides students with an introduction to statistical methods with an emphasis on applications using continuous probability models. Prerequisites: SC/MATH 1131 3.00; SC/MATH 2030 3.00; SC/MATH 2015 3.00 or SC/MATH 2310 3.00.

Rationale:

Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Mathematics & Statistics

Date of Submission:

October 25, 2017

Course Number:

2200 3.00

Effective Session:

Fall 2018

Course Title:

Extended Problems, Conjectures, and Proofs

Type of Change:

- | | | | |
|-------------------------------------|---|--------------------------|---|
| <input checked="" type="checkbox"/> | in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> | in cross-listing |
| <input type="checkbox"/> | in course number/level | <input type="checkbox"/> | in degree credit exclusion(s) |
| <input type="checkbox"/> | in credit value | <input type="checkbox"/> | regularize course (from Special Topics) |
| <input type="checkbox"/> | in title (max. 40 characters for short title) | <input type="checkbox"/> | in course format/mode of delivery * |
| <input type="checkbox"/> | in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> | retire/expire course |
| <input type="checkbox"/> | other (please specify): | <input type="checkbox"/> | |

Change From:

Extended exploration of problems leading to conjectures, partial solutions, and proofs. Problems build on reasoning which may be applied to fields such as analysis, algebra or number theory. Regular participation is required. Prerequisites: SC/MATH 1300 3.00, SC/MATH 1310 3.00, SC/MATH 1021 3.00 or equivalents; taking or has taken a math course at the 3000 level or higher. Course credit exclusion: SC/MATH 1200 3.00.

To:

Extended exploration of problems leading to conjectures, partial solutions, and proofs. Problems build on reasoning which may be applied to fields such as analysis, algebra or number theory. Regular participation is required. Prerequisites: SC/MATH 1300 3.00 **and** SC/MATH 1310 3.00, **or** SC/ISCI 1401 3.00 **and** SC/ISCI 1402 3.00, **or** SC/ISCI 1410 6.00; SC; SC/MATH 1021 3.00 or equivalents; taking or has taken a math course at the 3000 level or higher. Course credit exclusion: SC/MATH 1200 3.00.

Rationale:

Add ISCI courses to prerequisites.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

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|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Introduction to differential equations, including a discussion of the formation of mathematical models for real phenomena; solution by special techniques; applications; linear equations; solutions in series; other topics if time permits. Prerequisites: One of ~~SC/MATH 2010 3.00~~, SC/MATH 2015 3.00 or SC/MATH 2310 3.00; one of SC/MATH 1021 3.00, SC/MATH 1025 3.00, or SC/MATH 2221 3.00. Course credit exclusion: SC/MATH 2271 3.00, GL/MATH 3400 3.00 ~~Prior to Fall 2009: Prerequisites: One of AS/SC/MATH 2010 3.00, AS/SC/MATH 2015 3.00 or AK/AS/SC/MATH 2310 3.00; one of AK/AS/SC/MATH 1021 3.00, AS/SC/MATH 1025 3.00, or AK/AS/SC/MATH 2221 3.00. Course credit exclusion: AS/SC/MATH 2271 3.00, GL/MATH 3400 3.00~~

To:

Introduction to differential equations, including a discussion of the formation of mathematical models for real phenomena; solution by special techniques; applications; linear equations; solutions in series; other topics if time permits. Prerequisites: One of SC/MATH 2015 3.00 or SC/MATH 2310 3.00; one of SC/MATH 1021 3.00, SC/MATH 1025 3.00, or SC/MATH 2221 3.00. Course credit exclusion: SC/MATH 2271 3.00, GL/MATH 3400 3.00

Rationale:

Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

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|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

To:

Introduction to ordinary and partial differential equations, including their classification, boundary conditions, and methods of solution. Equations, methods, and solutions relevant to science and engineering are emphasized, and exploration is encouraged with the aid of software. Three lecture hours per week. One term. Three credits.
 Prerequisites: One of ~~SC/MATH 2010 3.00~~, SC/MATH 2015 3.00, SC/MATH 2310 3.00 or equivalent; one of SC/MATH 1025 3.00, SC/MATH 2022 3.00, SC/MATH 2222 3.00 or equivalent. Course Credit Exclusions: SC/MATH 2270 3.00, GL/MATH 3400 3.00 ~~Prior to Fall 2009: Prerequisites: One of AS/SC/MATH 2010 3.00, AS/SC/MATH 2015 3.00, AS/SC/MATH 2310 3.00 or equivalent; one of AS/SC/MATH 1025 3.00, AS/SC/MATH 2022 3.00, AS/SC/MATH 2222 3.00 or equivalent. Course Credit Exclusions: AS/SC/MATH 2270 3.00, GL/MATH 3400 3.00~~

Introduction to ordinary and partial differential equations, including their classification, boundary conditions, and methods of solution. Equations, methods, and solutions relevant to science and engineering are emphasized, and exploration is encouraged with the aid of software. Three lecture hours per week. One term. Three credits.
 Prerequisites: One of SC/MATH 2015 3.00, SC/MATH 2310 3.00 or equivalent; one of SC/MATH 1025 3.00, SC/MATH 2022 3.00, SC/MATH 2222 3.00 or equivalent. Course Credit Exclusions: SC/MATH 2270 3.00, GL/MATH 3400 3.00

Rationale:

Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Topics include measurement of interest, annuities, amortization of loans, bonds, sinking funds and depreciation. The course is at a level which will prepare students for the interest theory portion of the Society of Actuaries examinations. Prerequisite: ~~SC/MATH 1010 3.00 or SC/MATH 1014 3.00 or SC/MATH 1310 3.00.~~ Course credit exclusions: SC/MATH 2580 6.00, SC/MATH 2581 3.00, GL/MATH 2680 6.00. ~~Prior to Fall 2009: Prerequisite: AS/SC/MATH 1010 3.00 or AS/SC/MATH 1014 3.00 or AK/AS/SC/MATH 1310 3.00. Course credit exclusions: AK/AS/MATH 2580 6.00, AS/MATH 2581 3.00, GL/MATH 2680 6.00.~~

To:

Topics include measurement of interest, annuities, amortization of loans, bonds, sinking funds and depreciation. The course is at a level which will prepare students for the interest theory portion of the Society of Actuaries examinations. Prerequisite: SC/MATH 1014 3.00 or SC/MATH 1310 3.00 or **SC/ISCI 1401 3.00 or SC/ISCI 1410 6.00.** Course credit exclusions: **SC/MATH 1581**, SC/MATH 2580 6.00, SC/MATH 2581 3.00, GL/MATH 2680 6.00.

Rationale:

- Math 1010 has not been offered in the past seven years,
- Adding the integrated science courses to prerequisites.
- The course contents of MATH 2280 3.00 overlaps in most parts with those of MATH 1581 3.00.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|--|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input checked="" type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Financial Economics

To:

Models for Financial Economics

Rationale:

There are two reasons for doing that: (1) the Econ Dept has a course with the former name, (2) the latter name is taken by the exam of the Society of Actuaries that 2281 prepares the students for.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Vector functions, partial derivatives, gradient, multiple integrals, line integrals, optimization, applications. Prerequisite: ~~SC/MATH 1010 3.00~~ or SC/MATH 1014 3.00 or SC/MATH 1310 3.00. Students should have a knowledge of vector algebra in two and three dimensions. Course credit exclusions: ~~SC/MATH 2010 3.00~~, SC/MATH 2015 3.00, GL/MATH/MODR 2670 3.00, GL/MATH 3200 3.00. **Prior to Fall 2009:** Prerequisite: AS/SC/MATH 1010 3.00 or AS/SC/MATH 1014 3.00 or AK/AS/SC/MATH 1310 3.00. Students should have a knowledge of vector algebra in two and three dimensions. Course credit exclusions: AS/SC/MATH 2010 3.00, AS/SC/MATH 2015 3.00, GL/MATH/MODR 2670 3.00, GL/MATH 3200 3.00.

To:

Vector functions, partial derivatives, gradient, multiple integrals, line integrals, optimization, applications. Prerequisite: SC/MATH 1014 3.00 or SC/MATH 1310 3.00 or **SC/ISCI 1402 3.00 or SC/ISCI 1410 6.00**. Students should have a knowledge of vector algebra in two and three dimensions. Course credit exclusions: SC/MATH 2015 3.00, GL/MATH/MODR 2670 3.00, GL/MATH 3200 3.00.

