



FACULTY OF SCIENCE

COUNCIL OF THE FACULTY OF SCIENCE

Notice of Meeting
Tuesday, December 13, 2016
at 3:00pm – 4:30pm, in 306 Lumbers

Agenda

1. Call to Order and Approval of Agenda
2. Chair's Remarks
 - ***At this time will have the presentation to Council by Rhonda Lenton & Gary Brewer*****
3. Minutes of November 8, 2016 meeting
4. Business Arising
5. Inquiries and Communications
 - Senate Synopsis: Meeting of November 24, 2016
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
 - Science Curriculum Committee (consent & action items)
10. Other Business
 - 10.1 Motion to revise the Rules of FSc Council pertaining to the Petitions Committee quorum
 - 10.2 *Item for information:* Research Ethics Review of Undergraduate and Graduate Course-Related Research (Including MRPs)? Streamlining and Harmonization of Research Ethics Review Processes
 - 10.3 **Presentation by Provost R. Lenton & Vice-President G. Brewer on the Academic and Budget Planning and the IIRP:** Click here to download presentation:
<http://science.yorku.ca/files/2016/12/FSc-presentation-by-Rhonda-Gary.pdf>
Relevant reports and recommendations can be found at:
<https://yulink-new.yorku.ca/group/iirp/working-groups>



FACULTY OF SCIENCE

COUNCIL OF THE FACULTY OF SCIENCE

**Tuesday, November 8, 2016
at 3:00pm - 4:30pm
306 Lumbers**

Minutes

Attendance: M. Bayfield, D. Golemi-Kotra, K. Tamara, P. L. Lakin-Thomas, E. Hamm, M. Caplan, P. Delaney, M. McCall, W. Taylor, J. Grigull, P. Szeptycki, D. Hastie, G. Lavoie, R. McLaren, J. Heffernan, N. Madras (Chair), K. Maltman, J. Clark, N. Nivillac, R. Tsushima, E.J Janse van Rensburg, D. Wilson, M. Xu, K. Young, S. Siyakatshana (Assistant Secretary of Council)

Guests: B. Sheeller & H. McLellan

1. Call to Order and Approval of Agenda

The Chair of Council, Dr. N. Madras called the meeting to order and the Agenda was adopted as presented.

2. Chair's Remarks

On a personal note, the Chair remarked that he was looking forward to learning more about the Department of Physics and Astronomy while serving as internal reviewer for its imminent Cyclical Program Review.

3. Minutes of October 11, 2016 meeting

A motion was moved, seconded and carried to approve the Minutes of October 11, 2016.

4. Business Arising

There was no Business Arising.

5. Inquiries and Communications

Council noted the Senate Synopsis of Meeting of October 27, 2016.

6. Dean's Report to Council

Associate Dean Faculty, Dr. Janse van Rensburg presented the Dean's report on his behalf as follows,

- The Faculty of Science received a \$1M USD gift from Jim and Marilyn Simons for York Science Fellowships. Patricia Weisenfeld, Vice President –Special Initiatives at the Simons Foundation represented Jim and Marilyn at the gift announcement.
- The call for applications for the first batch of York Science Fellowships is now online: <http://science.yorku.ca/YorkScienceFellows>. He encouraged faculty to share this information with their colleagues at other institutions and ask them to encourage potential candidates to apply. He noted that this was a great opportunity to recruit and host an outstanding early-career researcher in your group.
- The York Science Forum was a success, with about 500 people attending the second York Science Forum last Wednesday at the Design Exchange.

- The event, titled “Hacking the Genome: The Brave New World of Gene Editing,” featured a keynote address by bioengineer Feng Zhang from the Broad Institute. Panelists: Mark Bayfield, Ron Pearlman (replaced Janet Rossant, last minute cancellation) moderated by Paul Kennedy from CBC radio.

He congratulated Jean-Paul Paluzzi (Biology) on receiving the 2016 Petro-Canada Young Innovator Award.

Media highlight: Sapna Sharma (Biology) who participated in a panel discussion on the impact of climate change on the Great Lakes on *TVO's The Agenda with Steve Paikin*.

He announced that the Faculty of Science Open Forum will be held on November 10, 2016, at 10am –12noon, Lumbers 306.

Lastly, he added that the Media Workshop for Researchers, hosted by the Faculty of Science will be held on December 7, 2016 at 10 am -1 pm. Location and details to be advised in due course.

7. Associate Deans' and Bethune Master's Remarks

Associate Dean Faculty, Dr. E.J Janse van Rensburg, reminded faculty about the anomalies exercise. He also reminded and urged faculty to make sure that their faculty profiles were up to date and informative. He added that it was important for their profiles to be professional and appealing to those who visit their profiles. He also issued another reminder to those intending to retire to provide nine months' notice.

Associate Dean, Students, Dr. A. Mills informed faculty that the Academic Innovation Fund call would come out next week.

8. Reports from Science Representatives on Senate Committees

Faculty were informed of a new proposal discussed at Senate requiring all faculty members to have their syllabuses ready two weeks before the start of classes. It was noted this would allow students to make informed decisions when choosing classes. It was noted no vote has been held yet on this proposal yet, as it is still in a consultation phase.

A discussion ensued as faculty weighed in on the proposal. The Chair asked Dr. V, Saridakis to make sure that faculty members would be made aware of the consultation period for this proposal.

9. Reports from Standing Committees of Council

- 9.1 Council noted the update from the Executive Committee: 2016-17 Vacancies Report on Senate and FSc Committees.
- 9.2 A motion was moved, seconded and carried to approve the Science Curriculum Committee items.
- 9.3 Appeals Committee: Annual Report – Council noted the report.
- 9.4 Committee on Examinations and Academic Standards: Annual Report – Council noted the report.
- 9.5 Committee on Teaching and Learning: FSc Online Course Evaluations

Dr. A. Mills spoke to the matter. Council deliberated on the pros and cons of online course evaluation. Council noted that the Departments of Mathematics and Statistics and Biology had already introduced fully online course evaluations.

10. Other Business

- 10.1 Suzanne Killick made a presentation on the Mental Health Strategy for the University: [Mental Health Strategy PPT oct 16.pptx](#).
- 10.2 Discussion of issues regarding benefit payments to Post-Doctoral Visitors

The Chair informed Council that the Director of Faculty Relations, Dr. Barry Miller, was unable to attend the meeting as hoped. However, he has offered to join Council at a later date to shed some light on the matter. In the meantime, faculty were encouraged to provide feedback to B. Miller regarding their concerns. Council also advised that Science should reach out to other Faculties in order to learn how this matter is handled. There was also a suggestion to contact Angela Zeno (Research Accounting) in order to get further details on how it works.

N. Madras, Chair of Council

S. Siyakatshana, Assistant Secretary of Council

The 630th Meeting of Senate held on Thursday, November 24, 2016

Remarks

The Chair of Senate, Professor George Comninel, advised that it was unlikely a meeting of Senate in December would be necessary, but asked that Senators reserve time on December 15 in case pressing business emerged.

York's President, Dr Mamdouh Shoukri, spoke of a disturbing trend that has given rise to the recent spate of racist rhetoric and actions in North America. The University must stand with those who are subject to marginalization, inequities, silencing and other forms of intolerance. This can be done by continuing to promote and facilitate dialogue, collaboration and understanding. In as enters his final months as President, Dr Shoukri pledged to defend York's hallmark values and to be a catalyst for positive change.

Reports

Under the auspices of the Academic Policy, Planning and Research Committee (APPRC) Senate received and discussed the following reports:

- Provost Rhonda Lenton's autumn report on enrolments and complement
- Vice-President Finance and Administration Gary Brewer's update on the budget context for academic planning
- Vice-President Research and Innovation Robert Haché's annual report

Approvals

Senate approved recommendations of the Academic Standards, Curriculum and Pedagogy (ASCP) to

- change degree requirements for the BA and BSc Programs in Psychology, Department of Psychology, Faculty of Health
- change degree requirements for the Bilingual BA Program in Communications, School of Translation, Glendon
- change admission requirements for the MA Program in Translation, School of Translation, Glendon / Faculty of Graduate Studies
- close the Honours Double-Major Interdisciplinary BA Program in Psychology, Department of Psychology, Faculty of Health
- close the Diploma in Real Estate and Infrastructure, Schulich School of Business / Faculty of Graduate Studies

Committee Information Reports

Senate Executive reported on

- its approval of members of Senate committees nominated by student Senators
- its concurrence with recommendations of the Sub-Committee on Honorary Degrees and Ceremonials with the result that four individuals have been added

to the pool of prospective honorary degree recipients and nine others have been extended for a further five years; Senate Executive also expressed its support for the Sub-Committee's efforts to expand and diversify the pool while enhancing the process by which individuals are nominated

- the work plan developed by the Sub-Committee on Equity
- a productive autumn meeting of Senate committee chairs and secretaries where it was learned that committees are seeking to institute governance enhancements, address Senate survey issues and explicitly tie initiatives to the University Academic Plan (UAP)
- the annual call for expressions of interest in membership on committees and other positions elected by Senate

APPRC reported that it had concurred with the Provost's recommendations to rename the existing Chair in Business History as the Richard E. Waugh Chair in Business History, and to establish the Timothy R. Price Chair in Real Estate and Infrastructure. The Committee also provided commentary on forums held in October devoted to discussion of Institutional Integrated Resource Plan working group reports. A planned discussion of the UAP's Priority 2 -- Advancing Exploration, Innovation and Achievement in Scholarship, Research and Related Creative Activities -- was deferred to the next meeting of Senate.

ASCP updated Senate on the progress of major initiatives (proposed amendments to the *Senate Grading Scheme and Feedback Policy*, implementation of new academic forgiveness policies, the Committee's priorities for the year). It also advised that it had approved minor change to the requirements for the BA, iBA and Accelerated BA programs in Translation offered by Glendon's School of Translation.

The Tenure and Promotions Committee filed its annual report for 2015-2016 and it doing so highlighted its plan to expedite the gathering and consideration of unit standards and communications with the parties to the YUFA collective agreement about the criteria applied to alternate stream candidate tenure and promotion.

Additional Information about this Meeting

Please refer to the full Senate agenda and supplementary material posted online with the November 24, 2016 meeting for details about these items.

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

Next Meeting of Senate

Subject to confirmation by the Executive Committee, Senate's next meeting will be held at 3:00 p.m. on **Thursday, December 15, 2016 OR Thursday, January 26, 2017.**

York University

COUNCIL OF THE FACULTY OF SCIENCE

Report of the Science Curriculum Committee

November 2016

The Faculty of Science Curriculum Committee has reviewed proposals for changes to course information and degree requirements and recommends to the Executive Committee that the following changes be submitted to Council for approval.

Details regarding these proposals (and regarding other minor changes to Calendar/Repository course descriptions and prerequisites which were approved by the Committee but are not reported here) are included in the working papers of November 29, 2016, meeting of the Curriculum Committee, which are on file for your inspection in the Office of the Dean, with all members of the Curriculum Committee or by contacting the Secretary of the Committee at jpearson@yorku.ca

Course Changes (consent items)

- 1.1 SC/CHEM 3071 “Pharmaceutical Discovery”; in degree credit exclusion(s)
- 1.2 SC/CHEM “Specialized Honours in Chemistry – Pharmaceutical & Biological Stream”; other

New Courses (consent items)

- 2.1 SC/CHEM 3075 3.0 “Introduction to Drug Discovery and Development”
- 2.2 SC/ISCI 1110 6.00 “Integrated Science (Biology)”
- 2.3 SC/ISCI 1210 6.00 “Integrated Science (Chemistry)”
- 2.4 SC/ISCI 1310 6.00 “Integrated Science (Physics)”
- 2.5 SC/ISCI 1410 6.00 “Integrated Science (Mathematics)”

Program Changes

- 3.1 Program closure, Mathematics for Commerce program
- 3.2 Changes to the Mathematics for Commerce program, Honours and Specialized Honours B.A. in Actuarial Science
- 3.3 Changes to the Mathematics for Commerce program, Undergraduate Certificate in Actuarial Science
- 3.4 Alignment of the General Education Requirements for B.A. Degrees in the Faculty of Liberal Arts and Professional Studies and the Faculty of Science
- 3.5 Change in degree requirements for Specialized Honours Program in Biophysics; in degree requirements (Consent item)

Changes to Existing Course

Faculty: SC

Department:

CHEM

Date of Submission:

Nov 2016

Course Number:

3071

Effective Session:

Y17

Course Title:

Pharmaceutical Discovery

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:

A practical look into the pharmaceutical industry, providing an overview of the drug discovery process. Topics include choosing disease states to study, pharmacological assays, rational drug design, synthetic and analytical chemistry, toxicology, drug metabolism and clinical trials. Three hours. One term. Three credits. Prerequisites: SC/BIOL 2020 3.00 or SC/BCHM 2020 3.00 or SC/CHEM 2050 4.00 or SC/BIOL 2020 4.00 or SC/BCHM 2020 4.00; SC/CHEM 2020 6.00 or SC/CHEM 2021 3.00.

To:

A practical look into the pharmaceutical industry, providing an overview of the drug discovery process. Topics include choosing disease states to study, pharmacological assays, rational drug design, synthetic and analytical chemistry, toxicology, drug metabolism and clinical trials. Three hours. One term. Three credits. Prerequisites: SC/BIOL 2020 3.00 or SC/BCHM 2020 3.00 or SC/CHEM 2050 4.00 or SC/BIOL 2020 4.00 or SC/BCHM 2020 4.00; SC/CHEM 2020 6.00 or SC/CHEM 2021 3.00.

Course credit exclusion: SC/CHEM 3075 3.0.

Rationale:

Contingent on the approval of the New Course Proposal for CHEM 3075. The course credit exclusion is needed, given the significant overlap between these two courses, which are not destined to be offered at the same time.

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: SC

Department:

CHEM

Date of Submission:

Oct 2016

Course Number:

Effective Session:

Y17

Course Title:

Specialized Honours in Chemistry – Pharmaceutical & Biological Stream

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 checked="" type="checkbox"/> | other (please specify): degree requirements | <input type="checkbox"/> | |

Change From:

To:

B. Major requirements:

- the program core, as specified above (28 credits);
- SC/BIOL 1000 3.00; SC/BIOL 1001 3.00;
- SC/BIOL 2040 3.00; SC/BIOL 2070 3.00; one of SC/CHEM 2050 4.00 or SC/BCHM 2020 3.00 or SC/BIOL 2020 3.00; SC/BCHM 2021 3.00 or SC/BIOL 2021 3.00;
- SC/CHEM 3011 3.00; SC/CHEM 3020 3.00; SC/CHEM 3030 3.00; SC/CHEM 3050 3.00; SC/CHEM 3051 3.00; SC/CHEM 3071 3.00^; SC/CHEM 3080 4.00;
- SC/CHEM 4000 8.00; SC/CHEM 4050 3.00; SC/CHEM 4051 3.00 or SC/CHEM 4021 3.00;
- at least three additional credits chosen from SC/CHEM 3021 3.00, SC/CHEM 4051 3.00, SC/BIOL 3110 3.00, SC/BIOL 4151 3.00.

B. Major requirements:

- the program core, as specified above (28 credits);
- SC/BIOL 1000 3.00; SC/BIOL 1001 3.00;
- SC/BIOL 2040 3.00; SC/BIOL 2070 3.00; one of SC/CHEM 2050 4.00 or SC/BCHM 2020 3.00 or SC/BIOL 2020 3.00; SC/BCHM 2021 3.00 or SC/BIOL 2021 3.00;
- SC/CHEM 3011 3.00; SC/CHEM 3020 3.00; SC/CHEM 3030 3.00; SC/CHEM 3050 3.00; SC/CHEM 3051 3.00; SC/CHEM 3071 3.00 **or SC/CHEM 3075 3.0**; SC/CHEM 3080 4.00;
- SC/CHEM 4000 8.00; SC/CHEM 4050 3.00; SC/CHEM 4051 3.00 or SC/CHEM 4021 3.00;
- at least three additional credits chosen from SC/CHEM 3021 3.00, SC/CHEM 4051 3.00, SC/BIOL 3110 3.00, SC/BIOL 4151 3.00.

