NOTICE OF MEETING
May 14, 2024
3pm – 4:30pm
via Zoom

AGENDA

1. Call to Order and Approval of Agenda
2. Chair’s Remarks
3. Approval of April 9, 2024 Minutes
4. Business Arising
5. Inquiries and Communications
   > April 25, 2024 Senate Synopsis
6. Dean’s Remarks
7. Associate Dean & Head of Bethune College Remarks
   a) Associate Dean, Curriculum & Pedagogy
   b) Associate Dean, Faculty Affairs
   c) Associate Dean, Research & Partnerships
   d) Associate Dean, Students
   e) Head of Bethune College
8. Reports from Science Representatives on Senate Committees
9. Report from Student Caucus Representative
10. Reports from Standing Committees of Council
   a) Executive Committee:
      > Vacancies report on the Standing Committees of FSc Council
   b) Undergraduate Curriculum Committee
      > Consent agenda items
   c) Committee on Examinations and Academic Standards
      > Consent agenda items
11. Other Business
    a) Changes to Faculty Council Rules of Council – Eva Hughes
    b) Decanal Renewal Process - Memo from Lisa Philipps, Provost & Vice-President Academic
1. Call to Order and Approval of Agenda
Chair of Council, N. Kovinich, called the meeting to order and a motion was moved, seconded and carried to approve the Agenda.

2. Chair’s Remarks
N. Kovinich extended a warm welcome to the council and informed its members that the upcoming Faculty Council meeting on May 14th will be held virtually.

3. Approval of March 12, 2024 Minutes
A motion was moved, seconded and carried to approve the Minutes.

4. Business Arising

5. Inquiries and Communications
> February 28, 2024 Senate Synopsis
> March 28, 2024 Senate Synopsis

6. Dean’s Remarks
Dean Wang welcomed council.

He shared exciting news about the new Science Student Academic Centre that will be located in the Life Sciences Building: renovations and construction will begin in the summer and will be completed before the end of 2024.

He extended congratulations to the Faculty of Science Research Team for their remarkable achievement: NSERC applicants made history by securing grants totaling more than 6 million dollars and over 2 million dollars was received from SAT grants.

The Faculty of Science Spring Open House was held on Saturday, April 6th, from 9:30 am to 2 pm at the Life Sciences Building, drawing a crowd of 200 attendees. A special note of gratitude goes to Eva Hughes and her team for orchestrating this successful event despite the tight timeline.

Dean Wang shared that the Faculty of Science has a total enrolment of 4959 students for Winter term 2024, which is historically the highest enrolment. He continued that there is currently a University wide challenge of 47% below target for international
student enrolment. The government decreased Ontario Visa permits by 50% but this will not impact the number of international places for York University.

The government announced $9 million in start-up funding to further develop the new School of Medicine at York University to be opened in 2028.

**Budget Update:**

Despite encountering numerous challenges in our budgetary landscape during the 2023-24 fiscal year, we anticipate concluding the year with a positive variance of $2,208,424.

For 2024-27 rolling budget, we were given a budget cut target of $2.6M in January 2024. We saved $3.2M in the first round, and another $1.5M in the second round to meet our new total reduction target of $4.7M. We have tried our best to save the support to students, research, and department operating budgets, with 24% of the Dean’s office operating budget cut.

**Strike Update:**

Thank you for all efforts to put our students in the front and centre of what we do. At FSc, 69% courses continued. According to the Senate Executive Update Memo of April 5 – S1 starts on time, W24 will be shortened by 2 weeks for those courses suspended and SU will start on May 21. S2 start time is to be determined.

7. **Associate Dean & Head of Bethune College Remarks**
   
a) **Associate Dean, Curriculum & Pedagogy**
   
H. Kouyoumdjian shared that the Markham Campus hosted a successful Open House on Saturday, April 6 and there were 300+ registered guests. We are scheduled to begin occupancy in early June in preparation for September.

Faculty of Science will be offering a First Year Science program, a Graduate Professional Masters in Biotechnology Management and a Graduate Diploma in Biotechnology at the Markham Campus.

He shared the an Innovatus article with council:

[Student learning, experience and success top priorities in the Faculty of Science](#)

He shared an article from Academia Top 10’s March 10 issue highlighting the Department of Mathematics & Statistics:

[YorkU math instructors pilot WeBWorK OER to support math students](#)

b) **Associate Dean, Faculty Affairs**

M. Scheid, on behalf of G. Audette:

Council was reminded to submit sabbatical requests via MachForm and retirement requests via email.
c) Associate Dean, Research & Partnerships
V. Saridakis presented Safeguarding Research at York University highlighting new policies that will be in effect May 1 2024.

d) Associate Dean, Students
The Faculty of Science Brunch took place on April 6 in the Life Sciences Building and was a success with 196 total attendees.

All students can request assessed grades until the end of remediation, there is no longer an April 9 deadline.

e) Head of Bethune College
There was none.

8. Reports from Science Representatives on Senate Committees
There was none.

9. Report from Student Caucus Representative
Natalie Moussa shared challenges students are facing during the strike such as services that have ended, dropping courses, remediation, filing petitions and inconsistency in communication.

10. Reports from Standing Committees of Council
a) Executive Committee:
   > Vacancies report on the Standing Committees of FSc Council
   N. Kovinich noted the vacancies that remain.
   b) Undergraduate Curriculum Committee
   > Consent agenda items

11. Other Business
a) Strategic Scheduling Evaluation, York University Final Report by Ad Astra – Frankie Billingsley, Associate Registrar & Director, Student Records & Scheduling - York University Final Report
Frankie presented to Council and welcomed questions and feedback.
APRIL 9 2024 ATTENDANCE

Anna Burtin
Brad Sheeller (non-voting guest)
Carl Wolfe
Chrystal Smith
Conor Douglas
dasantila golemi-kotra
Delwar Hossain
Derek Jackson
Dong Liang
Eva Hughes
Gerald Audette
Gino Lavoie
Helen McLellan
Hovig Kouyoumdjian
Iain Moyles
James Elwick
Jennifer van Wijngaarden
Jerusha Lederman
Jill Lazenby
John Amanatides
Jonathan Cevallos
Julie Clark
Lesley Milley
Maggie Xu
Mandy Ramnaraine
margaret mroziewicz
MArk Bayfield
Mark Bayfield (MArk Bayfield)
Mark Vicari
Melissa Hughes
Michael Haslam
Mike Scheid
Muhammad N Yousaf
Natalie Moussa
Neal Madras
Nikola Kovinich
Pat Hall
Patricia Lakin-Thomas
Patrick Ingram
Phoebe Chan
Robert Tsushima
Robin Metcalfe
Ruela Ordinaria
Sarah Burley Hollows
Satyam Verma
Stuart Macgregor
Taline Apelian-Sutor
Tanya Da Sylva
Tianna McFarlane
Tom Kirchner
Tracy Bhoola
Trevor VandenBoer
Vera Pavri
Violeta Gotcheva
Vivian Saridakis
Wendy Booth
Wendy Taylor
Wesley Moir
Yuna Hwang
The Senate of York University

Meeting Synopsis

The 706th Meeting of Senate
Held on Thursday, 25 April 2024, in person

Remarks

The Chair, Poonam Puri, welcomed Senators to the 706th meeting of Senate.

The President acknowledged the efforts that enabled a return to in-person activities. The decline in humanities and social sciences enrollments was highlighted, emphasizing the need for innovative responses to attract more students. Financial challenges were discussed in detail, focusing on budgetary shortfalls due to factors such as declining international student enrollments and extension of tuition freezes. The President also shared insights on the University's long-term vision, stressing the importance of maintaining foundational strengths while adapting to changing trends in the education sector.

Inquiries & Communications

There were none.

Approvals

Senate approved the recommendations of the Academic Policy, Planning and Research Committee to recommend to the Board of Governors the establishment of a Department of Theatre, Dance, & Performance in the School of Arts, Media, Performance & Design (AMPD), the disestablishment of the Department of Dance and Department of Theatre & Performance, effective 1 May 2024, and transfer of the constituent academic programs and curricula from the two existing departments to the above-noted new department.

Senate approved the recommendations of the Academic Standards, Curriculum and Pedagogy Committee to establish the Advanced Management Diploma (Type 2), to be available in all Master’s degree programs housed in the Schulich School of Business, effective F2024.

Committee Information Items

Executive

The Executive Committee’s information items included the following:

- A consultation with Senate following the end of the disruption of academic activities as required by the Senate Disruptions Policy
York University Senate

- A call for expressions of interest in membership on Senate committees and other positions elected by Senate, with terms beginning 1 July 2024
- Changes to the rules and procedures of Glendon Faculty Council, following the Executive Committee’s review, related to revised quorum for Council committees, changes to committee membership rules and student membership on several committees.

**Academic Policy, Planning and Research (APPRC)**

APPRC reported on the following items:

- planning and developments for the new Markham campus, including current data on undergraduate and graduate applications and enrolment projections for the FW’24 academic year
- preliminary academic planning for the newly approved School of Medicine

**Academic Standards, Curriculum and Pedagogy (ASCP)**

ASCP conducted a facilitated discussion on revisions to the Senate Academic Conduct Policy and Procedures, seeking the input of Senate on the question of whether the central features of the proposed Policy and Procedures represent process improvements.

**Tenure and Promotions (T&P)**

T&P presented its annual report for 2022-2023, which provided data on files reviewed and described activities for the past year, ongoing review of unit-level standards, appeals, composition of sub-committees, and other process matters.

**Additional Information about this Meeting**

Please refer to the full Senate agenda and supplementary material posted online with the 25 April 2024 meeting for details about the items reported.

Senate’s next meeting will be held at 3:00 pm on Thursday, 23 May 2024.
## 2023-2024 FSc Report on vacancies for Senate and FSc Standing Committees

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<th>Committee</th>
<th>Rules of Faculty Council - membership</th>
<th>Meeting time / Membership</th>
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<td>Senate</td>
<td>According to the York University Statutory Rules and Procedures governing the size and composition of Senate, the Faculty of Science shall have twelve members, including a minimum of two Chairs. According to The Rules of Council (Science), Faculty representation shall include the Director of Natural Science, three Department Chairs, and terms shall be for three years. Major Senate website</td>
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### Committee on Research & Awards
The Committee on Research and Awards shall consist of one member elected by Council from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology & Society/Natural Science, and one student member of Council.

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<th>Committee</th>
<th>Rules of Faculty Council - membership</th>
<th>Meeting time / Membership</th>
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<td>CEAS will normally meet every alternate Wed/Thurs from 1:00 - 3:00 pm year round.</td>
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### Graduate Curriculum Committee

The Graduate Curriculum Committee consists of:

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<th>Role</th>
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<td>Associate Dean – Associate Dean (ex officio)</td>
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<td>D. Golemi-Koka</td>
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<tr>
<td>Graduate student</td>
<td>Farnaz Mansouri-Noori</td>
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The purpose of the Graduate Curriculum Committee is to provide broad review and leadership to Council on matters of graduate curriculum, academic and program requirements with respect to:

- New Course Proposals
- Course Change Proposals
- Minor Changes to Program/Graduate Diploma Academic Requirements, Major Modifications to Program/Graduate Diploma
- New Graduate Degree Programs

The Graduate Curriculum Committee shall consist of:

- Associate Dean – Research & Graduate Education (ex officio)
- Graduate Program Director (or designate who must be a member of the graduate program) of each Graduate Program in the Faculty of Science
- One full-time faculty member from the Faculty of Health or Lassonde School of Engineering who is appointed to teach in any FSc graduate program
- A member at large with knowledge of graduate programming, and experience with curriculum approval at the Faculty level.

The Chair of the Committee is selected by the voting members of the Committee for a one-year term.

### Committee on Equity, Diversity & Inclusivity

The Committee on Equity, Diversity & Inclusivity is to provide broad review and leadership to Council on matters of Equity, Diversity, and Inclusivity issues with respect to:

- Tenure and Promotions
- Hiring and Retention of members from EDI groups
- Approaches to addressing gender bias in the workplace
- Research regarding equity recognized groups
- Workload and service contributions of EDI members
- EDI experiences in Teaching and Learning

The Committee on Equity, Diversity & Inclusivity shall consist of:

- Associate Dean, Faculty Affairs (ex officio)
- Associate Dean, Research & Partnerships (ex officio)
- One primary and one alternate member from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology & Society
- Two graduate students or postdoctoral fellow/visitors (one primary and one alternate) from any graduate program within the Faculty of Science
- One undergraduate student

The purpose of the Committee on Equity, Diversity & Inclusivity is to provide broad review and leadership to Council on matters of Equity, Diversity, and Inclusivity issues with respect to:

- Tenure and Promotions
- Hiring and Retention of members from EDI groups
- Approaches to addressing gender bias in the workplace
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The Committee on Equity, Diversity & Inclusivity shall consist of:

- Associate Dean, Research & Partnerships (ex officio)
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- Two graduate students or postdoctoral fellow/visitors (one primary and one alternate) from any graduate program within the Faculty of Science
- One undergraduate student

The Chair of the Committee is selected by the voting members of the Committee for a one-year term.

Meeting is held the last Wednesday of every month.
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 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 April 30 2024, 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 scicurri@yorku.ca

1.1 Science, Technology & Society

1.1.1 Changes to Existing Course: STS 3780 3.0 Biomedicine and Society
(mode of delivery)

1.2 Natural Science

1.2.1 Changes to Existing Course: NATS 1512 3.0 Environmental Pollution
(mode of delivery)
1.2.2 New Course Proposal: NATS 1524 3.0 Astronomy Across Cultures
1.2.3 New Course Proposal: NATS 1578 3.0 Drugs and Society: Medicines, Narcotics and Poisons

1.3 Chemistry

1.3.1 Changes to Existing Course: CHEM 4090 3.0 Topics in Materials Sciences
(title/calendar description)
STS 3780 is currently offered as LECT only

In addition to LECT, we would like to offer STS 3780 in alternative delivery modes in either the F, W and SU semesters: ONCA and BLEN

Rationale:
A goal of the Faculty of Science Strategic Plan 2021-2025 is to “optimize online and blended in-person/online courses and programs to diversify learning”, where the blended format is defined by the Registrar’s Office as a “combination of virtual and in-person learning; instructor will define whether virtual components are synchronous or asynchronous.” This format is suggested as a solution for balancing the diverse needs of commuting students and faculty with the benefits of in-person learning and maintaining a strong on-campus community. In addition, according to “A Case for Change: eLearning Integration at York University - Summary and Recommended Actions”, prepared by York’s Academic Technology Advisory Group, the literature shows “when compared to fully online and face-to-face, blended learning has been shown to have higher success rates and lower withdrawal rates.” As such, in the recent report from the Joint APPRC-ASCP Task Force on the Future of Pedagogy, a preliminary recommendation is to “consider expanding and enhancing blended learning at York so that it becomes a more common mode of delivery”.

