COUNCIL OF THE FACULTY OF SCIENCE

NOTICE OF MEETING

October 14, 2025

3pm – 4:30pm

via Zoom

AGENDA

1. Call to Order and Approval of Agenda
2. Chair's Remarks
3. Approval of September 9, 2025 Minutes
4. Other Business:
   a) New Ethics Online Submission System: Alison Collins-Mrakas - Director, Office of Research Ethics
5. Business Arising
6. Inquiries and Communications
   > **Senate Synopsis September 25, 2025**
7. Dean's Remarks
8. Associate Dean and Head of Bethune College Remarks
9. Reports from Science Representatives on Senate Committees
10. Science Student Caucus Items
11. Reports from Standing Committees of Council
12. **a) Executive Committee**
    > Ratification and Call for Nominations for Senate and Standing Committee of Council
    > Vacancies report on the Standing Committees of FSc Council
    > Revision to Rules of Council

    b) Undergraduate Curriculum Committee:
    > Consent agenda items

COUNCIL OF THE FACULTY OF SCIENCE

MINUTES

September 9, 2025

3pm – 4:30pm

via Zoom

MINUTES

1. **Call to Order and Approval of Agenda**
   Chair of Council, A. McEachern, called the meeting to order and a motion was moved, seconded and carried to approve the agenda.
2. **Chair's Remarks**
   A. McEachern welcomed the council back from the summer break and extended best wishes for a successful academic year.
3. **Approval of May 13, 2025 Minutes**
   A motion was moved, seconded and carried to approve the minutes.
4. **Business Arising**
   There was none.
5. **Inquiries and Communications**
   > Senate Synopsis May 22 & June 26
   > Pass/Fail and Credit/No-Credit Grades (Policy)
   > Joint Sub-committee on Quality Assurance Report
6. **Dean's Remarks**
   Interim Dean Tsushima thanked Chair Andrew McEachern and Vice-Chair Jeremy Webb for their leadership.

   He announced the appointment of Dr. Maydianne Andrade as the new Dean, effective January 1, 2026.

   Congratulations on your promotion to Full Professor:
   Mary-Helen Armor, Department of Science, Technology & Society
   Ada Chan, Department of Mathematics & Statistics
   Matthew George, Department of Physics & Astronomy
   Matthew Johnson, Department of Physics & Astronomy
   Vera Pavri, Department of Science, Technology & Society

   Congratulations on your Tenure and Promotion to Associate Professor:
   Christine Le, Department of Chemistry
   Lisa Robertson, Department of Biology
   Jesse Rogerson, Department of Science, Technology & Society

Birgit Schwarz, Department of Biology

He shared a timeline for the Faculties of the Future initiative and noted that the final report will be released to the York community in late September.

Upcoming Events & Activities:
Fall 2025 President's Town Hall – September 18 at 2pm – 3pm
Ontario Universities Fair – September 27 & 28
Truth & Reconciliation Day – September 30

7. Associate Dean and Head of Bethune College Remarks

a) Associate Dean, Faculty Affairs

A. Skelton:

Employees who intend to retire effective July 1, 2026 must submit written notice to the Dean or Associate Dean by September 29, 2025.

Advancement to Candidacy reports are due to the Dean by September 26.

The search for the new Head of Bethune is underway and a call for expressions of interest will be issued soon.

b) Associate Dean, Research & Partnerships

S. Moghadas:

He shared important application deadlines:

CIHR Projects Grant – September 10, 2025
NSERC Discovery Grant – November 3, 2025
NSERC Subatomic Physics Project Grant – October 1, 2025
SSHRC Insight Grant – October 1, 2025

c) Associate Dean, Students

M. Scheid:

There are 1,129 new students, representing an approximate 10% increase from 2024. Total enrollment is currently at 101.3% of target, though significant challenges remain in intentional student recruitment.

The Ontario Universities Fair will take place on September 27–28, followed by Fall Campus Day on October 25. Appreciation was expressed to the marketing, recruiting, and advising staff for their support.

The Science co-op program has expanded to nearly all Faculty of Science programs in 2025. The central co-op and career centre has been launched .

The Academic Policy on missed course work is now in effect.

d) Head of Bethune College

P. Wilson:

Academic Orientation was held on August 28, with nearly 950 students registered and 750 in attendance. Appreciation was extended to faculty, staff, and students for their leadership and support, which contributed to a successful event.

8. **Reports from Science Representatives on Senate Committees**
   There was none.
9. **Science Student Caucus Items**
10. **Reports from Standing Committees of Council**
11. **a) Executive Committee**

> Ratification and Call for Nominations for Senate and Standing Committee of Council

A motion was moved, seconded and carried to ratify all nominations to the Standing Committees of Council.

> Vacancies report on the Standing Committees of FSc Council

The chair, A. McEachern noted the vacancies that remain.

b) Academic Policy and Planning Committee
> Annual Report
c) Appeals Committee:
> Annual Report
d) Committee on Equity, Diversity and Inclusion:
> Annual Report
e) Committee on Examinations and Academic Standards:
> Annual Report
f) Graduate Curriculum Committee:
> Annual Report
g) Petitions Committee:
> Annual Report
h) Committee on Teaching & Learning:
> Annual Report
i) Research and Awards Committee:
> Annual Report
j) Senate T & P Review Committee:
> Annual Report
k) Undergraduate Curriculum Committee:
> Annual Report
> Consent agenda items < May 21, July 22 & August 19

12) Other Business

a) Feedback and Concerns on the School of Medicine – President Rhonda Lenton & David Peters – Dean, Faculty of Health

President Lenton and David Peters answered questions and concerns from the Faculty.

Meeting Adjournment

A motion was moved, seconded and carried to adjourn the meeting.

FACULTY COUNCIL ATTENDANCE

SEPTEMBER 9, 2025

Abisola	Anifowose
Acacia	Rose
Aleksandra	Wiscicka
Andrew	Skelton
Ayesha	Tahir
Brad	Sheeller
Bruce	Howard
Carl	Wolfe
Chris	Caputo
dasantila	golemi-kotra
David	Peters
Derek	Jackson
Emily	Anacleto
Eva	Hughes
Fatema	Nakhuda
Georges	Monette
Gerald	Audette
Gino	Lavoie
Gloria	Orchard
GORDON	CRAIG
Hugo	Chen
Iain	Moyles
Jade	Atallah
James	Elwick
Jane	Heffernan
Jean-Paul	Paluzzi
Jennifer	van Wijngaarden
Jeremy	Webb
Jerusha	Lederman
Jill	Lazenby
Joanne	Sequeira
Jorg	Grigull
Julie	Clark
Karyn	Davies
Katherine	Myers
Khansa	Cheema
Kyle	Belozerov
Maggie	Xu
Mandy	Ramnaraine
Mario	Verrilli
Mark	Vicari
Matt	George
Michael	Haslam
Michael	De Robertis
Mike	Scheid
Miles	Couchman
Nadia	Fatima
Natalie	Moussa
Neal	Madras
Nicole	Nivillac
Nik	Kovinich
Paniz	Hosseinipour
Parmida	Khodrang
Patricia	Lakin-Thomas
Paul	SZEPTYCKI
Paula	Wilson
peter	backx
Precious	Fagbenro
Racheal	Ajadi
Raghav	Sharma
Raman	Mir Eshghi
Rene	Fournier

Rhonda	Lenton
Robert	Tsushima
Robert	Tsushima
Robin	Metcalfe
Ruth	Igumbor
Ryan	Hili
Ryan	Schott
Sanaz	Gholizadeh
Setareh	Ghorbani
Seyed	Moghadas
Sibonile	Siyakatshana
Stephanie	Jones
Stephen	Watson
Taline	Apelian-Sutor
Tamara	Kelly
Thomas	Baumgartner
Tom	Kirchner
Valeriia	Shvetsova
Vera	Pavri
Vivian	Saridakis
Wendy	Booth
Wendy	Taylor
Assefa	Woldegerima
Yi	Sheng
Yuna	Hwang

2025-2026 FSc Report on vacancies for Senate and FSc Standing Committees of Council

RATIFICATION OF NOMINATIONS

Undergraduate Curriculum Committee:
N. Blinov, Department of Physics & Astronomy, term 2025 - 2025

2025-2026 FSc Report on vacancies for Senate and FSc Standing Committees

Committee	Rules of Faculty Council - membership	Meeting time / Membership	Term From	Term To
Senate	According to the York University Secretariat based on the Senate 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.	As per Senate website		
	Dean, Ex officio	R. Tsushima	Designated	
	Member at large	A. Skelton	Designated	
	Member at large	E. Hamm, Department of Science, Technology & Society	2024	2027
	Member at large	R. Hili, Department of Chemistry	2025	2028
	Member at large	T. Kelly, Department of Biology	2024	2027
	Member at large	W. van Wijngaarden, Department of Physics and Astronomy	2025	2028
	Member at large	T. Kubiseski, Department of Biology	2023	2026
	Member at large	VACANT	2025	2028
	Department Chair	T. Kirchner, Department of Science, Physics & Astronomy	2024	2027
	Department Chair	J. van Wijngaarden, Department of Chemistry	2024	2027
	Department Chair	M. Haslam, Department of Mathematics & Statistics	2023	2026
	Director of NATS	R. Metcalfe, Division of Natural Science	Designated	
	Student representative	Taline Apelian-Sutor	2025	2027
	Student representative	Raman Mir Eshgh	2025	2027
Faculty Council	Chair of Council	A. McEachern	2025	2026
	Vice-Chair of Council	V. Pavri	2025	2026
Staff Representatives		W. Booth	2025	2026
		D. Hossain	2025	2026
		M. Xu	2025	2026
FSc Reps on Senate Committees				
Senate Executive	1 member from FSc	T. Kelly	2024	2027
Academic Policy, Planning and Research Committee (APPRC)	1 member from FSc	G. Monette	2023	2026
ASCP (Academic Standards, Curriculum and Pedagogy Committee)	1 member from FSc	J. Elwick	2024	2027
Senate Tenure & Promotion	1 member from FSc	P. Wilson	2024	2027
Sub-Committee on Honorary Degrees & Ceremonials	1 member from FSc	VACANT	2025	2028
Executive Committee	The Executive Committee shall be chaired by the Chair of Council and include the Vice-Chair of Council, the Secretary of Council, and one member elected from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy, and Science, Technology & Society/Natural Science, the Dean of the Faculty of Science (ex officio), one student member of Council, and one of the staff members elected to Council.	Executive Committee normally meets the first Tuesday of each month (September to May) from 3pm - 430pm		
	Chair of Council	A. McEachern	2025	2026
	Vice-Chair of Council	J. Webb	2025	2026
	Dean, Ex officio	R. Tsushima	Designated	
	Asst. Dean - SEM & SEP	E. Hughes	Designated	
	Staff representative	W. Booth	2025	2026
	Undergraduate Student Rep	Seyedeh Lilia Modarresi Saryazdi	2025	2026
	Biology	M. Vicari	2023	2026
	Chemistry	C. Caputo	2024	2027
	Math & Stats	VACANT	2025	2028
	Physics & Astronomy	W. Taylor	2025	2028
	Science, Technology & Society	V. Pavri	2025	2028
APPC	The Academic Policy and Planning Committee shall include the Dean or designate (*ex officio*), the Master of Norman Bethune College and one member elected from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy, and Science, Technology & Society/Natural Science, one student member of Council, and one of the staff members elected to Council.	APPC will normally meet the last Thursday of each month (September to April) from 9:00 am - 10:30 am		
	Associate Dean, Faculty, (ex officio)	A. Skelton	Designated	
	Head of Bethune College	P. Wilson	Designated	
	Undergraduate Student Representative	Parmida Khodrang	2025	2026
	Elected staff representative	M. Xu	2025	2026
	Biology	R. Schott	2023	2026
	Chemistry	R. Fournier	2023	2026
	Math & Stats	P. Szeptycki	2023	2026
	Physics & Astronomy	W. van Wijngaarden	2025	2026
	Science, Technology & Society	VACANT	2025	2028
Undergraduate Curriculum Committee	The Curriculum Committee shall include the Dean and an Associate Dean (ex officio), the Chair or nominee from each teaching Division or Department, three members elected by Council and two student members of Council.	The Curriculum Committee will normally meet every last Tuesday of each month (September to April) from 9:00 - 10:30 am		
	Member at Large	VACANT	2025	2028
	Member at Large	Paula Wilson	2023	2026
	Dean, Ex officio	R. Tsushuima	Designated	
	Undergraduate Student Rep	S.Paniz Hosseinipour	2025	2026
	Undergraduate Student Rep	Racheal Ajadi	2025	2026
	Biology	J. Atallah	2023	2026
	Chemistry	D. Jackson	2025	2028
	Math & Stats	M.W. Wong	2023	2026
	Physics & Astronomy	N. Blinov (F) / P.Hall (W)	2025/2025	2025/2029
	Science, Technology & Society	R. Metcalfe,/ ALT. J. Rogerson	2025	2027
	Member at Large	L. Robertson	2023	2026