Rationale:

Remove courses not offered in the past seven years.
Add ISCI courses to prerequisites.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
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| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

The aim of this course is to give students in various disciplines some fundamental tools in statistical inference. Through a mixture of theory given in lecture hours and practice acquired during lab time, the student will understand when and how to use statistical tools such as the z, t or chi-squared tests, regression analysis, analysis of variance and various other techniques. Prerequisites: High school MATH 11U or MATH 11U/C. Course credit exclusions: SC/MATH 2930 3.00, SC/BIOL 2060 3.00, AP/ECON 2500 3.00, AP/SC/GEOG 2420 3.00, HH/KINE 2050 3.00, SC/MATH 2560 3.00, SC/MATH 2570 3.00, HH/PSYC 2020 6.00, SB/OMIS 1000 3.00. ~~Prior to Fall 2009: Course credit exclusions: SC/BIOL 2060 3.00, AS/ECON 2500 3.00, AS/SC/GEOG 2420 3.00, HH/AS/SC/KINE 2050 3.00, AK/AS/SC/MATH 2560 3.00, AK/AS/SC/MATH 2570 3.00, HH/AK/AS/SC/PSYC 2020 6.00, AS/SOCI 3030 6.00, SB/OMIS 1000 3.00.~~ Note: Students who have passed ~~AK/AS/SC/MATH 1131 3.00~~ may not take ~~AK/AS/SC/MATH 2565 3.00~~.

To:

The aim of this course is to give students in various disciplines some fundamental tools in statistical inference. Through a mixture of theory given in lecture hours and practice acquired during lab time, the student will understand when and how to use statistical tools such as the z, t or chi-squared tests, regression analysis, analysis of variance and various other techniques. Prerequisites: High school MATH 11U or MATH 11U/C. Course credit exclusions: SC/MATH 2930 3.00, SC/BIOL 2060 3.00, AP/ECON 2500 3.00, AP/SC/GEOG 2420 3.00, HH/KINE 2050 3.00, SC/MATH 2560 3.00, SC/MATH 2570 3.00, HH/PSYC 2020 6.00, SB/OMIS 1000 3.00. **NCR note:** Students who have passed SC/MATH 1131 3.00 may not take SC/MATH 2565 3.00.

Rationale:

Remove courses not offered in the past seven years.
Clarify the “Note” is NCR.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Spreadsheets and their application to business mathematics; deepening of topics in Business Mathematics I, including continuous compound interest, perpetuities, annuities where payments vary, callable bonds, bond yield rate, capital budgeting; mortality tables, life annuities, life insurance. Prerequisites: SC/MATH 1581 3.00; LE/CSE 1520 3.00 or permission of the instructor. Course credit exclusions: SC/MATH 2280 3.00, SC/MATH 2580 6.00, GL/MATH 2680 6.00. Prior to Summer 2013: Prerequisites: SC/MATH 1581 3.00; SC/CSE 1520 3.00 or permission of the instructor. Course credit exclusions: SC/MATH 2280 3.00, SC/MATH 2580 6.00, GL/MATH 2680 6.00. ~~Prior to Fall 2009: Prerequisites: AS/MATH 1581 3.00; AK/AS/SC/CSE 1520 3.00 (formerly COSC) or permission of the instructor. Course credit exclusions: AS/SC/MATH 2280 3.00, AK/AS/MATH 2580 6.00, GL/MATH 2680 6.00.~~

To:

Spreadsheets and their application to business mathematics; deepening of topics in Business Mathematics I, including continuous compound interest, perpetuities, annuities where payments vary, callable bonds, bond yield rate, capital budgeting; mortality tables, life annuities, life insurance. Prerequisites: SC/MATH 1581 3.00; LE/CSE 1520 3.00 or permission of the instructor. Course credit exclusions: SC/MATH 2280 3.00, SC/MATH 2580 6.00, GL/MATH 2680 6.00. Prior to Summer 2013: Prerequisites: SC/MATH 1581 3.00; SC/CSE 1520 3.00 or permission of the instructor. Course credit exclusions: SC/MATH 2280 3.00, SC/MATH 2580 6.00, GL/MATH 2680 6.00.

Rationale:

Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

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Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|---|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Numerical series, Riemann integration, Taylor polynomials, sequences and series of functions, uniform convergence, power series, introduction to metric spaces including compactness and completeness, Weierstrass Approximation Theorem. Continues MATH 2001. Proof-based, intended for Honours students in Mathematics. Prerequisites: ~~SC/MATH 1010 3.00 or both SC/ MATH 2001 3.00 and SC/MATH 1310 3.00~~. Course credit exclusion: ~~SC/MATH 3210 3.00, GL/MATH 3320 3.00, GL/MATH 4240 6.00~~ ~~Prior to Fall 2009: Prerequisites: AS/SC/MATH 1010 3.00 or both AS/SC/ MATH 2001 3.00 and AS/SC/MATH 1310 3.00. Course credit exclusion: AS/SC/MATH 3210 3.00~~

To:

Numerical series, Riemann integration, Taylor polynomials, sequences and series of functions, uniform convergence, power series, introduction to metric spaces including compactness and completeness, Weierstrass Approximation Theorem. Continues MATH 2001. Proof-based, intended for Honours students in Mathematics. Prerequisites: SC/ MATH 2001 3.00; SC/MATH 1310 3.00 or ISCI 1401 3.00 or ISCI1410 6.00. Course credit exclusion: GL/MATH 3320 3.00, GL/MATH 4240 6.00.

Rationale:

Add ISCI 1402 and 1410 to prerequisite.
Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

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Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
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| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Integrability of continuous functions over suitable domains, iterated integrals and Fubini's theorem, counterexamples, change of variables, Jacobian determinants, polar and spherical coordinates, volumes, vector fields, divergence, curl, line and surface integrals, Green's and Stokes's theorems, differential forms, general Stokes's theorem. Prerequisite: ~~SC/MATH 2010 3.00, or SC/MATH 2310 3.00; or SC/MATH 2015 3.00 and written permission of the mathematics undergraduate director (normally granted only to students proceeding in Honours programs in mathematics or in the Specialized Honours program in statistics). Prerequisite or corequisite: SC/MATH 2022 3.00 or SC/MATH 2222 3.00. Prior to Fall 2009: Prerequisite: AS/SC/MATH 2010 3.00, or AK/AS/SC/MATH 2310 3.00; or AS/SC/MATH 2015 3.00 and written permission of the mathematics undergraduate director (normally granted only to students proceeding in Honours programs in mathematics or in the Specialized Honours program in statistics). Prerequisite or corequisite: AK/AS/SC/MATH 2022 3.00 or AK/AS/SC/MATH 2222 3.00.~~

To:

Integrability of continuous functions over suitable domains, iterated integrals and Fubini's theorem, counterexamples, change of variables, Jacobian determinants, polar and spherical coordinates, volumes, vector fields, divergence, curl, line and surface integrals, Green's and Stokes's theorems, differential forms, general Stokes's theorem. Prerequisite: SC/MATH 2310 3.00; or SC/MATH 2015 3.00 and written permission of the mathematics undergraduate director (normally granted only to students proceeding in Honours programs in mathematics or in the Specialized Honours program in statistics). Prerequisite or corequisite: SC/MATH 2022 3.00 or SC/MATH 2222 3.00.

Rationale:

Remove courses not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

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Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Topics from algebra of sets, permutations, combinations, occupancy problems, partitions of integers, generating functions, combinatorial identities, recurrence relations, inclusion-exclusion principle, Polya's theory of counting, permanents, systems of distinct representatives, Latin rectangles, block designs, finite projective planes, Steiner triple systems. Prerequisites: SC/MATH 2022 3.00 or SC/MATH 2222 3.00; six credits from 3000-level mathematics courses without second digit 5; or permission of the course coordinator. ~~Prior to Fall 2009: Prerequisites: AK/AS/SC/MATH 2022 3.00 or AK/AS/SC/MATH 2222 3.00; six credits from 3000-level mathematics courses without second digit 5; or permission of the course coordinator.~~

To:

Topics from algebra of sets, permutations, combinations, occupancy problems, partitions of integers, generating functions, combinatorial identities, recurrence relations, inclusion-exclusion principle, Polya's theory of counting, permanents, systems of distinct representatives, Latin rectangles, block designs, finite projective planes, Steiner triple systems. Prerequisites: SC/MATH 2022 3.00 or SC/MATH 2222 3.00; six credits from 3000-level mathematics courses without second digit 5; or permission of the course coordinator.

Rationale:

Removing the prerequisite list for prior to Fall 2009.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

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Changes to Existing Course

Faculty: Science

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

Type of Change:

- | | |
|---|---|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
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| <input checked="" type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

This course introduces students to nonlinear optimization (nonlinear programming) ~~and the modeling language AMPL (American Mathematical Programming Language)~~. Three lecture hours per week. Prerequisites: SC/MATH 2015 3.00 or SC/MATH 2310 3.00; SC/MATH 1021 3.00 or SC/MATH 1025 3.00 or SC/MATH 2221 3.00. Course credit exclusions: ~~AS/MATH 4570 6.00~~, SC/MATH 4170 6.00.

To:

This course introduces students **to theories and modeling of** nonlinear optimization (nonlinear programming). Three lecture hours per week. Prerequisites: SC/MATH 2015 3.00 or SC/MATH 2310 3.00; SC/MATH 1021 3.00 or SC/MATH 1025 3.00 or SC/MATH 2221 3.00. Course credit exclusions: SC/MATH 4170 6.00.