This course explores issues at the intersection of biomedicine and society. Consequently, it stands to be of interest to a range of students, both within our STS program, other programs in the Faculty of Science, as well as other faculties more generally (e.g. Health). On-line offerings (ONCA) will make the course available to a wider group of students who would otherwise not be able to attend a fully in-person LECT course. This is particularly true for when the course will be mounted in the summer term.

Furthermore, a BLEN and ONCA offering will allow for a broader range of guest lectures, speakers and activities. Issues at the intersection of biomedicine and society involve regulatory issues, health technology assessments, health systems issues, and patient voices. Many experts or stakeholders within Canada are not located in Toronto or are not able to travel. An ONCA format will allow for more of those experts to engage in class meetings. Furthermore, the proposing Course Director (Conor Douglas) has an extensive international network of academics with expertise in this area. An ONCA course delivery format will also facilitate the participation of these international experts.

Our desire to offer greater course flexibility aligns with York University’s current Academic Plan. For example, one of York’s six priority areas of action addresses 21st century learning where one objective is to, “offer a wider range of credentials and flexible delivery options, from in-person to virtual, to expand access to learning for diverse individuals at multiple stages of their lives and careers” (https://yfile.news.yorku.ca/2020/06/28/york-university-launches-new-academic-plan-for-2020-to-2025/)

The Faculty of Science’s Strategic Planning Mandate (2021-25) also encourages departments to, “optimize online and blended in-person/online courses and programs to diversify learning” (https://www.yorku.ca-science/about/strategic-plan/)


**Course Design:**

For ONCA all lectures will be pre-recorded for asynchronous student access. In the first two weeks, three optional open office hours (of two hours each) will be available to students to ensure they can access recordings, readings, activities, or ask any questions. After the first two weeks regular office hours will be held on a regular weekly basis, together with a “Course Q&A Forum” where students can submit questions.

For BLEN the course would have a mix of pre-recorded lectures from the Course Director and guest lectures as well as in-person lectures from the Course Director.

Having guest speakers and guest lectures from a wider range of academic experts, and a broader range of stakeholder voices will enhance students’ abilities to achieving the learning objectives.

In both ONCA and BLEN formats student-to-student communication and collaboration will enhance these scheduled contact hours. These will take the form of team presentations that students will pre-record via Zoom, as well as peer-review activities in the development of final paper outlines.

A “Student Participation Forum” will also be created for eClass where students can respond to weekly discussion questions based on the unit’s topic and interact with each other asynchronously.

Weekly announcements will also be sent summarizing reading requirements, work and assignments due for the next week, reiterating material present in the Course Outline / Syllabus.

This delivery formats provides students with flexibility when scheduling their courses, thereby increasing the likelihood that they can find an STS course in their area of interest, which matches their schedule requirements (and possibly their international status).

The breakdown of format is as follows:

**(Method of) Instruction:**

1. **Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).**

   It is planned that this course is offered every year, or alternating years depending on instructor availability.

2. **Number of department members currently competent to teach the course.**

   There are currently four STS faculty competent to teach the course: Douglas, Elwick, Lazenby, and Monaldi.

3. **Instructor(s) likely to teach the course in the coming year.**

   Douglas is a national expert on this topic and is likely to teach the course in the coming year (2025-2026), and in years to come.
4. 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.

Each week students will have an estimated three hours of learning activities, outside of the associated course assignments.

For ONCA format there will be a pre-recorded series of mini lectures totaling approximately two hours per week. For BLEN similar amount of lecture time will take place in a mix of in-person and pre-recorded lectures.

For ONCA, each week, there will be two hours of optional open office hours where students can engage with the Course Instructor, ask content questions, and questions about assignments. In the first two weeks of term, there will be six hours of optional open office hours to ensure students are orientated to the course. This will also be the case in weeks when BLEN delivery is on-line.

Regular discussion questions will be posted in the “Student Participation Forum”, which students will be expected to contribute to, monitor, and respond for a total of about thirty minutes per week.

Assessment will include student presentations by rotating group presentations groups on weekly topics that the rest of the class will be expected to watch (about fifteen minutes each). These presentations (valued at 10%) will be recorded by students with mandatory cameras-on. The rest of the class will answer questions based on the presentation as one of their weekly assignments.

In combination of these camera-on recorded presentations, and an in-person final exam (valued at 30%) will work to maintain the academic integrity of the course.

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

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

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

**Faculty:** Science

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<td>Mar 13, 2024</td>
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<th>Course Number:</th>
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<td>NATS1512 3.0</td>
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<th>Course Title:</th>
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## Type of Change:

- [ ] in pre-requisite(s)/co-requisite(s)
- [ ] in course number/level
- [ ] in credit value
- [ ] in title (max. 40 characters for short title)
- [x] in Calendar description (max. 40 words or 200 characters)
- [ ] other (please specify):
- [ ] in cross-listing
- [ ] in degree credit exclusion(s)
- [ ] regularize course (from Special Topics)
- [ ] in course format/mode of delivery *
- [ ] retire/expire course
- [ ] in CCE/NCRs

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## Rationale:

A goal of the Faculty of Science Strategic Plan 2021-2025 is to “optimize online and blended in-person/online courses and programs to diversify learning”. The flexibility of online course offerings is especially important in NATS because students tend to choose their NATS courses after their core courses are already scheduled, leaving limited scheduling windows for NATS LECT courses. Thus, by providing online options for NATS courses, we increase the likelihood of students enrolling in courses of their chosen subject area. This can improve the student experience as well as the likelihood of student success and engagement in their NATS course. In addition, since ~50-60% of NATS courses are taught by sessional faculty, the flexibility of offering NATS courses in different delivery modes enables us to accommodate the changing needs and schedules of course directors who teach at other institutions.

The Division also recognizes the pedagogical and social importance of the in-person experience, particularly for 1st year students. We therefore aim to restrict our online course offerings to no more than 30% in the Fall/Winter session, as 30% represents the limit above which a program would have to propose a major modification change. During the summer term, when virtually all of our students are
beyond their first year, ~60% of NATS courses are offered in the online format to accommodate the needs of students who work and travel during the summer months.

NATS1512 is currently offered every Fall in the LECT format. It is recommended as a precursor for students who are interested in our more specialized environmental science courses, such as NATS1515 Atmospheric Pollution, NATS1516 Water Pollution and NATS1755 Natural Hazards. Offering NATS1512 in the online format in the summer term, in addition to the LECT format in the Fall term, increases the accessibility of this gateway course. Depending on the availability of course directors, NATS1512 ONCA would likely be offered every other summer, swapping with our other 3-credit online options in this subject area.

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: Courses changes involving components of online delivery and/or online assessments must include a revised ‘Course Design’, ‘Method of Instruction’ and ‘Evaluation’, following the instructions for these sections in the New Course Proposal Form.

### 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.

In the ONCA delivery mode, NATS1512 achieves its learning objectives by offering asynchronous, online lectures that utilize case studies and open-ended, thought-provoking questions (which are further explored in assignments) to help students engage with the material. In person activities from NATS1512 LECT (such as case studies) can be successfully converted to online through the development of instructional videos used to walk students through the case study scenario and associated completion task. Many aspects of NATS1512 LECT (such as the unit problem sets and skills seminars) are already online (eClass) assessments and therefore no change is required. Live Zoom office hours as well as asynchronous eClass Discussion Forums will be used to ensure students receive the support necessary to be successful in the course.

In the ONCA format, the assessment scheme is as follows:

- **Unit Problem Sets:** 6% (3 x 2% each)
- **Skills Seminar Completion Assignments:** 5% (5 x 1% each)
- **Case Studies:** 4% (5 x 1% each, lowest grade dropped)
- **Assignments:** 45% (3 x 15 % each)
- **Midterm**: 15%  
- **Final Exam**: 25%

*The midterm and final exam will be in person to ensure academic integrity is maintained. All other listed assessments will be done online (via eClass).

### Instruction:

1. NATS1512 ONCA will typically be offered every other summer.
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.

2. There are 2 faculty members with the expertise to teach this course (Stephanie Domenikos and Ian Lumb).
3. Stephanie Domenikos is expected to be teaching this format in SU25.
4. The number of learning hours for NATS1512 LECT is as follows:
   - 3 hours per week for in-person lectures/assessments (x 12 weeks)
   - 5 hours per week for non-contact course work (i.e. completion of homework assignments, problem sets, case studies, etc.) (x 12 weeks)

   The total number of learning hours will remain the same for NATS1512 in the ONCA format, as follows:
   - 6 hours per week for asynchronous, online lectures/assessments (x 6 weeks)
   - 10 hours per week for non-contact course work (i.e. completion of homework assignments, problem sets, case studies, etc.) (x 6 weeks)
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With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
This course explores the study, use and meaning of astronomy in different human cultures with a special focus on non-western cultures. Students learn how different human cultures have understood and interpreted the observed celestial phenomena throughout history and how this perception played a role in their understanding of human origins and its relationship to nature. Students approach astronomical concepts through the lens of archaeoastronomy (defined as the exploration of astronomical practices in ancient cultures) and ethnoastronomy (defined as the study of astronomical practices by different cultures around the world).

Topics includes celestial myths and their role in understanding/describing natural events, origins of astrology, cultural interpretations of the motions of the stars, planets, the Moon, and the Sun, methods of navigation and timekeeping, different calendars, and puzzles that have inspired important shifts in our understanding of the Universe. The course examines varying cultural conceptions of astronomy and how those conceptions function in different human societies on social, political, economic, and religious levels.

Co/Prerequisite: None
CCE: NATS1795 (The Nature of Time)
NCR: None

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.

*Cultural Astronomy* will begin by providing a general introduction to the appearance of the night sky, constellations, and the motions of celestial objects as observed by the naked eye from varying latitudes. This will provide a basis of knowledge from which to build conversations around how various cultures interpreted the night sky and these motions and developed knowledge systems surrounding it.

From here, students will be introduced to some of the earliest evidence and records of humankind’s attempts to understand and use the motion of celestial objects toward a variety of goals, such as timekeeping, navigation and ceremonial practices. This includes the analysis of ancient artwork and structures that predate most major writing systems and historical accounts. In this portion of the course, students are applying techniques of archaeoastronomy, the study of how ancient artwork, structures, and sites are connected to astronomical phenomena.

The focus of the course will then shift to how ancient civilizations embarked on systematic efforts to measure and record the location of various celestial objects. Students learn how such precise record-keeping not only led to emergence of specific patterns in the motion of celestial objects but also empowered these cultures to make predictions regarding the appearance of celestial bodies. Furthermore, the endeavor to comprehend the motion of celestial objects led to the development of an intricate tapestry of a pantheon of gods, creation myths, time-keeping practices for agriculture and, finally, the emergence of astrology as a predecessor to astronomy.

As the course unfolds, students will analyze and discuss how the development of astronomical knowledge played a central role in a number of social, cultural, and religious practices of various cultures around the world, and how this led to inventing ever more precise methods of timekeeping and making astronomical predictions. Throughout the course, students will be applying techniques of ethnoastronomy, the study of how astronomical practices of various cultures around the world inform their world views.

Below is a list of the major topics to be covered in Cultural Astronomy:

1. **Appearance of the Night Sky**
   Celestial Sphere, Constellations, the sky’s daily rotation, Sun, Moon, Ecliptic, The Zodiac, Planets, Sky from different latitudes, Eclipses

2. **The Beginnings and Megaliths: early evidence of humanity’s astronomical knowledge**
   Examples to be discussed may include: Göbekli Tepe in modern Turkey (circa 9,500 BCE); Cave Arts such as those found in Lascaux; Caves in modern France (circa 15,000 BCE), Nabta Playa in Egypt (circa 7,500 BCE); Newgrange in Ireland (circa 3,200 BCE), Stonehenge in England (circa 3,100-1600 BCE); the Nebra Sky Disc in Germany (circa 1800-1600 BCE)
3. Astronomy in Ancient Mesopotamia
   Sumerians and Babylonians, development of writing and number systems, the creation and use of astronomical knowledge for cultural purposes

4. Astrology as a pseudo-science
   Demarcating science from pseudo-science, falsifiability, Astrology as a pseudo-science

5. Astronomy in Ancient Egypt
   The development of constellations and timekeeping, calendar development, the use of astronomical signs for agricultural purposes, the development of religious practices related to the sky.

6. Astronomy in Ancient Iran, China, and India
   Importance of vernal equinox in Iranian Culture, Festivals of Tirgan and Mehregan. The development of Asian and South-Asian astronomical systems, such as detailed observational accounts and development of cultural practices related to predicting the future.

7. Astronomy in Mesoamerica
   Analysis of the Olmecs, Incas, Mayas, Aztecs, and their development of complex cultural practices related to predicting the night sky.

8. Aboriginal Astronomy in Canada and the United States
   Cultural groups such as the Mi'kmaq, Iroquois, Blackfoot, Cree, Inuit have complex knowledge systems that rely on oral histories, story telling, and writing systems to communicate knowledge of the night sky and how it can help humans live in this world.

9. Aboriginal Astronomy in Australia
   Megaliths in Australia, skylore, knowledge systems related to living on the land.