2025-2026 FSc Report on vacancies for Senate and FSc Standing Committees

Committee	Rules of Faculty Council - membership	Meeting time / Membership	Term	
			From	To
CEAS	The Committee on Examinations and Academic Standards shall consist of an Associate Dean (*ex officio*), five members elected by Council from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology & Society/Natural Science, and one student member of Council.	CEAS will normally meet every alternate Thurs from 1:00 - 3:00 pm year round.		
	In addition to the above membership of the committee, Council shall elect a alternate member from each of the Departments specified above. Th alternate member shall be the person polling the next highest number of votes to those elected to the committee from each Department. The alternate for the student member will be selected by the Science Student Caucus from one of its Members at Large. An alternate can only vote in the event that first elected members are not in attendance.			
	Associate Dean - Students, Ex officio	M. Scheid	Designated	
	Undergraduate Student Rep	Sophia Luzskov	2025	2026
	Undergraduate Student Rep	Madeline Blanco	2025	2026
	Biology	A. Hilliker, VACANT / ALT. VACANT	2023/2025	2026/2028
	Chemistry	P. Johnson & T.Zeng / ALT. VACANT	2023/2023	2026/2026
	Math & Stats	VACANT, VACANT / ALT. VACANT	2025/2025	2028/2028
	Physics & Astronomy	S. Tulin, B. Howard / ALT. C. Storry	2025/2025	2026/2026
	Science, Technology & Society	K. Birch / ALT. S. Domenikos	2025/2023	2028/2026
Petitions	The Petitions Committee for the purpose of hearing student petitions shall consist of an Associate Dean (*ex officio*), six members of Council, and two student members of Council. The Committee may divide the workload by splitting the Committee membership into two panels of four people each. A quorum shall consist of either (a) two faculty voting faculty members and one student member or (b) three voting faculty members.	Each panel meets once a month on Wednesday or Thursday from 2:30 pm - 4:00 pm		
	Associate Dean, Ex officio	M. Scheid	Designated	
	Undergraduate Student Rep	Nadia Fatima	2025	2026
	Undergraduate Student Rep	Precious Fagbenro	2025	2026
	Member at Large	E. McFarlane	2025	2028
	Biology	C. Jang	2025	2028
	Chemistry	D. Jackson	2025	2028
	Physics & Astronomy	S. Jerzak	2025	2026
	Math & Stats	H. Jankowski	2025	2028
	Science, Technology & Society	C. Douglas	2025	2028
	Member at Large	A. Mills	2023	2026
SRC T & P Committee	The Committee on Tenure and Promotions shall consist of one currently tenured member from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology & Society/Natural Science elected by Council, and one student member of Council. No member of the Committee shall be a member of another Tenure and Promotions Committee at any time during their tenure on this committee.	SRC T & P Committee will normally meet the last Friday of each month (September to May) from 9:00 am - 11:00 am in LUM 305B		
	In addition to the above membership of the committee, Council shall elect an alternate member from each of the Units mandated above. The alternate member shall be the person polling the next highest number of votes to those elected to the committee from each Department. The alternate for the student member shall be selected by the Science Student Caucus from one of its Members-at-Large on an annual basis. An alternate can only vote in the event that existing members are not in attendance.			
	Associate Dean - Faculty, Ex officio	A. Skelton	Designated	
	Undergraduate Student	Valeriia Shvetsova	2025	2026
	Biology	M. Bayfield/ ALT. VACANT	2023/2025	2026/2028
	Chemistry	A. Orellana/ ALT. S. Krylov	2023/2024	2026/2027
	Physics & Astronomy	M. George (Fall), C. Bergevin (Winter) / ALT. R. Lewis	2025/2025	2026/2026
	Math & Stats	Y.Gao / ALT. VACANT	2024/2025	2027/2028
	Science, Technology & Society	S. Domenikos / ALT. D. Lungu	2025/2023	2028/2026
CoTL	Currently, the Committee on Teaching and Learning shall consist of a minimum of two Faculty members from each department, the Associate Dean – Students, one Librarian, one staff member, one undergraduate student, and two graduate students, in addition to other members invited as provided for by the Rules. Graduate students and staff nominees will indicate their interest in serving on the committee in writing to the committee, who will then approve by majority vote.	CoTL normally meets every third Thursday of each month (September to May) from 10:00 am - 11:30 am		
	Associate Dean - Students, Ex officio	M. Scheid	Designated	
	Graduate Student Representative	Fatema Nakhuda	2025	2026
	Graduate Student Representative	Sanaz Gholizadeh	2025	2026
	Undergraduate Student Representative	Setareh Ghorbani Sini	2025	2026
	Stacie Science Library	M. Wang	Designated	
	IT Representative	VACANT	Designated	
	Teaching Commons Rep	Y. Su	Designated	
	Staff representative, Elected	D. Hossain	2025	2026
	Biology	L. Adriana Puentes Jacome	2024	2027
	Biology	J. Atallah	2023	2026
	Chemistry	H. Kouyoumdjian	2025	2026
	Chemistry	D. Wilson	2025	2028
	Physics & Astronomy	N. Blinov	2025	2026
	Physics & Astronomy	C. Boukare	2025	2026
	Math & Stats	VACANT	2025	2028
	Math & Stats	VACANT	2025	2028
	Science, Technology & Society	C. Rozins	2024	2027
Committee on Research & Awards	The Committee on Research and Awards shall consist of one member elected by Council from each of Biology, Chemistry, Mathematics and Statistics, Science, Technology & Society/Natural Science, and Physics and Astronomy, one student member of Council and an Associate Dean (*ex officio*).	The Research & Awards Committee will meet when grants and awards need to be adjudicated.		
	Associate Dean - Research & Graduate Education, Ex officio	S. Moghadas	Designated	
	Undergraduate Student Representative	Ruth Igumbor	2025	2026
	Graduate Student	Aysa Tajeri Emamchaei	2025	2026
	Biology	D. Golemi-Kotra	2023	2026
	Chemistry	T. Baumgartner	2025	2028
	Physics & Astronomy	R. Kannan	2025	2026
	Math & Stats	H. Zhu	2023	2026
	Science, Technology & Society	H. Mialet	2023	2026
Appeals Committee	The Appeal Committee for the purpose of hearing student appeals shall consist of four elected faculty members from Science units, an Associate Dean (ex officio) and two student members of Council. A quorum shall consist of either (a) two faculty members and one student member or (b) three faculty members.	Meeting is held once a month and times are polled by the Committee Secretary.		
	Associate Dean - Faculty, Ex officio	A. Skelton	Designated	
	Undergraduate Student Representative	Ayesha Tahir	2025	2026
	Undergraduate Student Representative	Abisola Anifowose	2025	2026
	Member at Large	VACANT	2025	2028
	Biology	L. Donaldson	2023	2026
	Chemistry	L. Hiscock	2023	2026
	Physics & Astronomy	P. Sholz	2025	2026
	Math & Stats	M.W. Wong	2023	2026
	Science, Technology & Society	D. Monaldi	2023	2026

2025-2026 FSc Report on vacancies for Senate and FSc Standing Committees

Committee	Rules of Faculty Council - membership	Meeting time / Membership	Term	
			From	To
Graduate Curriculum Committee	To provide broad review and commendation to Council via the Academic Policy and Planning Committee of all proposals received from Graduate Programs with respect to: New Course Proposals , Course Change Proposals, Minor Changes to Program/Graduate Diploma Academic Requirements, Major Modifications to Program/Graduate Diploma Academic Requirements, New Graduate Fields, New Graduate Diplomas, New Graduate Degree Programs The Graduate Education 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 graduate student member from any Graduate Program within 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 approvals at the Faculty-level. The Chair of the Committee is selected by the voting members of the Committee for a one-year term.	Meeting is held based on availability.		
	Associate Dean – Associate Dean Students, Ex officio	M. Scheid	Designated	
	Biology	J. Paluzzi	2023	2026
	Chemistry	R. Hili	2023	2026
	Physics & Astronomy	A. Muzzin	2023	2026
	Math & Stats	P. Ingram	2023	2026
	Science, Technology & Society	VACANT		
	Member from Faculty of Health OR Lassonde	VACANT		
	Member at Large	D. Golemi-Kotra	2023	2026
	Graduate student	Elizaveta Yakubovskaya	2025	2026
Committee on Equity, Diversity & Inclusion	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 form EDI groups • Approaches to addressing gender bias in the workplace • Research engaging equity recognized groups • Workload and service contributions of EDI members • EDI experiences in Teaching and Learning The Equity, Diversity and Inclusivity committee shall consist of: • Associate Dean, Faculty Affairs (ex officio) • Associate Dean,Research and 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	Meeting is held the last Wednesday of every month.		
	Associate Dean - Faculty, Ex officio	A. Skelton	Designated	
	Associate Dean, Dean - Research & Graduate Education, Ex officio	S.Moghadas	Designated	
	Undergraduate Student Representative	Natalie Moussa	2025	2026
	Graduate Student	Katherine Myers	2025	2026
	Graduate Student	Emily Anacleto	2025	2026
	Biology	D. Golemi-Kotra	2024	2027
	Chemistry	C. Young	2023	2026
	Physics & Astronomy	A. Kumarakrishnan	2025	2026
	Math & Stats	VACANT	2025	2028
	Science, Technology & Society	J. Lazenby	2025	2026

Faculty of Science Executive Committee

Proposed modifications to the rules of Science Council

October 2025

Section 35.f.

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

Change proposed:

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

Rationale: Increase in the number of petitions necessitates additional committee members.

Rules and Procedures of Council
Approved October 14, 2025

Chair/Vice-Chair

1. The Council shall elect, at the time of its annual elections, a Vice-Chair of Council to take office on the following July 1st. The Vice-Chair shall serve as Chair in the year following the term as Vice-Chair.

Membership

2. The following may attend and participate in all meetings of Council and shall have the right to vote:
   a) All faculty members with teaching appointments in the Faculty of Science;
   b) The Head of Bethune College;
   c) Three members of the Faculty of Science support staff, elected annually by the support staff;
   d) (i) 20 undergraduate students registered in the Faculty of Science elected annually by their peers this is the Science Student Caucus;
      (ii) 5 graduate students, with a minimum of one from each graduate program in the Faculty;
   e) The Assistant Dean – SEM & SEP;
   f) The Science Librarian;
   g) Dean of Libraries or designate (ex officio);
   h) The Chair of the Senate (ex officio);
   i) Secretary of the Senate (ex officio);
   j) The President of the University, (ex officio);
   k) The Vice-President Academic and Provost (ex officio).