Rationale:

Similar functionalities have been provided by Matlab or Python, which most students learned from other courses.
Math 4570 has not been offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty: Science

Department:

Mathematics & Statistics

Date of Submission:

October 25, 2017

Course Number:

4172 3.00

Effective Session:

Fall 2018

Course Title:

Applied Decision Models

Type of Change:

- | | |
|--|---|
| <input type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input checked="" type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

This course introduces the theory and applications of the following operations research decision models: Decision Tree Analysis, Game Theory, Inventory Models, and Dynamic Programming. Three lecture hours per week. Prerequisites: SC/MATH 2015 3.00 or SC/MATH 2310 3.00; SC/MATH 2030 3.00; CSE 1560 3.00 or equivalent. Course credit exclusions: ~~AS/MATH 4570 6.00~~, SC/MATH 4170 6.00

To:

This course introduces the theory and applications of the following operations research decision models: Decision Tree Analysis, Game Theory, Inventory Models, and Dynamic Programming. Three lecture hours per week. Prerequisites: SC/MATH 2015 3.00 or SC/MATH 2310 3.00; SC/MATH 2030 3.00; CSE 1560 3.00 or equivalent. Course credit exclusion: SC/MATH 4170 6.00

Rationale:

Remove course not offered in the past seven years.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Merger of Three Year Degree Program

Major modification of an existing program in the Department of Mathematics and Statistics

October 27, 17

Prepared by: Juris Steprans

Description of the proposed changes and the rationale

While the employment prospects of graduates with an honours degree are very good, the same cannot be said of students graduating with one of the three year degrees currently available from our department. After four years of study, most of our students are ready to either pursue a higher academic degree, or, have developed sufficiently strong skills in statistics, mathematical modelling or finance to be able to start careers in these fields. Others are ready to start professional careers as actuaries or teachers. The three year program, however, has been seen as a consolation prize not providing adequate preparation with which to start a career.

This flaw in our departmental offerings was identified during the cyclic program review and discussions on how to correct it have resulted in the current proposal. Currently the department offers three year BA and BSc degrees in either Pure Mathematics, Statistics or Applied Mathematics. The description of the Pure Mathematics degrees from our calendar provides a good idea of how these degrees are currently seen: "a three-year degree in mathematics ... is less demanding than the Honours Program and is very flexible. It allows the student to select courses in a wide variety of pure and applied mathematical areas. Students can also choose a liberal arts education with a moderate emphasis on mathematics...".

The current proposal is to eliminate the seven existing three year degrees and replace them with a single program offering two degrees, a BSc and a BA in Applied Mathematics, designed to provide students with a set of skills demanded by employers in finance, government and health services. Along with the common core of courses taken by all students in the Department of Mathematics and Statistics, students finishing either of the new three year degrees will be able to claim the following on their resumes:

- programming skills in MatLab, the language used in engineering, the sciences and finance
- knowledge of statistics, data analytics and regression analysis required in many industrial settings
- basic knowledge of financial mathematics
- familiarity with differential equations
- familiarity with the basics of linear programming used in scheduling and transport applications.

The new program will accomplish this by requiring students to select from a very short list of courses whose focus is on these five learning outcomes.

Outline of changes to requirements and learning outcomes

The requirements common to both the new three year BSc degree and the new three year BA degree will consist of the following:

Common core: 1131, 1200, 1021, 2022, 1300, 1310, 2310, 2030 (24 credits)

Computing requirement: EECS 1560 (3 credits)

Course specific to the three year program: 2041, 2270, 2280, 3171, 3330, 3333 (18 credits)

Third year courses required: 9 credits other than 3171, 3330, 3333 from 3000 or 4000 level courses, at least 3 of which are MATH courses.

In addition to these requirements, students completing the Applied Mathematics BSc degree will need:

Non-science courses: 12 credits

Foundational science: 6 credits

Science courses outside department: 24 credits

On the other hand, students completing the Applied Mathematics BA degree will need:

General Education Requirements: 24 credits from the following areas: Humanities, Modes of Reasoning, Natural Science, Social Science. These 24 credits must include the following minimum requirements: at least six credits from Humanities, Natural Science and Social Science (with no more than nine credits in each counting towards the general education requirement).

Elective Courses: 18 credits outside the department that are not required in their programs. This may include the computing course EECS 1560.

Degree Program Selection: Students in the new three year Applied Mathematics BA program will no longer be required to choose a departmental program.

The total number of credits required to finish either degree would be 90. For either degree it is possible to satisfy the 90 credit requirement in three years by taking no more than 30 credits a year. For the BSc degree this assumes that the 24 credits of science courses outside the Department of Mathematics and Statistics include 6 credits for foundational science. Since none of the foundational courses are offered by our department, this is always possible. This also assumes that the EECS 1560 requirement accounts for 3 of the 24 science credits outside the department. For the BA degree this assumes that the 3 credits of EECS 1560 are counted towards electives and that 6 of the 9 upper year credits are electives as well.

The only new component of these requirements is the list of courses specific to the three year program. Each of these courses has its own justification in the context of the goals of the new program and is intended to prepare graduates for employment in mathematics related positions.

- **2041 Symbolic computation laboratory:** This is a course on symbolic computation that will, in the future, use MatLab as its programming language. This is the language most commonly used in industrial and finance institutions.
- **2270 Differential equations:** Differential equations are still the most common tool used for the mathematical modelling of practical problems. A basic knowledge of these techniques is essential for anyone hoping to apply mathematics in a commercial or industrial setting.
- **2280 Mathematical theory of interest:** This course provides a quantitative introduction to the study of interest.
- **3171 Linear optimization:** This course introduces students to linear optimization and its business and industrial applications. Optimization is the main technique used in dealing with scheduling and transportation problems in commerce and industry.
- **3330 Regression analysis:** This course explores linear regression models for the analysis of data involving a single quantitative response variable. This is a very common use of statistics in government and various research settings.
- **3333 Data analytics:** This course provides application oriented training on data analytics in industrial or business settings. It covers a wide selection of data analytic techniques to equip the students with appropriate computing skills and required statistical methodologies to conduct machine learning and data mining.

Five of the seven existing three year degrees will all be retired. These are the BA and BSc degrees in Statistics and Mathematics and the BSc International Dual Degree Mathematics Statistics.

Overview of the consultation undertaken and assessment of impact on other programs

The idea of merging the seven existing three year degrees into BSc and BA versions of a single degree focussed on improving the marketability of their graduates was the result of various discussions held during the last cyclic program review. This review involved various retreats open to the entire department, as well as students. As is usual, and required by the cyclic review, the departmental offerings were reviewed by a team of outside consultants who encouraged the department to move forward with the idea of a three year degree aimed at improving the applicable skills of graduates.

Plans for the new program were then studied in the department's Curriculum Coordinating Committee over an extended period. The final discussions were held at the October 10 meeting of this committee and the current proposal was agreed upon. The proposal was then discussed at a meeting of departmental council on October 24 of 2017 and some final changes were made.

The other impetus for the proposed program came from the AAPR. One of the chief criticisms of our department in the results of the AAPR was the large number of programs offered. The current proposal will replace seven of these by two degrees in a single program.

Summary of resource implications

Since the objective of the new program is to guide students to existing courses that will help them in securing employment in mathematics related industries, no new courses will be required for the proposed program. While MATH 3333 is a new course, it was not designed with this program in mind and is expected to be popular with a much broader population of students. MATH 2041 will require only minor changes to adapt it to the new program.

One draw on resources that may be expected is that our department will be asking the Registrar's Office to promptly identify students whose GPA drops below a certain level in order to have them meet with an adviser in the Department. Having students switch to the three year program as early as possible will improve their prospects of finishing all the requirements within three years. Our UPD, Ada Chan, has already discussed this with Susy Ribeiro.

The administration of advising duties and consulting with students during the transition period may also add extra demands on the resources of the departmental undergraduate office.

Accommodation of currently enrolled students

The accommodation of existing students, as well as students who switch to the program late in their studies, is an important concern. It was decided that the UPD or Sectional Director would, if they decide it is warranted, allow students to replace certain courses on the list of courses specific to the three year program with others they deem appropriate. During the transition period it may be necessary for the number of such replaced courses to be larger than would be compatible with the goals of the new program.

Side-by-side comparison of program requirements

The side-by-side comparison of the requirements of the new three year BSc and BA degrees in Applied Mathematics with each of the seven existing three year programs will begin with a side-by-side comparison with the common features of all the existing BSc and BA degrees offered by the department. All the courses listed in this document are 3 credit courses.