Rationale:

Contingent on approval of the new course proposal for SC/CHEM 3075 3.0 and the addition of a course credit exclusion to SC/CHEM 3071 3.0.
This change allows students in this program the possibility of taking one course or the other in order to meet the degree requirements.

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)

Chemistry

Date of Submission:

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

3075 3.0

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

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

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

Intro. to Drug Discovery and Development
--

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 course introduces students to the fundamentals of modern drug development such as how the structure, metabolism, route of administration, additives in formulation, etc. play key roles in determining a drug's activity and efficacy. The course explains how a molecule can be identified as a leading compound (by high throughput screenings or computational modeling) and then optimized to ensure maximum efficacy and minimal side effects. The course is mainly focused on elements of structural biology and the pharmacological aspects of medicinal chemistry. Several classes of drug molecules are explained to ensure that students are exposed to a broad overview about the real world of drug discovery and development procedures. Guest speakers from pharmaceutical companies will speak about current pharmaceutical research and development as well as patents and innovation. Overall the course is designed to make sure that students are familiarized with the idea of drug design and development, and the recent approaches taking place in this field of science.

Prerequisites SC/CHEM 2020 3.0, SC/CHEM 2021 3.0 and either SC/CHEM 2050 4.0 or BIOL/BCHEM 2020 3.0.

Course Credit Exclusion: SC/CHEM 3071 3.0.

Cross-listed to SC/BIOL 3075 3.0.

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.

This course introduces students to the fundamental structural biology and pharmacological aspects of medicinal chemistry of modern drug development, from the identification of a molecular target and selection of a leading compound to the commercialization of the final drug.

Prerequisites: SC/CHEM 2021 3.0 and either SC/CHEM 2050 4.0 or SC/BIOL 2020 3.0 or SC/BCHEM 2020 3.0.

Course Credit Exclusion: SC/CHEM 3071 3.0.

Cross-listed to SC/BIOL 3075 3.0.

Expanded Course Description:

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

This course will mainly cover six topics.

- The first topic will give an overview of drugs. Some history about drug discovery from natural products and how they are processed nowadays to obtain the purified active ingredients will be discussed. Models of diseases will be also presented to unveil how they help in discovering drugs through reverse pharmacology. A history of penicillin will be introduced to show how serendipity sometimes also aids in drug discovery.
- The second topic will discuss various drug targets and how they aid in the identification of drug molecule. The idea that the strength of affinity between a target and a drug molecule, which can also be a determining factor for the efficacy of a drug molecule, will also be addressed.
- The third topic will introduce the concept of lead compounds and how they are modified to produce the best molecule having maximum efficacy and minimum side effects. The idea of computational modeling and high throughput screening will be also introduced in this part.
- In the fourth topic, receptors and enzymes will be discussed as drug targets for specific diseases. Several examples will be introduced to explain the concept that there are several pathways by which one specific disease can be addressed.
- The fifth topic will be about pharmacokinetics, drug distribution, metabolism and toxicity. This section will discuss how a drug's formulation assists in their activity and efficacy. The concepts of pro-drug and transporters will be introduced. Metabolism will be also explained to understand the relationship between dose and bioavailability. Side effects will be described to understand drug–drug or drug–food interaction models.
- The sixth topic will cover the prospects in the field of drug discovery. Patents, preclinical studies, clinical trials will be discussed. Personalized medication will be introduced as an approach to maximize efficacy and minimize side effects for each individual patient.

Learning objectives:

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

- describe and discuss modern processes in drug discovery and development.
- critically analyze biological pathways leading to disease and identify possible molecular targets (receptors and/or enzyme) from there.
- summarize the methods used to identify and validate molecular targets.
- discuss the methods used to screen bioactive compounds against targets.
- discuss methods used to improve the efficacy of a leading compound.

- explain the key concepts of dose, bioavailability, pre-clinical trials, clinical trials, patenting and regulations of pharmaceuticals that follows after a drug molecule has been identified.
- critically discuss the scientific literature and extract relevant scientific information about drug discovery and development.

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.

The course will be delivered in the traditional lecture format with guest lecturers. Online assignments will allow the students to assess their knowledge before the midterms and final exam. They can identify specific topics which should be learned or better clarified before the exams.

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.

SC/CHEM 3071 3.0 is required in the Specialized Honours in Chemistry – Pharmaceutical & Biological Stream.

In the foreseeable future, SC/CHEM 3071 3.0 will not be re-offered until a new faculty member takes it over, and the proposed new course will be offered every year in replacement. Once a new faculty member can re-offer SC/CHEM 3071, the proposed course may be offered in alternate years with SC/CHEM 3071 so that one or the other will be offered every year.

One member of the Department is currently competent to teach the course.

Prof. Demian Ifa will teach this course.

The students will have 3h of lecture per week and it is expected that they will devote at least 3h per week to private study.

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.)

Mid Term 1: 20%
Mid Term 2: 20%
Online assignments: 20%
Final Exam: 40%

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.

Richard B. Silverman. The Organic Chemistry of Drug Design and Drug Action. 3rd Edition. Publisher: Academic Press.

Graham L. Patrick. An Introduction to Medicinal Chemistry 5th Edition. Publisher: Oxford University Press.

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.

A standard Audio-Visual System will be used for projection of MS-Power Point slides.

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 is very important for the students in the Specialized Honours Degree stream in Pharmaceutical & Biological Chemistry or related programs (Biochemistry, Biology) that allow students to pursue a career in or related to the pharmaceutical industry.

This course supplements SC/CHEM 3071 3.0. The overlaps with the proposed course are significant, though the focus of each differs and will attract students with different orientations (organic vs. biological), and so justifies the course credit exclusion (see the concurrent proposal to include this cce in SC/CHEM 3071). The proposed cross-listing will allow students in a Biology program to take this course for Biology credit. There is no overlap with existing SC/BIOL courses.

The expected enrolment in the course: up to 75 students from Chemistry and Biology.

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: _____ Biology _____
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.

		Course(s) Created (X) or Modified to () (check one)	Course(s) Retired <input type="checkbox"/> or Modified from <input type="checkbox"/>
Complete Course Designation		CHEM 3075 3.0	
Enrolment (Estimate or Last)		75	
Number	Lecture Sections:	1	
	Lab Sections:		
	Tutorial Sections:		
Number	Course Coordinator	1	
	Lab Demonstrator		
	Mark/Graders	1	
Prerequisites (P) Corequisites (C) Credit Exclusions (E)		(P) SC/CHEM 2021 3.0 and either SC/CHEM 2050 4.0 or BIOL 2020 3.0 or BCHM 2020 3.0. (E) SC/CHEM 3071 3.0	
For which degree program is this required (if applicable)?		Specialized Honours in Chemistry – Pharmaceutical & Biological Stream	
Other resource implications (please specify)		none	

<p><i>Reason(s) for creation/ modification/ retirement</i></p>	<p><i>Provide a replacement for CHEM 3071 3.0, for which there is no current instructor. Once a new instructor is in place, the two courses can be offered in alternate years.</i></p>		
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Library Support Statement

CHEM3075: Introduction to Drug Discovery and Development

Date: November 3, 2016

I have reviewed the course proposal and the reading list provided and find that York University Libraries will soon have the required resources to support this course.

Reading List

Richard B. Silverman. The Organic Chemistry of Drug Design and Drug Action. 3rd Edition. Publisher: Academic Press. ****ON ORDER****

Graham L. Patrick. An Introduction to Medicinal Chemistry 5th Edition. Publisher: Oxford University Press. ****IN LIBRARY****

It is strongly recommended that the books on the reading list be placed on Reserve to ensure that they are available for all students to consult during the course. Please see the following <http://www.library.yorku.ca/web/ask-services/facultyinstructor-support/places-items-on-reserve/> for information on the process. To initiate a Reserve request, please complete the form at: reserves.library.yorku.ca.

Books and Journals

Books and major journals covering relevant subjects such as chemistry, drugs, drug discovery, pharmacology, and medicine are available at York University Libraries in electronic or physical formats.

Databases

Relevant databases include SciFinder, Reaxys, Web of Science, Scopus, CINAHL, Medline (via Ovid, PubMed, Web of Science), Scholars Portal (journals and e-books), Ulrich's International Periodicals Directory, and other specialized electronic resources.

Please note that interlibrary loan and document delivery options are available through RACER should any other information needs arise. <http://www.library.yorku.ca/web/ask-services/borrow-renew-return/racer-interlibrary-loan/>

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 forward any requests for purchase to the Chemistry Subject Librarian: gennyjon@yorku.ca or submit your purchase request by using the form at <http://www.library.yorku.ca/web/suggestion-for-purchase-form/>

Library Research Support

Please note that librarians provide research skills workshops to students and faculty on request. York University Libraries also offer a series of drop-in workshops that can be counted towards a Learning Skills Services' Passport to Success. Workshop topics include:

- Introduction to Chemical Information Searching and Advanced Organic Substructure Searching,

- Formulating search strategies, searching subject specific databases and databases such as Web of Science and Medline, the library catalogue, and government sources.
- Managing references using bibliographic management systems such as Mendeley and Zotero.
- Introduction to the libraries, citations, and avoiding plagiarism.

A Chemistry Research Guide (<http://researchguides.library.yorku.ca/chemistry>) has been created and is maintained by the subject librarian to bring together online and print resources that are useful to chemistry students and faculty. Resources and links will be added upon request. A customized course guide can be prepared for students enrolled in a specific course upon request.

Students may also find the resources listed in these Research Guides useful:

Biochemistry <http://researchguides.library.yorku.ca/biochemistry>

Biology <http://researchguides.library.yorku.ca/biology>

In summary, York University Libraries are well positioned to support this course.

Sincerely,

Genny Jon, Science Librarian

Steacie Science and Engineering Library

Ext: x33927

E-mail: gennyjon@yorku.ca

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty:

Indicate all relevant
Faculty(ies)

S

Faculty of Science

Department:

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

Biology

Date of Submission:

--

Course Number:

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

ISCI 1110 6.00 (Please consider ISCI 1110/1210/1310/1410 as a block of courses)
--

Var:

Academic Credit Weight:

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

Course Title:

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

Integrated Science (Biology)

Short Title:

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

Integrated Science (Biology)

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 course primarily examines foundational topics in biology 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 ISCI 1210, ISCI 1310, and ISCI 1410. This course is Drop by Permission only.

Course Credit Exclusion: SC/BIOL 1000 3.00 Biology I – Cells, Molecular Biology and Genetics, SC/BIOL 1001 3.00 Biology II - Evolution, Ecology, Biodiversity and Conservation Biology.

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 course is the biology component of the first-year program, Integrated Science. It covers the same topics and achieves equivalent learning outcomes as the traditional first-year biology courses (BIOL 1000/1001). Broad topics are: 1) light and life; 2) the cell; 3) evolution; 4) energy and enzymes; 5) membranes and transport; 6) cellular respiration; 7) photosynthesis; 8) dna structure and replication; 9) biotechnology; 10) cell division; 11) gene expression; 12) genetics; and, 13) cell communication; 14) nature of science; 15) introduction to evolution; 16) phylogenetics; 17) history of evolutionary thought; 18) microevolutionary processes and hardy-weinburg equilibrium; 19) speciation; 20) macroevolution; 21) human evolution; 22) introduction to ecology; 23) population ecology; 24) community ecology; and, 25) ecosystem ecology/biodiversity.

Our integrated program learning outcomes are:

- 1) Critically and creatively solve disciplinary and interdisciplinary problems by integrating and applying knowledge and skills in biology, chemistry, physics and math;
- 2) Quantitatively and qualitatively reason to form conclusions and make evaluations;
- 3) Effectively communicate with different audiences using written and verbal communication;
- 4) Collaborate with others in a productive and professional manner
- 5) Use the process of scientific inquiry to make effective decisions/arguments about real-world issues, including assessment of information in the media using scientific reasoning;
- 6) Describe the nature of science, how scientific knowledge is iterative and cumulative, the process by which scientific knowledge comes to be accepted as valid, including the roles of prediction, evidence, consensus, and authority and what is, and is not, appropriate subject matter to scientific study;
- 7) Explain and illustrate the predictive power of scientific theories and how acceptance or rejection of hypotheses takes place;
- 8) Use scientific terminology with correct scientific meaning and appropriate context

Our biology learning outcomes are:

- 1) Describe the nature of light, and explain how light impacts life in different ways;
- 2) Describe the cell theory and theory of evolution, and relate these theories to each other and other biological concepts in the context of natural selection;
- 3) Relate biological structure and function at different biological levels of organization;
- 4) Compare and contrast major biochemical pathways (including cellular respiration, photosynthesis and cell signaling);
- 5) Compare and contrast different mechanisms regulating gene expression, relating genes, alleles, proteins and phenotype;
- 6) Describe processes of cellular inheritance;

- 7) Describe basic techniques used in recombinant DNA technology and their significance;
- 8) Explain, in basic terms, how evolution (via mechanisms not limited to natural selection) shapes life on Earth, the necessity of genetic variation (e.g., through mutation), and how many behavioural traits are adaptive;
- 9) Describe how populations can change over time and space through intraspecific interactions and environmental constraints;
- 10) Describe the history of evolutionary thought, and the evidence for evolution and the common ancestry of life;
- 11) Explain how phylogenetics are used to generate hypotheses about the history of life on Earth;
- 12) Describe the mechanisms by which speciation can occur, difficulties in assigning a universal definition of the term 'species', and why the term can vary between groups of organisms;
- 13) Describe the different factors that can influence population growth, explaining differences in their effects;
- 14) Describe how interspecific interactions can shape populations and the communities these populations comprise;
- 15) Relate conservation plans with evolutionary processes and population dynamics;
- 16) Describe how energy and matter flow and/or are recycled in ecosystems, and how ecosystems may change over time due to natural or human-induced processes.

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 will be delivered in a face-to-face format. Students will interact with faculty from biology, chemistry, physics and mathematics for twelve contact hours (scheduled as three 4-hour blocks) each week. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

Students iteratively progress through three stages of learning: Guided Practice; Classroom activities; and Integrated Assignments. In their Guided Practice, students learn and practice basic concepts via readings, videos, conceptual questions, and/or practice problems on their own before class. Classroom periods are started with a two-stage Readiness Assessment, a short multiple-choice quiz that tests their understanding of the basic concepts. The quiz is first completed individually, and then completed again in teams to support peer instruction. Afterwards, instructors engage the students through lecture and activities (e.g. clicker questions, team problems, discussion etc.). At the end of a module (~3-4 weeks), students complete an integrated assignment in their teams that allows them to integrate their knowledge across topics taught in the past module.

One Bethune College Peer Mentor is assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.

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. Every year, one section
2. Any Biology faculty member should be competent to teach the course
3. Dr. Nicole Nivillac and Dr. Tamara Kelly
4. Students will engage in 3 contact hours each week. Students will also complete 30 laboratory hours

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.)

Guided Practice – 5%
Readiness Assessment – 15%

- 5% Individual
- 5% Team
- 5% Peer Assessment

Integrated Assignments – 15%
Labs – 20%
Midterm Exam – 20%
Final Exam – 25%

Both the academic and lab components must be passed, independent of one another, to pass the course.

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.

Required: Russell et al (2016) Biology I: Cells, Molecular Biology and Genetics Custom Text – SC/BIOL 1000 3.0. Nelson Education Ltd.

Required: Freeman et al. Symbiosis: The Pearson Custom Library for the Biological Sciences – Biology 1001 Biology II. (2013) Pearson Learning Solutions.

Selected online resources from Youtube, Khan Academy and Simbio Simulations

- www.youtube.com
- www.khanacademy.org
- simbio.com

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.

An active learning classroom (e.g. BRG 317 or LSB 107) is required.

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.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set. This course has the same learning objectives as the traditional first-year biology courses (BIOL 1000 and 1001).

Expected enrolment: 50 students

Currently, Integrated Science – Biology is offered as two three-credit courses (ISCI 1101 and 1102) with the topics taught in the fall and winter term aligning with the BIOL 1000 and 1001 topics. This curricular design was requested to support an “exit strategy” so that Integrated Science students could drop out after the fall term, and enroll in the traditional winter term courses. Several reasons lead us to believe that an exit strategy is not needed: 1) this strategy does not apply to physics, which only offers 6.0 credit first-year courses; 2) in our first cohort of students, no one intends on switching from the small, interactive Integrated Science classes to the large traditional first-year courses; 3) a full-year curricular model is successfully employed by other integrated science programs (e.g. McMaster Integrated Science, UBC Science One) In fact, the current exit strategy serves to constrain opportunities for further curricular integration.