3. The Council may issue invitations for either the full academic year, or for a particular meeting, to individuals who are not members of the Council; such individuals shall be entitled to participate in the meeting of the Council to which they have been invited but shall not have the right to vote.

4. All members of the Faculty of York University, all students enrolled in undergraduate courses offered by the Faculty of Science, and all graduate students in graduate programs of the Faculty of Science shall have the right to attend Council meetings but shall not have the right to vote.

Secretary

5. The Secretary of the Council shall be the Assistant Dean – SEM & SEP, and the Assistant Secretary of the Council shall be appointed by the Dean of the Faculty.

6. The duties of the Secretary shall be to take charge of the records and papers of the Council; to keep the same properly arranged for convenient reference; to be responsible for keeping minutes of the proceedings of all Council meetings and shall prepare and countersign all official Council documents.

Monthly Meetings

7. Monthly meetings shall be held from the September inaugural meeting to May, inclusive, unless otherwise ordered by special motion or by the Executive Committee.

8. Following the last meeting of Council (usually May unless otherwise decided by Council), and until the first regular meeting of Council in the Fall, the Executive Committee of Council shall possess and may exercise any or all of the powers, authorities and discretions vested in or exercisable by the Council with the understanding that the Executive Committee shall report to Council upon any actions taken under this authority at its first regular meeting.

9. The Chair of each meeting shall conduct the proceedings in conformity with the rules and procedures enacted by the Council and in all cases not so provided for, the practice of the House of Commons shall govern.

10. Monthly meetings of the Council shall be called and not normally proceed for longer than 90 minutes unless two-thirds of the members present and voting agree to continue with the business of the meeting.

Special Meetings

11. A special meeting may, and on requisition of not fewer than thirteen members shall, at any time, be called by the Chair, with not less than twenty-four hours' notice, for the transaction of such business only as may be specified in the notification of such meetings.

Quorum

12. At all regular or special meetings, twenty voting members of the Council shall form a quorum.

Discussion

13. Any member desiring to speak during a meeting shall address the Chair.

14. Originally, no member shall speak more than once (and then not longer than ten minutes unless permitted by the Council) to the same question, except the mover, who shall have the right of replying after all members choosing to speak have spoken. A member may, at any time, with the permission of the Chair, explain a material part of their speech which may have been misunderstood.

Motions

15. The Chair may take part in a debate on any subject, but before doing so shall leave the Chair's position and appoint the Vice-Chair or some other member to occupy it until the Chair has spoken.

16. No member shall speak to a question after it has been put by the Chair.

17. All questions which come before the Council shall be decided by a majority of the members present but, in the case of an equality of votes, the motion shall be deemed to be negative.

18. On any question, all members of Council shall have only one vote.

19. The Chair shall declare the results of every vote and, on any question except the motion to adjourn the Council or a debate, any member may require the number of yeas and nays to be recorded.

20. All motions, except those for adjournment of the Council or a debate, shall be put in writing and recorded, before being debated or put from the chair. No motion introducing new matters other than matters of privilege or petition shall be taken into consideration at any regular meeting of the Council, except upon a two-thirds vote of the voting members present, unless notice in writing has previously been given to the Secretary for circulation with the notice of meeting.

21. When a motion has been made and recorded, it shall be disposed of unless the mover, with the consent of the Council, withdraws it or allows it to stand over.

22. When a question is under debate, no motion shall be received by the Chair except for one of the following purposes:
    a) to adjourn the Council;
    b) to adjourn the debate;
    c) to put the question;
    d) to refer the matter to an appropriate committee;
    e) to amend.

23. A motion to adjourn the Council or a debate shall always be in order, but no member may speak to such a motion for more than five minutes.

24. A motion to refer a question to an appropriate committee shall, unless it is defeated, preclude all amendments to the main question.

Order of Business

25. The following order of business shall be observed by the Chair in bringing matters before the Council at all regular meetings, and no variation from this order shall be allowed, except by a two-thirds vote of the members present, which shall be taken without debate:
    a) Approval of Agenda. The notice of meeting may identify items to be dealt with by consent. A consent agenda item is deemed to be approved unless, prior to the consent agenda item being reached, at least one Councilor advises the Chair of a request to debate it.
    b) Reading and disposing of the minutes of the last meeting and of all intervening special meetings;
    c) Business arising out of the minutes;
    d) Inquiries and reading and disposing of communications, to be disposed of as read;
    e) Reading and disposing of reports of standing committees and special committees, to be disposed of as received;
    f) New business.

Standing Committees

26. The following shall be the Standing Committees of Council, whose duties are defined in the the Rules of Council and may be revised by a vote of Council. Ex officio members shall be non-voting. Chairs or their designates serve as departmental representatives on some Council committees, such as the Undergraduate Curriculum Committee. In such cases, Chairs or their designates are not considered ex officio, and have full voting rights. Standing Committees will report on at least a yearly basis to Council.

a) Executive Committee
b) Academic Policy and Planning Committee
c) Undergraduate Curriculum Committee
d) Graduate Curriculum Committee
e) Committee on Examinations and Academic Standards
f) Petitions Committee
g) Appeals Committee
h) Committee on Tenure and Promotions
i) Committee on Research and Awards
j) Committee on Teaching and Learning
k) Committee on Equity, Diversity and Inclusion

Standing Committees Membership & Terms of Office

27. 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.

28. The Chair of Faculty Council shall be Chair of the Executive Committee. Other Standing Committees shall elect their own Chair. The President, the Chair of Council and the Dean shall be members ex officio of all Standing Committees.

29. The quorum of any committee shall consist of the majority of its voting members.

30. Any member of the Council shall have the right to be present at, but shall not take part in any meeting part in, any meeting of any Standing Committee with the following exceptions:
    a. Meetings of committees which the Executive shall designate as dealing with confidential information on student grades or marks shall not be open to students who are not members of the committee.
    b. Meetings of the Tenure and Promotions Committee in which individual cases are discussed shall be held in camera and shall be completely confidential.
    c. Meetings of the Petitions Committee and of the Appeals Committee shall be held in camera.
    d. Any Committee of Council may, when discussing confidential matters, declare a meeting, or part thereof, to be held in camera by a vote of two thirds of the voting members present.

31. Vacancies occurring in a Standing Committee may be filled at any regular meeting of the Council.

32. No proposal to amend any of the rules and procedures shall be considered except at a regular meeting, and unless notice of the proposed change has been given.

33. None of the rules shall be suspended at any meeting of the Council except by a two-thirds vote vote of the members present.

34. Faculty members of Standing Committees shall serve for terms of three years unless the membership is defined by a particular appointment, such as the graduate program director. In each year where possible, one-third of the membership of each Standing Committee shall retire and be replaced by election from slates of names presented by the Executive Committee, possibly augmented by names from the floor of Faculty Council. Student members of Standing Committees shall serve for terms of one year but may be re-elected in subsequent years.

35. Faculty representation on Senate shall include the Director of Natural Science and three Department Chairs. Department Chairs on Senate shall serve three-year terms following a sequential rotation among departments, with one retiring and another beginning a term each year. The remaining faculty positions on Senate shall be for terms of three years and in each year approximately one-third of the membership shall retire and be replaced by election from a slate of names presented by the Executive Committee.

    Such a slate may be augmented by names nominated from the floor and may include Department Chairs not currently serving as one of the three entitled positions referred to above.

a) The Executive Committee

The Executive Committee shall be chaired by the Chair of Council and include the Vice- Chair of Council, the Secretary of Council, and one member elected from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy, and Science, Technology and Society/Natural Science, one student member of Council, and one of the staff members elected to Council, and the Dean of the Faculty of Science (ex officio). The Executive Committee shall normally approve agendas prior to Council meetings and the processes by which matters of importance to the development of the Faculty will arrive on that agenda.

The Executive Committee will seek candidates to serve on the Standing Committees of Council when vacancies occur. Additional nominations may be made from the floor at Council.

The results of the election shall be effective the following July 1, except for the Committeeon Examinations and Academic Standards and the Petitions Committee, which shall have their membership changed effective October 1.

b) The Academic Policy and Planning Committee

The Academic Policy and Planning Committee shall include the Dean or designate (ex officio), the Head of Bethune College and one member elected from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy, and Science, Technology and Society/Natural Science, one student member of Council, and one of the staff members elected to Council.

The Academic Policy and Planning Committee examines, formulates, and reviews long-term and short-term academic planning as well as comprehensive policies for the Faculty, including degree and non-degree credit studies.

In discharging its functions the Committee shall:

1. In tandem with the Dean and in close consultation with Departments and Divisions oversee the development of the Faculty Academic Plan, the coordination/implementation of the plan, and report to the Council on activities;
2. Make recommendations to the Council on the feasibility of new Schools/Departments, Programs, Research Centers;
3. Make recommendations to the Council on reviews of existing Schools/Departments, Programs, Research Centers;

4. Direct advice on the employment of resources within the Faculty to the Dean;
5. Advise the Dean on matters related to hiring priorities in relation to the Faculty Academic Plan;
6. Access all relevant information through the Office of the Dean and report to the Council regularly on all advice given to the Dean.

c) The Undergraduate Curriculum Committee

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, three faculty members elected by Council and two student members of Council.

In discharging its functions, the Committee shall:

1. Review annually a summary of the notice of intentions filed by units in the Faculty of Science;
2. Receive curricular submissions from departments and divisions for review, and recommendation to Council for approval or other appropriate action, concerning new course proposals, changes to existing courses, changes to program requirements and new programs;
3. Forward proposals to Senate as appropriate;
4. Encourage the development of innovative inter-disciplinary programs;
5. Collaborate with the Committee on Examinations and Academic Standards and the committee on Teaching and Learning on issues of joint concern.

d) The Graduate Curriculum Committee

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 graduate student member from any Graduate Program within 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 approvals at the Faculty-level. The Chair of the Committee is selected by the voting members of the Committee for a one-year term.

The Committee shall provide broad review and recommendations to Council via the Academic Policy and Planning Committee of all proposals received from Graduate Programs with respect to New Course Proposals, Course Change Proposals, Minor Changes to Program/Graduate Diploma Academic Requirements, Major Modifications to Program/Graduate Diploma Academic Requirements, New Graduate Fields, New Graduate Diplomas and New Graduate Degree Programs.

e) The Committee on Examinations and Academic Standards

The Committee on Examinations and Academic Standards shall consist of an Associate Dean (ex officio), five members elected by Council from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology and Society/Natural Science, and one student member of Council. In addition to the above membership of the committee, Council shall elect an alternate member from each of the Departments specified above. The alternate member shall be the person polling the next highest number of votes to those elected to the committee from each Department. The alternate for the student member will be selected by the Science Student Caucus from its membership. An alternate can only vote in

the event that the first elected member is not in attendance.

The said Committee shall:

1. Review, and recommend to Council, criteria for anomalous course grade profiles;
2. Review a summary of course grade profiles as approved by units following each teaching term, paying particular attention to first year courses;
3. Monitor and adjudicate anomalous course grade profiles;
4. Recommend to Council policy on awards including scholarships, prestigious awards, and the Dean's Honour Roll;
5. Constitute panels comprising three voting members, normally including one student, to hear and rule upon cases of alleged breach of the Senate Policy on Academic Honesty; and
6. Report at least annually in the fall to Council on its activities.

f) The Petitions Committee

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

g) The Appeals Committee

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

h) The Committee on Tenure and Promotions

The Committee on Tenure and Promotions shall consist of one currently tenured member from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology and Society/Natural Science elected by Council, and one student member of Council.