All current three year BSc programs	New three year BSc in Applied Mathematics
Common core credits: 24	Common core credits: 24
Computing requirement: 3	Computing requirement: 3
Non-science credits: 12	Non-science credits: 12
Foundational science credits: 6	Foundational science credits: 6
Science credits outside department: 24	Science credits outside department: 24
Courses specific to section	Courses specific to three year program: 18
Minimum 3000 level credits: 18	Additional 3000 level credits: 9

All current three year BA programs	New three year BA in Applied Mathematics
Common core credits: 24	Common core credits: 24
Computing requirement: 3	Computing requirement: 3
Elective credits: 18	Elective credits: 18
General Education Requirement: 24	General Education Requirement: 24
Degree program selection: required	Degree program selection: no longer required
Courses specific to section	Courses specific to three year program: 18
Minimum 3000 level credits: 18	Additional 3000 level credits: 9

Each of the seven existing degrees has a list of required courses (the common core) consisting of:

- MATH 1131
- MATH 1200
- MATH 1021
- MATH 2022
- MATH 1300
- MATH 1310
- MATH 2030
- MATH 2310.

The proposed three year degrees would maintain this common core, as well as the computing requirement and add as further requirements the following courses specific to both the BSc and BA in Applied Mathematics:

- MATH 2041
- MATH 2270
- MATH 2280
- MATH 3171
- MATH 3330
- MATH 3333.

The current three year BA and BSc degrees in **Statistics** require, along with the common core, the following courses:

- EECS 1560
- MATH 2031
- MATH 2131
- MATH 3131
- MATH 3330.

The current three year BA and BSc degrees in **Pure Mathematics** require, along with the common core:

- MATH 3010
- 9 additional credits selected from MATH courses (without second digit "5") at the 3000 level or higher.

The current three year BA and BSc degrees in **Applied Mathematics** require, along with the common core:

- EECS 1560
- MATH 2031
- MATH 2041
- MATH 2270
- MATH 3241
- MATH 3243
- MATH 3260 or MATH 3271
- 6 additional credits selected from MATH 3090, MATH 3171, MATH 3172, MATH 3242, MATH 3260, MATH 3410, MATH 4090, MATH 4141, or MATH 4161.

The current three year BA and BSc degrees in International Dual Degree Mathematics Statistics require, along with the common core, the following courses:

- EECS 1530/1560
- PHYS 1410
- MATH 2001
- MATH 2320
- MATH 2270
- MATH 3021/3022
- MATH 3171/3172
- MATH 3241
- MATH 3271
- MATH 3410
- General Education Requirement: Lingua e Cultura Italiana

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty:
Indicate all relevant Faculty(ies)

Faculty of Science

Department: Indicate department and course prefix (e.g. Languages, GER)	Date of Submission:
Mathematics and Statistics	September 12, 2017

Course Number: Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is "C")	Var:	Academic Credit Weight: Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6)	3.0
MATH3333			

Course Title:
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository

Data analytics: A Hands-on Approach

Short Title:
Appears on any documents where space is limited - e.g. transcripts and lecture schedules - **maximum 40 characters**

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With every new course proposal it is the Department's responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.

Brief Course Description:

Maximum 2000 characters

(approximately 300 words including spaces and punctuation).

The course description should be carefully written to convey what the course is about. It should be followed by a statement of prerequisites and co-requisites, if applicable. This description appears in the calendar.

For editorial consistency, and in consideration of the various uses of the Calendars, verbs should be in the present tense (i.e., "This course analyzes the nature and extent of..." rather than "This course will analyze...")

This is an applied statistics course for all math or science major students. The aim is to provide an application oriented training on data analytics in industrial or business setting. The course will cover a wide selection of data analytic techniques to equip the students with appropriate computing skills and required statistical methodologies to conduct machine learning and data mining. The lectures will spend 60% of time on various methodologies and algorithms; whereas 40% of the lectures will teach students to use data analytics related software R to solve real life problems. The students are expected to analyze data with the proposed software. The lecturers will provide students with business case studies to practice their analytical skills.

Prerequisites: Sc/Math 1131, EECS 1560 or EESC 1541 or equivalent.

Generic Course Description:

This is the description of the "Parent / Generic course" for Special Topics courses under which variances of the "Generic" course can be offered in different years (Max. 40 words). Generic course descriptions are published in the calendar.

List all degree credit exclusions, prerequisites, integrated courses, and notes below the course description.

Expanded Course Description:

Please provide a detailed course description, including topics / theories and learning objectives, as it will appear in supplemental calendars.

This is an applied statistics course for all math or science major students. The aim is to provide an application oriented training on data analytics and predictive modeling in industrial or business setting. The course will cover a wide selection of data analytic techniques to equip the students with appropriate computing skills and required statistical methodologies to conduct machine learning and data mining. The lectures will spend 60% of time on various methodologies and algorithms; whereas 40% of the lectures will teach students to use data analytics related software R to solve real life problems. The lecturers will provide students with business case studies to practice their analytical skills.

Tentative Weekly Schedule

- Week 1: Introduction to statistical software R. Use software to perform exploratory data analysis, including graphics, summary statistics, table and report.
- Weeks 2: Review on basic statistical theories on random variable, distributions, sampling distribution, hypothesis testing and confidence interval. Use Software to perform simple Monte Carlo simulations to visualize distributions, sampling distributions. Use software to perform one sample inference and two-sample inference.
- Week 3: Dimension reduction methods including principle component analysis and factor analysis and perform a case study on a multivariate data set.
- Week 5-6: Use Software to perform linear regression on a business case study, study model building, prediction and parameter estimation and testing.
- Week 6-7: Basic methodology of logistic regression and use software to perform generalized linear regression, study model building, prediction and parameter estimation and testing. Application of logistic regression in predictive modelling in credit scoring, marketing, and human behavior prediction.
- Week 8: Naïve Bayes Estimation and Bayesian Networks and hands-on analysis using the Naïve Bayes and Bayes Net Classifier.
- Week 9: A case study on a real industry data set to model responses to direct mail marketing.
- Week 10-12: K-nearest neighbor algorithm and hierarchical and k-means clustering, classification and decision Trees, neural networks and application of neural network modeling.

Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

- Three lecture hours.
- Case study on real life business datasets.
- The course will have the traditional teaching component including assignments, projects, midterm and final exam.
- Instructors will use in-class computer demonstrations and students can follow the computer instructions which are offered in the lectures and posted on the course website and use computer to do assignments.
- If necessary, we will book Gauss lab for lectures for help on computer use.

Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).
2. Number of department members currently competent to teach the course.
3. Instructor(s) likely to teach the course in the coming year.
4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained **OR** in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in learning activities required by the course.

1. The course is a selective course for mathematics students. It could have multiple sessions each year.
2. A few department members can teach this course:
 - a. Prof. Xin Gao
 - b. Prof. Steven Wang
3. Prof. Xin Gao is the most likely instructor for the first few offerings. Three lecture hours per week.

Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Evaluation criteria are:

Homework/Project:30%

Midterm test: 30%

Final exam: 40%

Some homework will be projects, which requires students to solve a practical problem by analyzing its properties using statistical methods and applying the methods on real data.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/ undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.

Data mining and business analytics with R, Johannes Ledolter, Wiley 2013

Discovering knowledge in Data, Daniel T. Larose, Wiley 2005

Data Mining methods and models, Daniel T. Larose, Wiley, 2006

The elements of Statistical Learning, Trevor Hastie, Robert Tibshirani, and Jerome Friedman, 2001

Other Resources:

A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

Lecture rooms should have computer and data projector.

Student should have access to computers to implement the algorithms and perform data analysis. Access to MATH computer GAUSS lab should be granted to students enrolled in the class.

Administrative resource is required to assist the lecturer or TAs to offer the course.

Course Rationale:

The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

There is an increasing trend that statistical based data analytic technologies are used widely in business settings. The course is aimed to teach students the data analytic techniques so that they possess the skillset to use in future career. It also provides an introduction on the applications of modern statistical methods in industrial and business settings.

This course is being created to address some of the suggestions raised by our undergraduate program cyclic review. The proposed course will provide students with more trainings in statistical computing.

It is projected that the size should be 65 students per session.

Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date
Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date
Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date

Accessible format can be provided upon request.

**COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY
TEMPLATE**

NEW COURSE PROPOSAL FORM

Faculty:
Indicate all relevant
Faculty(ies)

Faculty of Science

Department:
Indicate department and
course prefix (e.g.
Languages, GER)

Biology

Date of Submission: September 2017

Course Number:
Special Topics courses
Include variance (e.g.
HUMA 3000C 6.0,
Variance is "C")

SC/BIOL 4720

Var:

Academic Credit Weight: Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6)

3.0

Course Title:
The official name of the
course as it will appear in
the Undergraduate
Calendar and on the
Repository

Environmental Contaminants: Impacts on Organisms and Ecosystems

Short Title:
Appears on any
documents where space
is limited - e.g.
transcripts and lecture
schedules - **maximum
40 characters**

Environmental Contaminants

With every new course proposal it is the Department's responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.

Brief Course Description:

Maximum 2000 characters

(approximately 300 words including spaces and punctuation).

The course description should be carefully written to convey what the course is about. It should be followed by a statement of prerequisites and co-requisites, if applicable. This description appears in the calendar.

For editorial consistency, and in consideration of the various uses of the Calendars, verbs should be in the present tense (i.e., "This course analyzes the nature and extent of..." rather than "This course will analyze...")