10. Astronomy and Abrahamic Religions
    The interpretations of the sky from the point of view of Catholic, Jewish, and Islamic religion, evidence from the spiritual books, and cultural practices (times of prayer, important dates, lunar year, solar year and luni-solar year)

Course Learning Objectives

In completing this course, students should be able to

1. Describe the motion of the night sky on a daily and annual basis and provide a scientific explanation for the motion observed

2. Analyze ancient archaeological sites and comprehend their connections to the night sky.
3. Describe a broad range of astronomical achievements from a variety of cultures around the world.

4. Describe how observations and understanding of the night sky have been interwoven into many aspects of prehistoric, ancient, medieval, renaissance, and contemporary culture, including those related to social, political, agricultural, and religious endeavors.

5. Explain the broad range of social, political, and religious views that stem from astronomical knowledge throughout human history.

This course can be delivered in either the in-person (LECT) format, the blended format (BLEN), or as an online, asynchronous course with in-person exams (ONCA). The range of delivery formats provides students with flexibility when scheduling their courses, thereby increasing the likelihood that they can find a course in their area of interest.

LECT: All components of the course (i.e. lectures, in-class activities, midterms, and final exams) are held in-person. In-class activities will consist of active learning exercises such as clicker surveys and peer-to-peer/group discussions.

BLEN: All lectures will be delivered asynchronously online. In-person sessions will take place every second or third week, during which students will complete the active learning components described in the LECT section above. Clicker activities will be replaced with online quizzes or discussion forums to be taken after viewing lecture videos, to ensure students come prepared to participate in-class activities.

ONCA (Summer Only): All lectures will be delivered asynchronously online. Clicker activities will be replaced with online quizzes to be taken after viewing lecture videos. In-class discussion exercises will be replaced with online forum discussions.

Instruction:
1. Cultural Astronomy is intended to initially be offered annually in the Fall term, in either the LECT or BLEN formats, depending on the percentage of each format offered in a given year. Depending on popularity, it may also be offered in the summer term in the ONCA format.

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.

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).
2. Number of department members
2. Department members that are currently competent to teach the course are: Jesse Rogerson, Parandis Tajbakhsh, Robin Metcalfe, Robin Kingsburgh, Mary-Helen Armour

3. Instructors likely to teach this course in its first iteration are Jesse Rogerson or Parandis Tajbakhsh.

4. As a 3.0 credit course, students should expect three hours of lecture per week (36 in total), which can be broken into direct lecturing, in-class activities, and/or asynchronous lecture videos, depending on the format. A further one hour of office hours will be available to students. Outside of direct contact hours with the professor, students should expect an additional five hours (on average) of additional learning activities and assessments, related to assigned readings, assignments, and revision (60 hours in total). This brings the total student commitment over a full semester to approximately 96 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.)

**Participation and Engagement** (eg. via Clicker Activity): 10%
**Bi-Weekly Reflection Assignments**: 15%
**Research Project**: 25%
**Midterm Test**: 20%
**Final Exam**: 30%

Further notes:

**Bi-Weekly Reflection Assignments**: in these assessments, students will be prompted with various reflection-based questions asking to think and reflect on what they are learning, the significance, and personal thoughts. These can be submitted in various formats including through oral-recorded video.

**Research Project**: students will choose a constellation, photograph this constellation at least 3 times in the span of the semester, and research its significance in different cultures, including a culture not discussed in class. This project will begin early in the semester, to ensure students are able to photograph 3 times; each photograph will be required to be submitted immediately upon taking it, in addition to a 'selfie' taken with the same device to ensure that the photo is authentic. Each photo will be accompanied by the student’s research in addition to an annotated bibliography, hand drawn sketches of the constellation’s location in the sky, and a description of the student’s observing experience, making comparisons with the observing experience of the culture that the student has chosen.
These work-in-progress components are designed to help mitigate the impact of academic dishonesty (eg, the use of Generative AI).

Tests and exams: will be a mixture of multiple choice and short-answer questions. All tests are required to be in-person at York University.

Several book chapters/articles are assigned to students as required readings for this course. Below is a list:


The primary purpose of courses offered by the Division of Natural Science is to:

- broaden student horizons ("breadth")
- expose students to some of the fundamental ideas of the course’s major discipline ("scientific knowledge")
- Promote multi-or interdisciplinarity ("multi/interdisciplinarity")
- Develop skills, problem-solving tools and assessment strategies, some of which are specific to the courses discipline ("critical skills" and "critical thinking")

Cultural Astronomy is an umbrella term that refers to the fields of archaeoastronomy and ethnoastronomy. The former is concerned with the study of how the architecture of ancient monumental structures is related to astronomical alignments while the latter refers to the study of the living astronomical traditions through examining the written texts and preserved artefacts. In this sense, cultural astronomy is a truly multi-disciplinary field, combining aspects of astronomy (scientific knowledge), archaeology, and anthropology. In addition, this course exposes students to a non-western view of the emergence and development of the field of astronomy and thus broadens students’ breadth in both science as well as in different ways of knowing.

Furthermore, students will gain critical skills in the analysis of astronomical methods in the field of archaeoastronomy. Students will also employ critical thinking in making comparisons between the evolution of different ways of knowing in different culture contexts and distinguishing science from pseudo-science.

This course is an excellent addition to the popular astronomy courses offered by the NATS Division. While some small degree of overlap exists with NATS1740 6.0 Astronomy and NATS1745 6.0 History of Astronomy in covering the fundamentals of the sky, NATS1524 Cultural Astronomy departs from the additional astronomical concepts covered in NATS1740 and NATS1745 and instead delves far deeper into cultural comparisons and the non-western view. Such a course would be popular among students of history, sociology and anthropology. NATS1524 is also an excellent complement with the popular course NATS1525 3.0 Extraterrestrial Life: A Modern Discussion to include Historical, Religious and Cultural Aspects. By offering NATS1524 in the Fall and NATS1525 in the Winter, these two courses will enable students to complete their 6-credit NATS requirement by learning about astronomy through different cultural lenses, thereby acquiring knowledge about different ways of knowing. It is expected that NATS1524 and NATS1525 will replace a
section of NATS1745 6.0 History of Astronomy, which is currently offered in multiple formats 4 times per year.

NATS1795 6.0 has been identified as a CCE with this course owing to the overlap in astronomical fundamentals as well as non-western methods of timekeeping.

Expected enrollment: 150-200

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.

Accessible format can be provided upon request.
MEMORANDUM
York University Libraries

To: Robin Metcalfe

From: William Denton (York University Libraries)

Date: 01 February 2024

Subject: Library Statement of Support – NATS 1524: Cultural Astronomy

Summary

York University Libraries (YUL) is well positioned to support the proposed course. Our holdings, in astronomy and other subjects, grow yearly (as does the universe, though the Libraries is spatially finite); many areas of our collection will be of interest to students and instructors in this course, with all its historical and cultural aspects.

Collections

The Libraries’ collections echo the curricular and research priorities of students and faculty. Care is given to select materials that reflect new courses taught at York, as well as research and publishing trends. Library personnel review reading lists supplied for proposed courses to address any potential gaps. The Libraries already holds all but two of the suggested readings, and I have ordered the missing pair.

The Omni single-search interface provides students with access to a wide range of materials, including books, book chapters, articles, dissertations, streaming media, etc. Library users may also request items from partner libraries through Omni. A selection of electronic collections of particular interest are highlighted below. The A-Z list on the Libraries’ website provides a complete register of electronic offerings.

eBook Platforms:

- De Gruyter eBooks
- Oxford Scholarship Online
- Cambridge Core
- Taylor & Francis eBooks
- ProQuest eBook Central
- Scholars Portal Books
Services

Library Instruction

Librarians and archivists help students build research skills and digital fluencies through workshops, online research guides, and individual research assistance. Instructors can arrange a research skills workshop (or seminar) geared to a specific assignment, course, or competency.

Research Guides of Interest:

- Anthropology
- Astronomy
- History (and all the area history guides)
- History and Philosophy of Science and Technology

Research Help

Online research assistance is available in both English and French via chat and email. In addition, students and faculty can book one-hour research consultations with a specialist librarian.

Accessibility Services

Library Accessibility Services (LAS) provides alternative content formats, as well as adaptive technologies and spaces. With a referral, York University faculty and students can request transcription services or reserve an accessibility lab workstation. Contact lashelp@yorku.ca with questions.
### Faculty:
Indicate all relevant Faculty(ies)

Science

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

Science, Technology and Society (STS)/ Division of Natural Science (NATS)

### Date of Submission:
January, 2024

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

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<th>Course Number</th>
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<td>NATS 1578</td>
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### Course Title:
The official name of the course as it will appear in the Undergraduate Calendar and on the Repository

Drugs & Society: Medicines, Narcotics and Poisons

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

Drugs & Society

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With every new course proposal it is the Department’s responsibility to ensure that new courses do not overlap with existing courses in other units. If similarities exist, consultation with the respective departments is necessary to determine degree credit exclusions and/or cross-listed courses.
There is a fine line between medicines, recreational drugs, and poisons. This is historically true of cocaine, heroin, and amphetamines, and now also syntenic opioids like Fentanyl. Those dividing lines are drawn on both a biochemical and societal basis, and it is biomedical and social processes that lead to their development. This multidisciplinary course analyzes the nature and intersection of pharmaceuticals, science and society. The science of drug development cannot be fully understood without an appreciation of how drug research is funded, how drugs are regulated, and how they are provided. In doing so, the course provides a brief historical overview of the chemical and institutional history of pharmaceuticals, and the birth of the pharmaceutical industry. The course tracks the multiphase process of pharmaceutical drug development through numerous scientific, political, regulatory, medical, as well as business and innovation practices. In each phase of the drug research, development and deployment we identify and analyze key scientific and societal issues. The course demonstrates the scientific triumphs of medicines like vaccines and antibiotics. We discuss how stem cell and immunotherapies have collectively saved millions of lives while building some of the largest industrial sectors in the world. The course also discusses the connections between public taxpayer investment in pre-clinical scientific work and privatization into for-profit commercial ventures. We track how the scientific method influences clinical trials, which are increasingly conducted in low-and-middle income countries that have less stringent protection and controls for research participants. This course shows the chemical and biological basis upon which drugs are regulated and licensed in Canada, and how they end up on provincial drug plans (or not). We explore the power of the pharmaceutical industry in the marketing of drugs and the manipulation of biological information, and how they shape the prescribing practices of doctors. The course concludes by exploring statistical elements of defining rare diseases and the access and availability challenges for drugs for rare diseases (which are amongst the most expensive in the world).

Prerequisites required: None
CCE: None
NCR: None
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.

Students explore the intersection of science, pharmaceuticals and society. The history, successes, and growth of the pharmaceutical sector is demonstrated while critically analyzing the scientific and societal impact of drug research, clinical trials, regulation, marketing, and use of medicines.

No degree credit exclusions or pre-requisites.
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 a multidisciplinary examination of scientific and societal elements of pharmaceuticals, drug innovation and use. This includes the history and chemical basis of pharmaceutical traditional manufacturing, as well as the shift and rationale to more bio-based products. Other issues include contemporary practices of biomedical research design for clinical trials and drug regulation, as well as political processes through which drugs become integrated into provincial health services. The course covers key challenges related to biological and societal dimensions of (opioid) addiction, drug (over) pricing, and equity issues of unmet needs of patients with rare diseases.

With the successful completion of this course students should be able to:

- identify key scientific and institutional achievements in the history of the pharmaceutical industry
- describe the scope and scientific drivers of the contemporary pharmaceutical and therapeutic biotech sectors
- explain how the scientific method influences the phases of clinical trials, including how pre-clinical drug research is funded and undertaken in Canada
- explain how drugs are licensed / regulated / approved in Canada, including chemical determinants of safety, and biological markers for efficacy
- explain the processes through which drugs are listed on provincial drugs programs
- critically analyze the internationalization of clinical trials
- critically analyze the marketing of pharmaceuticals and manipulation of biological data
- identify key challenges related to drugs for rare diseases, including the statistical challenges associated with defining rarity.

WEEKLY / TOPIC SCHEDULE

1. Introduction to course; Introduction to Science & Technology Studies (STS) of pharma
2. Chemical history, growth and success of the pharmaceutical industry (eg, how chemistry used in the German synthetic dye industry was used to create chemical-based pharmaceuticals on an industrial scale.)
3. Developing drugs: how the scientific method informs pre-clinical research, how that gets funded; and the phases of clinical trials
4. Contract Research Organizations and the internationalization of clinical trials
5. The chemical basis and biological end-points in pharmaceutical regulation / licensing & economic evaluation of treatments in Canada
6. “Blockbuster drugs”, “Me Too drugs”, the chemistry of generics & patents
7. Covering and delivering drugs across provinces and territories: procedures, drug budgets, inequities
8. Rare diseases & unmet medical needs: Statistical challenges of defining rarity, and the shift from chemical-based to bio-based treatments
10. Use and over-use: Bio-chemical and societal basis for how medicines turn into drugs & opioid crises
11. Social pharmaceutical innovation & alternative ways forward
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 can be delivered in either the in-person (LECT) format, the blended format (BLEN), or as an online, synchronous course with in-person exams (ONCA). The range of delivery formats provides students with flexibility when scheduling their courses, thereby increasing the likelihood that they can find a course in their area of interest.

The breakdown of each format is as follows:

**LECT:** All components of the course (i.e. lectures, in-class activities, midterms, and final exams) are held in-person. In-class activities will consist of active learning exercises such as clicker surveys, pop talks, think-pair-share sessions, and hands-on activities and demonstrations in support of the projects (described in the evaluation scheme below).

**BLEN:** All lectures will be delivered synchronously online. In-person sessions will take place every second or third week, during which students will complete the active learning components described in the LECT section above. Clicker activities will be replaced with online quizzes to be taken after lectures, to ensure students come prepared to participate in-class activities. Midterm and final exam will be held in person.