No member of the Committee shall be a member of another Tenure and Promotions Committee at any time during their tenure on this committee.

In addition to the above membership of the committee, Council shall elect an alternate member from each of the Units mandated above. The alternate member shall be the person polling the next highest number of votes to those elected to the committee from each Department. The alternate for the student member shall be selected by the Science Student Caucus from its membership on an annual basis. An alternate can only vote in the event that the first elected member is not in attendance.

i) The Committee on Research and Awards

The Committee on Research and Awards shall consist of one member elected by Council from each of Biology, Chemistry, Mathematics and Statistics, Science, Technology and Society/Natural Science, and Physics and Astronomy; one undergraduate student member of Council; one Faculty of Science graduate student; and an Associate Dean (ex officio).

Non-Voting members shall consist of the Director – Research & Partnerships. The Chair and Vice-Chair of the Committee are selected by the voting members of the Committee for a one-year term. In the case of the absence or illness of the Chair, the Vice-Chair acts as Chair.

It is the mandate of the Committee to make recommendations and provide advice to Council on policy matters related to research. In addition, the Committee's functions and responsibilities include:

1. To adjudicate the following Faculty or University competitions/programs and recommend awardees/recipients to the Dean:
   - Excellence in Research Awards
   - Junior Faculty Fund and Minor Research Grant
   - Specific Research Grants (leave and non-leave)
   - York Research Chair
   - Others as needed;
2. To ratify NSERC's Undergraduate Student Research Awards (USRA) and Dean's Undergraduate Research Awards (DURA) that are ranked and adjudicated at the departmental level;
3. To provide advice to the Dean or individual departments on faculty research related awards, particularly prestigious awards;
4. To liaise with the Science Librarians on matters related to Library collections and services.

All committee members are required to complete the Unconscious Bias / EDI workshops offered by the Office of the Vice-President Equity, People & Culture. Additionally, all committee members are required to complete the training modules Bias in Peer Review, produced by the Tri-Agencies, and one of the Sex and Gender training modules, produced by CIHR.

When required, sub-committees can be created or additional colleagues may be invited to participate in the activities of the committee to adjudicate awards and grants should too many regular committee members find themselves in conflict of interest and quorum cannot be reached.

j) The Committee on Teaching and Learning

The Committee on Teaching and Learning shall consist of a minimum of two faculty members from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology and Society/Natural Science, one undergraduate student and one librarian, chosen in accordance with these rules. Additional members shall be the Associate Dean – Student Affairs, two Faculty graduate students, a Faculty staff member and other members as invited by the committee in June to serve one year terms for the following year.

Graduate students and staff nominees will indicate their interest in serving on the committee in writing to the committee, who will then approve by majority vote; such members will be members of the Committee only, not of council, unless they otherwise qualify for membership on Council.

It is the mandate of the Committee on Teaching and Learning to enhance the quality of the student learning experience by providing leadership in promoting and recognizing educational excellence in science and fostering a rich and vibrant teaching and learning community.

The functions of the Committee on Teaching and Learning shall be:

1. To support the implementation of the University Academic Plan and Faculty Five-Year Plan with respect to learning and teaching with the Faculty;
2. To review and develop education-related policies and procedures within the Faculty to strengthen the teaching and learning environment (excluding those that fall within the purview of existing committees such as CEAS);
3. To promote and support research in science education;
4. To promote and support best practice and innovative approaches to teaching in science;
5. To work with the Teaching Commons to provide professional development opportunities and resources to support faculty and graduate students in their educational roles (e.g. TDGAs);
6. To encourage and undertake inquiry into student learning needs and to initiate programs to address those needs (for example remediation, second start programs, etc.);
7. To oversee the development and select recipients of Educational Awards;
8. To promote the recognition of teaching excellence within the Faculty by facilitating nominations for external teaching awards.

k) Committee on Equity, Diversity and Inclusion

The Committee on Equity, Diversity and Inclusion shall consist of members from Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science, Technology and Society. Membership shall also consist of two graduate student or postdoctoral fellow/visitor members, one undergraduate student member selected from the Student Caucus, and the Associate Deans Faculty Affairs (ex officio) and Research & Graduate Education (ex officio). The Chair of the committee shall be elected annually from the faculty members on the committee.

It is the mandate of the Committee to provide broad review and leadership to Council on matters of Equity, Diversity and Inclusion with respect to tenure and promotions, hiring and retention of members form EDI groups, approaches to address Gender Bias in the workplace, research engaging equity recognized groups, recognition of workload and service contributions of EDI members, and EDI experiences in teaching and learning.

FACULTY OF
SCIENCE

Science
Curriculum
Committee

AGENDA

Date: Tuesday, September 23 2025

Time: 10:00 a.m.

Via Zoom

Members: Associate Dean of Students, Professor Michael Scheid,
Members voted: Professors Jade Atallah, Michael Haslam, Lisa Robertson, Robin Metcalfe (chair), Derek Jackson, Paula Wilson, and Jesse Rogerson. Tina Reddi, Secretary.

These are items passed at the Science Curriculum Committee Meeting. Items that were not approved is not reflected on this Agenda copy.

1.1 Minutes of the meeting:

1.1.1 August 19 2025

1.2 BIOLOGY:

1.2.1 New Course: SC/BIOL 4152 3.0 – Environmental Microbiology

1.3 MATHEMATICS and STATISTICS:

1.3.1 Change in pre-requisite and calendar description: SC/MATH 3282 3.0 – Mathematical Finance

1.3.2 Change in Standard Minor Modification: BSc. Data Science Honours – previous academic calendar has errors in Major credits total

1.3.3 Change in Standard Minor Modification: BA Honours and BA Specialized Honours Actuarial Science Program

1.4 <u>BETHUNE:</u>

1.4.1 Change in Title, in calendar description and addition of tutorials – SC/BC 1800 3.0

1.5 <u>NATURAL SCIENCE:</u>

1.5.1 New Course proposal: SC/NATS 1661 3.0 – Mating in the Natural World

1.5.2 New Course proposal: SC/NATS 1662 3.0 – Humans and Hormones: The Biology and Sociological Impact of the Endocrine System

1.5.3 New Course proposal: SC/NATS 1725 3.0 – The Science of Light: Exploring Waves, Vision, and Color.

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty: Indicate all relevant Faculty(ies)	Science
Department: Indicate department and course prefix (e.g. Languages, GER)	Biology
Date of Submission:	June 2025
Course Number: Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is "C")	BIOL 4152
Var:	
Academic Credit Weight: Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6	3.0
Course Title: The official name of the course as it will appear in the Undergraduate Calendar and on the Repository	Environmental Microbiology
Short Title: Appears on any documents where space is limited - e.g. transcripts and lecture schedules - **maximum 40 characters**	Environmental Microbiology

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

Brief Course Description:

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

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

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

Environmental Microbiology is the study of microorganisms in their natural environments, including soil, water, air, and extreme habitats. This course explores the interactions of microbes in and with the environment and examines their pivotal roles in the Earth's biogeochemical cycles. It explores the impact of microbes on climate change, emphasizing their potential for mitigating environmental damage and promoting a sustainable future. Students will take an evidence-based and critical approach to delve into the latest advancements in biotechnology, particularly the use of microorganisms for bioremediation, wastewater treatment and green energy production.

Prerequisites: SC BIOL3150 4.0 or SC/BIOL 3150 3.0

Generic Course Description:

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

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

Expanded Course Description:

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

Microorganisms are indispensable in supporting life on Earth through their biological functions and interaction in and with the environment. They have an extraordinary capacity to adapt to extreme environmental conditions, in terms of the physical and chemical properties of the environment. Recent technological advances utilize microorganisms to mitigate and reverse many of the human-driven environmental changes we face today. The study of environmental microbiology introduces students to the role of microorganisms in Earth's ecosystems and equips them with knowledge of the tools developed to address global challenges such as pollution, climate change, green energy production and promotion of a sustainable future. The course is organized around four primary themes:

(1) Introduction to the diversity of microbial life and their role in Earth's biogeochemical cycles.
(2) Examination of microbial interactions in and with the environment.
(3) Exploration of the use of microbes in environmental biotechnology for applications such as bioremediation and green energy production.
(4) Analysis of the impact of microbial activity on climate change and global sustainability efforts.

Topics to be covered in this course include:

1) **Introduction to environmental microbiology**
   Microbial habitats and niches
   Evolutionary adaptation of microbes to environmental changes
   Methodologies in Environmental Microbiology
2) **Biogeochemical cycles**
   Microbial roles in the carbon cycle
   Nitrogen cycle: denitrification and nitrogen fixation
   Sulfur and phosphorus cycles
   Human influence on biogeochemical cycles
3) **Environmental biotechnology applications**
   Bioremediation: techniques for oil spills, heavy metals, and pesticide degradation
   Microbial strategies for wastewater treatment and sludge management
   Green energy production: microbial fuel cells, bioenergy and algal biofuels
4) **Climate change and microbial communities**
   Role of microbes in greenhouse gas dynamics (methanogenesis, nitrous oxide production)
   Impact of rising temperature on microbial diversity and function
   Microbial contributions to climate change mitigation: carbon capture and bio-sequestration and enhanced weathering.

In this course, students will learn about the diversity of microorganisms on Earth, their contributions to biogeochemical cycling of essential elements to life, such as carbon, nitrogen, sulfur and phosphorus, and their metabolic capacities. Students will also explore the biotechnological utilization of microbes for environmental remediation and green energy production. They will develop skills in gathering scientific evidence and critically assessing scientific

literature on the role of microorganisms in environmental sustainability and technological advances on exploration and utilization of microorganisms to reverse environmental pollution and production of green energy. Furthermore, students will develop skills in summarizing opposing theories on the impact of microorganisms in the environment and convey these findings, verbally and in writing, to a diverse lay audience including their own peers.

Expected Learning Outcomes

Upon completion, students should be able to:

- Explain major concepts and methodologies in environmental microbiology, demonstrating detailed knowledge in certain topics (i.e., course topics).
- Examine the use of biotechnology to utilize microorganisms for environmental benefits.
- Gather, synthesize, interpret and critically evaluate, scientific information (including methodologies and data) about the role of microorganisms and impact of microbial-based technologies in mitigating environmental pollution and green-energy production, with a focus on recent case studies in bioremediation, wastewater treatment and green-energy production (relying on primary research sources).
- Apply scientific methodology to identify, define and analyze problems in primary scientific publications and design/suggest solutions.
- Summarize key points from scientific literature to provide relevant information and support a topic in environmental microbiology.
- Critique primary research articles assessing the links and impacts of microorganisms on the environment, climate change and green energy production.
- Apply learning from other fields (*e.g.*, genetics, biochemistry, microbiology) to support or refute scientific claims/conclusions made on a particular topic in environmental microbiology.
- Communicate (orally and in writing) scientific discoveries clearly to peers and a scientific audience.
- Discuss and debate issues related to environmental microbiology.
- Work effectively, responsibly, and collegially with peers in and out of class.

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

The course material will mainly be presented through lectures. The content of the course will primarily be derived from scientific literature. The primary research sources used to prepare the lectures, including primary research articles and books (collectively referred to as reading material) will be posted on eCLass. The course material will also include in-class presentations prepared by students on specific topics not covered in the lectures (see below) but that fall within the course objectives. In addition, students will lead in-class discussions and debates on recent scientific reports. Hence, class time will be divided among lectures, in-class student presentations and student-led

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.

discussions. The course incorporates a writing activity, a 1,500-word essay, to provide a platform for students to practice writing concisely and clearly for a lay audience.

In-class presentations, 10 min long, will be distributed throughout the course. The instructor will propose presentation topics through examples of primary research papers posted in the lectures and on eClass, as part of the reading material, while encouraging students to select topics of their own choice that align with the course objectives (e.g. primary research papers on biodegradation of specific pollutants or biotechnologies not covered in the lectures).