Generic Course Description:

This is the description of the "Parent / Generic course" for Special Topics courses under which variances of the "Generic" course can be offered in different years (Max. 40 words). Generic course descriptions are published in the calendar.

List all degree credit exclusions, prerequisites, integrated courses, and notes below the course description.

Course description:

This course provides an overview of major environmental contaminants, and their sources, as well as their impacts on the atmospheric, terrestrial and aquatic environments. The course emphasizes the mechanisms by which anthropogenic contaminants affect people, animals, and the ecosystems as a whole. Specifically, this course discusses the fundamental concepts regarding the physical and chemical changes induced in the environment by contaminants, their fate and transport in the environment, and their exposure pathways and biological effects. The impact of contaminants on environmental health and the long-term implications, the methods and recent advances in toxicological research, as well as the regulatory framework for environmental contaminants, are also discussed in this course.

Pre-requisites:

This is a multidisciplinary course. It is expected that students should have basic knowledge in ecology and animal biology.

SC/BIOL 2030 4.0, SC/BIOL 2050 4.0, and SC/BIOL 3070 4.0

Expanded Course Description:

Please provide a detailed course description, including topics / theories and learning objectives, as it will appear in supplemental calendars.

Environmental Toxicology is the study of the effects of toxic chemicals on people, wildlife and ecosystems. This is a multidisciplinary and applied field involving environmental chemistry, ecology and animal biology. In this course, the following topics will be covered:

1. Introduction of Environmental Toxicology:

General introduction and definition of “Environmental Toxicology”; significance of this field to the understanding of the effects of environmental contaminants on ecological and public health.

2. Fundamental concepts in Environmental Toxicology:

Discussion of the fundamental principles that govern the interactions between contaminants and the environments/biota, including: i) environmental fate and transport of contaminants, ii) dose-response relationships, iii) toxicodynamics and toxicokinetics, iv) routes of exposure and effects, iv) bioavailability, bioaccumulation, and biomagnification, and v) biological fate and mechanisms in biotransformation/detoxification/elimination.

3. Overview of major classes of environmental contaminants:

Discussion of the toxicology of current/emerging environmental contaminants of concern, including metals and metalloids, hydrocarbons, persistent organic pollutants, pesticides, endocrine disruptors, air pollutants, radio-nuclides, engineered nano-particles, pharmaceuticals, and personal care products. Overview of their major sources, effects on organisms, and the mode of action.

4. Introduction of environmental risk assessment and regulation:

Introduction of the approaches in toxicological testing, and recent advances in toxicological research. Discussion on the processes involved in ecological risk assessment and monitoring. Overview of the environmental policy and framework for the regulation of contaminants in Canada.

Learning objectives:

Upon successful completion of this course, students should be able to:

1. Explain the fundamental principles that govern the interactions among contaminants, environmental factors, and organisms.
2. Describe the sources and environmental fates of major classes of contaminants, as well as their biological effects, and mechanisms of their toxic action and tolerance.
3. Explain the approaches used by scientists in assessing the impacts of contaminants and in setting the regulatory framework. Apply concepts of toxicology to the analysis of ecological risk assessment and monitoring.
4. Evaluate primary literature, demonstrate critical thinking skills, and communicate effectively about current/emerging issues related to environmental pollution and its impacts, both orally and in writing, to peers.

Course Design:

Indicate how the course design supports students in achieving the learning objectives. For example, in the absence of scheduled contact hours what role does student-to-student and/or student-to-instructor communication play, and how is it encouraged?

Detail any aspects of the content, delivery, or learning goals that involve "face-to-face" communication, non-campus attendance or experiential education components.

Alternatively, explain how the course design encourages student engagement and supports student learning in the absence of substantial on-campus attendance.

This course is designed as an integration of lectures, group discussion, literature review and in-class presentation.

Lectures will be used to provide foundational knowledge and concepts about Environmental Toxicology. First, the course will provide fundamental principles of environmental toxicology, equipping biology students to think "chemically": e.g., what the sources of contaminants are and how they interact with the environments. The course will then discuss the toxicology (e.g., mechanisms of action, toxic effects) of major classes of anthropogenic contaminants and their impact on environmental health. The latter part of the course will provide an overview of the Canadian regulatory framework and risk assessments of environmental contaminants. This information will help students to understand how toxicological principles are applied in a real-world setting. In addition to lecture, selected publications and recent advances in toxicological research will be introduced. Classic cases in pollution and current and emerging environmental issues related to contaminants will also be discussed. Towards the end of the term, students will be required to submit a review article and present their work to the class. Throughout the course, students will be asked to form small groups for in-class discussion (e.g., case-based problem analysis, discussion of the current controversies associated with the use of certain substances). These more "student-centred" activities aim to stimulate students' active participation during the learning process, and to help develop their critical thinking and communication skills.

Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).
2. Number of department members currently competent to teach the course.
3. Instructor(s) likely to teach the course in the coming year.
4. An indication of the number of contact hours (defined in terms of hours, weeks, etc.) involved, in order to indicate whether an effective length of term is being maintained **OR** in the absence of scheduled contact hours a detailed breakdown of the estimated time students are likely to spend engaged in

1. Planned frequency:

Every year. 1 section.

2. Number of faculty competent to teach this course: 3 (any biology faculty with toxicology, physiology, or ecology background could teach this)

3. Instructor likely to teach this course: Raymond Kwong

4. Contact hours:

3 hours per week. 12 weeks in total.

learning activities
required by the course.

A large, empty rectangular box with a thin black border, intended for listing learning activities required by the course.

Evaluation:

A detailed percentage breakdown of the basis of evaluation in the proposed course must be provided.

If the course is to be integrated, the additional requirements for graduate students are to be listed.

If the course is amenable to technologically mediated forms of delivery please identify how the integrity of learning evaluation will be maintained. (e.g. will "on-site" examinations be required, etc.)

Bibliography:**A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES**

The Library has requested that the reading list contain complete bibliographical information, such as full name of author, title, year of publication, etc., and that you distinguish between required and suggested readings. A statement is required from the bibliographer responsible for the discipline to indicate whether resources are adequate to support the course.

Also please list any online resources.

If the course is to be integrated (graduate/undergraduate), a list of the additional readings to be required of graduate students must be included. If no additional readings are to be required, a rationale should be supplied.

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.**Grades for the class will be based on the following:**

Mid-term exam 1: 25%

Mid-term exam 2: 25%

Writing assignment: 25%

Oral presentation: 20%

Participation in the oral presentation: 5% (e.g., facilitating discussion/asking questions)

Writing assignment and oral presentation: Students will be required to write a review article about current/emerging issues related to environmental pollution, and will present their work to the class (10 min) followed by a short Q&A session (3 min).

No textbook is required for this course. Lecture notes and selected articles will be provided to students through Moodle.

Suggested reading materials:

Principles of ecotoxicology. Fourth edition. C.H. Walker, R.M. Sibly, S.P. Hopkin, D.B. Peakall (Eds). 2012. CRC Press.

Introduction to Environmental Toxicology: Impacts of Chemicals Upon Ecological Systems. Third edition. Wayne Landis, Ruth Sofield, Ming-Ho Yu, Wayne G. Landis, Ming-Ho Yu (Eds). 2003. CRC Press.

Online resources:

Environment and Climate Change Canada

<https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=C6C230D5-1>

Canadian Environmental Protection Act. This website identifies the priority substances that may pose a risk to the health of Canadians or to the environment.

Health Canada

<http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/index-eng.php>

Canadian guidelines and assessment programs for environmental contaminants.

TOXNET & TOXLINE

[https://toxnet.nlm.nih.gov/;](https://toxnet.nlm.nih.gov/)

<https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?TOXLINE>

Bibliographic databases covering the effects of chemicals, risk assessment, toxicology, environmental health etc.

The above resources are adequate to support the proposed course.

Other Resources:

A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain

COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.

Course website: Moodle

All lecture notes and links to selected research papers will be posted to Moodle.

Course Rationale:

The following points should be addressed in the rationale:

How the course contributes to the learning objectives of the program / degree.

The relationship of the proposed course to other existing offerings, particularly in terms of overlap in objectives and/or content. If inter-Faculty overlap exists, some indication of consultation with the Faculty affected should be given.

The expected enrolment in the course.

Course rationale:

Pollution has a profound negative impact on ecological sustainability and social-economic development, and there is an increasing need for science students to understand these issues. Currently, there is no specific course offered in the Biology program discussing environmental contaminants and the mechanisms underlying their effects. The Biology program provides students with the opportunities to study the form and function of organisms, their evolution and ecology, as well as their physiology. The proposed new course in Environmental Toxicology will introduce students to the general principles and practice of Environmental Toxicology, and will complement and further strengthen the Biology program by providing students with an understanding of how human activities (i.e., introduction of contaminants) affect animal function and ecological systems. The proposed course is designed to equip students with the skills and knowledge to critically evaluate and understand current and emerging environmental issues. Additionally, through class discussion and assignments, students may gain new perspectives on topics relating to technology advancement, sustainable development, and global environmental challenges. Students will recognize the relevance of the concepts they learned in the class in their daily lives and surroundings. Ultimately, this course will contribute to the Biology program by: i) inspiring students to learn more about the relationships between human activities and the natural world, and ii) providing students with an all-rounded education in life sciences that can lead to fulfilling careers.