**ONCA:** All lectures will be delivered asynchronously online. Clicker activities will be replaced with online quizzes to be taken after viewing lecture videos. Demonstrations and pop-talks can be pre-recorded and posted for students to view and engage with in online forum discussions. Think-pair-share sessions can be conducted via online forum discussions. Hands-on activities will be designed for students to complete at home. Midterm and final exam will be held in person.
Instruction:

1. Planned frequency of offering and number of sections anticipated (every year, alternate years, etc.).

   It is planned that this course would typically be offered once a year.

2. Number of department members currently competent to teach the course.

   Conor Douglas (Associate Professor, STS) is expertly qualified to teach this course.

   It may also be taught by qualified faculty in the Dept of Biology and the Faculty of Health, when available.

3. Instructor(s) likely to teach the course in the coming year.

   Conor Douglas is likely to teach the course in the coming years.

4. Indication of number of contact hours.

   There will be approximately 2-2.5 hours of lecture contact and 0.5-1 hour of learning activities per week (in-person or asynchronous online) for a total of 36 hours, with the course director also being available via weekly office hours, online help sessions, online forums and email.
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.)

In-class activities and quizzes: 20% (will include reflection journal entries after in-class group-pair-share, and short multiple choice on-line quizzes during on-line synchronous class meetings).

Conceptual mind-map: 25% (summative assessment due at the end of the course. Conceptual mind-maps are diagrams used to visually organize information into a hierarchy, showing relationships among pieces of the whole. They are effective tools to visualize and summarize learning. This assessment will help students to visualize and recall the various dynamics related to pharmaceutical science and drug innovation. This assessment will help students to visually map key points in history of the development of the pharmaceutical industry, stages of clinical trials, the drug licensing (regulation), economic evaluation processes and the relationship of the associated institutions. This assignment will also help to map where public and private funding plays in the innovation process, and where provincial drugs providers fit it. It will help to visualize connections between course units, and provide space for connecting course concepts and societal issues to these institutional processes.

Midterm exam (during in class meeting): 25% (will include multiple choice, problem-solving, and short answer questions based on lecture and reading materials)

Final exam (in exam period): 30% (will include multiple choice, problem-solving, and short answer questions based on lecture and reading materials)

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.

THESE ARE A SELECTION OF READINGS FOR EACH WEEK. NOT ALL WILL BE USED.

1. Introduction to course, STS of pharma


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.**

<table>
<thead>
<tr>
<th>2. History of pharmaceutical industry (German synthetic dye industry)</th>
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<th>3. Developing drugs: how pre-clinical research gets funded and done &amp; phases of clinical trials</th>
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<td>Archer, S. (2023). Funding science in Canada: How two decades of stagnant grant funding has rendered Canada non-competitive in the biomedical science and medical research sector <a href="https://deptmed.queensu.ca/dept-blog/funding-science-canada-how-two-decades-stagnant-grant-funding-has-rendered-canada-non">https://deptmed.queensu.ca/dept-blog/funding-science-canada-how-two-decades-stagnant-grant-funding-has-rendered-canada-non</a></td>
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<th>4. Contract Research Organizations and the internationalization of clinical trials</th>
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<th>5. Pharmaceutical regulation – In Canada (how is it done)</th>
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6. Health Technology Assessment and valuing treatments - in Canada


7. Covering and delivering drugs across provinces and territories: procedures, drug budgets, inequities


8. Rare diseases & unmet medical needs


9. Marketing medicines: Canada-USA differences & ghost writing


10. Use and over-use: How medicines turn into drugs & opioid crises


11. Social pharmaceutical innovation & alternative ways forward


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.

The primary resource required is a classroom of appropriate size, and that is for the in-person form of delivery only. The lecture hall / room would require the standard computer, projector and screen set-up.

Teaching Assistants will be required as is standard practice within the Natural Science program.

All reading materials are available on-line through the York University library catalogue.

No lab space or other equipment is required for this course.

Course Rationale:

The following points should be addressed in the rationale:

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

Contribution to Program Learning Objectives

As stated in the document “What is a NATS Course?” developed by the Division of Natural Science, the primary goal of a NATS course is to develop students' scientific literacy and critical thinking in a scientific context. To this end, NATS courses aim to achieve the following:

- broaden student horizons ("breadth"): Pharmaceutical sciences and pharmaceutical innovation is more than what happens in a lab. “Drugs and Society” will provide an understanding of all of the phases and stages through which drugs are researched, developed, and brought into our provincial healthcare systems. In doing so the breadth of pharmaceutical science and innovation processes is provided. This is highly relevant to all students who are very likely to interact with pharmaceutical medicines as patients, but also provides a broad overview of all of the different disciplinary processes in the chemical, physical and life sciences through which drug development and use takes place.

- expose students to some of the fundamental chemical and biological concepts in pharmaceutical science ("scientific knowledge"): This course overviews the chemical history of pharmaceuticals, the scientific method in the context of drug testing, the chemical and biological factors involved in drug policy and marketing in Canada as well as in the interplay between medicines and addictive substances, and the statistical factors involved in the treatment of rare diseases.

- promote multi- or interdisciplinarity: NATS courses commonly reach beyond the sciences to include scholarship focused on social, historical, and environmental impacts and influences related development of science and technology. This course does this for pharmaceutical science and innovation. No one discipline is responsible for pharmaceutical research, development,
regulation, and integration into medical practice. This course draws on a range of different disciplinary approaches including history, economics, innovation studies, Science and Technology Studies, organizational studies, political science, health economics, health systems research, sociology and anthropology to provide an overview of all of these processes that would be very difficult to cover in a disciplinary-bound course and program.

- develop skills, problem-solving tools and assessment strategies, some of which are specific to the course’s discipline (“critical skills” and “critical thinking”): While an overview is provided of the pharmaceutical innovation process, this is combined with critical analysis of that process and the associated biomedical and societal issues that it raises. None of the stages of pharmaceutical development are perfect or unproblematic, and this course highlights key challenges along the innovation process. Furthermore, pharmaceuticals themselves are not unmitigated successes, with issues of misuse highlighted. Importantly, alternative approaches to different components of the pharmaceutical innovation and use system are highlighted.

- cultivation skills in students that prepare them to be effective citizens (“Civic engagement”): Drugs are powerful things, some of them help you get better when you are not well, some can make you sicker (e.g. if you don’t take them the right way), and some turn out not to be medicines at all. While improved health is the goal of pharmaceuticals, there are also industrial implications. Knowing how drugs are developed and the societal issues raised in those development processes will not only help students be better members of society, but also better patients as they make choices around how they consume drugs themselves.

Relationship of the Course to Program Offerings

NATS1578 is a much-needed addition to our small complement of popular 3-credit courses in the field of Science, Technology and Society (STS). NATS currently has no courses which focus on this important, pervasive and highly-topical area. It should be a popular 3-credit choice for our many pre-med students and students from the Faculty of Health. It is an excellent pairing with NATS1575 3.0 Forensics, which provides students with the fundamentals of forensic chemistry including drug analysis. Another complementary pairing is with NATS1565 3.0 Plant Life, Human Life, which includes topics pertaining to the chemistry of active ingredients in herbal medicine, modern pharmacology and psychoactive drugs. For students interested in health science, these 3 courses will provide students with some choices for completing their 6-credit NATS requirement in this area.
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.

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<th>Dept: ___________________________</th>
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Accessible format can be provided upon request.
MEMORANDUM
York University Libraries

To: Robin Metcalfe
From: William Denton (York University Libraries)
Date: 02 February 2024
Subject: Library Statement of Support – NATS 1578 Drugs & Society

Summary

York University Libraries (YUL) is well positioned to support this proposed course. Our rich collections are ready to serve the student and instructor needs for such courses, and any gaps in our collection (a book we do not have; an electronic version of a print book) are usually easily filled. We are always happy to expand our collection to support NATS courses and the needs of the Science, Technology and Society program.

Collections

The Libraries’ collections echo the curricular and research priorities of students and faculty. Care is given to select materials that reflect new courses taught at York, as well as research and publishing trends. Library personnel review reading lists supplied for proposed courses to address any potential gaps.

Historically, textbook publishers have not made their electronic content available for purchase by libraries. This remains an ongoing challenge. Library personnel can assist with locating Open Access alternatives. Furthermore, the Libraries’ Open Scholarship department offers support to researchers on digital publishing, open repositories, and Creative Commons licensing.

The Omni single-search interface provides students with access to a wide range of materials, including books, book chapters, articles, dissertations, streaming media, etc. Library users may also request items from partner libraries through Omni. A selection of electronic collections of particular interest are highlighted below. The A-Z list on the Libraries’ website provides a complete register of electronic offerings.

Services

Library Instruction
Librarians and archivists help students build research skills and digital fluencies through workshops, online research guides, and individual research assistance. Instructors can arrange a research skills workshop (or seminar) geared to a specific assignment, course, or competency.

Research Guides of Interest:

- Science and Technology Studies
- Health Law
- How to find newspaper articles

Research Help

Online research assistance is available in both English and French via chat and email. In addition, students and faculty can book one-hour research consultations with a specialist librarian.

Accessibility Services

Library Accessibility Services (LAS) provides alternative content formats, as well as adaptive technologies and spaces. With a referral, York University faculty and students can request transcription services or reserve an accessibility lab workstation. Contact lashelp@yorku.ca with questions.
## Changes to Existing Course

**Faculty:**

**Department:** Chemistry  
**Date of Submission:** April 18, 2024

**Course Number:** CHEM 4090 3.0  
**Effective Session:** FW25

**Course Title:** Topics in Materials Sciences

### Type of Change:

- [ ] in pre-requisite(s)/co-requisite(s)
- [ ] in course number/level
- [ ] in credit value
- [X] in title (max. 40 characters for short title)
- [X] in Calendar description (max. 40 words or 200 characters)
- [ ] other (please specify):

### Change From:

**Topics in Materials Sciences**

Exploring the chemistry behind novel materials relevant to electronics, alternative energy sources, life sciences and polymer sciences. One term. Three credits. Prerequisites: SC/CHEM 3021 3.00 and SC/CHEM 3030 3.00; SC/CHEM 3031 3.00 is strongly recommended.

### To:

**Chemistry of Nanostructured Materials**

Exploring the chemistry behind nanostructured materials relevant to electronics, alternative energy sources, life sciences and polymer sciences. One term. Three credits. Prerequisites: SC/CHEM 3021 3.00 and SC/CHEM 3030 3.00; SC/CHEM 3031 3.00 is strongly recommended.
Rationale:

This course was recently "revived" after many years of dormancy.

We are proposing to change the title and calendar of the course to better and more specifically reflect the course material and also to attract more potential students. In 2024, materials science is dominated by nanostructured materials, making the course relevant for our students today.

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.
DEPARTMENT OF BIOLOGY GRADE DISTRIBUTION REPORT

2022-2023
Grades Review Report to CEAS

November 2023 (Updated February 2024)

Department of Biology

This report was prepared by members of the teaching committee Nicole Nivillac (UPD), Andrew Donini, Charlotte De Araujo, Tanya Da Sylva, Dasantila Golemi-Kotra and Robert Tsushima (Chair of Department)

This report is based on grade distributions obtained from the university information system (see attached excel file). The grade distributions reflected in the Excel file are largely due to the increased opportunities for student collaboration on course evaluations/assignments, and changes to the format of course assessments. Most of our courses were also redesigned to better support students with challenges regarding mental health and wellness.

Courses within the CEAS guidelines were not addressed in this report.

General Comments (course specific reflections are found later in this report)

Many factors contributed to higher grades this year. For some lab courses certain online labs that were implemented due to COVID have remained in place and have resulted in higher lab grades. The ability to provide online options for assessments resulted in more collaboration (both permitted and not-permitted) among students, and access to online resources including answer-generating sites such as CHEGG and ChatGPT also contributed.

The following changes were found to be common to all courses with grades outside the normal distribution:

1. **Changes in assessments**: These changes were made due to the fact that many course instructors have recognized the benefits of incorporating online components in their courses to reinforce course concepts. Given the learning gains associated with these blended course formats, these components have remained as a part of the standard course design.

2. **Increased awareness and application of Universal Design for Learning Principles (UDL)**: Many of the instructors with high grade distributions attributed most or all of the changes in their distributions to the incorporation of UDL principles and assessment strategies. These changes were meant to promote an inclusive student environment and to minimize the challenges relating to stress and anxiety faced by students. An increase in UDL principles in a course typically correlates with an increase in peer-to-peer learning/collaboration, flexibility in assignment style and deadlines, options to exclude some assessments with lower grades, and more frequent low stakes assessments rather than the traditional individual timed midterms and exams.
Several instructors also indicated a frustration in applying evidence-based pedagogy, such as UDL, while trying to remain within the grade distribution values imposed by the Faculty.

3. **Grade distribution policy expectation that instructors include commentary on intended changes to address concerns:** The Teaching Committee would like to point out that several of the anomalous grade distributions were due to the application of evidence-based pedagogy and assessment. Given these rationales, the Biology department is firm in the opinion that we do not intend to discourage any instructors from adopting/applying these principles to their courses since they align with best practices for teaching and learning. These principles also play a significant role in student comprehension of concepts and student retention with our courses and programs.

The arguments in support of providing flexibility to students, decreasing stress and anxiety, and encouraging student collaboration are all important course goals. However, concerns have been raised in previous year regarding courses where the majority of students consistently attain A/A+ grades. In these instances, these courses can contribute to pronounced disparities in grade distributions across the program, potentially leading to reduced student satisfaction in courses adhering to more traditional evaluation schemes. The underlying concern stems from the notion that if every student consistently earns an A/A+, it may have consequences post-graduation, where students achieving these grades might not be perceived as high-achieving but rather merely average.

The teaching committee (and the department) will likely have to determine whether the Department of Biology’s grade averages align with those at other institutions within Ontario.

**Brief summary of findings from instructor reports:**

**BIOL 1000/1001**

One section in BIOL 1000 had a grade distribution that was than higher than Faculty guidelines the rationale for this is describe later in this report. Differences between sections is expected given differences in the numbers of major versus non-majors as well as students who were not successful in the course in the preceding Fall term repeating the course.