Student presentations on topics not covered in the lectures enable active student participation in course-content creation, with the aim of helping them to gather, synthesize, interpret and critically evaluate scientific information. In-class discussions will follow these students-led presentations with the aim of encouraging students to think critically about scientific information by applying foundational scientific knowledge (acquired through this course and prerequisite courses) and scientific methodology (acquired in this course and in the lab component of prerequisite courses). This format of in-class discussions will enable a more structured assessment of students as it will be in a question&answer format. In addition, in-class presentations, discussions and debates will encourage independent research and learning, provide students with a platform to actively engage with the course material, and develop their ability to communicate topics and ideas clearly and convincingly.

In-class discussion and debates will be mediated through monitoring and assessing the questions posed by students in the class and their answers to those questions. This activity will primarily be carried out during student presentations (which will be distributed throughout the course). To a lesser extent, this activity will also be monitored during lectures, where students will be encouraged to ask and answer questions. The writing activity will contribute to the communication learning objectives of the course.

The eClass platform will be the technology-based platform for students to access course materials such as lecture notes and primary research papers used to prepare them; to exchange ideas with their peers on topics of interest; to present and discuss scientific literature in the classroom; and to stay informed about the latest discoveries relevant to this course.

Instruction:

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

1) This course will be offered in-person at Keele Campus annually in the Winter term to accommodate the preceding Fall Bio3150 students (Bio3150 is a prerequisite)
2) Dr. Golemi-Kotra will be teaching this course.
3) The course could also be taught by Luz Puentes Jacome or Dr. Nicole Nivillac of the Biology Department.
4) The contact time is envisioned as two 90 min sessions per week (three hours total). In total 12 weeks, one semester.

Evaluation:

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

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

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

Evaluation of students' learning will be based on:

1) Eight quizzes (two quizzes for each topic), worth 20%
2) In-class presentations, worth 20%
3) Written essay, worth 20%
4) In-class discussions, worth 10%
5) Final Exam, worth 30%

The class size for this course is estimated at 40 students. This could be increased to 50 once it becomes clear that course leaning objectives can be easily achieved.

Quizzes and in-class discussions will be used to assess students' progress during the course and identify any need for adjustments to course delivery or additional support for student learning. They will also provide students with regular low-stakes feedback. Quizzes will consist of short answer questions.

In-class presentations and discussions will be used to assess students' critical analysis of scientific topics presented in primary scientific papers, as well as their ability to present and persuade the audience of the significance of the scientific findings. Participation in in-class discussions and debates will be assessed by monitoring students' questions and responses throughout the course. Clear guidelines will be provided for this assessment exercise to ensure quality and consistency.

The written essay consists of a 1,500-word essay on a specific primary scientific paper. This assignment will assess students' writing skills and their understanding of a specific topic (or question) in the environmental microbiology. It will also assess their ability to highlight the broader context of the topic, identify the research question or hypothesis, identify and describe the methodology used to investigate the question, present the findings and their significance including the limitations and drawbacks of the methodological approaches used to address the scientific question and propose possible solutions to those limitations. The essay is not a summary—which will reduce the temptation to use AI tools— but rather as a structured analysis composed of these assessment elements (background, hypothesis, methodology, findings, significance, drawbacks, and solutions). Quizzes and in-class discussions and debates will take place during regular lecture times.

The final exam will be cumulative and consist of short-answer questions targeting the foundational knowledge delivered throughout the course. The exam will be administered during the regular final exam period.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

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

Also please list any online resources.

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

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.

Journal of Environmental Microbiology, one of the Wiley Journal series. https://enviromicro-journals.onlinelibrary.wiley.com/journal/14622920

Environmental Microbiology, The Journal is devoted to the advancement of understanding of microbial interactions and microbial processes in the environment and publishes cutting-edge original research reporting significant advances in or relating to this subject. https://www.pulsus.com/journal-environmental-microbiology.html

*Microbial Ecology***,** The Journal is dedicated to presenting high-quality scientific investigations of how microorganisms interact with their environment, each other, and their hosts. The Journal covers: the ecology of microorganisms in natural and engineered environments. https://link.springer.com/journal/248?utm_source=slink&utm_medium=journal_finder

Applied and Environmental Microbiology, The Journal publishes study results that make significant contributions to applied microbial research, basic microbial ecology research, and genetic and molecular investigations of microbial topics of practical value. The journal sheds new light on key microbiological principles, fundamental microbial processes, and basic questions in applied and environmental microbiology. https://journals.asm.org/journal/aem

Total Environment Microbiology, The Journal foci are on research on environmental microbiology, which interfaces the effect of atmosphere, lithosphere, hydrosphere, biosphere, and anthroposphere on microbes and their activities. Emphasis is on advances in methodology or mechanistic understanding with a clear connection to the environment. Topics covered: Microbial Ecology and biogeochemistry; Microbial communities' assembly and dynamics; Microbial interactions; Applied microbiology and biotechnology; Systems biology, modelling and bioinformatic studies; Microbial genetics and genomics; Microbial physiology and metabolism; Antimicrobial resistance https://www.sciencedirect.com/journal/total-environment-microbiology

Biomed Central—Environmental Microbiome, The Journal foci: air, soil and aquatic microbial ecology; microbiome analyses; bioremediation; microbiome of the built environment; geomicrobiology; microbial interaction with plants and agricultural crops; extreme environment microbiology and astrobiology. https://environmentalmicrobiome.biomedcentral.com/

Applied Microbiology and Biotechnology, The Journal focuses on research regarding prokaryotic or eukaryotic cells, relevant enzymes and proteins, and applied genetics and molecular biotechnology. https://link.springer.com/journal/253?utm_source=slink&utm_medium=journal_finder

Books:

Environmental Microbiology, 3rd Edition, 2015. Editors Ian L. Pepper, Charles P. Gerba and Terry J. Gentry.

Manual of Environmental Microbiology, 4th Edition, 2016. Marylynn V. Yates (Editor-in-Chief), Cindy H. Nakatsu (Editor), Robert V. Miller (Editor), Suresh D. Pillai (Editor), American Society of Microbiology Press.

Environmental Microbiology, Walter Reineke, Michael Schlömann, Springer Spektrum, 2023.

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.

No special physical resources are required. A lecture space that can accommodate 80 students is needed. Although the class size for this course is 40 students, the class space should be able to accommodate twice as much enough space among students during the quizzed.

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.

The most recent advancements in biotechnology have demonstrated the remarkable potential of microorganisms to reverse many of the deleterious human activities impacting the environment. The course will provide foundational knowledge underpinning these technological advances, such as the interactions of microbes with the environment, their indispensable role in supporting life on Earth, and their enormous metabolic capacity to adapt to diverse and extreme environmental conditions. In addition, the course will explore the methodologies employed to study microbes in the environment and analyze the impact of technological advances on the mitigation of major environmental issues while addressing sustainability for the future. Furthermore, the course engages students in creating course content, critically analyzing and discussing scientific publications and presenting scientific findings to a lay audience. Overall, the course material and activities will expose students to potential environment-focused career paths in research, teaching or policy making.

The course maps to the following Biology program learning outcomes:

1. DEPTH AND BREADTH OF KNOWLEDGE

a. Describe the basic structures and fundamental processes of life at the molecular, cellular, organismal and population levels Detailed knowledge in some specialized topics.

b. Describe some of the current advances in biology.

c. Describe the chemical, physical and mathematical basis of biology, and apply concepts from these disciplines to understand and study biological phenomena.

d. Appreciate and explore concepts and knowledge outside of science.

2. KNOWLEDGE OF METHODOLOGIES

Evaluate and carry out observational methodologies to answer questions in biology, safely and effectively.

3. APPLICATION OF KNOWLEDGE

a. Gather, organize, synthesize and critically evaluate information from scientific literature and other sources.

b. Apply the process of science by formulating questions, developing hypotheses, designing and carrying out experiments to test hypotheses, collecting, analyzing and interpreting data to draw conclusions and, where appropriate, propose solutions.

4. COMMUNICATION SKILLS

a. Speak and write effectively and clearly for a diversity of audiences.

b. Effectively communicate scientific concepts, data, and arguments through written, visual and oral methods to peers and scientists.

5. AWARENESS OF LIMITS OF KNOWLEDGE

Identify limitations of biological knowledge, experiments and evidence-based inquiry, both in one's own research and that of others.

6. AUTONOMY AND PROFESSIONAL CAPACITY

Exercise self-reflection, self-assessment and independence in learning and goal setting; take responsibility for decisions and actions.

There is no substantive overlap between this course and others that currently are being offered in the Department of Biology or in other departments in YorkU. There might be some tangential overlap of topics in Human Microbiome (SC/BIOL 4154) when it comes to the discussion of methodologies to study interactions between microbes and environment.

Expected course enrollment is 30.

Faculty and Department Approval for Cross-listings:

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

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

Accessible format can be provided upon request.

MEMORANDUM

York University Libraries

To: Dasantila Golemi-Kotra

From: Marcia Salmon (York University Libraries)

Date: 18 June 2025

Subject: Library Statement of Support – BIOL 4152 (Environmental Microbiology)

Summary

York University Libraries (YUL) is well positioned to support the proposed course. Faculty and students can make use of an array of library resources and services to meet their research and learning needs. This statement highlights offerings related to the major themes of the course. It also brings attention to collections of interest from connected fields such as Microbiology, Ecology and Environmental Sciences.

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. Tailored purchasing profiles ensure new materials are regularly purchased on subjects such as:

- Microbiology, Ecology and Environmental Sciences

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:

- Biology
- Ecology
- Environmental Studies
- Natural Science

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.

Immersive and Creative Spaces

The Libraries' Making & Media Creation Lab (Scott Library & Markham Campus Library) offer equitable access to library expertise and media creation spaces including:

- audio-visual media creation spaces and editing suites
- lending equipment such as cameras, microphones, digital audio recorders and virtual reality headsets
- workstations with access to digital media production software including the Adobe Suite and popular free and open-source creative software

The Digital Scholarship Centre offers resources for faculty members seeking to integrate audio- and video based assignments and activities into their courses and enables media literacy skills development in support of coursework and capstone projects. In addition, it serves faculty needs for equipment and recording space as they are developing their own eLearning Open Educational Resource materials.

FS Resource Implications Form **Unit: _____** **Date: _____**

		Course(s) Created X or Modified to □ (check one)		Course(s) Retired □ or Modified from □
Complete Course Designation		SC/BIOL 4152 3.0 Environmental Microbiology		
Enrolment (Estimate or Last Offering)		40		
Number of:	**Lecture Sections:**	1		
	Lab Sections:	0		
	Tutorial Sections:	0		
Number of:	**Course Coordinators (Tutor 1):**	0		
	Lab Demonstrators (Tutor 2):	0		
	Mark/Graders (Tutor 3):	0		
Prerequisites (P) Corequisites (C) Credit Exclusions (E)		SC/BIOL 3150 3.0 or 4.0		
For which degree program is this required (if applicable)?		Not required for a specific degree but can be used to meet degree requirements for all biology programs		
Other resource implications (please specify)		None		
Reason(s) for creation/ modification/ retirement		The most recent advancements in biotechnology have demonstrated the remarkable potential of microorganisms to reverse many of the deleterious human activities impacting the environment. This course will expose students to the field of environmental microbiology and will expand the 4000 level course options for biology students.		