As a 6.0 credit course, possible additional integration points include:

- Cellular electrodynamics (Electrochemical gradients, membrane potential, ion channels, nerve conductance): Related topics - Biology: Cells (F); Chemistry: Electrochemistry (W); & Physics: Electric current (W)
- Enzyme kinetics: Related topics - Biology: Enzymes (F) & Chemistry: Reaction kinetics (W)
- Ionic interactions: Related topics - Chemistry: Ionic bonds (F) & Physics: Electrostatics (W)
- Evolutionary genetics: Related topics - Biology: Genetics (F) & Biology: Evolution (W)
- Equilibrium: Related topics - Biology: Diffusion (F); Chemistry: Reaction equilibriums (W); Physics: Statics (W)
- Light: Related topics - Biology: Life, photosynthesis (F); Chemistry: Atomic spectra (F); Physics: Electromagnetic radiation (W)

Math topics traditionally taught in the winter term (integration, differential equations, polar coordinates) would better support the other disciplines if taught earlier in the year (e.g. Integration is needed to understand energy and work in physics and chemistry (early fall topics).

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.

Library Support Statement

ISCI 1110 6.00: Integrated Science (Biology)

I have reviewed the course proposal and the supporting reading list, and find that York University Libraries (YUL) have the required resources to support this undergraduate course based on the following criteria:

- Books (including e-books), handbooks and visual resources
- Print and electronic journals
- Biology, Natural Science, Chemistry, Kinesiology & Health Sciences databases
- Library course guides and subject specific guides
- Access to other libraries' holdings through Interlibrary Loans and resource sharing
- Ongoing purchases of new library materials based on course requirements
- Librarians' assistance with finding and using research information for appropriate purposes

York Libraries have adequate resources on general biology, cell and molecular biology, bioinformatics and genetics. There are many books and visual resources on photosynthesis, ecology, biodiversity and human evolution (biology). In addition to books, we also have streaming video resources on mathematical and statistical concepts. The experiential educational resources on anatomy and physiology will be helpful to students enrolled in this course. Students and faculty can access resources on statistical methods in biology along with books on writing in the sciences, report & proposal writing. Books and e-books are also available on biochemistry and biophysics. The library catalogue is the starting point for locating all resources including material in the reading list.

Some important databases include,

- Biological Abstracts
- General Science Abstracts
- History of Science Technology & Medicine
- PubMed
- ProQuest databases
- Scopus
- Web of Science

Some of the important library guides include,

Biology: <http://researchguides.library.yorku.ca/biology>

Ecology: <http://researchguides.library.yorku.ca/ecology>

Kinesiology & Health Sciences: <http://researchguides.library.yorku.ca/kinesiology>

Data incl. Health Data: <http://researchguides.library.yorku.ca/data>

More databases: <http://www.library.yorku.ca/web/steacie/science-databases/>

In addition, [customized course guides](#) can be prepared for students enrolled in a specific course.

The Libraries subscribe to all the important Biology and Ecology journals. York University Libraries has the book mentioned in the reading list. Specific course books and other resources can be made available from the Steacie reserve desk by completing an online request form <http://www.library.yorku.ca/web/ask-services/facultyinstructor-support/places-items-on-reserve/>. Undergraduate students can request books and journal articles that are not available at York by using the interlibrary loan and document delivery system RACER: <http://www.library.yorku.ca/e/resolver/id/1534609>

Science librarians also provide library research skills through workshops on topics, including:

- Formulating search strategies and help with subject specific databases
- Critically evaluating information sources
- Writing resources
- Using & citing data resources
 - Managing and organizing references using citation management tools

The Steacie Library Teaching Lab has individual computing stations and accomodates 35 students at a time. This Lab is primarily used for delivering library research skills workshops. There may be specific areas that require additional resources. Collection development in the library is an ongoing process. It is based on a commitment to developing library resources that are in alignment with the University's curricular and research activities. Additional resources for this course will be purchased for the library. Please forward any requests for purchase to the Biology Librarian, Rajiv Nariani, at rajivn@yorku.ca.

In summary, I would state that the Steacie Science & Engineering library is well-positioned to support this undergraduate course.

Sincerely,

[Rajiv Nariani](#)

Science Librarian

102L, Steacie Science and Engineering Library

York University Libraries

York University

Toronto, ON

P: (416) 736-2100 x20396

rajivn@yorku.ca

November 25, 2016

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)

Chemistry

Date of Submission:

--

Course Number:

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

ISCI 1210 6.00 (Please consider ISCI 1110/1210/1310/1410 as a block of courses)
--

Var:

Academic Credit Weight:

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

Course Title:

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

Integrated Science (Chemistry)

Short Title:

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

Integrated Science (Chemistry)

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 course primarily examines foundational topics in chemistry 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 ISCI 1110, ISCI 1310, and ISCI 1410. This course is Drop by Permission only.

Course Credit Exclusion: SC/CHEM 1000 3.00 Chemical Structure and SC/CHEM 1001 3.00 Chemical Dynamics.

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 course is the chemistry component of the first-year program, Integrated Science. It covers the same topics and achieves equivalent learning outcomes as the traditional first-year chemistry courses (CHEM 1000/1001). Broad topics are: 1) Gases; 2) Thermochemistry; 3) Atomic Theory & Periodic Table; 4) Chemical Bonding; 5) Solids and Liquids; 6) Chemical Kinetics; 7) Chemical Equilibrium; 8) The Driving Force of Chemical Change; and, 9) Electrochemistry.

Our integrated program learning outcomes are:

- 1) Critically and creatively solve disciplinary and interdisciplinary problems by integrating and applying knowledge and skills in biology, chemistry, physics and math;
- 2) Quantitatively and qualitatively reason to form conclusions and make evaluations;
- 3) Effectively communicate with different audiences using written and verbal communication;
- 4) Collaborate with others in a productive and professional manner
- 5) Use the process of scientific inquiry to make effective decisions/arguments about real-world issues, including assessment of information in the media using scientific reasoning;
- 6) Describe the nature of science, how scientific knowledge is iterative and cumulative, the process by which scientific knowledge comes to be accepted as valid, including the roles of prediction, evidence, consensus, and authority and what is, and is not, appropriate subject matter to scientific study;
- 7) Explain and illustrate the predictive power of scientific theories and how acceptance or rejection of hypotheses takes place;
- 8) Use scientific terminology with correct scientific meaning and appropriate context

Our chemistry learning outcomes are:

- 1) Explain and predict gas behavior and properties using the gas laws, ideal gas equation, and general gas equation;
- 2) Use kinetic molecular theory to explain effusion and diffusion, and relate kinetic molecular theory and collision theory in the context of gas reactions;
- 3) Relate heat, work, and internal energy, and explain the transfer of energy as heat and work in chemical reactions using the Laws of Thermodynamics;
- 4) Describe entropy as a driving force for physical and chemical changes;
- 5) Describe atomic structure from a classical and quantum theoretical perspective, and explain how atomic orbitals combine to form chemical bonds using Valence Bond theory;
- 6) Discuss the scope and limitations of Lewis Theory, VSEPR Theory, Valence Bond theory, and Molecular Orbital theory in explaining chemical bonds, and/or the structure and reactivity of molecules. Apply these theories in the appropriate contexts;
- 7) Describe intermolecular forces (van der Waals forces, London

dispersion forces, dipole-dipole interactions), relate intermolecular forces to states of matter and their properties, and describe changes between states of matter using phase diagrams;
8) Describe chemical reactions in terms of mechanisms and rates;
9) Apply the principles of chemical equilibrium to acids and bases and complex ions;
10) Describe the conversion of chemical energy into electrical energy and vice versa.

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 will be delivered in a face-to-face format. Students will interact with faculty from biology, chemistry, physics and mathematics for twelve contact hours (scheduled as three 4-hour blocks) each week. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

Students cycle through four stages of learning: Guided Practice; Classroom activities; Homework; and Integrated Assignments. In their Guided Practice, students learn and practice basic concepts via readings, videos, conceptual questions, and/or practice problems on their own before class. Classroom periods are started with a two-stage Readiness Assessment, a short multiple-choice quiz that tests their understanding of the basic concepts. The quiz is first completed individually, and then completed again in teams to support peer instruction. Afterwards, instructors engage the students through lecture and activities (e.g. clicker questions, team problems, discussion etc.). Weekly or bi-weekly homework assignments allow students to review and practice both basic and advanced concepts. At the end of a module (~3-4 weeks), students complete an integrated assignment in their teams that allows them to integrate their knowledge across topics taught in the past module.

One Bethune College Peer Mentor is assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.

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.

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

1. Every year, one section
2. Any Chemistry faculty member should be competent to teach the course
3. Dr. Bill Pietro
4. Students will engage in 3 contact hours each week. Students will also complete 36 laboratory hours over the year.

Guided Practice – 5%

Readiness Assessment – 15%

- 5% Individual
- 5% Team
- 5% Peer Assessment

Homework – 10%

Integrated Assignments – 15%

Labs – 20%

Midterm Exam – 15%

Final Exam – 20%

Both the academic and lab components must be passed, independent of one another, to pass the course.

Required: Petrucci, Herring, Madura, Bissonnette (2011) General Chemistry: Principles and Modern Applications – Revised Custom Edition for York University Chem 1000/1001/1500. Pearson Learning Solutions.

Mastering Chemistry

Selected online resources from Youtube and Khan Academy

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.

- www.youtube.com
- www.khanacademy.org

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.

An active learning classroom (e.g. BRG 317 or LSB 107) is required.

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.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set. This course has the same learning objectives as the traditional first-year chemistry courses (CHEM 1000 and 1001).

Expected enrolment: 50 students

Currently, Integrated Science – Chemistry is offered as two three-credit courses (ISCI 1201 and 1202) with the topics taught in the fall and winter term aligning with the CHEM 1000 and 1001 topics. This curricular design was requested to support an “exit strategy” so that Integrated Science students could drop out after the fall term, and enroll in the traditional winter term courses. Several reasons lead us to believe that an exit strategy is not needed: 1) this strategy does not apply to physics, which only offers 6.0 credit first-year courses; 2) in our first cohort of students, no one intends on switching from the small, interactive Integrated Science classes to the large traditional first-year courses; 3) a full-year curricular model is successfully employed by other integrated science programs (e.g. McMaster Integrated Science, UBC Science One) In fact, the current exit strategy serves to constrain opportunities for further curricular integration.

As a 6.0 credit course, possible additional integration points include:

- Cellular electrodynamics (Electrochemical gradients, membrane potential, ion channels, nerve conductance): Related topics - Biology: Cells (F); Chemistry: Electrochemistry (W); & Physics: Electric current (W)
- Enzyme kinetics: Related topics - Biology: Enzymes (F) & Chemistry: Reaction kinetics (W)
- Ionic interactions: Related topics - Chemistry: Ionic bonds (F) & Physics: Electrostatics (W)
- Evolutionary genetics: Related topics - Biology: Genetics (F) & Biology: Evolution (W)
- Equilibrium: Related topics - Biology: Diffusion (F); Chemistry: Reaction equilibria (W); Physics: Statics (W)
- Light: Related topics - Biology: Life, photosynthesis (F); Chemistry: Atomic spectra (F); Physics: Electromagnetic radiation (W)

Math topics traditionally taught in the winter term (integration, differential equations, polar coordinates) would better support the other disciplines if taught earlier in the year (e.g. Integration is needed to understand energy and work in physics and chemistry (early fall topics).

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.

Library Support Statement

ISCI 1210 6.00: Chemistry

Date: November 25, 2016

I have reviewed the course proposal and the reading list provided and find that York University Libraries will soon have the required resources to support this course.

Reading List and Complementary Materials

Petrucci, Herring, Madura, Bissonnette. (2011). *General Chemistry: Principles and Modern Applications – Revised Custom Edition for York University Chem 1000/1001/1500*. Upper Saddle River, N.J.: Pearson Learning Solutions. – 2013 edition on Reserve in library

Molecular modelling kits, calculators, and other non-book materials are available on Reserve at Steacie Library.

It is important to verify that the books on the reading list are available on Reserve prior to the beginning of the course to ensure that they are available for all students to consult during the duration of the course. Please see the following <http://www.library.yorku.ca/web/ask-services/facultyinstructor-support/places-items-on-reserve/> for information on the Reserve process. To initiate a Reserve request, please complete the form at: reserves.library.yorku.ca.

Books and Journals

A variety of books, study guides such as Schaum's Outlines, and major journals on the subject of chemistry and related subjects are available at York University Libraries in electronic or physical formats.

Databases

Relevant databases for researching chemistry and science literature include SciFinder, Reaxys, Web of Science, Scopus, Scholars Portal (journals and e-books), Ulrich's International Periodicals Directory, and other specialized electronic resources.

Please note that interlibrary loan and document delivery options are available through RACER should any other information needs arise. Interlibrary loans can be accessed via:

<http://www.library.yorku.ca/web/ask-services/borrow-renew-return/racer-interlibrary-loan/>

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 forward any requests for purchase to the Chemistry Subject Librarian: gennyjon@yorku.ca or submit your purchase request by using the form at <http://www.library.yorku.ca/web/suggestion-for-purchase-form/>

Library Research Support

Please note that librarians provide research skills workshops to students and faculty on request. York University Libraries also offer a series of drop-in workshops that can be counted towards a Learning Skills Services' Passport to Success. Workshop topics include:

- Introduction to Chemical Information Searching and Advanced Organic Substructure Searching
- Formulating search strategies, searching subject specific databases and databases such as Web of Science and Medline, the library catalogue, and government sources.
- Managing references using bibliographic management systems such as Mendeley and Zotero.
- Introduction to the libraries, citations, and avoiding plagiarism.

A Chemistry Research Guide (<http://researchguides.library.yorku.ca/chemistry>) has been created and is maintained by the subject librarian to bring together online and print resources that are useful to chemistry students and faculty. Resources and links will be added upon request. A customized course guide can be prepared for students enrolled in a specific course upon request.

Students in the Integrated Science program may also find the resources listed in these Research Guides useful:

Biology <http://researchguides.library.yorku.ca/biology>

Mathematics <http://researchguides.library.yorku.ca/mathematics>

Physics <http://researchguides.library.yorku.ca/physics>

In summary, York University Libraries are well positioned to support this course.