BIOL 1001 grades overall were higher than those for BIOL 1000 (with several sections falling outside guidelines). One reason for higher grades is likely the removal of one midterm to allow for the introduction of “Questions of the Fortnight” and dropping some of the lowest assignment scores. These modifications were implemented to encourage a more profound understanding of the course material and foster critical analysis.

While there were still noticeable differences between BIOL 1000/1001, compared to the previous academic year, these distributions were not as drastic. Despite the fact that BIOL 1000 used traditional
midterms/final exams, these changes may be attributed to the format of the assessments being online in the Winter term. Additionally, the BIOL 1000 team kept the increased 10% activity portion of the course and the policy where students could replace the lowest midterm grade with that of the final exam if the final exam was higher.

A plan has been made for the BIOL 1000 and 1001 teams to meet and discuss how these grade discrepancies can be addressed moving forward.

**Second Year Courses**

Courses outside guidelines included (but are not limited to) BIOL 2020 (Biochemistry), BIOL 2040 (Genetics), BIOL 2070 (Research Methods in Cell and Molecular Biology), BIOL 2900 (Microbiology for Nurses) and BIOL 2905 (Introduction to Medical Microbiology).

- **BIOL 2020**: The instructor for this course provided more leniency to students in areas such as assignment submission dates and the ability to drop lower midterm grades.

- **BIOL 2040**: The instructors state that the higher grades are due to the continued implementation of UDL principles, modification of the frequency of assessments, more opportunities for collaborative work and increased feedback.

- **BIOL 2070**: The instructor explained that the course was redesigned to provide students with multiple attempts on certain assignments to demonstrate their understanding of course concepts, flexibility in assessment deadlines and opportunities to improve their written work.

- **BIOL 2900**: This course is for nursing majors, who tend to be highly motivated resulting in higher grades.

- **BIOL 2905**: Increased opportunities for collaboration and increased enrollment of mature students were attributed to the increased A/A+ in this course.

**Third- and Fourth-Year Courses**

Approximately 40% of our 3rd and 4th year courses combined resulted in higher grade distributions. These distributions were attributed to the following reasons:

- Retention of some online teaching methodologies and assessments.
- Increased awareness and incorporating of UDL principles.
- Providing more supplementary materials to complement lectures.
- Improvements in the type and timing of feedback provided to students.
- Increased opportunities for students to work collaboratively.
- Flexibility in assignment deadlines to help students balance course load and manage mental health challenges.
- Ability to drop a low scoring assignment.
The teaching committee would like to point out that the numerical grade distribution data presented in the grade distribution should be taken at face value. It is important to note that, in evaluating academic performance, we must also consider the dynamic nature of best practices in teaching and learning, which may not be fully reflected in the presented numerical data. The numbers serve as a starting point for discussion and analysis, recognizing the ongoing commitment to refining our educational methods and ensuring that we are creating the best learning environment to support our students.
COURSE SPECIFIC REFLECTIONS

COURSES WITH A PERCENTAGE OF A/A+ THAT FALL OUTSIDE THE FACULTY GUIDELINES

1000/2000 Level Courses

<p>| Bioc1-2rd Year courses with grades outside of expected range for &gt;=15 student class size and &gt;=30% A/A+ |
|-----------------------------------------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Acad Year</th>
<th>Session</th>
<th>Course</th>
<th>Section Period</th>
<th>Course name</th>
<th>Total Grades</th>
<th>GPA</th>
<th>A/A+ %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2040 A</td>
<td>F</td>
<td>Genetics</td>
<td>244</td>
<td>7.59</td>
<td>69%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2040 M</td>
<td>W</td>
<td>Genetics</td>
<td>285</td>
<td>7.2</td>
<td>64%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2040 B</td>
<td>F</td>
<td>Genetics</td>
<td>287</td>
<td>7.18</td>
<td>59%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1001 A</td>
<td>F</td>
<td>Biology II</td>
<td>189</td>
<td>7.07</td>
<td>57%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2070 M</td>
<td>W</td>
<td>Research Meth in Cell and Molecular Biology</td>
<td>227</td>
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<td>52%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2050 A</td>
<td>F</td>
<td>Ecology</td>
<td>208</td>
<td>6.83</td>
<td>46%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1001 M</td>
<td>W</td>
<td>Biology II</td>
<td>465</td>
<td>6.52</td>
<td>45%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1500 M</td>
<td>W</td>
<td>Intro to Biology</td>
<td>108</td>
<td>6.39</td>
<td>45%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1000 B</td>
<td>F</td>
<td>Biology I</td>
<td>378</td>
<td>6.11</td>
<td>44%</td>
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<td>2022</td>
<td>PW</td>
<td>BIOL2050 M</td>
<td>W</td>
<td>Introduction to Medical Microbiology</td>
<td>105</td>
<td>5.92</td>
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<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2020 B</td>
<td>F</td>
<td>Biochemistry</td>
<td>156</td>
<td>5.63</td>
<td>41%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1001 N</td>
<td>W</td>
<td>Biology II</td>
<td>430</td>
<td>6.2</td>
<td>40%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2900 B</td>
<td>F</td>
<td>Clinical Microbiology for Nurses</td>
<td>180</td>
<td>6.59</td>
<td>38%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2000 A</td>
<td>F</td>
<td>Clinical Microbiology for Nurses</td>
<td>155</td>
<td>6.39</td>
<td>36%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1001 P</td>
<td>W</td>
<td>Biology II</td>
<td>287</td>
<td>5.94</td>
<td>34%</td>
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<tr>
<td>2022</td>
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<td>W</td>
<td>Animals</td>
<td>168</td>
<td>5.71</td>
<td>34%</td>
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<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2010 M</td>
<td>W</td>
<td>Plant Biology</td>
<td>182</td>
<td>5.43</td>
<td>31%</td>
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<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL2020 M</td>
<td>W</td>
<td>Biochemistry</td>
<td>133</td>
<td>5.03</td>
<td>31%</td>
</tr>
<tr>
<td>2022</td>
<td>PW</td>
<td>BIOL1001 O</td>
<td>W</td>
<td>Biology II</td>
<td>354</td>
<td>5.59</td>
<td>30%</td>
</tr>
</tbody>
</table>

SC/BIOI 1000 B

**REFLECTION:** BIOL 1000 B is part of a multi-section course with 3 other sections. For this course all sections used the same midterms, final exam and reading quizzes. The sections also followed a common set of learning outcomes and lecture slides. Throughout the term several factors led to increased marks: 1. the lowest midterm mark was reweighted to the final exam if the final exam was higher, 2. the lowest 20% of the activity mark was dropped and 3. the tests and exam were taken out of less marks to boost the averages for the other 3 sections.

During the term Section B had consistently higher averages for the evaluations compared to the other sections and so the factor mentioned above led to a further increase in the number of A/A+. This may be attributed to the higher number of majors in section B versus sections C and D.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** Given the this is a multi-section course, it is not possible to alter the evaluation scheme without consulting with the instructors for the other sections.
**SC/BIOL 1001 A**

**REFLECTION:** Weekly Quizzes and practice questions were designed in a way allowing to drop some of the lowest scores. These were implemented to encourage attendance/collaboration and enforce the understanding in course concepts.

Midterm was removed to accommodate weekly written assignments to promote a more profound understanding of the course material, to foster critical analysis and to improve written communication skills.

Online labs (4 out of 6) that were implemented due to COVID have remained in place and have resulted in higher lab grades.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** To meet the CEAS guidelines, in future, the evaluation scheme will incorporate three changes: 1) lower the weight of weekly practice questions; 2) reduce weekly practice questions; 3) will add a midterm test.

**SC/BIOL 1001 M, O, P**

**REFLECTION:** This rationale is for disparity among sections and applies to sections M, O, and P. Section N was taught by a sessional instructor and will not be addressed here.

In the course used UDL practices that allow for flexibility, e.g., dropping the lowest 2 of 11 quizzes, dropping 1 of the 5 assignments, providing 5% for activities (both in-class and on eClass that encourage students to engage with course material and thus help students to identify areas for which they need to seek help or focus on, and 1% bonus for a participation in 3 surveys in a national effort to improve equity in foundational science classrooms. The contributes to highly engaged students who do well.

Each section varies in terms of the time it is offered and the population of students that it serves. Section M (1:30 – 2:30 pm) is the largest section and is reserved mainly for Biology majors. Attendance at this section is typically quite high (~80%) despite lectures being recorded and is offered in a flipped format. Students come to classes prepared via pre-class preparation (readings and videos) and work through questions which are used to drive discussion and examination of course concepts. Students tend to be highly engaged as demonstrated by their performance in the ‘activities’ (these are both in-class and online elements that encourage students to work with and practice applying concepts) part of the course. Section P is reserved for many Biology majors but tends to have a higher proportion of non-majors relative to section M. Attendance and engagement (both in-class and within the LMS) tend to be lower in section P, likely because of the time the course is offered. Engagement in both sections M and P tend to be higher than for section O, which is reserved mainly for non-majors. We cover all the same major concepts, although there is some variation (minor) in the order/presentation of topics (e.g., phylogenetics first and then speciation or vice-versa). Most of the Questions of the Fortnight are similar across sections and where they aren’t we vet each other’s assignment questions. Our midterms/final exams are written independently but vetted by each other to ensure appropriate level of difficulty, and
we typically have some questions that are the same. While there have always been some differences among the sections, these have become more prominent since the pandemic. This year we have added in some new concepts and have increased the level of challenge in the QOF. We have also assigned TAs to look for cheating via Turnitin scores and to see how answers compare to ChatGPT.

<table>
<thead>
<tr>
<th>Section</th>
<th>When section offered</th>
<th>Population</th>
<th>Activities (5%) (best 75%)</th>
<th>Quizzes (5%) (best 9/11)</th>
<th>QOFs (20%) (best 4/5)</th>
<th>Midterm (20%)</th>
<th>Final Exam (30%)</th>
<th>Labs (20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>MW 5:30 – 6:50 pm</td>
<td>More non-majors</td>
<td>3.92/5</td>
<td>3.65/5</td>
<td>15.49/20</td>
<td>10.82/20</td>
<td>16.94/30</td>
<td>16.00/20</td>
</tr>
<tr>
<td>P</td>
<td>MWF 8:30 – 9:20 am</td>
<td>~ equal mix of BIOL/non-majors</td>
<td>3.49/5</td>
<td>4.18/5</td>
<td>15.83/20</td>
<td>12.78/20</td>
<td>19.64/30</td>
<td>16.47/20</td>
</tr>
</tbody>
</table>

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** The instructors state that they have addressed this in the reflection above.

**SC/Biol 1001 N**

**REFLECTION:** Weekly Quizzes and practice questions were implemented to encourage attendance/collaboration and enforce the understanding in course concepts. Some of the lowest scores were dropped for accommodations.

Biweekly written assignments were designed to promote a more profound understanding of the course material, to foster critical analysis and to improve written communication skills. Peer-to-peer learning was encouraged and lowest scores were dropped.

Online labs (4 out of 6) that were implemented due to COVID have remained in place and have resulted in higher lab grades.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** To meet the CEAS guidelines, in future, the evaluation scheme will incorporate two changes: 1) lower the weight of weekly quizzes and practice questions; 2) reduce weight for online labs.

**SC/Biol 1500 M:** No response received from the instructor

**SC/Biol 2010 M:** No response received from the instructor

**SC/Biol 2020 B**
**REFLECTION:** The following factors effected the grade distribution for BIOL 2020 for the Fall 2022 semester:

1. Students being more aware of how accommodations (SAS) can support their learning. Throughout the semester, I had students reach out with accommodation requests for support. This enabled them to ensure they had supports (e.g. extra time, room, study sheets) to complete the assessments.

2. Students had a number of assessments to support their learning and revisit and review course concepts.

3. The assessments employed UDL practices. For instance, with midterms and final exams, midterms were optional and the weight was transferred to the final exam. Similarly, students had two opportunities to complete quizzes without time limits. The best 4/6 quiz option was provided to give students a greater chance to earn their mark and the opportunity to receive the best possible score. Students were also provided a ‘study-sheet’ to emphasize more application rather than memorization-based questions. Lastly, students had an essay assessment which was based on the grades from their peers. Many peers were generous in their grading approach.

4. The fall 2022 offering was designed to follow the same format and set-up as BIOL 2020 Section A too.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** In future, in BIOL2020 I would adjust the scheme to remove the time limits for the quizzes.

Similarly, I would remove the peer grading part as part of the assessment and replace it with a TA graded component. I would explore the option of including online midterms.

During the summer of 2023, the biochemistry teaching team met, discussed and coordinated how biochemistry will be offered to ensure consistency. We discussed approaches for the course grading schemes (e.g. midterms, assessments) as a group.

**SC/BIOL 2020 M**

**REFLECTION:** The course is anomalous by only 3 students.

To provide students with multiple attempts to show evidence of learning, a flexible grading scheme was recently implemented in which the value of individual students' midterm exams is shifted to the cumulative final exam, if that improves their overall grades. This helps students manage this content-heavy course, providing more time and practice for students who initially struggle with the material. As a result, students have done better in this course than previously.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** Recognizing the description of A and A+ grades, the range of difficulty of questions on exams will be adjusted so as to better differentiate excellent and exceptional students.

**SC/BIOL 2030 M**
REFLECTION: I don’t know why 34% of the class obtained A/A+ for this particular session, except that they earned their grade by completing the lab component and 3 tests/exams as has been the case for the past several years. I haven’t changed how I deliver the course over the past several years and it is coordinated for consistency with my colleague Scott Kelly and now Julie Clark who teach other sections of the same course.

POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD: I am not going to change the delivery of this course based on one session of the course in which 34% (rather than 30%) obtained A/A+. If the current session that I am teaching falls foul of this arbitrary number then I will definitely take a look at it and consult with my colleague’s Scott Kelly and Julie Clark who teach other sections of the same course to align with them on any changes that I propose to make.