Changes to Existing Course

Faculty:

Department: Mathematics and Statistics

Date of Submission: August 26, 2025

Course Number: 3282

Effective Session: Fall 2026

Course Title: Mathematical Finance

Type of Change:

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

Change From:	To:
A comprehensive introduction to continuous-time Mathematical Finance. This course introduces Brownian motion and Ito calculus and covers interest rate models and derivatives, the Black-Scholes model and the Black-Scholes partial differential equation, implied volatility and Merton's optimal portfolio problem. ~~This course, together with MATH 2281 3.0 "Models for Financial Economics", prepares students for topics covered in the IFM and QFI Core exams of the Society of Actuaries.~~ Prerequisites: SC/MATH 2131 3.0, SC/MATH 2281 3.0	A comprehensive introduction to continuous-time Mathematical Finance. This course introduces Brownian motion and Ito calculus and covers interest rate models and derivatives, the Black-Scholes model and the Black-Scholes partial differential equation, implied volatility and Merton's optimal portfolio problem. Prerequisites: SC/MATH 2281 3.0; SC/MATH 2030 3.0 or SC/MATH 2131 3.0

Rationale:

Math 3282 was initially designed to support the Applied Math Specialized Honours program in Mathematical Finance and the Actuarial Science Program. New enrollments in the Mathematical Finance were recenty suspended due to low program enrollments; Actuarial Science students had stopped taking Math 3282 except in a few isolated cases; Math 3282 was therefore not offered on the Keele campus in FW 2024/25 and it will not be offered there for the foreseeable future. Math 3282 is scheduled to be offered at the Markham campus in support of the Fintech program; it will now essentially exist as a service course only on that campus. Since it will no longer support the Actuarial Science program, we want to remove language that implies that it does.
The Fintech students have a slightly different background in Mathematics courses than Keele Math students, but the Math & Stats Department considers the prerequisites the Fintech students will have, specifically SC/MATH 2030 3.0 and SC/MATH 2281 3.0, sufficient preparation for this 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.

York University

Detailed Minor Modifications to Existing Programs

TEMPLATE

Modifications to Existing Programs fall under Section 5 of the York University Quality Assurance Procedures (YUQAP).

Full YUQAP can be found here: https://www.yorku.ca/unit/yuqap/

DETAILED MINOR MODIFICATIONS USUALLY INCLUDE ONE OR MORE OF THE FOLLOWING FEATURES:

- Addition of part-time/full-time program options, or a change from option to the other, where no significant change in resources is required
- Addition of an optional, standalone work-integrated learning element, e.g., an internship course or similar non-credit element.
- Substantive changes in admission requirements
- Substantive changes in progression requirements
- Substantial changes to required/core courses for a major/graduate degree that do not rise to the level of a major modification
- Substantial changes to an existing program option that was previously established through a major modification (i.e., substantial change to a minor, option, certificate, work-integrated learning option, or graduate specialization.)

OTHER STANDARD MINOR MODIFICATIONS CAN BE UNDERTAKEN THROUGH YOUR FACULTY. THESE USUALLY INCLUDE ONE OR MORE OF THE FOLLOWING FEATURES:

- Calendar copy corrections
- Revisions and/or updates to Program Learning Outcomes (PLOs) that do not change the substance of the PLOs
- Changes program name or nomenclature where there are no changes to PLOs
- Course changes – revisions, additions, deletions, repositioning, resequencing, etc. – where there are no changes to PLOs
- Changes in program requirements or sequencing where less than 1/3 of the program courses are affected
- Minor changes (changes to less than 1/3 of the program) to an existing minor, specialization, option, certificate, or WIL option (i.e., minor change to anything established through a major modification)
- Closure of any degree option, e.g. honours specialization

See the YUQAP website for further details, resources, and templates.

Detailed Minor Modification Proposal

Faculty: Science

Department: Mathematics and Statistics

Program: Data Science

Degree Designation: This change applies to the following programs:

a. Bachelor of Science Honours Major

Type of Modification: Changes to degree requirements (correcting an error in the listing)

Location *(current campus and, if applicable, proposed)*:

Effective Date: Fall 2026

Approval Date at Faculty Council:

---

1. Describe the proposed modifications to the program.

There are two versions of the honours program in Data Science: a BA Honours program and a BSc Honours program. The program requirements for the BA program are correct as they appear in the University calendar. This program change only applies to an obsolete requirement in the BSc Honours program listing in the University calendar. The present revision was accidentally omitted in an earlier program change.

In the current Data Science BSc Honours program description under major requirements, students are required to pass either LE/EECS 2011 – Fundamentals of Data Structures (3.00) or AP/ITEC 2620 Introduction to Data Structures (3.00). These requirements were included in the design and launch of the Data Science program over two years ago, but never needed. Indeed, the course LE/EECS 2011 was retired in the academic year 2023/24, while the Data Science cohort was in the first year of the program, and students were not expected to enroll. The EECS department worked with Math & Stats to design a replacement course specifically for Data Science students, namely LE/EECS 2502, which now appears as a required course in the current major requirements of the program, intended to be taken instead of LE/EECS 2011 or AP/ITEC 2620. LE/EECS 2502 is now in its second year of offering.

The obsolete requirement of LE/EECS 2011 or AP/ITEC 2620 should have been removed as a requirement for the BSc Honours Data Science program when LE/EECS 2502 was introduced as the new requirement in a minor program revision two years ago. This change was correctly implemented for the BA Honours Data Science program but the removal of the old requirements was accidentally omitted for the BSc program.

The obsolete requirements of LE/EECS 2011 or AP/ITEC 2620 remain listed in the calendar, along with the requirement of LE/EECS 2502, which is an error. LE/EECS 2011 is no longer offered and ITEC 2620 has two prerequisites not taken by Data Science Students. This is causing significant confusion amongst students and advisors alike, and must be corrected as soon as possible.

This proposal removes three credits in EECS from the major requirements, bringing them precisely into line with the BA version of the program. The additional three credits are added to Science Breadth requirements.

2. Include as an appendix a side-by-side comparison of the existing and proposed program requirements as they will appear in the Undergraduate or Graduate Academic Calendar. Please indicate deletions as strikethrough text and additions as underlined text in a contrasting colour.

See attached.

3.1 List the current and/or updated Program Learning Outcomes for the proposed modified program.[1] No changes to the Program Learning Outcomes are required; the current PLOs are as follows:

1. Core Knowledge and Understanding

1.1 Explain the key concepts related to Data Science, including, but not limited to, regression analysis, data management, data visualization, data processing, data analytics, data mining, applied AI, programming languages, algorithms, web mining, machine learning, and statistical computing.

1.2 Connect Data Science components to a domain of their choice, such as Economics, Geography, Biology, Psychology, Business Administrative Studies, or Environmental Studies.

2. Critical Analysis and Decision-Making

[1] Ideally, a program would have 8-12 Program Learning Outcomes (PLOs) that reflect the program and demonstrate how the program meets Ontario's Degree Level Expectations. Support for visioning, defining, and mapping your PLOs can be found in the Office of the Vice Provost Academic.

2.1 Know the established data science techniques (theoretical foundations, acquiring, cleaning, reducing, modelling, visualizing, and storing data) and understand the trade-offs and the common pitfalls involved in applying these techniques.

2.2 Critically evaluate, and interpret Data Science information (from primary sources, census, online information, scholarly works, and in industry), develop questions, and propose actionable solutions.

2.3 Identify and analyze data science complexities when applying to domain specific models and issues.

2.4 Apply strategic thinking and propose solutions for Data Science real-world issues during coursework and Capstone experience.

3. Professional Communication

3.1 Effectively communicate data science concepts, data, procedures, and arguments through a variety of mediums (written, visual, and oral mediums) for the target audience (i.e. Peers, scientists, public and/or industry).

3.2 Work collaboratively across disciplines to address data science solutions.

4. Ethical Behaviour, Social Responsibility and Professional Capacity

4.1 Identify ethical issues and implications associated with applications of data science in a variety of settings.

4.2 Demonstrate initiative, academic integrity, personal responsibility, and accountability in the laboratory and classroom settings and when communicating their work.

3.2 Provide a rationale for the proposed changes as articulated through the Program Learning Outcomes.

The proposed changes in this document are related to PLOs 1.1, 2.1 and 2.3 documented in the previous section of this document. In particular, the same outcomes are guaranteed by taking LE/EECS 2502 (designed specifically for the Data Science program to satisfy the PLOs) instead of LE/EECS 2011 or AP/ITEC 2620.

3.3 How will the proposed modification support the achievement of Program Learning Outcomes?

The course LE/EECS 2502 addresses the PLOs 1.1, 2.1 and 2.3 in the same way as does the two older options LE/EECS 2011 or AP/ITEC 2620.

4. Describe how students currently enrolled in the program will be accommodated.

Students in the BSc Honours Data Science Program have been advised to take LE/EECS 2502 instead of LE/EECS 2011 or AP/ITEC 2620 for the past year. An equivalence for the requirement has been manually added to the files of individual students. Students will continue to be accommodated in this way as necessary.

5. Describe any resource implications and how they are being addressed (e.g., through a reallocation of existing resources). If new/additional resources are required, provide a statement from the relevant Dean(s)/Principal confirming resources will be in place to implement the changes.

There are no resource implications associated with this proposal.

6. If relevant, summarize the consultation undertaken with relevant academic units, including commentary on the impact of the proposed changes on other programs. Provide individual statements from the relevant program(s) confirming consultation and their support.

The proposed change does not alter our agreements with other units or faculties, nor does it impact other academic programs. LE/EECS 2011 was listed in the Data Science proposal dated in September 2021. LE/EECS 2502 was specifically created for Data Science students on December 13, 2022 to replace the old (retired) requirement LE/EECS 2011 or AP/ITEC 2620. AP/ITEC 2620 has never been a viable alternative for Data Science students since it has two additional courses as prerequisites that Data Science students do not have.

The EECS department worked with Math & Stats to design the replacement course specifically for Data Science students, LE/EECS 2502, and this is now in its second year of offering.

7. For optional work-integrated learning elements (e.g., an optional internship course), please describe the consultation to ensure these elements are in line with best practice for experiential education and York's established other practices in this area. The Office of the Vice Provost, Teaching and Learning can provide further guidance.

APPENDICES

Appendix: Side-by-Side Academic Calendar Copy Comparison

Ensure that deletions are indicated with strikethrough text and additions are made in a contrasting colour.