Sincerely,

Genny Jon, Science Librarian
Steacie Science and Engineering Library
Ext: x33927
E-mail: gennyjon@yorku.ca

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)

Physics and Astronomy

Date of Submission:

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

ISCI 1310 6.00
(Please consider ISCI
1110/1210/1310/1410 as a
block of courses)

Var:

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

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

Integrated Science (Physics)

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

Integrated Science (Physics)

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 course primarily examines foundational topics in physics 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 ISCI 1110, ISCI 1210, and ISCI 1410. This course is Drop by Permission only. Course Credit Exclusion: SC/PHYS 1010 6.00 Physics

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 course is the physics component of the first-year program, Integrated Science. It covers the same topics and achieves equivalent learning outcomes as the traditional first-year physics course (PHYS 1010). Broad topics are: 1) Motion in one, two and three dimensions; 2) Newton's Laws; 3) Energy; 4) Linear Momentum, Collisions, and Systems of Particles; 5) Rotational Dynamics; 6) Gravitation; 7) Oscillations; 8) Waves; 9) Electricity and Circuits; 10) Magnetic Fields; 11) Electromagnetic Induction; and, 12) Electromagnetic Waves

Our integrated program learning outcomes are:

- 1) Critically and creatively solve disciplinary and interdisciplinary problems by integrating and applying knowledge and skills in biology, chemistry, physics and math;
- 2) Quantitatively and qualitatively reason to form conclusions and make evaluations;
- 3) Effectively communicate with different audiences using written and verbal communication;
- 4) Collaborate with others in a productive and professional manner
- 5) Use the process of scientific inquiry to make effective decisions/arguments about real-world issues, including assessment of information in the media using scientific reasoning;
- 6) Describe the nature of science, how scientific knowledge is iterative and cumulative, the process by which scientific knowledge comes to be accepted as valid, including the roles of prediction, evidence, consensus, and authority and what is, and is not, appropriate subject matter to scientific study;
- 7) Explain and illustrate the predictive power of scientific theories and how acceptance or rejection of hypotheses takes place;
- 8) Use scientific terminology with correct scientific meaning and appropriate context

Our physics learning outcomes are:

- 1) Explain Newton's laws of motion, and relate force, mass and motion;
- 2) Solve rotational dynamics problems using the work-mechanical energy approach, force-torque approach, and conservation of angular momentum;
- 3) Relate the principle of conservation of mechanical energy to the work done by a constant force, variable force and a spring;
- 4) Apply the laws of conservation of momentum and energy to collisions;
- 5) Solve problems using Newton's law of universal gravitation;
- 6) Describe oscillatory motion, apply the conservation of mechanical energy to a simple harmonic oscillator, and identify and describe situations when resonance occurs;
- 7) Describe wave motion as a multivariable function, relate Newton's laws to wave motion, and examine different wave behaviours in a variety of mediums;
- 8) Describe the relationship between magnetic and electric fields according to Maxwell's equations

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 will be delivered in a face-to-face format. Students will interact with faculty from biology, chemistry, physics and mathematics for twelve contact hours (scheduled as three 4-hour blocks) each week. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

Students cycle through four stages of learning: Guided Practice; Classroom activities; Homework; and Integrated Assignments. In their Guided Practice, students learn and practice basic concepts via readings, videos, conceptual questions, and/or practice problems on their own before class. Classroom periods are started with a two-stage Readiness Assessment, a short multiple-choice quiz that tests their understanding of the basic concepts. The quiz is first completed individually, and then completed again in teams to support peer instruction. Afterwards, instructors engage the students through lecture and activities (e.g. clicker questions, team problems, discussion etc.). Weekly or bi-weekly homework assignments allow students to review and practice both basic and advanced concepts. At the end of a module (~3-4 weeks), students complete an integrated assignment in their teams that allows them to integrate their knowledge across topics taught in the past module.

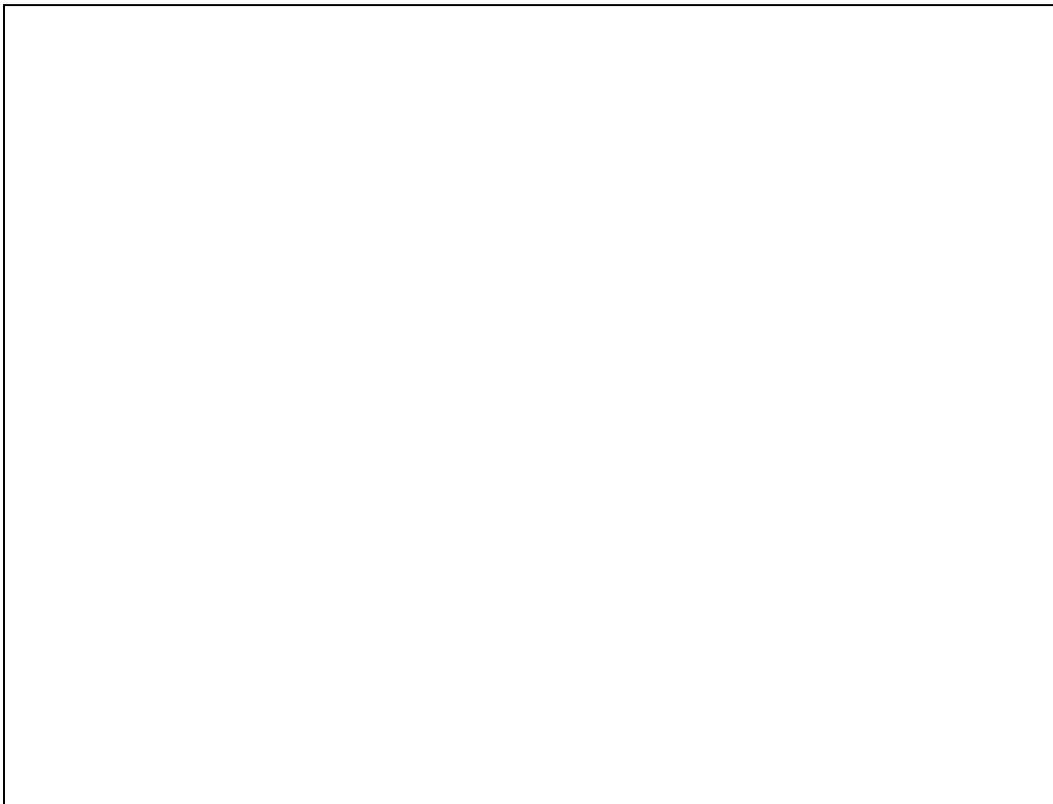
One Bethune College Peer Mentor is assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.

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

1. Every year, one section
2. Any Physics faculty member should be competent to teach the course
3. Dr. Chris Bergevin or Dr. Scott Menary
4. Students will engage in 3 contact hours each week. Students will also complete 30 laboratory hours over the year.

students are likely to spend engaged in 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.)

- Guided Practice – 5%
- Readiness Assessment – 15%
 - 5% Individual
 - 5% Team
 - 5% Peer Assessment
- Homework – 10%
- Integrated Assignments – 15%
- Labs – 20%
- Midterm Exam – 15%
- Final Exam – 20%

Both the academic and lab components must be passed, independent of one another, to pass the course.

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

Required: Wolfson, R. (2016). Essential University Physics: Volumes 1 and 2. Pearson Education, Inc.

Selected online resources (e.g.) Youtube, Khan Academy and PhET Simulations

- www.youtube.com
- www.khanacademy.org
- <http://phet.colorado.edu>

Mastering Physics

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.

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.

An active learning classroom (e.g. BRG 317 or LSB 107) is required.

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.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set. This course has the same learning objectives as the traditional first-year physics courses (PHYS 1010).

Expected enrolment: 50 students

Currently, Integrated Science – Physics is offered as two three-credit courses (ISCI 1301 and 1302) with the topics taught in the fall and winter term aligning with the PHYS 1010 topic order. This curricular design was requested to support an “exit strategy” so that Integrated Science students could drop out after the fall term, and enroll in the traditional winter term courses. Several reasons lead us to believe that an exit strategy is not needed: 1) this strategy does not apply to physics, which only offers 6.0 credit first-year courses; 2) in our first cohort of students, no one intends on switching from the small, interactive Integrated Science classes to the large traditional first-year courses; 3) a full-year curricular model is successfully employed by other integrated science programs (e.g. McMaster Integrated Science, UBC Science One) In fact, the current exit strategy serves to constrain opportunities for further curricular integration.

As a 6.0 credit course, possible additional integration points include:

- Cellular electrodynamics (Electrochemical gradients, membrane potential, ion channels, nerve conductance): Related topics - Biology: Cells (F); Chemistry: Electrochemistry (W); & Physics: Electric current (W)
- Enzyme kinetics: Related topics - Biology: Enzymes (F) & Chemistry: Reaction kinetics (W)
- Ionic interactions: Related topics - Chemistry: Ionic bonds (F) & Physics: Electrostatics (W)
- Evolutionary genetics: Related topics - Biology: Genetics (F) & Biology: Evolution (W)
- Equilibrium: Related topics - Biology: Diffusion (F); Chemistry: Reaction equilibriums (W); Physics: Statics (W)
- Light: Related topics - Biology: Life, photosynthesis (F); Chemistry: Atomic spectra (F); Physics: Electromagnetic radiation (W)

Math topics traditionally taught in the winter term (integration, differential equations, polar coordinates) would better support the other disciplines if taught earlier in the year (e.g. Integration is needed to understand energy and work in physics and chemistry (early fall topics)

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: Lauren Grant, Educational Development Specialist, Faculty of Science
From: John Dupuis, Physics and Astronomy Librarian
Re: ISCI 1310 – Integrated Science (Physics)
Date: November 25, 2016

I have reviewed the course proposal and attached **ISCI 1310 – Integrated Science (Physics)** 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 research assignments:

- A librarian can go to the classroom or tutorial and help introduce students to the various resources available at the library including ejournals, ebooks and databases. Many students are not aware of what they can access for free.
- A librarian can also introduce students to research techniques, including how to evaluate Internet sources for use in scholarly research.

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

- **Access Engineering** – An extensive engineering and science ebook package which includes online versions of all the Schaum's Outline Series books, including the ones relevant for physics undergraduates.
- **Books24x7 Engineering Pro** – an extensive ebook package with valuable information for all technology subject areas
- **Scholars Portal Journals** is an interdisciplinary article database that makes it very easy for undergraduates to find reliable scholarly sources.
- **INSPEC** is a bibliographic database that specialized in physics, computer and electrical engineering.
- **Mendeley and Zotero** are bibliographic citation tools that are supported by Steacie Library and can be valuable for students to track their reading for their papers and assignments. Training is available.

Please note that the Steacie Library also has extensive collections of basic books in all areas of physics.

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)

Faculty of Science

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

Mathematics and Statistics

Date of Submission:

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

ISCI 1410 6.00
(Please consider ISCI
1110/1210/1310/1410 as a
block of courses)

Var:

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

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

Integrated Science (Mathematics)

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

Integrated Science (Mathematics)

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 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 ISCI 1110, ISCI 1210, and ISCI 1310. This course is Drop by Permission only. Course Credit Exclusion: SC/MATH 1013 3.00 Applied Calculus I and SC/MATH 1014 3.00 Applied Calculus II.

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 course is the mathematics component of the first-year program, Integrated Science. It covers the same topics and achieves equivalent learning outcomes as the traditional first-year physics course (PHYS 1010). Broad topics are: 1) Functions and Models; 2) Limits and Derivatives; 3) Differentiation; 4) Integration; 5) Differential Equations; 6) Parametric Equations and Polar Coordinates; and, 7) Infinite Sequences and Series

Our integrated program learning outcomes are: 1) Critically and creatively solve disciplinary and interdisciplinary problems by integrating and applying knowledge and skills in biology, chemistry, physics and math;

2) Quantitatively and qualitatively reason to form conclusions and make evaluations;

3) Effectively communicate with different audiences using written and verbal communication;

4) Collaborate with others in a productive and professional manner

5) Use the process of scientific inquiry to make effective decisions/arguments about real-world issues, including assessment of information in the media using scientific reasoning;

6) Describe the nature of science, how scientific knowledge is iterative and cumulative, the process by which scientific knowledge comes to be accepted as valid, including the roles of prediction, evidence, consensus, and authority and what is, and is not, appropriate subject matter to scientific study;

7) Explain and illustrate the predictive power of scientific theories and how acceptance or rejection of hypotheses takes place;

8) Use scientific terminology with correct scientific meaning and appropriate context

Our mathematics learning outcomes are: 1) Appropriately develop and interpret limits, and use them to analyze continuous and differentiable functions; 2) Compute first and higher order derivatives and sketch graphs of functions; 3) Identify and employ the appropriate tools and techniques in differential calculus to solve problems on related rates and optimization; 4) Define the definite integral in terms of Riemann sums and interpret it as an area; 5) Explain the Fundamental Theorem of Calculus, and use it to compute definite integrals; 6) Distinguish between the indefinite and definite integral; and 7) Evaluate definite and indefinite integrals using the appropriate techniques at hand; 8) Identify the appropriate integration techniques needed to solve a problem; 9) Evaluate improper integrals using the appropriate techniques at hand; 10) Develop the appropriate integrals in rectangular and polar coordinates for areas of planar regions, volumes and surface areas of solids; 11) Compute areas of specific planar regions, surface areas and volumes of solids arising in sciences and engineering; 12) Solve initial value problems for first-order differential equations and integral equations that can be reduced to first-order differential equations; 13) Test for convergence and divergence of sequences and infinite series;

and 14) Represent functions in terms of power series and Taylor series

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 will be delivered in a face-to-face format. Students will interact with faculty from biology, chemistry, physics and mathematics for twelve contact hours (scheduled as three 4-hour blocks) each week. Students will also participate in biology, chemistry and physics laboratories in specific Integrated Science laboratory sections.

Students cycle through four stages of learning: Guided Practice; Classroom activities; Homework; and Integrated Assignments. In their Guided Practice, students learn and practice basic concepts via readings, videos, conceptual questions, and/or practice problems on their own before class. Classroom periods are started with a two-stage Readiness Assessment, a short multiple-choice quiz that tests their understanding of the basic concepts. The quiz is first completed individually, and then completed again in teams to support peer instruction. Afterwards, instructors engage the students through lecture and activities (e.g. clicker questions, team problems, discussion etc.). Weekly or bi-weekly homework assignments allow students to review and practice both basic and advanced concepts. At the end of a module (~3-4 weeks), students complete an integrated assignment in their teams that allows them to integrate their knowledge across topics taught in the past module.

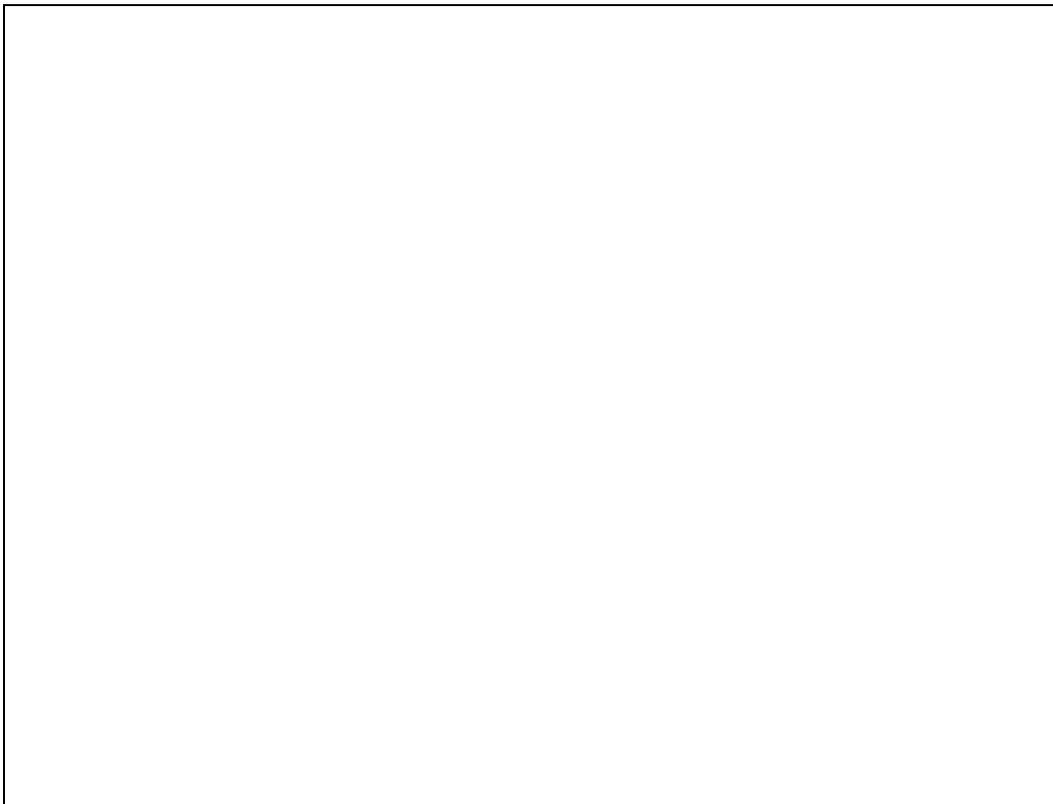
One Bethune College Peer Mentor is assigned to the Integrated Science cohort to provide students with the resources needed to develop their academic skills for success in university.

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

1. Every year, one section
2. Any Mathematics faculty member should be competent to teach the course
3. Dr. Neal Madras
4. Students will engage in 3 contact hours each week.

students are likely to spend engaged in 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.)