SC/BIOL 2040 A, B and M

REFLECTION: This is for BIOL 2040 Fall 2022, sections A and B and Winter 2023, section M. Across all three sections (two in Fall 2022; one in Winter 2023) of BIOL 2040, the same lecture notes and assessment schemes were used, thus we are replying together. In Fall 2021, a substantively revised version of BIOL 2040 was offered and was adopted in Winter 2023. In the revised version we approach genetics from a complexity standpoint with the aim of representing the true nature of genetics and its role in in generation of phenotypes more accurately. Further, Donovan and others (e.g., Jamieson and Radick, 2017) have shown that our current approach to teaching genetics from a “Mendelian” stance encourages genetic essentialism and determinism, which underpin racist thinking.

Students are initially discomfited by the complexity approach, particularly as we begin to dismantle their misconceptions one by one. And by rooting our course in complexity, rather than simplistic Mendelian genetics, more is expected of students with respect to connecting ideas compared to pre-revision. However, with changes to the course focus, we have also increased our efforts to support students and address accessibility issues, focusing on implementing principles of universal design for learning (UDL) within the course. Specifically, we have employed practices that emphasize overall flexibility—rather than the individualistic ‘accommodations’ model—as well as encouraging students to try and fail and try again by dropping subsets of each assignment type. Our approach has led to higher quality responses on formative and summative assessments and student work demonstrates a deeper understanding of material and connections between concepts. Many UDL practices are also in-line with pedagogical best practices shown to enhance student retention of knowledge and concepts, and result in significant improvement in learning gains. In part, for BIOL 2040 that means breaking term work into multiple smaller open-ended assessments, allowing students to approach the same ‘problem’ multiple ways and build connections between material. This framework also provides regular feedback, so that students can effectively correct misunderstandings during the course. While this is in line with best practices for enhancing student learning, it also means students have a large portion of their grade before the withdrawal deadline (last day of term). Overall, we feel our approach increases student learning and therefore success by the end of term.
Please note that there was a 10% difference between the number of A/A+ between sections A and B although ALL of the pre-class preparation, pre-class quizzes, course lecture notes, assessments, etc. were the exact same, indicating that there was likely differences in student preparedness. Section M used all the same pre-class preparation/quizzes, lecture notes and most of the same assessments.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** As with all new strategies and innovations in teaching, major changes usually require some calibration time and even experimenting across several terms and outcomes can be hard to predict ahead of time. In our case, we reduced the Deep Questions to every other week, reduced the activities component of the course, but still maintained considerable flexibility, including grace days for assignment deadlines. Thus, if a student does poorly, it is because they do not know the material, rather than missing the deadline (or equivalent), which can artificially lower course averages. As a group we have already met to discuss some adjustments of weightings, possible changes in marking, introduction of more challenging questions (our questions are already quite challenging and rooted in the primary literature and it is finding the right balance of challenging), and perhaps a partial return to more traditional assessments will likely lower marks in future terms. It may take several terms of adjustments to find the right balance, but we are working on this.

**SC/BIOL 2050 A**

**REFLECTION:** Weekly practice question sets were provided with the aim of improving student learning. The best 10 out of 12 scores were recorded. Quizzes were retained online and one of the lowest grades was dropped. This provided flexibility and allowed self-accommodation for occasionally missing practice questions and sets or quizzes.

For course assignments, the course instructor (myself) offered extensive help to the students to improve their research/communication skills.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** To meet the CEAS guidelines, in future, the evaluation scheme will incorporate two changes: 1) lower the weight of weekly practice questions; 2) remove the options to exclude midterm tests with lower grades.

**SC/BIOL 2070 M**

**REFLECTION:** The assessment structure for this course provides students multiple attempts to demonstrate mastery of course content. This included multiple attempts of procedurally generated quizzes and limited resubmissions to substantively improve written work – all of which may have affected letter grade distribution.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** If necessary, I could roll back these changes. However, I would require strong rationale to do so, given that students are meeting defined outcomes in the course.

**SC/BIOL 2900 A:** This course was taught by a CUPE contract faculty member; we did not request a rationale from them as they are no longer responsible for this course.
**SC/BIOL 2900 B**: This course was taught by a CUPE contract faculty member; we did not request a rationale from them as they are no longer responsible for this course.

**SC/BIOL 2905 M**: This course was taught by a CUPE contract faculty member; we did not request a rationale from them as they are no longer responsible for this course.

**3000/4000 Level Courses**

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Session</th>
<th>Course</th>
<th>Section</th>
<th>Period</th>
<th>Course Name</th>
<th>Total Grades</th>
<th>GPA</th>
<th>A/A+ %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4250</td>
<td>M</td>
<td>W</td>
<td>Applied Immunology</td>
<td>50</td>
<td>8.4</td>
<td>96%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4270</td>
<td>B</td>
<td>F</td>
<td>Integrative Reproduction: Questions and Concepts</td>
<td>49</td>
<td>8.35</td>
<td>94%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4505</td>
<td>M</td>
<td>W</td>
<td>Controversies in the Modern Life Sciences</td>
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<td>Human Molecular Genetics</td>
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<tr>
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<td>FW</td>
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<td>Advanced Biochemistry and Molecular Genetics Laboratory</td>
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<tr>
<td>2022</td>
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<td>F</td>
<td>Applied Immunology</td>
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<td>86%</td>
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<tr>
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<td>FW</td>
<td>BIOL4370</td>
<td>A</td>
<td>F</td>
<td>Integrative Reproduction: Questions and Concepts</td>
<td>51</td>
<td>8.08</td>
<td>84%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4390</td>
<td>M</td>
<td>W</td>
<td>Population Genetics</td>
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<td>7.95</td>
<td>80%</td>
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<td>2022</td>
<td>FW</td>
<td>BIOL4380</td>
<td>M</td>
<td>W</td>
<td>Systems Neuroscience</td>
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<td>7.98</td>
<td>79%</td>
</tr>
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<td>2022</td>
<td>FW</td>
<td>BIOL3120</td>
<td>M</td>
<td>W</td>
<td>Immunobiology</td>
<td>130</td>
<td>7.23</td>
<td>69%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4003</td>
<td>M</td>
<td>W</td>
<td>The Scientific Method</td>
<td>48</td>
<td>7.5</td>
<td>67%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4245</td>
<td>A</td>
<td>F</td>
<td>Conservation Biology</td>
<td>43</td>
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<td>63%</td>
</tr>
<tr>
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<td>FW</td>
<td>BIOL4100</td>
<td>M</td>
<td>W</td>
<td>Behavioural Genetics</td>
<td>15</td>
<td>7.2</td>
<td>60%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4141</td>
<td>A</td>
<td>F</td>
<td>Current Topics and Methods in Cell Biology</td>
<td>48</td>
<td>7.33</td>
<td>60%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL3290</td>
<td>M</td>
<td>W</td>
<td>Plant Ecology</td>
<td>39</td>
<td>7.28</td>
<td>59%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL3120</td>
<td>A</td>
<td>F</td>
<td>Immunobiology</td>
<td>261</td>
<td>7.19</td>
<td>59%</td>
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<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4250</td>
<td>M</td>
<td>W</td>
<td>Birds and the Environment</td>
<td>56</td>
<td>6.86</td>
<td>56%</td>
</tr>
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<td>2022</td>
<td>FW</td>
<td>BIOL4720</td>
<td>A</td>
<td>F</td>
<td>Environmental Contaminants: Impacts on Organisms and Ecosystems</td>
<td>32</td>
<td>8.81</td>
<td>56%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4394</td>
<td>M</td>
<td>W</td>
<td>The Human Microbiome</td>
<td>49</td>
<td>7.33</td>
<td>55%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL3210</td>
<td>A</td>
<td>F</td>
<td>Advanced Biochemistry and Molecular Genetics Laboratory</td>
<td>35</td>
<td>7.43</td>
<td>55%</td>
</tr>
<tr>
<td>2022</td>
<td>FW</td>
<td>BIOL4265</td>
<td>A</td>
<td>F</td>
<td>Biology in Environmental Management</td>
<td>34</td>
<td>7.06</td>
<td>50%</td>
</tr>
</tbody>
</table>

**SC/BIOL 3120 A and M**

**REFLECTION:** This rationale applies to both BIOL3120A and BIOL3120M

I’ve increased my efforts to address accessibility issues, focusing on universal design for learning (UDL). Universal design for learning approaches emphasize flexibility and student-centered practices that increase the overall accessibility of course structures, rather than an individualistic ‘accommodations’ model. UDL approaches lower barriers, they do not lower expectations.

Many UDL practices are also in-line with pedagogical best practices shown to enhance student learning gains and retention of knowledge. For my courses that includes multiple lower stakes assessments throughout the term, scaffolding of heavier weighted assessments, addressing major course learning objectives across multiple assessments, and allowing students to meet the learning objectives multiple ways. These practices allow students to build deeper connections between course concepts and provides regular feedback so they can effectively correct misunderstandings and build their academic and professional skillsets. While this is in line with best practices for enhancing student learning, it also means students have a large portion of their grade before the withdrawal deadline (last day of term).
Further since adopting these approaches I have increased the complexity of assessments. In fact, my students consistently note (often unhappily) that the amount of work and expectations of quality in my courses is higher than their other courses at the same year level. Compared to when I had a more traditional approach, my students now have more written assessments, requiring both content knowledge and communication skills (important components of degree outcome). Assessments are also more comprehensive, and almost exclusively at application level or higher (application, analysis, evaluation, synthesis, and/or creation).

Overall, since adopting these approaches, I have seen higher quality responses on summative assessments and student work shows a deeper understanding of material and connections between concepts. I have also seen a significant improvement in student engagement.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** My expectations for students have always been and remain high. My increased efforts to address accessibility issues and incorporate pedagogical best practices have enhanced the learning environment. Less students now struggle with basic concepts, and the average quality of work has improved. More of my students can now reach an exceptional level of achievement, which is indicative of good teaching practices not poor ones.

The grade distribution tells you nothing about the quality of the education our students are receiving. It might feel like because it’s been quantified that it is a good measure, but it isn’t, because there is no correlation with an acceptable grade distribution (which exist without thought, reflection, or evidence) and quality education.

York acknowledges this fact, and its undergraduate grading scheme is not norm-based (x% of As, y% of Bs, etc.). For example, a grade of A is defined as “A Excellent. Thorough knowledge of concepts and/or techniques together with a high degree of skill and/or some elements of originality in satisfying the requirements of an assignment or course.” There is nothing in “thorough knowledge of concepts...with a high degree of skill” that indicates it should be a rare event. If we provide them with good learning environments shouldn’t our students be able to achieve a thorough level of knowledge and high degree of skill? Are we not here to teach them knowledge and skills?

As I have mentioned, I consistently reflect on my approach to teaching and make necessary adjustments to my course structure. I also believe a good educator sets high expectations for their students and assumes that they are capable of success. However, based on the quality of student work elicited by my approach and principles of equity and inclusion, as well as my understanding of the teaching and learning research, and in alignment with York’s grading policies I will not alter my teaching approach to force a specific grade distribution. Instead, I will focus on providing a learning environment that enables students to gain a thorough level of knowledge and high degree of skill or greater.

**SC/Biol 3140 A**
**REFLECTION:** Having been course director for Biol3140 over an ~15-year period, the Fall 2023 semester class generated an unprecedented number of requests for accommodation. To minimize the challenges relating to stress and anxiety faced by students I was extremely understanding and considerate in almost all cases. In retrospect, perhaps too much so. This is likely the main reason for a higher-than-normal anomalous grade.

Secondly, we had a new TA who was responsible for marking lab reports and although detailed instructions were provided the average scores were higher than anticipated.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** A less-indulgent approach with requests from students for special considerations, and more detailed discussion with marker TA's and correction of over-scoring at source would make a difference.

**SC/BIOL 3140 M**

**REFLECTION:** The assessment structure in this course provides students multiple attempts to demonstrate mastery of course content. This included limited resubmissions to substantively improve written work, and this may have affected letter grade distribution.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** If necessary, I could eliminate the possibility of resubmissions. However, I would require strong rationale to do so, given that students are meeting defined outcomes in the course.

**SC/BIOL 3290 M:** No response provided by the instructor

**SC/BIOL 4005 M**

**REFLECTION:** The 2023 > 50% of students with A/A+ grades for BIOL 4005 could be false (see point 1) or real (see point 2).

1. It is a small class (48 students), and it is reasonable to assume that anomalous grade distributions are to be expected from one year to another. If years were grouped together to get a normal distribution and sufficient sample size, it is possible that the total numbers could be within expectations.

2. However, the grades may be real and reflect achievements by the students. We have a syllabus that highlights our active learning approaches and universal design approaches (for example multiple written assignments with extensive feedback for each to allow them to improve from one to the next, +3 days extensions for all students on some assignments, best of 90% of activity marks etc.). These approaches are specifically advised in the literature to reduce the burden and stress on students and help them achieve higher learning. Further we have approaches such as draft submissions that gave the students additional writing opportunities to receive extensive feedback which they implemented for their major assignments. As a result, the written submissions were extremely well done, demonstrating high levels of critical thinking and reasoning, something I would hope we want in our graduating students. Further, as improved writing and critical thinking skills are
objectives of this course we are pleased with this outcome as it demonstrates a considerable gain of skill in the students which was concerningly lacking. We will not be changing these approaches as they achieve learning objectives of the course as well as our roles as professors. In fact, we are proud of the fact that we took students that were shamefully underdeveloped in their writing skills and ensured that graduates from our program can write coherently and accurately, using evidence-based practices. We are satisfied that by using Turn-It-In we verified that students were not copying each other/plagiarizing, but we had no tools at our disposal to verify that they did not pay someone to write their assignments for them, or work on them together outside of class, or use generative AI. To help mitigate this risk and hopefully ensure that students are responsible for their own work, we implemented an oral exam, where a graded discussion occurred between ourselves and the students to ensure their personal knowledge of the subject. Their responses in the moment indicated that they all had not only a sufficient grasp of the material but in many cases had mastered it. Without support from the university to tackle the issue of generative AI, there remains little that we can do aside from evaluating in class discussions.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** Please note, for this current year we did make some modifications to the course to better support our students. We have removed one of the writing assignments that was completed at home and implemented an in-class written essay exam. This may prove useful in preventing the use of generative AI for one of the written assignments.