Current calendar copy:	Proposed Calendar Copy:
MAJOR REQUIREMENTS (~~72~~ Credits)	**MAJOR REQUIREMENTS (69 Credits)**
Complete all of the following Passed the following: SC/MATH1013 - Applied Calculus I (3.00) SC/MATH1014 - Applied Calculus II (3.00) SC/MATH1019 - Discrete Mathematics for Computer Science (3.00) SC/MATH1025 - Applied Linear Algebra (3.00) SC/MATH1130 - Introduction to Data Science (3.00) SC/MATH1131 - Introduction to Statistics I (3.00) SC/MATH2015 - Applied Multivariate and Vector Calculus (3.00) SC/MATH2030 Cr=3.00 EN - Elementary Probability (3.00) SC/MATH2130 - Principles and	Complete all of the following Passed the following: SC/MATH1013 - Applied Calculus I (3.00) SC/MATH1014 - Applied Calculus II (3.00) SC/MATH1019 - Discrete Mathematics for Computer Science (3.00) SC/MATH1025 - Applied Linear Algebra (3.00) SC/MATH1130 - Introduction to Data Science (3.00) SC/MATH1131 - Introduction to Statistics I (3.00) SC/MATH2015 - Applied Multivariate and Vector Calculus (3.00) SC/MATH2030 Cr=3.00 EN - Elementary Probability (3.00) SC/MATH2130 - Principles and

Techniques of Data Science (3.00) □ SC/MATH2131 - Introduction to Statistics II (3.00) □ SC/MATH3330 - Regression Analysis (3.00) □ SC/MATH3333 - Data analytics: A Hands-on Approach (3.00) □ SC/MATH4036 - Introduction to Statistical Machine Learning (3.00) □ SC/MATH4931 - Simulation and the Monte Carlo Methods (3.00) □ SC/MATH4949 - Data Science Capstone Course (6.00) □ Passed the following: □ LE/EECS1015 - Introduction to Computer Science and Programming (3.00) □ LE/EECS1516 - Object Oriented Design and Principles using Python (3.00) □ LE/EECS2502 - Data Structures for Data Science (3.00) ~~□ Complete 1 of the following~~ ~~□ Completed at least 3 credits from the following types of courses:~~ ~~LE/EECS 2011 - Fundamentals of Data Structures (3.00)~~ ~~□ Passed the following:~~	Techniques of Data Science (3.00) □ SC/MATH2131 - Introduction to Statistics II (3.00) □ SC/MATH3330 - Regression Analysis (3.00) □ SC/MATH3333 - Data analytics: A Hands-on Approach (3.00) □ SC/MATH4036 - Introduction to Statistical Machine Learning (3.00) □ SC/MATH4931 - Simulation and the Monte Carlo Methods (3.00) □ SC/MATH4949 - Data Science Capstone Course (6.00) □ Passed the following: □ LE/EECS1015 - Introduction to Computer Science and Programming (3.00) □ LE/EECS1516 - Object Oriented Design and Principles using Python (3.00) □ LE/EECS2502 - Data Structures for Data Science (3.00) □ Passed the following: □ AP/ITEC3221 - Data and Information Management (3.00) □ AP/ITEC3310 - Introduction to Data Visualization (3.00) □ Passed the following: □ AP/WRIT2202 - Introduction to Effective

~~AP/ITEC2620 - Introduction to Data Structures (3.00)~~ Passed the following: AP/ITEC3221 - Data and Information Management (3.00) AP/ITEC3310 - Introduction to Data Visualization (3.00) Passed the following: AP/WRIT2202 - Introduction to Effective Communication for Data Science (3.00) Completed at least 3 credits from the following types of courses: AP/PHIL 3500 3.00 **SCIENCE BREADTH (~~12~~ Credits)** **Complete all of the following** 24 total – of which ~~12~~ credits are satisfied by the major requirements Complete all of the following Completed at least ~~12~~ credits from the following types of courses: in science disciplines outside the major Current science disciplines include computer science, kinesiology and health science, psychology, biology, biochemistry, biophysics, chemistry,	Communication for Data Science (3.00) Completed at least 3 credits from the following types of courses: AP/PHIL 3500 3.00 **SCIENCE BREADTH (15 Credits)** **Complete all of the following** 24 total – of which 9 credits are satisfied by the major requirements Complete all of the following Completed at least 15 credits from the following types of courses: in science disciplines outside the major Current science disciplines include computer science, kinesiology and health science, psychology, biology, biochemistry, biophysics, chemistry,

environmental biology, earth and atmospheric science, geography, physics and astronomy, science and technology studies. ○ *Note: at least 3 of the 24 science breadth credits must be at the 2000-level or above.	environmental biology, earth and atmospheric science, geography, physics and astronomy, science and technology studies. ○ *Note: at least 3 of the 24 science breadth credits must be at the 2000-level or above.

Appendix: Consultation and Support Letters

The EECS department worked with Math & Stats to design a replacement course specifically for Data Science students, namely LE/EECS 2502, which now appears as a required course in the current major requirements of the program, intended to be taken instead of LE/EECS 2011 or AP/ITEC 2620. LE/EECS 2502 is now in its second year of offering.

The requirement of LE/EECS 2011 or AP/ITEC 2620 should have been removed as a requirement for the BSc Honours Data Science program when LE/EECS 2502 was introduced as the new requirement two years ago. This change was correctly implemented for the BA Honours Data Science program but was accidentally omitted for the BSc program.

A motion to remove the redundant paragraph was presented by the current Data Science Director Steven Wang to the Data Science Curriculum Committee of the Department of Mathematics and Statistics on March 26, 2025 . The motion was passed.

Program: BSC (Honours) Data Science
Degree Program: Please Select Applicable Degree Program
Specialized Honours **Honours** Ordinary (90-credit) Double Major Major/Minor Minor
Other:
Effective Date: FALL 2026

Please note that only those fields applicable to the relevant program need to be completed.

Current Calendar Copy (~~Strikethrough~~ items to be removed)	New Calendar Copy (Underline items to be added in revisions to existing programs)
Admission Requirements **Current Students**	**Admission Requirements** **Current Students**
Continuing Requirements ☐ *GPA requirements*	**Continuing Requirements**
Graduation Requirements	**Graduation Requirements**
General Education – Required Credits:	**General Education** – Required Credits:
Major Requirements – Required Credits: 72 ☐ Complete all of the following ○ Passed the following: ✦ SC/MATH1013 -Applied Calculus I (3.00) ✦ SC/MATH1014 -Applied Calculus II (3.00) ✦ SC/MATH1019 -Discrete Mathematics for Computer Science (3.00) ✦ SC/MATH1025 -Applied Linear Algebra (3.00) ✦ SC/MATH1130 - Introduction to Data Science (3.00) ✦ SC/MATH1131 - Introduction to Statistics I (3.00)	**Major Requirements** – Required Credits: 69 ☐ Complete all of the following ○ Passed the following: ✦ SC/MATH1013 -Applied Calculus I (3.00) ✦ SC/MATH1014 -Applied Calculus II (3.00) ✦ SC/MATH1019 -Discrete Mathematics for Computer Science (3.00) ✦ SC/MATH1025 -Applied Linear Algebra (3.00) ✦ SC/MATH1130 - Introduction to Data Science (3.00) ✦ SC/MATH1131 - Introduction to Statistics I (3.00)

✦ SC/MATH2015 - Applied Multivariate and Vector Calculus (3.00) ✦ SC/MATH2030 Cr=3.00 EN - Elementary Probability (3.00) ✦ SC/MATH2130 - Principles and Techniques of Data Science (3.00) ✦ SC/MATH2131 - Introduction to Statistics II (3.00) ✦ SC/MATH3330 - Regression Analysis (3.00) ✦ SC/MATH3333 - Data analytics: A Hands-on Approach (3.00) ✦ SC/MATH4036 - Introduction to Statistical Machine Learning (3.00) ✦ SC/MATH4931 - Simulation and the Monte Carlo Methods (3.00) ✦ SC/MATH4949 - Data Science Capstone Course (6.00) ○ Passed the following: ✦ LE/EECS1015 - Introduction to Computer Science and Programming (3.00) ✦ LE/EECS1516 - Object Oriented Design and Principles using Python (3.00) ✦ LE/EECS2502 - Data Structures for Data Science (3.00) ~~○ Complete 1 of the following~~ ~~✦ Completed at least 3 credits from the following types of courses:~~ ~~LE/EECS 2011 - Fundamentals of Data Structures (3.00)~~ ~~✦ Passed the following:~~ ~~✦ AP/ITEC2620 - Introduction to Data Structures (3.00)~~ ○ Passed the following: ✦ AP/ITEC3221 - Data and Information Management (3.00) ✦ AP/ITEC3310 - Introduction to Data Visualization (3.00) ○ Passed the following: ✦ AP/WRIT2202 - Introduction to Effective Communication for Data Science (3.00)	✦ SC/MATH2015 - Applied Multivariate and Vector Calculus (3.00) ✦ SC/MATH2030 Cr=3.00 EN - Elementary Probability (3.00) ✦ SC/MATH2130 - Principles and Techniques of Data Science (3.00) ✦ SC/MATH2131 - Introduction to Statistics II (3.00) ✦ SC/MATH3330 - Regression Analysis (3.00) ✦ SC/MATH3333 - Data analytics: A Hands-on Approach (3.00) ✦ SC/MATH4036 - Introduction to Statistical Machine Learning (3.00) ✦ SC/MATH4931 - Simulation and the Monte Carlo Methods (3.00) ✦ SC/MATH4949 - Data Science Capstone Course (6.00) ○ Passed the following: ✦ LE/EECS1015 - Introduction to Computer Science and Programming (3.00) ✦ LE/EECS1516 - Object Oriented Design and Principles using Python (3.00) ✦ LE/EECS2502 - Data Structures for Data Science (3.00) ○ Passed the following: ✦ AP/ITEC3221 - Data and Information Management (3.00) ✦ AP/ITEC3310 - Introduction to Data Visualization (3.00) ○ Passed the following: ✦ AP/WRIT2202 - Introduction to Effective Communication for Data Science (3.00) ○ Completed at least 3 credits from the following types of courses: AP/PHIL 3500 3.00

○ Completed at least 3 credits from the following types of courses: AP/PHIL 3500 3.00	
Streams – Required Credits:	**Streams** – Required Credits:
Science Breadth – Required Credits: 12 Complete all of the following 24 total – of which ~~12~~ credits are satisfied by the major requirements ○ Complete all of the following ✦ Completed at least ~~12~~ credits from the following types of courses: in science disciplines outside the major ✦ Current science disciplines include computer science, kinesiology and health science, psychology, biology, biochemistry, biophysics, chemistry, environmental biology, earth and atmospheric science, geography, physics and astronomy, science and technology studies. ○ *Note: at least 3 of the 24 science breadth credits must be at the 2000-level or above.	**Science Breadth** – Required Credits: 15 Complete all of the following 24 total – of which 9 credits are satisfied by the major requirements ○ Complete all of the following ✦ Completed at least 15 credits from the following types of courses: in science disciplines outside the major ✦ Current science disciplines include computer science, kinesiology and health science, psychology, biology, biochemistry, biophysics, chemistry, environmental biology, earth and atmospheric science, geography, physics and astronomy, science and technology studies. ○ *Note: at least 3 of the 24 science breadth credits must be at the 2000-level or above.
Practical – Required Credits:	**Practical** – Required Credits:
Outside the Major – Required Credits:	**Outside the Major** – Required Credits:

Additional Elective Credits – Required Credits:	**Additional Elective Credits** – Required Credits:
Bilingual Requirement	**Bilingual Requirement**
Upper-Level Requirement	**Upper-Level Requirement**
Additional Comments/Notes ☐ *Minimum GPA requirements* ☐ *Other special notes*	**Additional Comments/Notes**
Grand Total Credit Count -	**Grand Total Credit Count -**

Please use the checklist to ensure that your submission has includes the following items:

- ☐ Relevant areas of Calendar Copy (Or complete if new proposal)
- ☐ Courses – Please Ensure the following:
  - All courses have an '**Active Status**'
  - Written Faculty Associations for each course
  - Correct Credit Value
  - Correct Course Rubric
  - Correct Course Number
  - Cross-listings (If applicable)
  - Integrations (only if application)
  - Confirmed updated information on courses / listings offered by another Faculty
- ☐ Effective Date
- ☐ All Degree Designation (s) / Credential (s) Changes clearly indicated for changes / new proposals
  - Please use a separate template for each degree designation for clarity purposes
- ☐ You have referenced the Current Published Academic Calendar
- ☐ Grand Total Credit Count Reflection (Equals the approved amount of credits required for graduation, for e.g., Grand Total Credit Count = 90 credits, etc.)
- ☐ Category Credit Values Requirements Clearly Outlined
- ☐ Supporting Documentation

<u>Types of Requirements:</u>

1) Admission Requirements:

Future Student: This is a generic text which will not be edited.

Current Students: This is the type for requirement that a currently enrolled student will need to get admitted into the program.