- Guided Practice – 5%
- Readiness Assessment – 15%
 - 5% Individual
 - 5% Team
 - 5% Peer Assessment
- Homework – 10%
- Integrated Assignments – 15%
- Midterm Exam 1 – 15%
- Midterm Exam 2 – 15%
- Final Exam – 25%

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

Required: Stewart (2012) Calculus: Early Transcendentals, Seventh Edition. Brooks/Cole, Cengage Learning.

Selected online resources (e.g.) Youtube, Khan Academy and PhET Simulations

- www.youtube.com
- www.khanacademy.org
- <http://phet.colorado.edu>

WebAssign

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.

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.

An active learning classroom (e.g. BRG 317 or LSB 107) is required.

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.

By taking an integrated approach, this course will enable students to see and explore the connections between biology, chemistry, physics and mathematics in the context of societal issues and problems. The ability to approach large societal issues and problems from an interdisciplinary perspective is an essential skill for science students to develop as part of their scientific literacy skill set. This course has the same learning objectives as the traditional first-year calculus courses (MATH 1013/1014).

Expected enrolment: 50 students

Currently, Integrated Science – Mathematics is offered as two three-credit courses (ISCI 1401 and 1402) with the topics taught in the fall and winter term aligning with MATH 1013 and 1014. This curricular design was requested to support an “exit strategy” so that Integrated Science students could drop out after the fall term, and enroll in the traditional winter term courses. Several reasons lead us to believe that an exit strategy is not needed: 1) this strategy does not apply to physics, which only offers 6.0 credit first-year courses; 2) in our first cohort of students, no one intends on switching from the small, interactive Integrated Science classes to the large traditional first-year courses; 3) a full-year curricular model is successfully employed by other integrated science programs (e.g. McMaster Integrated Science, UBC Science One) In fact, the current exit strategy serves to constrain opportunities for further curricular integration.

As a 6.0 credit course, possible additional integration points include:

- Cellular electrodynamics (Electrochemical gradients, membrane potential, ion channels, nerve conductance): Related topics - Biology: Cells (F); Chemistry: Electrochemistry (W); & Physics: Electric current (W)
- Enzyme kinetics: Related topics - Biology: Enzymes (F) & Chemistry: Reaction kinetics (W)
- Ionic interactions: Related topics - Chemistry: Ionic bonds (F) & Physics: Electrostatics (W)
- Evolutionary genetics: Related topics - Biology: Genetics (F) & Biology: Evolution (W)
- Equilibrium: Related topics - Biology: Diffusion (F); Chemistry: Reaction equilibriums (W); Physics: Statics (W)
- Light: Related topics - Biology: Life, photosynthesis (F); Chemistry: Atomic spectra (F); Physics: Electromagnetic radiation (W)

Math topics traditionally taught in the winter term (integration, differential equations, polar coordinates) would better support the other disciplines if taught earlier in the year (e.g. Integration is needed to understand energy and work in physics and chemistry (early fall topics)

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.

Library statement for ISCI 1410 (Integrated Science (Mathematics))

William Denton

29 November 2016

I have reviewed the course proposal for ISCI 1410 (Integrated Science (Mathematics)) and can state that York University Libraries (YUL) has the required resources to support this undergraduate course through the following:

- books (print and online), encyclopædias and handbooks,
- access to all YUL holdings, and
- ongoing purchases of new resources based on course requirements.

The bibliography lists one textbook, Stewart's *Calculus: Early Transcendentals*, in the now outdated 2012 seventh edition. We have many copies of it and of the 2016 eighth edition. We also have a number of other introductory calculus textbooks, where students can find the same information presented in different ways, and many problem workbooks such as Schaum's Outlines should they want to do practice problem sets. Books 24x7¹ will be a good source of ebooks.

We also have a research guide for mathematics.²

Collection development is an ongoing process based on a commitment to developing library resources that are in alignment with the university's curricular and research activities. Additional resources can be purchased for the library. Please forward any requests for purchase to me.

The Steacie Science and Engineering Library is well positioned to support this course.

Respectfully submitted,

William Denton <wdenton@yorku.ca>
Associate Librarian
102N Steacie Science and Engineering Library, x20006

¹<http://ezproxy.library.yorku.ca/login?url=http://library.books24x7.com/bookshelf.asp>

²<http://researchguides.library.yorku.ca/mathematics>

PROGRAM CLOSURE, MATHEMATICS FOR COMMERCE PROGRAM, DEPARTMENT OF
MATHEMATICS AND STATISTICS, FSC

In line with the ‘Honours and Specialized Honours B.A. in Actuarial Science (AC)’ proposal, we intend to close all current streams of the Mathematics for Commerce (MATC) program in the Department of Mathematics and Statistics (DMS). We further discuss this closure in more detail.

- 1. Program:** Mathematics for Commerce (MATC)
- 2. Degree designation:** B.A.
- 3. Type of modification:** Program closure
- 4. Effective date:** Fall term, 2017
- 5. Rationale including alignment with academic plans:** The reason for closing MATC is the rebranding of its AC streams (see, ‘Honours and Specialized Honours B.A. in Actuarial Science (AC)’ proposal for more details, including the alignment with the University/Faculty Academic Plans.)
- 6. Impact on other units:** NA
- 7. Impact of closure on students currently enrolled in the program including an outline of the provisions for students to complete their programs, timelines, and availability to transfer credits to other programs:** All students currently enrolled in MATC will be accommodated to ease the transition. More specifically
 - All AC students will be able to complete their Bachelor’s of MATC degree using the original (year of admission) University Calendar with no restriction of time. The students who started in MATC after 2010 will be offered to graduate with either Bachelor’s in MATC or Bachelor’s in AC;
 - All Operations Research (OR) students will be able to complete their degree based on the original (year of admission) University Calendar with no restriction of time;
 - All three-year B.A. students will be able to complete their degree based on the original (year of admission) University Calendar with no restrictions of time;
 - All Honours MATC students who will not be able to maintain the required cumulative GPA after the new AC major comes into effect, will have the choice to either graduate with the three-year B.A. in MATC or the three-year B.A. in Statistics.
- 8. Impact on faculty members:** NA

9. General implications for the quality and diversity of academic programming: The AC streams of the current MATC will run as a stand alone major; the Statistics Curriculum Committee in the DMS voted in favour of offering the OR stream under the general umbrella of the Statistics program; as a result of the last Cyclical Review, the DMS looks to unify all three-year B.A.'s into one, and the Departmental Curriculum Committee is serious in pursuing this goal. All in all, we do not see any harm in the closure of MATC. On the contrary, the conversion of the highly successful AC streams of MATC into a stand alone major is to further enhance the comprehensive portfolio of high quality academic programs offered by the FSc in particular and York University in general.

CHANGES TO THE MATHEMATICS FOR COMMERCE PROGRAM, DEPARTMENT OF
 MATHEMATICS AND STATISTICS, FSC
 HONOURS AND SPECIALIZED HONOURS B.A. IN ACTUARIAL SCIENCE

The purpose of this proposal is the rebranding of the Actuarial Science (AC) stream of the Mathematics for Commerce (MATC) undergraduate program within the Department of Mathematics and Statistics (DMS). We feel that the proposed changes are to further leverage the growth and bloom of AC at York University. Needless to say, the proposal has been approved by all relevant parties in the DMS. It is worthwhile noticing that the immediate consequences of this proposal is the closure of MATC, and as such the discontinuation of two of its current streams. More specifically, these are: (1) Honours B.A. in MATC, Operations Research (OR) stream - the Curriculum Committee of the Statistics Section in the DMS has voted in favour of offering OR under the umbrella of the Statistics program, and (2) B.A. in MATC, three-years - one of the recommendations of the last cyclical review was to unify all the existing three-year programs in the department. The Curriculum Committee of the DMS is serious in pursuing this direction.

AC is the area of mathematics that applies quantitative methods to assess risks in the insurance and finance industries. It became a formal discipline in the late 17th century, when the increased demand for such long-term insurance coverages as life insurances, annuities and burials expenses coverages emerged. Since then and for a long time, actuaries have been mainly interested in studying the present monetary value of future obligations as well as the variability of these present values in the contexts of life and health, property and casualty insurances, pension funds and social wealth-fare programs. Today actuaries are also being employed in the areas of enterprise risk management, and even in general finance and investment. Overall, the importance of AC is evident from numerous empirical studies, which conclude that a sound national insurance market is an essential characteristic of economic growth.

In what follows we describe the proposal in more detail. For this, we note in passing that we will (1) discontinue all the existing streams of the MATC program; and (2) reestablish the Actuarial Science stream of MATC as a stand alone major in AC that comprises Honours and Specialized Honours in Actuarial Science.

1. Program: Mathematics for Commerce

2. Degree designation: B.A.

3. Type of modification: This has been deemed a ‘major change of an existing program’ via consultations with Alice Pitt - VP Academic, Julie Parna - Director, Strategic Academic Initiatives, and Peter Cribb - former AD Students at the FSc.

4. Effective date: Fall term, 2017.

5. General descriptions of the changes: We propose to:

- (a) close all the existing streams of MATC;
- (b) rebrand the presently existing Honours and Specialized Honours AC streams of MATC into stand alone AC majors.

6. Rationale: The AC stream of MATC has been doing quite well for at least last seven years. For instance, the enrolments during the aforementioned period nearly doubled, the program was ranked highest among other programs within the DMS in the AAPR exercise, connections with relevant employers in the GTA area resulted in internship placements of the third and fourth year students (six students in 2015-2016, ten students so far in 2016-2017), a new faculty member with research interests in AC was hired. The accomplishments have arguably become possible due to a significantly reworked and enriched curriculum (since 2009-2010), and the realization of some links with alumni within the insurance/finance industry.

A few years ago, the FSc Dean's Office (Peter Cribb back then) asked to convert the AC stream into a stand-alone program, which would improve the visibility and marketability of AC at York. The conversion also aligns well with the plan of the DMS to apply for the designation of the Center of Actuarial Excellence (CAE), conferred by the Society of Actuaries (SoA). In this respect, schools must offer an identifiable major in AC - among other criteria - to apply for the CAE title.

7. Alignment with the University/Faculty Academic Plans: The changes are very well aligned with the University/Faculty goals. For instance:

(a) *Innovative quality programs for academic excellence.* We will continue investing efforts in enhancing the AC undergraduate curriculum. Our aspirations herein are to have a top professional degree of its kind in Canada and internationally.

(b) *Advancing exploration, innovation and achievement in scholarship, research and related creative activities.* The successes of the AC stream in finding partners in the insurance/finance sector arose in parts from the joint industry-academia research projects with undergraduate students involved (through, e.g., NSERC USRA, York RAY, etc). The list of Faculty Members associated with the AC stream boasts, e.g., a Fellow of the Institute of Mathematical Statistics, a Fortis Chair Prize laureate, as well as Associate Editors of respectful international journals. To keep up the momentum, we have recently proposed a new Organized Research Unit - Risk and Insurance Studies Centre (RISC) York University. RISC York will be a national and international research hub that pursues a holistic

approach to the field of Insurance and related topics, and as such, it is heavily intertwined with the AC program.

(c) *Enhanced quality in teaching and student learning.* We will keep creating experiential learning opportunities for the students interested in research or applications in the area of Actuarial Science. We note in this respect, that the placement rates with just Sun Life Financial have been very good so far (six undergraduate students in 2015-2016, and ten undergraduate students in 2016-2017). We hope to have more placements within Mercer (an interviewing event on campus is scheduled in late January), and via the Risk and Insurance Management Society (RIMS) (we hosted Mari-Jo Hill, a professional member of the RIMS in November 2016, and some discussions started). In addition, RISC York will engage AC students in its research projects.

8. Changes in the program and the associated learning outcomes: We only introduce very minor changes to the content of the AC stream. In fact, we are quite happy with its current form. The learning outcomes of the new AC program are thus going to be identical to the ones of the AC stream, with the emphasis on the preparation for a successful career in the area of Actuarial Science and Financial Risk Management.

The learning outcomes of the new AC program span all the items listed below:

(a) *Depth and breadth of knowledge, knowledge of methodologies, and application of knowledge.* Graduates are expected to have a critical understanding of the fundamental concepts of the disciplines, various methodologies and applications. More precisely, they should be able to:

- (●) display solid knowledge of the mathematical foundations of AC for a well developed capacity to perform analyses leading, e.g., to proving theoretical results, finding exact where possible and approximate where necessary solutions to problems, assessing these solutions for efficiency, determining whether better solutions are obtainable, etc. Briefly speaking, this part of the curriculum provides the graduates with the basic tools required to understand the existing formal models and to develop new ones;

- (●) demonstrate strong grounding in the concepts and skills of notions of statistical theory, such as, e.g., variability and its impact on decision making, data quality and ways to measure the quality of data, modelling and stages involved in it. This part of the curriculum is to ensure that the graduates grasp not only the ways of setting up quantitative models to describe phenomena of interest in AC, but also deeply comprehend these models' further fitting, validation, comparison and improvements;

- (●) show solid conception of the notions of the microeconomic principles underlying financial markets and instruments, as well as the macroeconomic role of AC. This part of the curriculum aims at exposing the graduates to an alternative (economic) perception of

the notion of risk, and it depicts a broader picture of modern societies with the Actuarial Science being an inevitably important building block;

(●) display good grasp in the skills of computer programming with an emphasis on object oriented coding languages by demonstrating an intellectual understanding of the key principles of algorithm design, efficient programming principles, and debugging. This part of the curriculum further contributes to the capacity of the graduates to solve real world problems, especially when numerical ways are to be pursued. The Actuarial Science field has gone through revolutionary changes during the last thirty years due to in part the proliferation of high speed computers, and the computer programming constituent of the curriculum should not therefore be underestimated.

(b) *Communication skills.* Graduates will have shown the ability to collect, assemble, analyze and present information, arguments and analyses to a range of audiences including colleagues and team members, faculty.

(c) *Awareness and limitations of knowledge.* Graduates will have displayed a substantial understanding of the limitations of what AC can and cannot do, and the ability to distinguish between what it inherently cannot accomplish from what it might be able to achieve in the future with advances of scientific methodologies and computing.

(d) *Autonomy and professional capacity.* Graduates will show an appreciation and ability to take legal and ethical implications into account, to demonstrate professionalism, to manage both independent and team projects effectively, and to learn independently through research and other means.

We further map the aforementioned learning outcomes to the courses offered to the Honours and Specialized Honours B.A. AC students.

(a.1) *Depth and breadth of knowledge.* The essential and foundational elements of the discipline are first conveyed by two sets of courses in the mathematical foundations of AC, and in the specifics of basic AC.

(●) The mathematical foundations of AC are taught in differential and integral calculus with applications (MATH 1300/1310/2310), linear algebra (MATH 1021/2022), probability theory (MATH 2030/4430 or MATH 2030/4431), mathematical statistics (MATH 1131/2131/3131/3132). These courses are mandatory to all Honours students. A rigorous introduction to real analysis (MATH 2001), and the theory of differential equations (MATH 2270) are mandatory to all Specialized Honours students and open to highly motivated Honours students. These courses prepare the graduates for Exam P of the SoA;

(●) Classical specific foundations of AC are taught in the mathematical theory of interest (MATH 2280) and the mathematics of life contingencies 1 (MATH 3280). The former introduces elementary, but pivotally important objects such as time value of money, annuities with non-contingent payments, loans and bonds, while the latter exposes the graduates to the aspects of mathematical modeling of the future life-time of an individual, or more generally, of a group of individuals having independent or interdependent future life-times, and it also extensively employs the International Actuarial Notation (IAN), the language actuaries have been using for years. We note in passing that the courses are mandatory to all Honours students, and they are essential for passing the SoA Exams FM and MLC.