Expected enrolment: 40

Faculty and Department Approval for Cross-listings:

If the course is to be cross-listed with another department, this section needs to be signed by all parties. In some cases there may be more than two signatures required (i.e. Mathematics, Women's Studies). In the majority of the cases either the Undergraduate Director or Chair of a unit approves the agreement to cross-list. All relevant signatures must be obtained prior to submission to the Faculty curriculum committee.

Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date
Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date
Dept:	_____	_____	_____
	Signature (Authorizing cross-listing)	Department	Date

Accessible format can be provided upon request.

September 20, 2017

Hello Tamara,

Thank you for sending me the memo and attached proposal for the course:

BIOLOGY 4720 Environmental Contaminants: Impacts on Organisms and Ecosystems

I have reviewed the bibliography that you provided with the course description and find that we have the following resources already in our collection:

Suggested reading materials:

- Principles of ecotoxicology. Fourth edition. C.H. Walker, R.M. Sibly, S.P. Hopkin, D.B. Peakall (Eds). 2012. CRC Press.
- Introduction to Environmental Toxicology: Impacts of Chemicals Upon Ecological Systems. Third edition. Wayne Landis, Ruth Sofield, Ming-Ho Yu, Wayne G. Landis, Ming-Ho Yu (Eds). 2003. CRC Press.

Online resources:

- ***Environment and Climate Change Canada***

<https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=C6C230D5-1>

Canadian Environmental Protection Act. This website identifies the priority substances that may pose a risk to the health of Canadians or to the environment.

- ***Health Canada***

<http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/index-eng.php>

Canadian guidelines and assessment programs for environmental contaminants.

- ***TOXNET & TOXLINE***

<https://toxnet.nlm.nih.gov/>

<https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?TOXLINE>

Bibliographic databases covering the effects of chemicals, risk assessment, toxicology, environmental health etc.

Please note that we also subscribe to a large collection of journals in the field of toxicology, and that for journals that we do not subscribe to, **Interlibrary loan** and document delivery options are available through **RACER** for any additional information needs that may come up. Undergraduate students can order up to 25 journal articles through RACER per year, and these are delivered to the desktop, free of charge. Books can also be requested through this system free of charge.

Registration and requesting is available from:

<http://www.library.yorku.ca/cms/resource-sharing/services-for-york-faculty-and-students/illrequestform/>

You may request that the recommended readings be placed on **Reserve** for student use at Steacie Library by familiarizing yourself with the information about Reserves and Copyright, at: <https://www.library.yorku.ca/web/ask-services/facultyinstructor-support/places-items-on-reserve/> and then proceed to making your request at the link provided.

Collection development in the library is ongoing, and is based on a commitment to developing library resources that are in alignment with the University's curricular and research activities. Additional books in this field will be added to the library collection as they are published.

Please submit your purchase requests by using the form at:

<https://www.library.yorku.ca/web/suggestion-for-purchase-form/>

Please note that librarians provide research skills workshops to students and faculty on request, including:

- Searching the library catalogue and databases
- Evaluating information sources
- Assistance with designing assignments that incorporate principles of Information Literacy skills development
- Managing references using Mendeley bibliographic management system (students find this particularly useful)

Research Guides have been created for Biology <http://researchguides.library.yorku.ca/biology> and Ecology <http://researchguides.library.yorku.ca/ecology>, and related guides are available in Environmental Studies, Chemistry, etc. These are maintained by subject librarians to bring together online and print resources that are useful to students and faculty. Resources and links will be added upon request. <http://researchguides.library.yorku.ca/>

In summary, I would state that we are well positioned to support this course.

Sincerely,

Ilo-Katryn Maimets, Science Librarian
Steacie Science and Engineering Library
Ext: x33927
E-mail: ilo@yorku.ca

Changes to Existing Course

Faculty:

Department:	Biology	Date of Submission:	Sept. 2017
Course Number:	SC/BIOL 1500 3.0	Effective Session:	Summer 2018
Course Title:	Introduction to Biology		

Type of Change:

<input type="checkbox"/> in pre-requisite(s)/co-requisite(s)	<input type="checkbox"/> in cross-listing
<input type="checkbox"/> in course number/level	<input checked="" type="checkbox"/> in degree credit exclusion(s)
<input type="checkbox"/> in credit value	<input type="checkbox"/> regularize course (from Special Topics)
<input type="checkbox"/> in title (max. 40 characters for short title)	<input type="checkbox"/> in course format/mode of delivery *
<input checked="" type="checkbox"/> in Calendar description (max. 40 words or 200 characters)	<input type="checkbox"/> retire/expire course
<input type="checkbox"/> other (please specify):	<input type="checkbox"/>

Change From:

To:

<p>An introductory course in biology for students needing adequate preparation for SC/BIOL 1010 6.00. The course explores underlying theories and the unity and diversity of life. Topics include evolution, cell theory, introductory biochemistry, inheritance, biodiversity, and ecology. NCR NOTE: May not be taken by any student who has taken or is currently taking another university course in biology. Note: Not eligible for Biology credit towards a Biology, Biochemistry or Environmental Biology program.</p>	<p>An introductory course in biology for students needing adequate preparation for SC/BIOL 1010 6.0 SC/BIOL 1000 3.00. The course explores underlying theories and the unity and diversity of life. Topics include evolution, cell theory, introductory biochemistry, inheritance, biodiversity, and ecology. NCR NOTE: May not be taken by any student who has taken passed or is currently taking another university course in biology. Note: Not eligible for Biology credit towards a Biology, Biochemistry or Environmental Biology program.</p>
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Rationale:

BIOL 1010 6.0 has not been offered for 6 years, and thus the description was updated to BIOL 1000 3.0, the first of the two course series in first year. In the NCR NOTE, "has taken" has now been clarified as "has passed".

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty:

Department:

Biology

Date of Submission:

Sept. 2017

Course Number:

SC/BIOL 2021 3.0

Effective Session:

Summer 2018

Course Title:

Cell Biology

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

To:

Prerequisite: One of the following: (1) SC/BIOL 2020 4.00, (2) SC/BCHM 2020 4.00, (3) SC/BIOL 2020 3.00, (4) SC/BCHM 2020 3.00, (5) SC/BIOL 1010 6.00 and SC/CHEM 2050 4.00, (6) SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00 and SC/CHEM 2050 4.00. Course credit exclusions: SC/BIOL 2021 4.00, SC/BCHM 2021 4.00.

Prerequisite: One of the following: ~~(1) SC/BIOL 2020 4.00, (2) SC/BCHM 2020 4.00, (3) SC/BIOL 2020 3.00, (4) SC/BCHM 2020 3.00, (5) SC/BIOL 1010 6.00 and SC/CHEM 2050 4.00, (6) SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00 and SC/CHEM 2050 4.00.~~ (1) SC/BIOL 2020 3.00, (2) SC/BCHM 2020 3.00, -or (3) SC/BIOL 1000 3.00 and SC/BIOL 1001 3.00 and SC/CHEM 2050 4.00. Course credit exclusions: SC/BIOL 2021 4.00, SC/BCHM 2021 4.00.

Rationale:

This proposal aims to simplify the pre-requisites by removing mentions of older courses that have not been offered for many years in favour of replacement courses still offered.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty:

Department:

Biology

Date of Submission:

Sept. 2017

Course Number:

SC/BIOL 3110 3.0

Effective Session:

Summer 2018

Course Title:

Molecular Biology I: Nucleic Acid Metabolism

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Prerequisites: One of the following: (1) SC/BIOL 2020 4.00 or SC/BCHM 2020 4.00; SC/BIOL 2021 4.00 or SC/BCHM 2021 4.00; SC/BIOL 2040 4.00; (2) if the three credit course is taken in either one or more of SC/BIOL 2020, SC/BIOL 2021, SC/BIOL 2040, then SC/BIOL 2070 3.00 is required.