**SC/BIOL 4120 A**

**REFLECTION:** I’ve increased my efforts to address accessibility issues, focusing on universal design for learning (UDL). Universal design for learning approaches emphasize flexibility and student-centered practices that increase the overall accessibility of course structures, rather than an individualistic ‘accommodations’ model. UDL approaches lower barriers, they do not lower expectations. Many UDL practices are also in-line with pedagogical best practices shown to enhance student learning gains and retention of knowledge. For my courses that includes multiple lower stakes assessments throughout the term, scaffolding of heavier weighted assessments, addressing major course learning objectives across multiple assessments, and allowing students to meet the learning objectives multiple ways. These practices allow students to build deeper connections between course concepts and provides regular feedback so they can effectively correct misunderstandings and build their academic and professional skillsets. While this is in line with best practices for enhancing student learning, it also means students have a large portion of their grade before the withdrawal deadline (last day of term).

Further since adopting these approaches I have increased the complexity of assessments. In fact, my students consistently note (often unhappily) that the amount of work and expectations of quality in my courses is higher than their other courses at the same year level. Compared to when I had a more traditional approach, my students now have more written assessments, requiring both content knowledge and communication skills (important components of degree outcome). Assessments are also
more comprehensive, and almost exclusively at application level or higher (application, analysis, evaluation, synthesis, and/or creation).

Overall, since adopting these approaches, I have seen higher quality responses on summative assessments and student work shows a deeper understanding of material and connections between concepts. I have also seen a significant improvement in student engagement.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** My expectations for students have always been and remain high. My increased efforts to address accessibility issues and incorporate pedagogical best practices have enhanced the learning environment. Less students now struggle with basic concepts, and the average quality of work has improved. More of my students can now reach an exceptional level of achievement, which is indicative of good teaching practices not poor ones.

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As I have mentioned, I consistently reflect on my approach to teaching and make necessary adjustments to my course structure. I also believe a good educator sets high expectations for their students and assumes that they are capable of success. However, based on the quality of student work elicited by my approach and principles of equity and inclusion, as well as my understanding of the teaching and learning research, and in alignment with York’s grading policies I will not alter my teaching approach to force a specific grade distribution. Instead, I will focus on providing a learning environment that enables students to gain a thorough level of knowledge and high degree of skill or greater.

**SC/Biol 4120 M**

**REFLECTION:** I’ve increased my efforts to address accessibility issues, focusing on universal design for learning (UDL). Universal design for learning approaches emphasize flexibility and student-centered practices that increase the overall accessibility of course structures, rather than an individualistic ‘accommodations’ model. UDL approaches lower barriers, they do not lower expectations.

Many UDL practices are also in-line with pedagogical best practices shown to enhance student learning gains and retention of knowledge. For my courses that includes multiple lower stakes assessments
throughout the term, scaffolding of heavier weighted assessments, addressing major course learning objectives across multiple assessments, and allowing students to meet the learning objectives multiple ways. These practices allow students to build deeper connections between course concepts and provides regular feedback so they can effectively correct misunderstandings and build their academic and professional skillsets. While this is in line with best practices for enhancing student learning, it also means students have a large portion of their grade before the withdrawal deadline (last day of term).

Further since adopting these approaches I have increased the complexity of assessments. In fact, my students consistently note (often unhappily) that the amount of work and expectations of quality in my courses is higher than their other courses at the same year level. Compared to when I had a more traditional approach, my students now have more written assessments, requiring both content knowledge and communication skills (important components of degree outcome). Assessments are also more comprehensive, and almost exclusively at application level or higher (application, analysis, evaluation, synthesis, and/or creation). Compared to Fall 2022, for Winter 2023 I lowered the weight of group assessments (oral presentation), and created more individual assignments. All assignments involved extensive engagement with the primary literature, independent research and critical analysis.

Overall, since adopting these approaches, I have seen higher quality responses on summative assessments and student work shows a deeper understanding of material and connections between concepts. I have also seen a significant improvement in student engagement.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** My expectations for students have always been and remain high. My increased efforts to address accessibility issues and incorporate pedagogical best practices have enhanced the learning environment. Less students now struggle with basic concepts, and the average quality of work has improved. More of my students can now reach an exceptional level of achievement, which is indicative of good teaching practices not poor ones.

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assumes that they are capable of success. However, based on the quality of student work elicited by my approach and principles of equity and inclusion, as well as my understanding of the teaching and learning research, and in alignment with York’s grading policies I will not alter my teaching approach to force a specific grade distribution. Instead, I will focus on providing a learning environment that enables students to gain a thorough level of knowledge and high degree of skill or greater.

**SC/Biol 4141 A**

**Reflection:** I attribute the high grades in BIOL4141 to three factors: 1) A high-achieving self-selected student cohort; 2) Applying UDL principles to the course design; 3) A highly competent course director who puts a great deal of time and care into teaching.

1) Student cohort: This is an elite fourth-year course targeted to students intending to go on into research, requiring a demanding third-year course (BIOL3130) as pre-requisite. From the initial enrolment of 50, there were 15 drops before the final, and those dropping will have been the weakest students. It is expected that this student cohort will do well.

2) UDL principles: The course is not a lecture-and-multiple-choice-exam format. It is entirely based on student presentations of scientific papers. It includes frequent low stakes assessments in the form of daily quizzes that motivate students to read the papers in advance and to come to class. Daily attendance averages greater than 85% and this high attendance will have a positive effect on learning outcomes. In addition students are allowed to drop the 3 lowest quiz grades out of 19. Peer-to-peer learning is incorporated in the presentations by students to their peers in the classroom, increasing their attention to the presentations. Grading rubrics are detailed and provided in advance so students know how they will be assessed. Quiz and exam questions are not based on regurgitating facts but rather understanding of the scientific principles, experimental design, and methods. Quizzes and exams are open-book and open-note to discourage memorization and encourage deeper understanding. Quiz answers are discussed in class immediately after the quiz to provide instant feedback. Quiz and essay exam questions and answers are posted on eClass after grading to provide additional feedback and allow students to improve their performance.

3) Superior teaching: The course director puts a great deal of effort into choosing papers that will interest the students and that are updated every year to reflect exciting new developments in the field. Every student is offered an individual tutorial to go through their paper in detail so they understand it thoroughly as they prepare their presentation, and much of the teaching for this course occurs outside the classroom during these individual tutorials. Communication with students is rapid and all questions are answered quickly.

**Potential revisions to the course moving forward:** I do not plan to revise the evaluation scheme. I believe it serves the pedagogical goals of the course very well.

**SC/Biol 4154 M:** No response provided by the instructor.
SC/BIOL 4245

REFLECTION: A Two of the main learning objectives for this course were for the students to develop effective communication skills and social skills. The course was designed with a project (25% of the final grade) that allowed the student working in a team of 2-4. The teamwork encouraged peer-to-peer learning, communication and collaboration, which in turn led to an overall high grade for the team project.

For the assessment component, three paper synopses (15%) were due throughout the course term. Feedback for the students was provided in a timely manner to help the students improve their written work.

The Midterm and final tests were designed with flexibility to adhere to the principles of UDL, which allowed dropping a low grade.

POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD: To meet the CEAS guidelines, in future, the evaluation scheme will incorporate two changes: 1) change the weight of team project from 25% to 20%; 2) remove the options to exclude midterm tests with lower grades.

SC/BIOL 4250 M: No response provided by the instructor.

SC/BIOL 4265 A: We did not contact this instructor for a rationale as they are currently on a personal leave.

SC/BIOL 4270 A and B

REFLECTION: We co-developed all the teaching and assessment materials for BIOL 4270 and co-taught each of the sections together. This was our second time teaching the course together, and over the summer of 2022, based on our post-class and weekly reflections, we substantively revised BIOL 4270 for Fall 2022.

Each section of this course is capped at 50 students, making it one of the smaller Biology courses. Students are told from the outset that there is a considerable amount of reading of the primary literature and writing in the class, as well as collaborative group and teamwork. Unlike foundational first- and second-year classes, there is more flexibility in what courses students can take in fourth year and thus they can pick courses that suit their comfort zone. Being up front about what BIOL 4270 entail results in a number of students uncomfortable with this format dropping the course within the first week and is an exercise in self-selection on the part of the students. Given that the course is not required by any program and requires a considerable amount of “non-traditional” (i.e., not what students from large first, second-, and third-year courses are used to) work, and the changeover in the population during the first week, students who stay in the course are likely there by choice and prepared to do what is asked of them. Unlike some courses in the department, the course incorporates aspects of cell/molecular, physiology, and ecology/evolution. Further, almost all students in the course are in honours programs.
BIOL 4270 is a skills and content-based course for fourth year Biology students. In the course, students are provided with opportunities to acquire and improve transferable skills, such as written and oral presentation, critical thinking and analysis of the primary literature, and the ability to reason through problems. In this course we aim to provide a supportive welcoming environment, in which students form a community of learners. We use inclusive teaching practices such as a high structure course, rooted in the principles of UDL emphasizing flexibility and a variety of assessment types (critical analysis papers, peer discussion, peer review, presentations), allowing students multiple opportunities and ways to demonstrate their knowledge. The resources we provide transparency and help students understand what is expected of them. All assessments are rooted in evidence-based practices shown to improve learning of both content and skills via increased student engagement with the material. Smaller assignments are used as scaffolded opportunities for feedback in working towards a larger project. For example, the annotated bibliography and peer edit/review, helped students to develop and write a solid critique of the primary literature and provided a more authentic approach to writing that incorporates feedback. This is then used as a basis for the individual media article or team synthesis project. For all activities we provided as much feedback as possible, and in the course, we discussed how to use feedback, both from the instructors and peers, to improve. At this point it was up to students to apply this feedback and work to improve their work. Further students are given considerable autonomy (with approval) with the project topics they would like to pursue. Moreover, assignments had grace days reducing incompletes, which can lower course grades artificially.

We aimed to provide students with as much developmental support as possible. For example, teams were formed in accordance with the current science education literature, and team charters, etc. were used to ensure that team members were on the same page and had some guiding constraints in their project work (based on Oakley et al. 2004, Turning Student Groups into Effective Teams). Given the size of most first (250+ students), second (250+), and third (150+) year courses in Biology, this is often the first team experience for many of our Biology. To support them we provide time in class for teams to meet and work on scaffolded elements toward their synthesis projects. This work helps to establish better bonds among team members, and results in a better team projects as students work cohesively are much more productive within their teams than if there was no scaffolding. If we didn’t offer such structure, we suppose that would reduce the grades but more so out of the difficulty of working together rather than from a lack of understanding. Multiple assignments and forms of assessment work minimizes the impact of one poor assessment on the overall grade.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** We are considering adding in more analyses of papers and reducing the weight of the team assignment. In the future, we could eliminate the supportive aspects of the course as that would reduce the grades, although we would then have to correspondingly scale our expectations. We could reintroduce a midterm, although this does not fit with the course as an environment in which to build authentic transferable skills.

**SC/BIOL 4285 M:** This course was taught by a CUPE contract faculty member; we did not request a rationale from them as they are no longer responsible for this course.
SC/Biol 4305 M

Reflection: The following factors effected the grade distribution for BIOL4305 for the Winter 2023 semester:

1. Students had a number of weekly written assessments and reflective pieces to support their learning and revisit and review course concepts. Additionally, the written assessments were low-stakes assessment that helped build on previous work. Therefore, with the removal of the final exam and a replacement of this assessment with a final essay, students had received both instructor and peer feedback from at least 3-4 peers. All students took advantage of this opportunity and were able to continuously improve their work. For the final presentation component, students were also provided with flexibility in the approach. This helped to reduce student anxiety and also helped to support students with accommodation needs.

2. The course had around 50 students and several students who were strong students, accepted into professional schools (e.g. dental school, law school, graduate studies, optometry). Additionally, some students had shared that they had completed professional degrees (e.g. medical school degrees in another country) and were taking this course to help get recertified.

Potential revisions to the course moving forward: I would continue this course offering, and maybe add additional written assessments. If offered TA support, this would help with providing feedback in a timely manner.

SC/Biol 4380 M

Reflection: I relied on three activities for the final grade of the students. These were 1) class presentation 2) mid term and 3) final exam. Apart from the class presentations, the other exams were conducted on eClass. I speculate that the overall quality of the class was good. Therefore, it was difficult to discriminate amongst them with only 3 tests.

Potential revisions to the course moving forward: I will make the grades rely on more regular tests to estimate the finer-grain differences in aptitude across the class. Currently, I speculate that given the reliance on 3 main events (presentation, mid-term, and finals), it was not feasible to rank the students more reliably.

SC/Biol 4390 M: This course was taught by a CUPE contract faculty member; we did not request a rationale from them as they are no longer responsible for this course.
**REFLECTION:** NUMBER OF STUDENTS | Biol4400 had under 20 students which is a luxurious instructor-student ratio for both students and instructor. It allowed me to provide every student with one-on-one educational support to promote their success in the course.

CUSTOMIZED ACTIVE & COLLABORATIVE STUDENT-LED KNOWLEDGE CONSTRUCTION | The course design was heavily based on students constructing their own knowledge through active and collaborative evidence-based pedagogy with in-house customizations designed by myself and presented at the Faculty of Science Conversations on Science Education Symposium at York University. Specifically, a modified JIGSAW was carried out every Tuesday followed by a modified FISHBOWL every Thursday. More information on these can be provided through available documentation and a summary visual. The eClass site for the course can also be consulted as it outlines these customized techniques in detail. The use of these techniques in my course increased learning since the literature states that students who construct their knowledge through collaborative active learning outperform peers who have undergone traditional lecturing (Davidson & Major, 2014).