Then, building on the pillars above, The following courses introduce a number of modern concepts of the AC curriculum:

(●) The mathematics of life contingencies II (MATH 3281) exposes the students to the world of life insurance, a prominent and arguably the oldest area of the application of AC. Notions of assurances and annuities with contingent payments are treated probabilistically and with the help of the topics learned in MATH 2131/2280/3280. The students explore ways to measure and price actuarial risks, as well as to maintain the reserves of insurance companies in accordance with regulation requirements. The course is mandatory to all Honours students and, when accompanied by MATH 3280 and MATH 4430 (or MATH 4431), prepares the graduates for passing Exam MLC of the SoA;

(●) Risk theory 1 (MATH 4280) aims at non-life (property and casualty) aspects of AC as well as at the discipline's newer role in enterprise risk management. The goals of the course are twofold in this respect: the graduates first learn to model the frequency and severity of insurance risks and to assess the adequateness of their models, and they study risk measurement and pricing of insurance risks thereafter. The course is mandatory to all Honours students, and, along with MATH 3131/3132 and MATH 4281, covers the material required for Exam C of the SoA;

(●) Introduction to computing (LE/EECS 1560) is mandatory to all Honours students, and it is to be taken in an early stage of the degree. In addition, students are advised to enroll in the computational methods for finance (MATH 4143), which is a requirement in the Specialized Honours B.A. degree. Another related available course is MATH 4930B that covers simulation and Monte Carlo methods;

(●) Data analysis employing regression models (MATH 3330) and time series models (MATH 4130B) are two courses, which expose the students to a variety of techniques in Applied Statistics. Graduates with B and better standing in these two courses are exempted from the Validation by Educational Experience (VEE) part of the SoA exams;

(●) Basic economics core courses, that are relevant to AC, i.e., microeconomic and macroeconomic theories (ECON 1000/1010/2300/2350) are recommended as elective credits in both streams, and given good (B or higher) standing, these courses can be used to satisfy the VEE requirement in Economics of the SoA;

(●) Another component of York AC curriculum, that has been embedded amongst its elective credits, is the corporate finance core. This includes two intermediate corporate finance courses (ECON 4400 and ECON 4410), which once again conditionally upon B or better standing fulfil the VEE requirement (corporate finance) of the SoA. We also note in passing that the courses mentioned herein along with the Models of Financial Economics (MATH 2281) prepare the students for Exam MFE of the SoA.

Actuaries are often expected to estimate consequences of a vast variety of losses, starting from a single death of a human being and ending up with terrorist acts and natural catastrophes. Actuaries therefore always enjoy interdisciplinary education in other than their own field. Our curriculum addresses well this peculiarity of the discipline. E.g.,

(●) Breadth beyond science, specified by General Education (GenEd) (24 credits). There is a good variety of courses to choose from within this degree component. In particular, the AP/WRIT 1702 6.00 and AP/MODR 1770 6.00 are mandatory in all streams, with the aim that the students will develop verbal and written communication skills.

(a.2) *Knowledge of methodologies.* The curriculum provides ample opportunities to comprehend both classic and modern AC methodologies. More specifically,

(●) General life insurance liabilities are thoroughly covered in the sequence MATH 3280/3281. Noticeably, keeping in step with the present days developments and their implications, the courses additionally introduce the idea of interdependent risks, that has long been unfairly abandoned by practitioners. The students explore various probabilistic models describing dependent risks and learn how to prise these risks effectively to maintain the solvency of an insurer at a satisfactory level. The courses are mandatory for all Honours students;

(●) Loss models (formulation and validation) are taught in MATH 4280. In addition, this course also introduces the modern perception of risk measurement and solvency within financial conglomerates. In this latter respect, the students learn to classify popular risk measures with respect to their theoretical properties and relevance to real world situations. The use of the Value-at-Risk risk measure, which has been a trade mark of the finance industry for roughly speaking the past century, is criticized and linked to the 2007 – 2008 world financial crisis. Coherent risk measures are introduced as possible, but not unique alternative. The course is mandatory in all Honours degrees;

- (●) Ruin theory, a multi-period generalization of specific risk measurement elements, taught in MATH 4280, is introduced in MATH 4281. We note in passing, that this course is mandatory for the all Honours students;

- (●) Credibility theory, a method widely employed by actuaries to conduct prospective experience rating, is taught in MATH 4281;

- (●) Some relevant methods that are borrowed from other disciplines, e.g., the theory of option pricing, the Monte Carlo simulation techniques, regression analysis, numerical methods in finance are taught in MATH 2281, MATH 4930, MATH 3330 and MATH 4141, respectively.

(a.3) *Application of knowledge.* Both the Honours and Specialized Honours B.A. degrees in actuarial science have a significant theoretical core comprising fundamental courses in mathematics, statistics, economics, corporate finance. Many of these courses follow a quite rigorous formal approach, which aims at developing a good analytic capacity in all graduates. However, the professional actuarial exams are based on real world problems, and they are numerical in their nature. To close the gap York curriculum has:

- (●) One hour weekly faculty lead tutorials in each one of MATH 3280/3281/4280/4281. These tutorials intensively deal with the numerical problems solving. The problems are taken either directly from appropriate professional exams or from recommended textbooks. The tutorials are mandatory to all Honours students;

- (●) Although MATH 2280/2281 do not have dedicated tutorials, a considerable part of the courses is devoted to real world problems solving. Once again, the corresponding professional exams and textbooks are used as sources;

- (●) Numerical techniques in mathematical finance are taught in MATH 4143, which is a mandatory course for all specialized Honours students, and it is open to other students. The course extensively employs MATLAB software to price such financial derivatives as the European, American and barrier options, futures, forwards. The concept of no-arbitrage pricing is discussed and elucidated with examples. The problem of portfolio optimization is attacked with the help of appropriate programming methods. At the end of the course, the students work on individual projects, in which they solve numerical problems, write a MATLAB code, prepare and present corresponding reports;

- (●) applications of the Monte Carlo methods are covered in MATH 4931. In AC and finance, the Monte Carlo methods are used to simulate the various sources of uncertainty that affect the values of, e.g., policies, instruments, portfolios or investments in question. These simulations are then employed to calculate a representative value. At the end of

the course, the students are challenged with individual projects, in which they code a program in the R software to mimic real world phenomena of interest;

(●) Applied statistics techniques, such as hypothesis testing, prediction and regression are often used by actuaries for pricing, reserving and risk management. These and other statistical methods are discussed in MATH 3330, which is a requirement in all Honours degrees. For instance, regression can be used to determine insurance prices for a multi-line insurance business. Indeed, in competitive markets insurance companies do not use the same price for all insureds. The problem is known as adverse selection. Using an appropriate set of explanatory variables, regression-based classification systems can be developed so that each person insured pays his or her fair share;

(●) Studies of growth and change are often best described by differential equations. These are discussed in MATH 2270, which is a mandatory course for all Specialized Honours students. Actuarial applications of differential equations include, but are not restricted to the study of population growth (logistic differential equation), insurance policy values (Thiele's differential equation), the well-known Black and Scholes pricing model (heat-like differential equation);

(●) MATH 1200 is a basic problem solving course, which aims at helping the students to develop the ability to attack a broad variety of mathematical problems, and to analyze the solutions for effectiveness. All Honours students must take this course.

(b) *Communication skills.* The curriculum is designed to steadily cultivate students communication skills. More specifically, AP/WRIT 1702 looks into best practices of writing, AP/MODR 1770 6.00 teaches to write persuasively and argue strategically, MATH 1200/2280/4280 develop the capacity to communicate quantitative contexts clearly to peers, MATH 3330 has a built-in project on real data analysis for fostering data analysis skills and presentation skills. Team work is encouraged in all upper level AC courses, i.e., in MATH 3280/3281/4280/4281. Last but not least, the general education courses embedded in all Honours degrees are writing intensive, and they therefore develop students' ability to communicate their ideas in writing clearly.

(c) *Awareness and limitations of knowledge.* The somewhat precarious solvency status of many modern pension funds is an alive illustration of the limitations of knowledge in AC.

(●) All upper level AC course, i.e., MATH 3280/3281/4280/4281, commence by reiterating to the students the difference between the real world and the formal model, describing it. Each model is introduced in conjunction with its underlying assumptions, and thus its appropriateness, as well as its pros and cons, are communicated to the students;

- (●) The computing power is another limitation which is made clear to the Specialized Honours students in MATH 4143. The graduates should be aware of the numerical complexity inherent in a variety of solutions, and the advantages of the analytic solutions, if these are obtainable;
- (●) Limitations of cognate areas are discussed in the corresponding courses. For instance, in MATH 1131, the discussion of confidence interval and two types of errors associated with hypothesis testing manifest the limitation of the statistical inference procedures.
- (d) *Autonomy and professional capacity.*
- (●) The actuarial code of conduct is communicated to the students in all programs in MATH 3280 and then reiterated in MATH 4280;
- (●) To cultivate students collaboration skills, MATH 1200, MATH 2280, MATH 3330, MATH 4280 require students to work effectively with peers and hence exercise the initiative, the personal responsibility and decision making skills in complex settings;
- (●) Top students have opportunities of internship placements, where they can partake in the real world actuarial decisions making process;
- (●) AC is a rapidly evolving discipline that is advancing constantly under the influence of other disciplines and finance industry demands. The 3rd and 4th year courses provide students with the state-of-the-art developments of relevant methodologies and knowledge. This makes the graduates into autonomous professionals having solid foundations, significant learning capacities and abilities to successfully adapt to the changing environment.

To conclude, our main goal is to prepare the students for a successful career in AC. For this, we have the following mapping between York AC courses and the SoA exams:

York AC courses	SoA exams
MATH 1300, 1310, 2310, 2030, 2131, 1131	Exam P
MATH 1021, 2280, 2281	Exams FM and MFE
MATH 3280, 3281, 4430 (or 4431)	Exam MLC
MATH 3131, 3132, 4280, 4281, 4931	Exam C
ECON 1000, 1010	VEE Economics
ECON 4400, 4410	VEE Corporate Finance
MATH 3330, 4130B	VEE Applied Statistics

9. Consultations: The changes have been approved by the Mathematics and Statistics Council. In addition, Dr. Brian Huss, Coordinator of the Modes of Reasoning program confirmed that the MODR is able to accommodate the AC students. Dr. Kerry Doyle,

Undergraduate Program Director of the Writing Department, said she is certain they would be able to accommodate the AC students. Dr. Antonella Valeo, the ESL course coordinator, concurred.

10. Changes in admissions requirements: The new AC major will have same admission requirements as MATC.

11. Resource implications: NA.

12. Change in mode of delivery: NA.

13. Assessment of teaching and learning: NA.

14. Accommodation of the current students: All students will be able to complete their degree along the lines of the original or newer university calendars, per their choice. The students that will not meet the requirements of the Honours degree, will be automatically accepted into the three-year B.A. in Statistics.

Appendix 1

1. Program-specific degree requirements. The Department of Mathematics and Statistics offers B.A. and Honours B.A. degree programs in actuarial science.

All degree candidates must complete the mathematics/statistics core: 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 2310 3.00.

All degree candidates must comply with the general education requirements: AP/WRIT 1702 6.00 (or AP/ESL 1010 3.00 and AP/ESL 1015 3.00), AP/MODR 1770 6.00, and 12 credits from natural science and social science (refer to the Faculty of Science Regulations Governing Undergraduate Degree Requirements section).

All degree candidates, in accordance with their declared programs, must comply with general regulations specified in the Faculty of Science Regulations Governing Undergraduate Degree Requirements section and, in so doing, must also satisfy the course, credit and standing requirements specified below.

To graduate in an Honours program requires successful completion of all Faculty requirements and departmental required courses and a minimum cumulative credit-weighted grade point average of 5.00 (C+) over all courses completed.

Specialized Honours Program

In comparison to the Honours Actuarial Science, the emphasis is on furnishing students with more in depth mastery of concepts in mathematics/statistics, and thus on preparing students for the possibility of graduate school. Similarly to the Honours Actuarial Science, the main objective is to prepare students to attain the designation of Associate of the Society of Actuaries (SoA), the Casualty Actuarial Society (CAS), and the Canadian Institute of Actuaries (CIA).

- LE/CSE 1560 3.00;
- the mathematics/statistics core (24 credits);
- SC/MATH 2001 3.00; SC/MATH 2131 3.00; SC/MATH 2270 3.00; SC/MATH 2280 3.00; SC/MATH 2281 3.00;
- SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3280 3.00; SC/MATH 3281 3.00; SC/MATH 3330 3.00*;
- SC/MATH 4130B 3.00*; SC/MATH 4143 3.00; SC/MATH 4280 3.00; SC/MATH 4281 3.00; SC/MATH 4430 3.00 or SC/MATH 4431 3.00; additional elective credits from the Department of Mathematics and Statistics**, 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.

Honours Program

The emphasis is on preparing students to attain the designation of the SoA, CAS, CIA.

- LE/CSE 1560 3.00;
- the mathematics/statistics core (24 credits);
- SC/MATH 2131 3.00; SC/MATH 2280 3.00; SC/MATH 2281 3.00;
- SC/MATH 3131 3.00; SC/MATH 3132 3.00; SC/MATH 3280 3.00; SC/MATH 3281 3.00; SC/MATH 3330 3.00*;
- SC/MATH 4130B 3.00*; SC/MATH 4280 3.00; SC/MATH 4281 3.00; SC/MATH 4430 3.00 or SC/MATH 4431 3.00; additional elective credits from the Department of Mathematics and Statistics**, 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.

* This course is part of the Applied Statistics Validation by Educational Experience (VEE) requirements of the SoA/CAS/CIA. In addition to it, students should take the following courses as electives: AP/ECON 1000 3.00, AP/ECON 1010 3.00 for the Economics VEE and AP/ECON 2300 3.00, AP/ECON 2350 3.00, AP/ECON 4400 3.00, AP/ECON 4410 3.00 for the Corporate Finance VEE. Note that to be granted VEE credit from the SoA/CAS/CIA, students must achieve a grade of B or higher in each VEE requirement.

** Suggested elective courses in the Department of Mathematics and Statistics are:

- SC/MATH 3001 3.00 (Specialized Honours B.A.); SC/MATH 3090 3.00; SC/MATH 3171 3.00; SC/MATH 3241 3.00; SC/MATH 3271 3.00 (Specialized Honours B.A.); SC/MATH 3410 3.00; SC/MATH 3430 3.00;
- SC/MATH 4000 3.00; SC/MATH 4034 3.00; SC/MATH 4130K 3.00; SC/MATH 4143 3.00 (Honours B.A.); SC/MATH 4171 3.00; SC/MATH 4172 3.00; SC/MATH 4230 3.00; SC/MATH 4300 3.00; SC/MATH 4330 3.00; SC/MATH 4630 3.00; SC/MATH 4931 3.00; SC/MATH 4939 3.00.