To:

Prerequisites: ~~One of the following: (1) SC/BIOL 2020 4.00 or SC/BCHM 2020 4.00; SC/BIOL 2021 4.00 or SC/BCHM 2021 4.00; SC/BIOL 2040 4.00; (2) if the three credit course is taken in either one or more of SC/BIOL 2020, SC/BIOL 2021, SC/BIOL 2040, then SC/BIOL 2070 3.00 is required.~~
SC/BIOL 2020 3.0, SC/BIOL 2021 3.0, SC/BIOL 2040 3.0, and SC/BIOL 2070 3.0

Rationale:

This proposal aims to simplify the pre-requisites by removing mentions of older courses that have not been offered for many years in favour of replacement courses still offered.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty:

Department:

Biology

Date of Submission:

Sept. 2017

Course Number:

SC/BIOL 3150 4.0

Effective Session:

Fall/Winter 2018

Course Title:

Microbiology

Type of Change:

- | | |
|--|--|
| <input checked="" type="checkbox"/> in pre-requisite(s)/co-requisite(s) | <input type="checkbox"/> in cross-listing |
| <input type="checkbox"/> in course number/level | <input type="checkbox"/> in degree credit exclusion(s) |
| <input type="checkbox"/> in credit value | <input type="checkbox"/> regularize course (from Special Topics) |
| <input type="checkbox"/> in title (max. 40 characters for short title) | <input type="checkbox"/> in course format/mode of delivery * |
| <input type="checkbox"/> in Calendar description (max. 40 words or 200 characters) | <input type="checkbox"/> retire/expire course |
| <input type="checkbox"/> other (please specify): | <input type="checkbox"/> |

Change From:

Prerequisites: One of the following: (1) SC/BIOL 2020 4.00 or SC/BCHM 2020 4.00; SC/BIOL 2021 4.00 or SC/BCHM 2021 4.00; SC/BIOL 2040 4.00; (2) if the 3 credit course is taken in either one or more of SC/BIOL 2020, SC/BIOL 2021, SC/BIOL 2040 3.00, then SC/BIOL 2070 3.00 is required. Course credit exclusion: SC/BIOL 3150 3.00.

To:

Prerequisites: ~~One of the following: (1) SC/BIOL 2020 4.00 or SC/BCHM 2020 4.00; SC/BIOL 2021 4.00 or SC/BCHM 2021 4.00; SC/BIOL 2040 4.00; (2) if the 3 credit course is taken in either one or more of SC/BIOL 2020, SC/BIOL 2021, SC/BIOL 2040 3.00, then SC/BIOL 2070 3.00 is required.~~ SC/BIOL 2020 3.0, SC/BIOL 2021 3.0, SC/BIOL 2040, and SC/BIOL 2070 3.0. Course credit exclusion: SC/BIOL 3150 3.00.

Rationale:

This proposal aims to simplify the pre-requisites by removing mentions of older courses that have not been offered for many years in favour of replacement courses still offered.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Changes to Existing Course

Faculty:

Department:	Biology	Date of Submission:	Sept. 2017
Course Number:	SC/BIOL 4350 4.0	Effective Session:	F/W 2018
Course Title:	Comparative Chordate Anatomy		

Type of Change:

<input type="checkbox"/> in pre-requisite(s)/co-requisite(s)	<input type="checkbox"/> in cross-listing
<input checked="" type="checkbox"/> in course number/level	<input checked="" type="checkbox"/> in degree credit exclusion(s)
<input type="checkbox"/> in credit value	<input type="checkbox"/> regularize course (from Special Topics)
<input type="checkbox"/> in title (max. 40 characters for short title)	<input type="checkbox"/> in course format/mode of delivery *
<input checked="" type="checkbox"/> in Calendar description (max. 40 words or 200 characters)	<input type="checkbox"/> retire/expire course
<input type="checkbox"/> other (please specify):	<input type="checkbox"/>

Change From:

To:

SC/BIOL 4350 4.00	SC/BIOL 3350 4.00
Course Description	Course Description
A comparative study of the biology of chordate animals in which the evidence of their evolutionary relationships is emphasized. Three lecture hours, three laboratory hours. One term. Four credits. Prerequisites: SC/BIOL 2030 4.00.	A comparative study of the anatomy of chordate animals in which the evidence of their evolutionary relationships is emphasized. Three lecture hours, three laboratory hours. One term. Four credits. Prerequisites: SC/BIOL 2030 4.00. Course Credit Exclusion: SC/BIOL 4350 4.00

Rationale:

This course change is a continuance of the 2013-14 Biology Curriculum review recommendation to offer more courses at the 3rd year level and to provide more training and skill development. Additionally, the topic material relies on a second year (SC/BIOL 2030 4.0) prerequisite, and the nature of the material is more suited to a second or third year course than to a fourth year course. Finally, anatomy is emphasized for a more precise description of the course offering.

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department is required.

Note: Since one change (such as a change in year level or credit value) may result in several other changes (e.g., to the course description, evaluation, instruction, bibliography, etc.), please submit as many details as possible. If there are several changes, please feel free to use a New Course Proposal Form in order to ensure that all the required information is included.

* Note: If there is a technology component to the course, a statement is required from ATS indicating whether resources are adequate to support the course. Courses converted from face-to-face to an on-line delivery mode should follow the instructions provided on page 4 of the New Course Proposal Form to provide revised 'Course Design' and 'Method of Instruction' information.

Science Student Caucus 2017 – 18

Alita Gideon	Biomedical Science
Chanhee Seo	Biology
Clarelle Gonsalves	Biomedical Science
Do Eon (Joshua) Lee	Biology
Joshua Parsons	Astrophysics
Karen Rowe	Mathematics For Commerce
Magdelina Yimesghen	Biomedical Science
Mohammad Kiumarsi	Biomedical science
Robert Cheung	Biology
Rushi Patel	Biomedical Sciences
Steven Spector	Biomedical Sciences
Thanusika Thuraiselvam	Biology

Revisions to the T&P Policy and Procedures

Tenure and Promotions Policy, Criteria and Procedures

Policy/Procedure Section	Existing Text	Proposed Revision (changes in red)
<p>B. The Description of Criteria for Tenure and Promotion</p>	<p>Set out below is a description of the criteria which reflects the University standards:</p> <p>The Senate Committee requires explication of the standards employed in the evaluation of candidates by individual departments/divisions/schools and Faculties. In keeping with the University's commitment to foster a climate of respect for equity and diversity, standards for tenure and promotion must recognize research and professional contributions in an equitable way. This includes acknowledging diverse career paths, traditions and values, ways of knowing and forms of communicating knowledge.</p> <p>Because promotion and tenure primarily affect junior members of the academic community, the following criteria are described so that they may constitute not only a basis for evaluation after performance, but also a means of encouraging junior faculty before and during performance.</p> <p>B.1 Teaching</p> <p>Members of faculty perform many functions, but all are teachers. At the level of the university, teaching is itself an expression of scholarship. In an age of intense specialisation generating an information explosion, the scholar who can take information and synthesise it into coherent structures of knowledge is performing an essential and sophisticated task. To be able to create an intelligible and intelligent university course is a very significant accomplishment. The facile distinction between teachers and researchers comes from another era when a graduate education conferred upon the teacher a long-lasting competence in a single field. Today disciplines interpenetrate to such a degree that the researcher cannot rest tranquilly secure in his or her area of expertise, and the teacher cannot rest secure that a gentle summer's preparation will be sufficient</p>	<p>Set out below is a description of the criteria which reflects the University standards:</p> <p>The Senate Committee requires explication of the standards employed in the evaluation of candidates by individual departments/divisions/schools and Faculties. In keeping with the University's commitment to foster a climate of respect for equity and diversity, standards for tenure and promotion must recognize research and professional contributions in an equitable way. This includes acknowledging diverse career paths, traditions and values, ways of knowing, ways of engaging the community though community-engaged scholarship and forms of communicating knowledge.</p> <p>Because promotion and tenure primarily affect junior members of the academic community, the following criteria are described so that they may constitute not only a basis for evaluation after performance, but also a means of encouraging junior faculty before and during performance.</p> <p>B.1. Teaching</p> <p>Members of faculty perform many functions, but all are teachers. At the level of the university, teaching is itself an expression of scholarship. In an age of intense specialisation generating an information explosion, the scholar who can take information and synthesise it into coherent structures of knowledge is performing an essential and sophisticated task. To be able to create an intelligible and intelligent university course is a very significant accomplishment. The facile distinction between teachers and researchers comes from another era when a graduate education conferred upon the teacher a long-lasting competence in a single field. Today disciplines interpenetrate to such a degree that the researcher cannot rest tranquilly secure in his or her area of expertise, and the teacher cannot rest secure that a gentle</p>