PEDAGOGICAL TRANSPARENCY & BUY-IN | Frequently, students don’t buy in to challenging learning experiences, those that require them to be active and work hard. This was especially a potential problem for me because the course is tough. The content is complex. The cognitive load is high. The design requires constant work. The assessment is always higher order. To ensure I had student buy-in, I had to sell the pedagogies I employed consistently. This can be seen through messaging in the course outline and on eClass. I always explained why we were doing things a specific way and grounded it in the literature. The students did buy in, put in the work, and achieved major gains reflected in their grades.

UDL | DIVERSE ASSESSMENT (MULTIPLE MEANS OF ACTION AND EXPRESSION) | To ensure that student evaluation adheres to principles of Universal Design for Learning, assessment in this course is comprised of various low stakes evaluation opportunities that vary in nature. The entire course grade is divided into 6% assessment increments (16x6% + 4%=100%). These include weekly, online, open-book, cumulative, and integrative quizzes, a group project also divided into various 6% deliverables, multiple methods of class participation assessments, and other. There are no midterms or final exam. That said, all assessments were integrative, cumulative, and higher order on nature (Bloom’s taxonomy). The aforementioned diversity in assessment methods is more effective at capturing learning since not all students can express their learning the same way.

DETAILED FEEDBACK | Given the class size I was always able to identify learning gaps and address them through weekly detailed feedback. This was especially useful since all assessments were cumulative and integrative. The approach ensured that no gaps were left behind to tarnish subsequent assessments.

FLEXIBILITY | BUILT-IN ACCOMMODATION | Built into the assessment scheme was accommodation for everyone and everything; be it illness, crisis, stress, technological difficulties, religious needs, the weather, or any other. This built-in accommodation was integrated into the evaluation scheme in 3 ways listed below. Given this built-in accommodation, no further extensions or exceptions were made.
1. The lowest 4 x 6% increments were be dropped. No questions asked. Only 3 out these 4 passes can apply to an in-person deliverable.

2. The lowest 20% of “Other contributions” counting towards the 4% category is dropped. Please see evaluation breakdown in the course outline.

3. Built-in to all deadlines was a one-day extension. For example, if the time to complete a specific deliverable is calculated to be 2 days, 3 days in total were provided.

EXEMPLARY STUDENTS | I really had some excellent students in this course! It was a pleasure to be part of their learning. If you examine some their profiles, you can see that many are exceptional!


POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD: I would not. The grades are a true reflection of student gains.

SC/BIO 4720 A

RELECTION: 1. Increasing active participation in essay assignments to improve critical writing skills: My course includes an essay assignment that contributes 25% towards the final grade. To increase student participation and peer learning, I have included a group peer evaluation of the draft introduction of the essay. In this exercise, students are asked to identify common writing issues in their peers' work, provide feedback, and recognize strengths and areas for improvement. This exercise helps students avoid repeating the same mistakes in their final essay. It also has been quite successful in helping students identify common writing issues, giving them an opportunity to reflect on their own writing and learning processes and how they can enhance their writing and critical thinking skills. Moreover, this opportunity helps improve other assignments that require critical writing, including midterm exams and PowerPoint presentations. This approach addresses UDL practices, including "Multiple Means of Engagement" (by providing a collaborative and interactive learning experience), and "Reflection and Self-Assessment" (through reflection on self-assessment and writing approaches).

2. Multiple ways to obtain grades: There are multiple ways for students to obtain grades, including two midterm exams (25% each), a writing assignment (25%), student presentations (15%), and participation and summaries of students’ talks (10%). This approach recognizes that students have varied strengths and challenges, offering diverse opportunities for them to demonstrate their understanding of the course materials. It addresses UDL practices on "Diverse Assessments Reflect Diverse Intelligences and Skills" (allowing students to leverage their strengths in a balanced manner) and "Encourages Comprehensive Skill Development" (the different assessments help students develop a broad range of skill sets).
POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD: To address the issue of grade distribution while maintaining the fairness and integrity of the assessment process, I plan to refine the rubrics by incorporating more detailed criteria. This will enable a clearer distinction between different levels of mastery. Additionally, I am considering rebalancing the grade weightings, such as by assigning greater importance to midterm exams. The majority of questions in these exams are crafted to evaluate students' grasp of concepts and fundamental mechanisms. The midterms, designed to be challenging yet systematic, can effectively gauge students' understanding. This adjustment aims to ensure that grades accurately reflect the depth of students' knowledge and the breadth of their transferable skills.

COURSES WITH A PERCENTAGE OF E/F THAT FALL OUTSIDE THE FACULTY THE GUIDELINES

1000/2000 Level Courses

There are no courses at this level that fall outside the faculty guidelines.

3000/4000 Level Courses

| BIOL 3-4th Year courses with grades outside of expected range for >=15 student class size and >20% E/F |
|---|---|---|---|---|
| **Acad Year** | **Session** | **Course** | **Section** | **Course name** | **Total Grades** | **GPA** | **E/F%** |
| 2022 | FW | BIOL3010 M | W | Advanced Biochemistry | 119 | 4.79 | 32% |
| 2022 | FW | BIOL3110 B | F | Molecular Biology I: Nucleic acid metabolism | 192 | 3.75 | 26% |
| 2022 | FW | BIOL3310 N | W | Molecular Biology II: Regulation of Gene Expression | 149 | 4.3 | 25% |
| 2022 | FW | BIOL3130 M | W | Virology | 191 | 3.66 | 24% |

SC/Biol 3010 M: This course is offered by the Chemistry department.

SC/Biol 3110 B

REFLECTION: BIOL3110 uses traditional assessment methods comprising two midterms (25% each), one final exam (45%) and five pop-up in-class quizzes (5%). Exam format includes MC (50%) and SA (50%). Due to heavy exam percentage in this course, a lot students missed exams due to various reasons. The number of DNW student in F22 final exam was 31 (20% missing exam out of total 152 students), and among them, 9 students missed all three exams. Excluding DNW, class average stands at 65% and only 14% students (17 out of 121) failed the course, receiving grades E/F. Subsequently, two deferred exams were offered to 14 students (8 passed the course and 6 failed).

POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD: Since pandemic, all study material and lectures have been recorded and posted on eClass. Class attendance and participation have been low. To encourage class participation in F23, I have added in-class iclicker bonus point (2%) and implemented drop lowest midterm policy to encourage students taking exams.

SC/Biol 3130 M
**REFLECTION:** The following factors affected the grade distribution for BIOL 3130 for the Winter 2023 semester: Overall, this course was bimodal in terms of student performance. Two sections (Section M and N) were offered with similar lecture content and course setup (two midterms and a final exam). The assessments were predominantly short answer and long answer style questions building on their biochemistry background. Questions were usually application based and required students to interpret experimental data. Students who actively participated in lecture, attended extra help sessions and participated in our voluntary in-person activities generally passed and were successful in the course. Many of the students, who did not attend lecture, or write midterms did not pass the course.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** In future, I would explore having TA support to enable the inclusion of a written assignment. This could help students potentially pass the course.

**SC/BIOL 3130 N**

**REFLECTION:** BIOL3130 (Molecular Biology II) is a difficult course because we cover a lot of material and students must understand concepts and details of gene expression. This information is imperative for fourth year courses so both BIOL3130 and its pre-requisite BIOL3110 tend to be challenging for students.

I provide several supports: 1) pre-recorded lectures; 2) lecture slides; 3) a free pdf textbook that I follow closely; 4) complete answers to tests to use as a study guide. More than 50% of students do not attend class perhaps because they assume that recorded lectures are sufficient. Those who do attend lectures always perform better on tests. I consistently have a bi-modal distribution in grades as a result.

Other factors that could contribute to high E/F grades are: 1) According to students, my tests don’t provide much "wiggle room" for guessing. Students must know the material rather than just be familiar with it. 2) All tests are in person and without group work so there is no opportunity for help from others or from AI.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** Perhaps I could introduce more tests so that if students perform poorly on the first one, they can recover their grade easier in subsequent tests.

**SC/BIOL 3155 M**

**REFLECTION:** BIOL3155 was based on the "Flipped" course strategy. the lectures and the discussions were delivered in two different modes: First, students had to cover the relevant pre-recorded lecture/s on their own, like 110 minutes every week, and second, we had weekly In-class / in-person meetings for further discussions of the material covered in the pre-recorded lectures, including Q & A sessions, after exam reviews and much more.

Unfortunately, too many students (especially students who failed) decided to start to cover all the material a day or two before the test or the exam. Some started to cover the material on the same day of the exam or not at all. In addition, as they were not prepared for the discussion on the material these
students missed most of the in-person meetings. So academically the grades reflect the performance of these students who failed the course.

**POTENTIAL REVISIONS TO THE COURSE MOVING FORWARD:** In the first lecture of my courses this year, I spoke with the students about the ways to do well in the course based on the experience from the previous year. I am making it clear that covering the material on time and attending the in-person meeting is critical for their performance. Indeed, I can see some improvement in students' performance as most of them cover the material on time and attend the in-person meetings.
May 1, 2024

Addendum-Faculty Level Review of 2022-2023 Departmental Grade Reports – Biology

The Biology Departmental Grade Report and response was not approved in the December 2023 Faculty Council Meeting. Following this, the chair of CEAS and the Associate Dean of Students met with members of the Biology anomalous grades committee to discuss ways in which the report could be improved. We thank Biology for their more detailed report with particular recognition for providing exceptional course-level detail, rationale, and reflection on anomalous grades.

Overall, the committee was satisfied with the rationale provided for courses with anomalous grades, particularly considering the reflection that many course directors took in addressing these anomalies in the future. There does remain an adversarial tone to parts of the report and CEAS would like to remind the department that they are executing their mandate from Faculty Council to obtain and discuss annual reports on anomalous grades. This multi-departmental committee allows for a transdisciplinary reflection on anomalous grades beyond department norms and practices. The policy on anomalous grades determines the definition of an anomalous grade and the committee must assess reports using this framework. We make no statement or opinion on whether anomalous grades are good, bad, right, or wrong, we simply follow the collegial process as outlined through Faculty Council.

The department acknowledged two commonalities with courses with anomalously high grades: increased online assessments (with further acknowledgment that this may induce unauthorized collaboration) and implementation of evidence-based Universal Design for Learning Principles (UDL). Many instructor rationales further commented that the use of UDLs resulted in higher-quality submissions as the term progressed.

Following many of the reflections within the report, CEAS would make the following recommendations for the department:

- Acknowledging the opportunity for unauthorized collaboration with online assessments, instructors should consider their usage and weighting when computing individual evaluations.
- Since many of the anomalously high courses drop assessments as part of student evaluation, consider reducing the number or types of assessments that are dropped from grade calculation.
- Where possible, track the outcomes of students both within the program and post-graduation to measure the impact of UDLs on learning and skill acquisition. This will help differentiate learning from grade inflation.

We once again thank the department for their additional efforts in completing their anomalous grade review. Following Faculty of Science policies, we request that this letter be disseminated to department members so course directors can review and assess their teaching and course practices accordingly.
Sincerely,

Iain Moyles Chair, CEAS
Philip Johnson
Tihana Mirkovic
Jan Sapp
Toby Zeng
Yashna Manek
Panel Members, CEAS
Faculty of Science Executive Committee

Proposed modifications to the rules of Science Council

May 2024

Section 2.c.

Current: Faculty members in the Department of Geography who indicate their intentions to become members each academic year before the second regular meeting of the Council;

Change proposed: delete 2.c.

Rationale: The Department of Geography no longer exists.

Section 35.c.

Current: The Undergraduate Curriculum Committee shall include the Dean (ex officio) and an Associate Dean (ex officio), the Chair or nominee from each teaching Division or Department, the Chair or nominee of the Department of Geography, three faculty members elected by Council and two student members of Council.

Change proposed: delete “the Chair or nominee of the Department of Geography”

Rationale: The Department of Geography no longer exists.

Section 2.e.(i)

Current: 20 undergraduate students registered in the Faculty of Science elected annually by their peers.

Change proposed: 20 undergraduate students registered in the Faculty of Science elected annually by their peers. Add: This is the Science Student Caucus.

Rationale: clarification of the Science Student Caucus.

Section 27.

Current: Undergraduate students proposed to Faculty Council as members of Standing Committees and Senate shall be elected by the Science Student Caucus from among the undergraduate student members of the Faculty Council. Undergraduate students serve one-year terms on Standing Committees and two-year terms on Senate.
Change proposed: The 20 members of the Science Student Caucus (2.e.(i). above) will select from themselves proposed membership on Standing Committees and Senate. These selections will then be put forward to Faculty Council for ratification. Undergraduate students serve one-year terms on Standing Committees and two-year terms on Senate.

Rationale: clarification of the Science Student Caucus membership on the Standing Committees and Senate.

**Sections 36.a., 36.b., 36.e., 36.h., 36.i., 36.j., 36.k.**

Current: Science & Technology Studies

Change proposed: Science, Technology and Society

Rationale: update of departmental name

**Sections 25., 36k.**

Current: Committee on Equity, Diversity and Inclusivity

Change proposed: Committee on Equity, Diversity and Inclusion

Rationale: update of current use of committee name
Memorandum

To: Nik Kovinich, Chair, Faculty Council
   Faculty of Science Faculty Council

From: Lisa Philipps, Provost & Vice-President Academic

Date: May 9, 2024

Subject: Update on renewal of Dean Rui Wang

Dear Colleagues,

I write to share the news that Dean Rui Wang has elected not to pursue renewal for a second term as Dean, Faculty of Science. I am very grateful to Dean Wang for his leadership and service over the last several years and look forward to our continuing work together in the remaining time of his appointment.

Under his stewardship, you and your Faculty have achieved significant strides in curricular innovation, research outcomes, student experience, faculty complement renewal, international partnerships, and philanthropic support. This progress was achieved by all of you together, even while navigating the pandemic and other challenges. Dr. Wang has served ably as President of the Canadian Council of Deans of Science, enhancing York’s national reputation in Science.

I congratulate Dean Wang on his achievements in supporting inclusive excellence in the Faculty of Science and more broadly at York University. I look forward to launching the search for his successor, which will commence in the fall in consultation with Faculty Council.