TABLE 1. Old versus new Specialized Honours B.A. in AC

Specialized Honours AC old	Specialized Honours AC new
General education requirements (24 credits)	
24 credits in HUMA, MODR, NATS, SOSC	AP/WRIT 1702 6.00 (or AP/ESL 1010 3.00 and AP/ESL 1015 3.00), AP/MODR 1770 6.00; 12 credits in NATS, SOSC
Suggested elective courses (18 credits)	
AP/ECON 1000 3.00; AP/ECON 1010 3.00; AP/ECON 2300 3.00; AP/ECON 2350 3.00; AP/ECON 4400 3.00; AP/ECON 4410 3.00;	AP/ECON 1000 3.00; AP/ECON 1010 3.00; AP/ECON 2300 3.00 AP/ECON 2350 3.00; AP/ECON 4400 3.00; AP/ECON 4410 3.00
Mathematics/Statistics core courses (24 credits)	
SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; SC/MATH 1021 3.00; SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2310 3.00	SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; SC/MATH 1021 3.00; SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2310 3.00
Major courses (54 credits)	
EECS 1560 3.00; SC/MATH 2280 3.00; SC/MATH 2001 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; SC/MATH 2281 3.00; SC/MATH 2270 3.00; SC/MATH 3131 3.00, SC/MATH 3280 3.00; SC/MATH 3330 3.00; SC/MATH 4430 3.00 (or SC/MATH 4431 3.00); SC/MATH 3132 3.00; SC/MATH 3281 3.00; SC/MATH 4280 3.00; SC/MATH 4130B 3.00; SC/MATH 4281 3.00; SC/MATH 4143 3.00	EECS 1560 3.00; SC/MATH 2280 3.00; SC/MATH 2001 3.00; SC/MATH 2031 1.00 ; SC/MATH 2131 3.00; SC/MATH 2281 3.00; SC/MATH 2270 3.00; SC/MATH 3131 3.00, SC/MATH 3280 3.00; SC/MATH 3330 3.00; SC/MATH 4430 3.00 (or SC/MATH 4431 3.00); SC/MATH 3132 3.00; SC/MATH 3281 3.00; SC/MATH 4280 3.00; SC/MATH 4130B 3.00; SC/MATH 4281 3.00; SC/MATH 4143 3.00

TABLE 2. Old versus new Honours B.A. in AC

Honours AC old	Honours AC new
General education requirements (24 credits)	
24 credits in HUMA, MODR, NATS, SOSC	AP/WRIT 1702 6.00 (or AP/ESL 1010 3.00 and AP/ESL 1015 3.00); AP/MODR 1770 6.00; 12 credits in NATS, SOSC
Suggested elective courses (18 credits)	
AP/ECON 1000 3.00; AP/ECON 1010 3.00; AP/ECON 2300 3.00; AP/ECON 2350 3.00; AP/ECON 4400 3.00; AP/ECON 4410 3.00	AP/ECON 1000 3.00; AP/ECON 1010 3.00; AP/ECON 2300 3.00; AP/ECON 2350 3.00; AP/ECON 4400 3.00; AP/ECON 4410 3.00
Mathematics/Statistics core courses (24 credits)	
SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; SC/MATH 1021 3.00; SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2310 3.00	SC/MATH 1131 3.00; SC/MATH 1200 3.00; SC/MATH 1300 3.00; SC/MATH 1310 3.00; SC/MATH 1021 3.00; SC/MATH 2022 3.00; SC/MATH 2030 3.00; SC/MATH 2310 3.00
Major courses (54 credits)	
SC/MATH 2280 3.00; SC/MATH 2031 1.00; SC/MATH 2131 3.00; EECS 1560 3.00; SC/MATH 3131 3.00, SC/MATH 3280 3.00; SC/MATH 3330 3.00; SC/MATH 4430 3.00 (or SC/MATH 4431 3.00); SC/MATH 3281 3.00; SC/MATH 4280 3.00; SC/MATH 4130B 3.00;	SC/MATH 2280 3.00; SC/MATH 2031 1.00 ; SC/MATH 2131 3.00; SC/MATH 2281 3.00 ; EECS 1560 3.00; SC/MATH 3131 3.00, SC/MATH 3280 3.00; SC/MATH 3330 3.00; SC/MATH 4430 3.00 (or SC/MATH 4431 3.00); SC/MATH 3132 3.00 ; SC/MATH 3281 3.00; SC/MATH 4280 3.00; SC/MATH 4130B 3.00 SC/MATH 4281 3.00

CHANGES TO THE MATHEMATICS FOR COMMERCE PROGRAM, DEPARTMENT OF
 MATHEMATICS AND STATISTICS, FSC
 UNDERGRADUATE CERTIFICATE IN ACTUARIAL SCIENCE

Actuarial Science (AC) is the area of mathematics that applies quantitative methods to assess risks in the insurance and finance industries. It became a formal discipline in the late 17th century, when the increased demand for such long-term insurance coverages as life insurances, annuities and burials expenses coverages emerged. Since then and for a long time, actuaries have been mainly interested in studying the present monetary value of future obligations as well as the variability of these present values in the contexts of life and health, property and casualty insurances, pension funds and social wealth-fare programs. Today actuaries are also being employed in the areas of enterprise risk management, and even in general finance and investment. Overall, the importance of AC is evident from numerous empirical studies, which conclude that a sound national insurance market is an essential characteristic of economic growth.

We propose to create an Undergraduate Certificate in AC for York students with a strong quantitative background (e.g., students from various Departments within the Lassonde School of Engineering, Physics and Astronomy), as well as for career changers from outside of the University. We note in this respect, that due to the CNBC list of best jobs in North America, actuary was ranked 1st in 2010/2013/2015 as well as 2nd and 4th in 2009/2012 and 2014, respectively. According to Service Canada, the national unemployment rates for actuaries were nil in 2001 - 2007, very low in 2009 - 2011, and the job prospects are good with the number of actuaries expected to grow significantly. The situation is echoed internationally, as the tightening of the global insurance/banking regulations have resulted in a significant diversification of the fields in which actuaries work. Therefore, the demand for AC has been sustainably high, and does not seem to decline in the foreseeable future.

In what follows we describe the proposal in more detail.

1. **Program:** Mathematics for Commerce (MATC)
2. **Degree designation:** Undergraduate Certificate in AC
3. **Type of modification:** Major change of an existing program
4. **Effective date:** Fall term, 2017
5. **General descriptions of the changes:** We propose to create a 36 credits Undergraduate Certificate in AC.

6. Rationale: AC is very interdisciplinary in its nature, and not surprisingly, therefore, practising actuaries often have diverse educational backgrounds, e.g., Mathematics, Statistics, Engineering, Physics, Economics, Business, Biology, and even Medicine. Likewise, at York we have observed numerous evidences of interest in AC outside of the Department of Mathematics and Statistics (DMS), and beyond the FSc. In addition, there have been many career changers, which looked for joining the field of insurance.

However, the Honours and Specialized Honours B.A. degrees in AC are very intense subject-wise - required courses span all of Mathematics, Statistics, and Economics, and time-wise - four years of full-time studies are necessary. An Undergraduate Certificate in AC (36 credits in total) is to provide a natural and concise response to the internal and external demand. The Certificate can be completed in one or two years, depending on the student's background.

7. Alignment with the University/Faculty Academic Plans: The proposed change is very well aligned with the University/Faculty goals. For instance:

(a) *Innovative quality programs for academic excellence.* The Certificate is unique in Canada, with a limited version being offered by the University of New Brunswick. We do not know of any other school that has a similar program of study.

(b) *Enhanced quality in teaching and student learning.* The students enrolled in the Certificate will be able to enjoy the numerous experiential learning opportunities that exist for the students interested in research or applications in the area of AC. We note in this respect, that the placement rates with just Sun Life Financial have been very good so far (six undergraduate students in 2015-2016, and ten undergraduate students in 2016-2017). We hope to have more placements within Mercer (an interviewing event on campus is scheduled in late January), and via the Risk and Insurance Management Society (RIMS) (we hosted Mari-Jo Hill, a professional member of the RIMS in November 2016, and some discussions started). In addition, Risk and Insurance Studies Centre (RISC) York - a recently proposed Organized Research Unit that will pursue a holistic approach to the field of Insurance and related topics, will engage the AC Certificate students in its research projects.

8. Changes in the program and the associated learning outcomes: Refer to the relevant parts in the 'Honours and Specialized Honours B.A. in AC' proposal.

9. Consultations: The Department of Economics has been very supportive so far. For instance, they allowed the AC students to enrol in AP/ECON 1000 3.00; AP/ECON 1010 3.00; AP/ECON 2300 3.00; AP/ECON 2350 3.00; AP/ECON 4400 3.00; AP/ECON 4410 3.00; on a regular basis.

10. Changes in admissions requirements: The AC Certificate will require: (1) Calculus - similar to SC/MATH 1014 3.00; SC/MATH 1015 3.00; (2) Statistics - similar to SC/MATH 1131 3.00; and Linear Algebra - similar to SC/MATH 1025 3.00. The students that lack some of the just-mentioned requirements, may choose to enrol in the required courses at York. This would be in addition to the 36 credits required by the Certificate.

11. Resource implications: NA

12. Change in mode of delivery: NA

13. Assessment of teaching and learning: NA

14. Accommodation of the current students: NA

Appendix 1

1. Certificate-specific requirements. York University students may earn a Certificate in Actuarial Science concurrent with fulfillment of the requirements for a Bachelors degree. This certificate is also open to students who already hold a Bachelors degree from an accredited institution, who are admissible according to Faculty and University policies, and whose previous studies satisfy the Certificate's admission requirements.

To qualify for the Certificate in Actuarial Science, students must complete 36 credits from the list of approved courses including:

Year 1:

- AP/ECON 1000 3.00; AP/ECON 1010 3.00 - this requirement can be waived if the assessment of student's past academic credentials reveals that the topics were covered at a satisfactory level, which is of particular relevance to Degree Holders in Economics*;
- SC/MATH 2015 3.00 (or SC/MATH 2310 3.00) - this requirement can be waived if the assessment of student's past academic credentials reveals that the topics were covered at a satisfactory level, which is of particular relevance to Degree Holders in Mathematics/Statistics*;
- SC/MATH 2030 3.00; SC/MATH 2131 3.00 - this requirement can be waived if the assessment of student's past academic credentials reveals that the topics were covered at a satisfactory level, which is of particular relevance to Degree Holders in Statistics*;
- SC/MATH 2280 3.00; SC/MATH 2281 3.00.

Year 2:

- SC/MATH 3280 3.00; SC/MATH 3281 3.00; SC/MATH 4280 3.00; SC/MATH 4281 3.00; SC/MATH 3330 3.00.

* When some of the required courses are transferred from previous studies, the students should complement their 36 credits, enrolling in the courses from the list below

- SC/MATH 3131 3.00; SC/MATH 4130B; SC/MATH 4430 3.00 (or SC/MATH 4431 3.00); SC/MATH 4931B 3.00;
- AP/ECON 2300 3.00; AP/ECON 2350 3.00; AP/ECON 4400 3.00; AP/ECON 4410 3.00.

The cumulative grade point average in all 36 credits must be at least 5.00 (C+).

CURRICULAR CHANGE

ALIGNMENT OF THE GENERAL EDUCATION REQUIREMENTS FOR B.A. DEGREES IN
THE FACULTY OF LIBERAL ARTS AND PROFESSIONAL STUDIES AND THE FACULTY
OF SCIENCE

We propose that the Faculty of Science (FSc) aligns its General Education (GenEd) requirements with these of the LA&PS for all existing B.A. programs. We note in passing that there are seemingly only two departments in the FSc that have B.A.'s, and these are Science and Technology and Mathematics and Statistics. Both departments have approved the proposal through Council votes.

The reason for the proposal comes from the concurrent proposal of modifications to the Actuarial Science (AC) curriculum. In the new AC curriculum, the Department of Mathematics and Statistics is willing to ask students to take AP/WRIT 1702 6.00 - becoming a better writer: methods and models - as one of the GenEd requirements in the area of Humanities. The course is indeed categorized as a Humanities course by the LA&PS, and is considered a legitimate GenEd course therein for all B.A. programs. The situation is not so within the FSc. In fact, the FSc allows only courses that explicitly say HUMA in their rubric to be counted as proper GenEd courses in the field of Humanities.

Memorandum

To: Faculty Curriculum Committees, Associate Deans Academic and Graduate Program Directors

From: Lisa Farley, Chair, Senate Committee on Academic Standards, Curriculum & Pedagogy

Date: 18 November 2016

Subject: Proposed Changes to the Senate Grading Scheme and Feedback Policy

The Senate Academic Standards, Curriculum and Pedagogy Committee has been discussing a series of changes to the **Senate Grading Scheme and Feedback Policy**. Notice of the proposal was provided to Senate at its meeting in October to gather feedback before bringing the proposed changes forward for approval. At that meeting questions were raised by Senators about the policy and proposed changes. The set of questions and responses from the Coordinating & Planning Sub-committee of ASCP has been prepared.

One of the suggestions at the Senate meeting was to provide Faculties an opportunity to review and comment on the proposed changes. The Senate Committee is happy to facilitate consultation with Faculties on this initiative. To that end, ASCP is transmitting the proposal and the set of questions and responses to Faculty curriculum committees, Associate Deans Academic and Graduate Program Directors with a request that the documentation be reviewed and questions or comments be sent back to the Senate committee; the documentation is attached.

It is requested that any feedback to be shared with ASCP be sent to the Secretary of the Committee, Cheryl Underhill at underhil@yorku.ca by **Friday, 9 December 2016**.

Changes to the Senate Grading Scheme and Feedback Policy

It is the intention of the Academic Standards, Curriculum and Pedagogy Committee to make the following recommendation to Senate for approval:

That the Senate Grading Scheme and Feedback Policy be revised as follows, effective 1 July 2018:

- i. expansion of the name to the *Grading Scheme and Feedback Policy Governing Undergraduate and Graduate Courses*
- ii. add the requirement that a basic course syllabus be available to students no later than two weeks prior to the commencement of classes in an academic term, as set out in the table below;
- iii. add the JD program in Law as an exemption from the policy
- iv. editorial amendments as set out in the table below

The basic syllabus template is attached.

Existing Policy	Proposed Revisions
<p>The grading scheme (i.e. kinds and weights of assignments, essays, exams, etc.) shall be announced, and be available in writing, within the first two weeks of class, and</p> <p>Under normal circumstances, graded feedback worth at least 15% of the final grade for Fall, Winter or Summer Term, and 30% for 'full year' courses offered in the Fall/Winter Term be received by students in all courses prior to the final withdrawal date from a course without receiving a grade, with the following exceptions:</p> <ul style="list-style-type: none"> • graduate or upper level undergraduate 	<p>I. Grading Scheme A basic course syllabus* which includes the grading scheme (i.e. kinds and weights of assignments, essays, exams, etc.) shall be available to students no later than two weeks prior to the commencement of classes in an academic term, with the final syllabus made available in writing to students enrolled in the course within the first two week of classes.</p> <p>II Graded Feedback Under normal circumstances, graded feedback worth at least 15% of the final grade for Fall, Winter or Summer Term, and 30% for 'full year' courses offered in the Fall/Winter Term be received by students in all courses prior to the deadline to drop a course without academic record, with the following exceptions:</p> <ul style="list-style-type: none"> • graduate or upper level undergraduate

<p>courses where course work typically, or at the instructor's discretion, consists of a single piece of work and/or is based predominantly (or solely) on student presentations(e.g. honours theses or graduate research papers not due by the drop date, etc.);</p> <ul style="list-style-type: none"> • practicum courses; • ungraded courses; • courses in Faculties where the drop date occurs in within the first 3 weeks of classes; • courses which run on a compressed schedule (a course which accomplishes its academic credits of work at a rate of more than one credit hour per two calendar weeks). <p>Note: Under unusual and/or unforeseeable circumstances which disrupt the academic norm, instructors are expected to provide grading schemes and academic feedback in the spirit of these regulations, as soon as possible.</p>	<p>courses where course work typically, or at the instructor's discretion, consists of a single piece of work and/or is based predominantly (or solely) on student presentations(e.g. honours theses or graduate research papers not due by the deadline to drop a course without academic record, etc.);</p> <ul style="list-style-type: none"> • practicum courses; • courses taken on a Pass/Fail basis; • courses in Faculties where the deadline to drop a course without academic record occurs within the first 3 weeks of classes; • courses which run on a compressed schedule (a course which accomplishes its academic credits of work at a rate of more than one credit hour per two calendar weeks). <p>Note: Under unusual and/or unforeseeable circumstances which disrupt the academic norm, instructors are expected to provide grading schemes and academic feedback in the spirit of these regulations, as soon as possible.</p> <p>III. Exemptions The Grading Scheme and Feedback Policy Governing Undergraduate and Graduate Courses does not apply to the JD program in law.</p> <p>*See the template for the Basic Course Syllabus.</p>
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Rationale

i. Expansion of the Policy Name

There was uncertainty whether the policy is applicable to graduate programs as well as undergraduate programs. Since the Graded Feedback component of the policy specifically speaks to graduate courses, and with the concurrence of the Faculty of Graduate Studies, it is the position that it does apply to graduate courses. For clarity

therefore, it is proposed that the scope of the legislation be articulated in the title of the policy to include reference to undergraduate and graduate courses

ii. Grading Scheme / Basic Syllabus Changes

The Vice-President Academic and Provost recently discussed several issues with the Senate Committee on the general topic of enrolment management. Key among them was the very high volume of course changes undergraduate students make in the first weeks of a new term. Data from the Registrar's Office shows 68 000 course additions and 60 000 course drops were made by undergraduate students in the first two weeks of the Fall 2015 term, for a total of 128 000 course changes. Students report that it is an extremely frustrating time for them.

Course changes in the frenzied start of term have been an issue of discussion of late among the Provost, the Vice-Provost Students and the York Federation of Students. YFS highlighted that one of the factors contributing to the high volume of changes is the provision of course syllabi after the term begins. Often decisions are made to change courses after students receive the syllabus in the early weeks of classes and consider the assignment structure, weighting, and the readings in the context of their total academic commitments for the year.