Policy/Procedure Section	Existing Text	Proposed Revision <i>(changes in red)</i>
	<p>scholarship for a good introductory course.</p> <p>To assess the quality of a candidate's teaching, there are certain standards which can and should be applied within the University. The content of the teaching must be evaluated — whether it is conventional and routine, or whether scholarship is revealed through research, analysis, reflection, synthesis and the expression of original work. The effectiveness of communication must also be considered, since communication is the essence of good teaching. The performance of the candidate must be assessed in terms of specific situations — i.e., with undergraduate or with graduate students, in groups and tutorials, in the laboratory or in the field, in small or large lectures. A candidate may be more effective in one situation than in others. While no one situation should be given a premium value to the detriment of others, a candidate should be superior in at least one area of teaching.</p> <p>The judgement of colleagues must be brought to bear on the assessment of teaching performance; reliance on mere hearsay should be avoided. The direct expression of students' evaluation of teachers should be solicited. Without a concrete, highly specific and well-supported evaluation of a teacher's performance, the Senate Review Committee will return a dossier with a request for more information.</p> <p>B.2. Professional Contribution and Standing</p> <p>In most cases distinction within a profession arises from the communication of knowledge or skills through public service, scholarly publication, or the production of works of art. Although publication and performance are not in themselves a guarantee of excellence, one recognises that these kinds of professional activity are addressed to communities larger than York University and that, therefore, they must be judged in this larger professional context. In certain cases a distinguished public expression constitutes <i>prima facie</i> evidence that the quality of the work has been assessed and found to be of a high standard; in other cases it may be necessary to solicit assessments from specialists in the same field.</p>	<p>summer's preparation will be sufficient scholarship for a good introductory course.</p> <p>To assess the quality of a candidate's teaching, there are certain standards which can and should be applied within the University. The content of the teaching must be evaluated — whether it is conventional and routine, or whether scholarship is revealed through research, analysis, reflection, synthesis and the expression of original work. The effectiveness of communication must also be considered, since communication is the essence of good teaching. The performance of the candidate must be assessed in terms of specific situations — i.e., with undergraduate or with graduate students, in groups and tutorials, in the laboratory or in the field or in the community, in small or large lectures. A candidate may be more effective in one situation than in others. While no one situation should be given a premium value to the detriment of others, a candidate should be superior in at least one area of teaching.</p> <p>The judgement of colleagues must be brought to bear on the assessment of teaching performance; reliance on mere hearsay should be avoided. The direct expression of students' evaluation of teachers should be solicited. Without a concrete, highly specific and well-supported evaluation of a teacher's performance, the Senate Review Committee will return a dossier with a request for more information.</p> <p>B.2. Professional Contribution and Standing</p> <p>In most cases distinction within a profession arises from the communication of knowledge or skills through public service and community engagement, scholarly publication, or the production of works of art. Although publication and performance are not in themselves a guarantee of excellence, one recognises that these kinds of professional activity are addressed to communities larger than York University and that, therefore, they must be judged in this larger professional context. In certain cases a distinguished public expression constitutes <i>prima facie</i> evidence that the quality of the work has been assessed and found to be of a high standard; in other cases it may be necessary to solicit assessments from</p>

Policy/Procedure Section	Existing Text	Proposed Revision <i>(changes in red)</i>
	<p>When the candidate has written or produced a work as part of a team or group in a research project, the nature of his or her contribution must be assessed.</p> <p>Intellectual achievement may also be manifested by studies or activities that have been commissioned by governments or by private institutions. Contributions of this kind are significant, but they can be uneven and should always be evaluated by a recognised authority in the same field.</p> <p>Generally, the quality of a candidate's scholarship will be evaluated in the light of judgements by reputable scholars; in cases where there may be division within a discipline, the File Preparation Committee should describe the nature of the conflict among schools of thought and present the Adjudicating Committee with a wider range of professional opinion. Where the candidate is relatively junior, judgement should point not only to immediate achievement, but to the promise or lack of promise for further development.</p> <p>The work performed by members of faculty for public and private institutions is indeed an integral part of the relationship between the University and the community. Communication with the general public in a variety of forms and media will be a continuing necessity for the modern university, and outstanding contributions of faculty in this area must be recognised. Service in an advisory capacity to various public agencies, presentation of lectures and talks to other than professional audiences, performances with radio and television networks — all such activity should be documented as evidence of any special capacity to enhance the intellectual relationship between the University and the community.</p> <p>These activities must not be separated from the other criteria; they will be weighed in relation to the central core of responsibility which belongs</p>	<p>specialists in the same field.</p> <p>When the candidate has written or produced a work as part of a team or group in a research project, including in the context of community-engaged scholarship, the nature of his or her contribution must be assessed.</p> <p>Intellectual achievement may also be manifested by studies or activities that have been commissioned by governments, communities or by private institutions. Contributions of this kind are significant, but they can be uneven and should always be evaluated by a recognised authority in the same field.</p> <p>Generally, the quality of a candidate's scholarship will be evaluated in the light of judgements by reputable scholars, augmented where relevant by the judgement of community experts; in cases where there may be division within a discipline, the File Preparation Committee should describe the nature of the conflict among schools of thought and present the Adjudicating Committee with a wider range of professional opinion. Where the candidate is relatively junior, judgement should point not only to immediate achievement, but to the promise or lack of promise for further development.</p> <p>The work performed by members of faculty for public and private institutions and for community constituencies or organizations is indeed an integral part of the relationship between the University and the community. Communication with the general public in a variety of forms and media will be a continuing necessity for the modern university, and outstanding contributions of faculty in this area must be recognised. Service in the context of community engaged scholarship to various public agencies or organizations, presentation of lectures and talks to other than professional audiences, performances with radio and television networks — all such activity should be documented as evidence of any special capacity to enhance the intellectual relationship between the University and the community.</p> <p>These activities must not be separated from the</p>

Policy/Procedure Section	Existing Text	Proposed Revision <i>(changes in red)</i>
	to every member of faculty not only to transmit but to extend the boundaries of perception, understanding and knowledge.	other criteria; they will be weighed in relation to the central core of responsibility which belongs to every member of faculty not only to transmit but to extend the boundaries of perception, understanding and knowledge.
B.4. Application of the Tenure and Promotion Criteria	<p>The Senate Committee requests explication of the standards employed in the evaluation of candidates by individual departments/divisions/schools and Faculties in accordance with these criteria. All recommendations for tenure and promotion to the rank of Associate Professor require either demonstrated superiority (excellence) in a minimum of one of the three categories outlined above, with at least competence demonstrated in teaching and in professional contribution and standing, or at least high competence in all three categories.¹ The Senate Committee will review the standards set forth by Faculties and departments/divisions/schools; it will also undertake to ensure that standards are uniformly applied throughout the University.</p> <p>The level of achievement required for the granting of tenure and promotion is identical for first, second and third year Candidacy consideration.</p>	<p>The Senate Committee requests explication of the standards employed in the evaluation of candidates by individual departments/divisions/schools and Faculties in accordance with these criteria.</p> <p>All recommendations for tenure and promotion to the rank of Associate Professor require either demonstrated superiority (excellence) in a minimum of one of the three categories outlined above, with at least competence demonstrated in teaching and in professional contribution and standing, or at least high competence in all three categories.¹</p> <p>Without diminishing or detracting from existing scholarly expectations, standards for tenure and promotion must, as relevant, recognize and provide an appropriate basis for the assessment of community engaged scholarship encompassing all three areas of professional responsibility, where <i>community</i> may be local, national or international.</p> <p>The Senate Committee will review the standards set forth by Faculties and departments/divisions/schools; it will also undertake to ensure that standards are uniformly applied throughout the University.</p> <p>The level of achievement required for the granting of tenure and promotion is identical for first, second and third year Candidacy consideration.</p>
F.3.3.1 Dean's Letter	The Dean will write a letter of transmittal to the Senate Committee, in which he/she will either concur in the judgement of the Adjudicating Committee or dissent from that judgement. In the latter instance, the Dean will give reasons for his/her recommendation.	<p>The Dean will write a letter of transmittal to the Senate Committee, in which he/she will either concur in the judgement of the Adjudicating Committee or dissent from that judgement. In the latter instance, the Dean will give reasons for his/her recommendation.</p> <p>In cases where the file has been referred back to the Adjudicating Committee by the Senate Committee for reconsideration pursuant to F.3.4, the Dean will write a letter of transmittal to the Senate Committee as</p>

Policy/Procedure Section	Existing Text	Proposed Revision <i>(changes in red)</i>
		<p>follows:</p> <p>(a) if the Adjudicating Committee did not change its judgement on reconsideration he/she will simply note without reasons concurrence or dissent in the judgement of the Adjudicating Committee on reconsideration;</p> <p>(b) if the Adjudicating Committee changed its judgement on reconsideration he/she will either concur in that judgement of the Adjudicating Committee or dissent from that judgement. In the latter instance, the Dean will give reasons for his/her recommendation.</p>



June 1, 2017

Office of the President

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Professor Lesley Beagrie
Chair, Senate Executive Committee
c/o University Secretariat
Kaneff Tower, 1050
York University

Dear Professor Beagrie,

We are writing to request that the Senate Executive Committee forward the proposed revisions to the *Tenure and Promotions Policy, Criteria and Procedures*, the *Procedures Governing the Advancement to Candidacy to Senate* at its meeting of June 15, 2017, with the recommendation that the revised document be adopted in its totality. The proposed changes stem from negotiations between the York University Faculty Association and the University in the negotiations of the renewal 2015-18 collective agreement. The Osgoode Hall Faculty Association was invited to comment on the proposed revisions and has expressed no objections to their adoption.

Yours sincerely,

A handwritten signature in black ink, appearing to read "msl7".

Mamdouh Shoukri, C.M., O.Ont.
President and Vice-Chancellor

A handwritten signature in blue ink, appearing to read "Richard Wellen".

Richard Wellen
President, YUFA

Encl. Report to Senate for Action
Proposed Amendments to Tenure & Promotions Policy, Criteria & Procedures