The *Senate Grading Scheme and Feedback Policy* is the relevant legislation that establishes the timeframe for the provision of a course grading scheme to graduate and undergraduate students. Specifically it states that:

the grading scheme (i.e. kinds and weights of assignments, essays, exams, etc.) be announced, and be available in writing, within the first two weeks of class (emphasis added).

Providing students with information about the course, its material and grading scheme prior to the start of classes may considerably reduce the challenges students are encountering, lead to earlier and sustained engagement in their courses and holistically improve their academic experience.

The active period of course changes within the first two weeks of term is also a considerable challenge for effective enrolment management for programs and individual course directors. Fewer course changes - particularly enrolment in courses three and four weeks into a term – will enhance the experience for both students and course directors.

Coincident with the earlier deadline for providing syllabi, it will be recommended that at a minimum a basic syllabus be used by course directors. It would include the following information:

- the title, number and credit weight of the course

- the instructor's name and contact information (if known)
- the course time and location (if known)
- a general course description and learning outcomes
- the anticipated text / readings
- the evaluation framework

The proposed Basic Course Syllabus template, which includes the above categories of information, is attached. The basic syllabus will be required for every undergraduate and graduate course. Course instructors will have the ability to finalize details (e.g., the readings, learning outcomes) of the syllabus if necessary as classes commence, with the exception of the evaluation framework which is to have been finalized and articulated on the core syllabus prior to the start of the academic session.

iii. Exemption of the JD Program

Consultation with Osgoode Hall Law School on the policy confirmed that with the School's different sessional dates and typical format of JD program courses the application of the Senate policy is not feasible. The Senate Committee concurs.

iv. Editorial Amendments

The minor changes to the policy are as follows:

- separating the policy into three distinct components: Grading Scheme, Graded Feedback and Exemptions
- changing the references from "final withdrawal date from a course without receiving a grade" to "deadline to drop a course without academic record"
- updating the reference of "ungraded course" to "courses taken on a Pass / Fail basis"

All three changes are for clarity and updating terminology to reflect current uses / rules.

Supporting UAP Priorities

The new 2015-2020 University Academic Plan includes furthering a "student-centred approach" as one of its seven priorities. The Plan states that "the success of our students is a top priority including providing the strongest possible support..." It calls on the University to view its entire framework through a student lens including "decisions about our academic plans, the learning environment, the campus experience and academic support strategies." The Academic Standards, Curriculum & Pedagogy Committee believes that enhancing students' decision-making ability for course selection and reducing the frustration of the early weeks of a new term significantly contributes to fostering a student-centred approach to program planning and bolstering academic support for students. For the constructive outcomes that the changes will produce, the ASCP strongly supports the policy changes.

Implementation

The University Registrar has liaised with the Faculties and University Information Technology (UIT) on implementation planning to ensure an easy and efficient transition to the new process. A key initiative that is moving forward to support the recommendations from the IIRP working groups on Enhancing Quality Academic Programs and Academic Advising is the adoption of a new pan-university curriculum management tool. Among its many benefits, the software system will support:

- academic unit through to Senate workflow for the development, review and approval of courses and programs
- mapping curriculum to program learning outcomes
- the Engineering programs' external accreditation requirements
- calendar publication
- the posting of course syllabi¹ in the existing centralized course repository

The curriculum tool will be fully implemented over a three-year time frame (2016-2019), with Glendon and the Lassonde School of Engineering piloting the first phase of implementation in 2017.

Currently students are only able to review syllabi that are posted on course websites (Moodle sites) once they have enrolled in the course. Linking syllabi to the course repository accessible to all students means they can review them prior to making enrolment decisions. The new process of posting syllabi by the proposed deadline can be operationalized with the curriculum tool for the FW 2018 – 2019 academic year. However all Faculties currently have the ability to post syllabi on departmental / Faculty websites and they will be strongly encouraged to adopt the new practice for the FW 2017-2018 year where feasible. Many course directors across the University already post their syllabi well in advance of the current deadline.

The committee's deliberations about shifting the deadline for syllabi included possible implementation challenges of the earlier timeframe. An issue of note is the late assignment of a course directorship. Data provided by the Office of Institutional Planning & Analysis confirms that on average just 5% of courses are unassigned two weeks prior to the start of a term. That there would be a relatively small number of instances where the course director would not be able to meet the deadline should not impede change that will benefit a significant number of students, course directors, and enrolment planning exercises. Moreover, for those cases where directorships are not finalized in time, it will be the recommended practice to post the syllabus from the prior year / term denoting that upon appointment of the course director the syllabus may change.

¹ The website hosting the course repository and syllabi will be accessible only to members of the York community; it will not be a public site.

Consultation

Through the Office of the Provost, the initiative to adopt an earlier deadline and the use of a basic syllabus was discussed with the York University Faculty Association (YUFA) early on (2014) and again recently, in October 2016. Similarly, CUPE 3903 will be afforded an opportunity to comment on the policy changes. C

Consultation with Faculties is in progress. Feedback received will be discussed before further steps are taken.

Basic Course Syllabus

FACULTY NAME
UNIT NAME

Course Title and Number:

Term Being Offered:

Course Instructor and Contact Information:

Course Time and Location:

General Course Description: Overview and Learning Outcomes

Anticipated Text / Readings:

Additional readings may be assigned or recommended during the course.

Evaluation: Grading and Course Requirements

It is planned that the final grade for the course will be based on the following forms of evaluation and corresponding weighting:

***Note to Instructors:** If a mid-term examination is planned, and intended to be held outside of class on a weekend, students must be advised of that in the above evaluation scheme and the date upon which the mid-term will be held.

These course materials are designed for use as part of the ([enter course name, code, section and semester](#)) course at York University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this material for distribution (e.g. uploading material to a commercial third-party website) may lead to a violation of Canadian copyright law.

Questions / Comments from Senators about the Proposed Revisions to the Senate Grading Scheme and Feedback Policy

How will the new deadline be met for those courses taught by contract faculty who are appointed after the deadline has passed or whose contract only takes effect after the deadline has passed?

Regarding the issue of a late assignment of a course directorship, data provided by the Office of Institutional Planning & Analysis confirms that on average just 5% of courses are unassigned two weeks prior to the start of a term. York's policies and processes are most often driven by meeting the needs of the majority, and build in flexibility to accommodate exceptions where necessary and / or warranted. The proposed changes to the Grading Scheme and Feedback legislation is one such policy. For those cases where directorships are not finalized in time or contract faculty are not available prior to the start of the term, it will be the recommended practice for Faculties to post the syllabus from the prior year / term denoting that upon appointment of the course director the syllabus may change. The first year of the revised policy may not have the benefit of having the prior year's syllabus available to post but the practice will be available in subsequent years.

The benefits to students of the earlier grading scheme deadline are compelling and merit adopting notwithstanding the minor challenges that come with changes to a new practice.

How will the policy change be enforced?

The Senate committee was heartened to learn from the Registrar's Office that many course directors across the University already post their syllabi well in advance of the current deadline. And with the new curriculum management tool coming into place, the process will be very user-friendly, similar to that used by course directors now to upload student grades to the centralized system. Further, it will be the practice to post syllabi from the prior year / term for courses where the basic or full syllabus is not received in time for posting by the deadline. Collectively these factors support the requirements of the policy being adhered to. Note as well that the current policy has a deadline for the provision of the grading scheme without specific measures to compel compliance.

Will Faculties be consulted about the proposed change and be given an opportunity to provide input before it is brought to Senate for approval?

ASCP was pleased to respond to the suggestion that Faculties be consulted.

Course directors need to be able to adjust the grading scheme to accommodate circumstances that arise during the course; it will be problematic if that is not possible.

Data and feedback from students confirm that many of York's undergraduates work part-time in addition to their studies; some as much as 30 hours per week. Managing

the demands of both is extremely difficult and requires careful scheduling and time management. Changes to the grading scheme and assignment deadlines after a course has commenced, adds to the already existing challenge for many students. The deadline for the provision of the grading scheme is being proposed to change to *two weeks prior to the start of a term* and it is expected that changes to the scheme are not made thereafter.

Of course there will be occasions where circumstances at the University or within a course call for accommodation, which may include a need to adjust the kinds or weights of the types of assessment. In such scenarios - hopefully rare - the principle shall always be that students must not be disadvantaged by any such changes.

Does the policy apply to graduate programs as well?

This question prompted a discussion with the Faculty of Graduate Studies, the Schulich School of Business and Osgoode Hall Law School about the applicability of the policy to graduate programs and the JD program in law. Within the FGS Academic Regulations there is a Faculty rule regarding the provision of the grading scheme in courses which is consistent with the current Senate policy - to be provided to students in the first two weeks of classes. Initial feedback from the Faculty supports the earlier deadline. Similarly the Schulich School of Business has no objections to the earlier deadline as its current practices already exceed that time frame.

The second component of the policy pertains to the amount of graded feedback students are to receive before the deadline to withdraw from a course without academic record. FGS also has confirmed that its drop deadlines are consistent with those established each year for undergraduate courses. The policy also articulates a set of courses deemed exceptions to the graded feedback requirement, which includes some formats of graduate courses. With the exceptions remaining in place, the policy can be applicable to graduate programs. The name of the policy therefore has been expanded to indicate its applicability to both undergraduate and graduate courses.

On the matter of the JD program, Osgoode's different sessional dates and typical format of courses make the application of the Senate policy difficult. Identifying the JD program as an exception to this policy has now been stated in the policy.

Some Faculties have IT systems in place to post syllabi. Has thought been given to a pan-university system or compatible architectures to avoid duplication of resources and efforts?

The Registrar's Office has committed to work with Faculties and UIT to explore ways the new curriculum management software can integrate with existing platforms to avoid duplication.

Is the necessary IT support in place to implement the new process?

The new process of posting syllabi by the proposed deadline can be operationalized for the FW 2018 – 2019 academic year, concurrently with the University's move to

the use of a new curriculum management tool. However all Faculties currently have the ability to post syllabi on departmental / Faculty websites and they will be strongly encouraged to adopt the new practice for the FW 2017-2018 year where feasible.

Since students enrol in FW courses in July, did the committee consider making the syllabus deadline much earlier to coincide with the commencement of the enrolment period?

The provision of the syllabus concurrently with the enrolment period would be ideal. Practically it was recognized that that would not be feasible across all Faculties currently.

Changes to Existing Courses & Degree Programs

Department:	Physics & Astronomy	Date of Submission:	December 2016
Course Number:		Effective Session:	FW 2017
Course Title:	Addition of Option to Specialized Honours Program in Biophysics		

Type of Change:

<input checked="" type="checkbox"/> in degree requirements	<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"/> in pre/co-requisite(s)	<input type="checkbox"/> other (please specify):

Change From:

To:

<p>Additional courses:</p> <ul style="list-style-type: none"> at least nine credits from: SC/PHYS 2040 3.00, SC/PHYS 3020 3.00, SC/PHYS 3050 3.00, SC/PHYS 3090 3.00, SC/PHYS 3150 3.00, SC/PHYS 3220 3.00, SC/PHYS 3320 3.00, SC/PHYS 4010 3.00, SC/PHYS 4011 3.00, SC/PHYS 4020 3.00, SC/PHYS 4040 3.00, SC/PHYS 4050 3.00, SC/PHYS 4120 3.00; 	<p>Additional courses:</p> <ul style="list-style-type: none"> at least nine credits from: SC/PHYS 2040 3.00, SC PHYS 3010 3.00; SC/PHYS 3020 3.00, SC/PHYS 3050 3.00, SC/PHYS 3090 3.00, SC/PHYS 3150 3.00, SC/PHYS 3220 3.00, SC/PHYS 3320 3.00, SC/PHYS 4010 3.00, SC/PHYS 4011 3.00, SC/PHYS 4020 3.00, SC/PHYS 4040 3.00, SC/PHYS 4050 3.00, SC/PHYS 4120 3.00;
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Rationale:

It has been realized that Biophysics majors interested in Biomechanics ought to have training in mechanics beyond that provided in second year. PHYS 3010 3.00 (Classical Mechanics) introduces students to Lagrangian and Hamiltonian mechanics, an energy--based viewpoint that is quite important in a very wide variety of biological problems. Such background is also advisable for those majors interested in progressing to advanced studies in quantum biology..

Note: For course proposals involving cross-listings, integrations and degree credit exclusions, approval from all of the relevant Faculties/department/divisions 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 (Form 1) 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 ATSG indicating whether resources are adequate to support the course.

This is a **Notice of Motion** pursuant to section 32 of the Rules of Faculty Council (Faculty of Science) to amend the Rules of Faculty Council, in particular the subsection establishing the Petitions Committee and the details of its committee structure.

Current provision:

36(e) The Petitions Committee

The Petitions Committee for the purpose of hearing student petitions shall consist of an Associate Dean (*ex officio*), six members of Council, and two student members of Council. A quorum shall consist of either (a) three voting faculty members and one student member or (b) four voting faculty members.

Proposed amended provision (with changes underlined):

36(e) The Petitions Committee

The Petitions Committee for the purpose of hearing student petitions shall consist of an Associate Dean (*ex officio*), six members of Council, and two student members of Council. The Committee may divide the workload by splitting the Committee membership into two panels of four people each. A quorum for a panel shall consist of either (a) two voting faculty members and one student member or (b) three voting faculty members.

Rationale for the change:

The volume of petition applications has grown. The Petitions Committee has tried to reduce workload for members by splitting the membership into two panels working independently. However, with a membership of eight people, including two students who are not always available, it is difficult to achieve a quorum of four.

Terry Carter of the University Secretariat advised as follows:

“Three is not too few; that is the quorum for Senate Appeals Committee panels. We have 3 panels of four so that if one person is not available we still have quorum.”

Accordingly, this proposal reduces quorum for the Petitions Committee from four people to three, and it specifically provides that the Committee membership may be split in two so that two panels of four may work independently.

Moved by Alex Mills, Associate Dean of Students
November, 2016



OFFICE OF THE
VICE-PRESIDENT
RESEARCH &
INNOVATION

509 KANEFF TOWER
4700 KEELE ST
TORONTO ON
CANADA M3J 1P3
T 416 736-5780
F 416 736-5512
haigbro@yorku.ca
www.yorku.ca/research

November 14, 2016

Delivered via email

To: **Ray Jayawardhana, Dean, Faculty of Science**

From: **Celia Haig-Brown, Associate Vice-President, Research**

Date: **Monday November 14th, 2016**

Re: **Research Ethics Review of Undergraduate and Graduate Course-Related Research (Including MRPs) – Streamlining and Harmonization of Research Ethics Review Processes**

A number of both external and internal drivers have necessitated changes to research ethics procedures and/or processes. In response to these changes, research ethics protocols and attendant resources for Faculty, **graduate** and **undergraduate** research have been harmonized. Further, research ethics reporting at the undergraduate and graduate level has been streamlined to better facilitate compliance with relevant regulatory guidelines.

As per section 3.6 Procedures, Senate Policy on Research Involving Human Participants (2013), Faculties are delegated accountability for the conduct of and responsibility for ethics review conducted in courses at the undergraduate and graduate level (including MRPs). Specifically, course-related (including MRPS), non-funded, minimal risk research proposed by students in Departments, Schools or Graduate Programs (with the exception of theses and dissertations), are subject to review by the relevant Faculty/Departmental level Ethics Review committee.

The Office of Research Ethics will be providing a number of consultation, outreach and information sessions from November 2016 through May 2017 to facilitate the implementation of the streamlined reporting templates and harmonized research ethics protocol.

In order to ensure an effective consultation and implementation process, the appropriate contact for distribution of communications is required. In most Faculties, the responsibility for research ethics rests with the Associate Dean Research; however, it is our understanding that that is not the case for all Faculties. Thus, it would be appreciated if each Faculty could confirm the contact (name, position) for the portfolio within which the responsibility for research ethics rests.

Your timely response would be appreciated.

Should you have any questions, please contact:

Alison Collins-Mrakas,
Office of Research Ethics
ext. 55914 or acollins@yorku.ca

Yours sincerely,



Celia Haig-Brown, Ph.D.
Professor and Associate Vice-President Research
Office of the Vice-President Research & Innovation