2) Continuing Requirements: This is the type of requirement that a student is required to stay enrolled in the program.
3) Graduation Requirements: This is the type of requirements that a student needs to complete to achieve that degree program.
4) General Education: The student is required to fulfill a specific number of courses from general education categories.
5) Major Requirements: A structured set of courses specifically designated for inclusion in the undergraduate program requirements, either mandatory or among a list of options for students to choose. May include or be in addition to core courses.
   a. Core Courses: Mandatory specified courses within an undergraduate program that provide a solid theoretical foundation and / or convey a common body of disciplinary knowledge and skills.
6) Streams – A structured set of courses with a particular focus within an Honours undergraduate degree program, to provide additional depth within the Major. Appears on the academic transcript but does not appear on the degree parchment.
7) Science Breath – Specific to the Faculty of Science and Faculty of Health
8) Practical – Practical requirements that a student needs to complete.
9) Outside the Major – This is the type of requirement that a student needs to complete with courses listed outside of the major program.

10) Elective – Also referred to as Free electives. Course(s) outside the prescribed set of program requirements, chosen by students and which count towards the total number of credits required for the degree
11) Bilingual – This is the type of language requirement that a student needs to fulfill within the above-mentioned credits (General Education, Major Requirements, etc).
12) Upper-level Requirement – This is the type of requirement that clearly states from the above-mentioned requirements, how many need to be from the 3000 and/ or 4000 level.

York University

Standard Minor Modifications to Existing Programs

TEMPLATE

Modifications to Existing Programs fall under Section 5 of the York University Quality Assurance Procedures (YUQAP).
Full YUQAP can be found here: https://www.yorku.ca/unit/yuqap/

STANDARD MINOR MODIFICATIONS USUALLY INCLUDE ONE OR MORE OF THE FOLLOWING FEATURES:

- ☐ Minor changes to degree or admission requirements
- ☐ The laddering or stacking of credentials or similar options
- ☐ Changes to the delivery mode in courses
- ☐ Substitutions or edits to course lists or requirements
- ☐ Minor changes to program titles
- ☐ Changes to existing emphasis, option or minor program
- ☐ Calendar copy corrections that are not editorial in nature, e.g., typos
- ☐ Revisions and/or updates to Program Learning Outcomes (PLOs) that do not change the substance of the PLOs
- ☐ Changes program name or nomenclature where there are no changes to PLOs
- ☐ Course changes – revisions, additions, deletions, repositioning, resequencing, etc. – where there are no changes to PLOs
- ☐ Changes in program requirements or sequencing where less than 1/3 of the program courses are affected
- ☐ Minor changes (changes to less than 1/3 of the program) to an existing minor, specialization, option, certificate, or WIL option (i.e., minor change to anything established through a major modification)
- ☐ Closure of any degree option, e.g. honours specialization

See the YUQAP website for further details, resources, and templates.

Minor Modification Proposal

Faculty: Science
Department: Mathematics and Statistics
Program: Actuarial Science
Degree Designation: BA Honours and BA Specialized Honours
Type of Modification: Standard Minor Modification
Location *(current campus and, if applicable, proposed)*: Keele
Effective Date: 2026
Approval Date at Faculty Council:

1. Describe the proposed modifications to the program.

The proposed modification is best described by comparison of the program tables below. We note that all the following courses (18 in total) are needed to cover the CIA's topics (this has led to increased course load in both the Specialized Honours BA and Honours BA):

MATH 1130 3.00, ECON 1000 3.00, ECON 1010 3.00
MATH 2030 3.00, MATH 2130 3.00, MATH 2131 3.00, MATH 2280 3.00, MATH 2281 3.00, ADMS 2500 3.00
MATH 3131 3.00, MATH 3280 3.00, MATH 3281 3.00, MATH 3333 3.00
MATH 4280 3.00, MATH 4281 3.00, MATH 4282 3.00, MATH 4331 3.00, MATH 4430 3.00

Also, because of increased course load, we propose to replace the sequence of linear algebra MATH 1021 3.00 and MATH 2022 3.00 (current version of the program) with the single course MATH 1025 3.00 (proposed version of the program). This is consistent with the Data Science curriculum and is thus not new.

Finally, the substitution of MATH 4130B 3.00 (current version of the program) with MATH 4331 3.00 is needed because of the change in course number put forward by the Statistics Section that owns the course, whereas the substitution of MATH 2310 3.00 (current version of the program) with MATH 2015 3.00 (proposed version of the program) is required because the former course is discontinued.

Current tables:

BA Specialized Honours – Current

Math/Stats Core: MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; ~~MATH 2310 3.00~~; ~~MATH 1021 3.00~~; ~~MATH 2022 3.00~~; MATH 1131 3.00; MATH 2030 3.00 - total 24 credits.

Major requirement: LE/EECS 1560 3.00; MATH 2001 3.00; MATH 2131 3.00; ~~MATH 2270 3.00~~; MATH 2280 3.00; MATH 2281 3.00; MATH 3131 3.00; ~~MATH 3132 3.00~~; MATH 3280 3.00; MATH 3281 3.00; MATH 3330 3.00; MATH 4280 3.00; MATH 4281 3.00; ~~MATH 4130B 3.00~~; ~~MATH 4143 3.00~~; MATH 4430 3.00 (or MATH 4431 3.00); 6 additional credits in Math/Stats that are at least at the 3000 level and at least 3 of these credits must be at the 4000 level (*).

Suggested electives: ECON 1000 3.00; ECON 1010 3.00; ECON 2300 3.00; ECON 2350 3.00; ECON 4400 3.00; ECON 4410 3.00 – total 18 credits.

GenEd requirements: AP/WRIT 1702 6.00 (HUMA) or both ESL 1010 3.00 and ESL 1015 3.00 (HUMA), AP/MODR 1770 6.00 (MODR); 12 additional credits with at least six credits from Social Science (no more than 9 credits in each subject counting towards the general education requirement)– total 24 credits.

	Fall Term	Winter Term
Year 1	MATH 1300 3.00 (core) MATH 1021 3.00 (core) MATH 1131 3.00 (core, Exam P of the SoA)	MATH 1310 3.00 (core) MATH 2022 3.00 (core) MATH 1200 3.00 (core)
	(GenEd – HUMA) ECON 1000 3.00 (suggested elective – VEE Economics of the SoA) ECON 1010 3.00 (suggested elective – VEE Economics of the SoA)	
Year 2	MATH 2030 3.00 (core, Exam P of the SoA) MATH 2280 3.00 (Exam FM of the SoA) MATH 2001 3.00 MATH 2310 3.00 (core) ECON 2300 3.00 (suggested elective, prerequisite to ECON 4400 3.00)	MATH 2131 3.00 (Exam P of the SoA) MATH 2281 3.00 (Exam IFM of the SoA) LE/EECS 1560 3.00 MATH 2270 3.00 ECON 2350 3.00 (suggested elective, prerequisite to ECON 4400 3.00)
Year 3	MATH 3131 3.00 (Exam STAM of the SoA) MATH 3280 3.00 (Exam LTAM of the SoA) MATH 3330 3.00 MATH 4430 3.00 or MATH 4431 3.00 (Exam LTAM of the SoA) ECON 4400 3.00 (suggested elective, VEE Corporate Finance of the SoA)	MATH 3132 3.00 (Exam STAM of the SoA) MATH 3281 3.00 (Exam LTAM of the SoA) ECON 4410 3.00 (suggested elective, VEE Corporate Finance of the SoA)
	AP/MODR 1770 6.00 (GenEd – MODR) or AP/MODR 1790 6.00 (GenEd – MODR, ESL)	
Year 4	MATH 4280 3.00 (Exam STAM of the SoA) MATH 4130B 3.00 MATH 4143 3.00	MATH 4281 3.00 (Exam STAM of the SoA)
	Six MATH credits at 3000 level or higher, **at least three** of which are at 4000 level **Twelve** additional credits in GenEd courses	

BA Honours – Current

Math/Stats Core: MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; ~~MATH 2310 3.00~~; ~~MATH 1021 3.00; MATH 2022 3.00~~; MATH 1131 3.00; MATH 2030 3.00 - total 24 credits.

Major requirement: LE/EECS 1560 3.00; MATH 2131 3.00; MATH 2280 3.00; MATH 2281 3.00; MATH 3131 3.00; ~~MATH 3132 3.00~~; MATH 3280 3.00; MATH 3281 3.00; MATH 3330 3.00; MATH 4280 3.00; MATH 4281 3.00; ~~MATH 4130B 3.00~~; MATH 4430 3.00 (or MATH 4431 3.00).

Suggested electives: ECON 1000 3.00; ECON 1010 3.00; ~~ECON 2300 3.00~~; ~~ECON 2350 3.00~~; ECON 4400 3.00; ECON 4410 3.00 – total 18 credits.

GenEd requirements: AP/WRIT 1702 6.00 (HUMA), AP/MODR 1770 6.00 (MODR), 12 additional credits with at least six credits from Social Science (no more than 9 credits in each subject counting towards the general education requirement)– total 24 credits.

	Fall Term	Winter Term
Year 1	MATH 1300 3.00 (core) MATH 1021 3.00 (core) MATH 1131 3.00 (core, Exam P of the SoA)	MATH 1310 3.00 (core) MATH 2022 3.00 (core) MATH 1200 3.00 (Year) (core)
	AP/WRIT 1702 6.00 (GenEd – HUMA) ECON 1000 3.00 (suggested elective – VEE Economics of the SoA) ECON 1010 3.00 (suggested elective - VEE Economics of the SoA)	
Year 2	MATH 2030 3.00 (core, Exam P of the SoA) MATH 2280 3.00 (Exam FM of the SoA) MATH 2310 3.00 (core) ECON 2300 3.00 (suggested elective, prerequisite to ECON 4400 3.00)	MATH 2131 3.00 (Exam P of the SoA) MATH 2281 3.00 (Exam IFM of the SoA) LE/EECS 1560 3.00 ECON 2350 3.00 (suggested elective, prerequisite to ECON 4400 3.00)
	Six additional credits in GenEd courses	
	MATH 3131 3.00 (Exam C of the SoA)	MATH 3132 3.00 (Exam STAM of the SoA)

Year 3	MATH 3280 3.00(Exam LTAM of the SoA) MATH 3330 3.00 MATH 4430 3.00 or MATH 4431 3.00 (Exam LTAM of the SoA) ECON 4400 3.00 (suggested elective, VEE of the SoA)	MATH 3281 3.00 (Exam LTAM of the SoA) ECON 4410 3.00 (suggested elective, VEE of the SoA) MATH 3XYZ 3.00 or MATH 4XYZ 3.00
	Three additional credits in GenEd, elective or MATH courses without the second digit 5	
Year 4	MATH 4280 3.00 (Exam STAM of the SoA) MATH 4130B 3.00	MATH 4281 3.00 (Exam STAM of the SoA)
	Twenty-one additional credits in GenEd, elective or MATH courses at 3000 level or higher with a total of 24 GenEd credits and 36 credits at 3000 level or higher	

BA Specialized Honours – New (courses in red are newly added)

Math/Stats Core: MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; MATH 2015 3.00; MATH 1025 3.00; MATH 1131 3.00; MATH 2030 3.00 - total 21 credits.

Major requirement: LE/EECS 1560 3.00; MATH 1130 3.00; MATH 2001 3.00; MATH 2130 3.00; MATH 2131 3.00; MATH 2280 3.00; MATH 2281 3.00; MATH 3131 3.00; MATH 3280 3.00; MATH 3281 3.00; MATH 4282 3.00; MATH 3283 3.00 (or MATH 3284 3.00); MATH 3330 3.00; MATH 3333 3.00; MATH 4280 3.00; MATH 4281 3.00; MATH 4331 3.00; MATH 4430 3.00 (or MATH 4431 3.00); MATH 4283 3.00 (or MATH 4284 3.00) – total 57 credits.

Suggested electives: ECON 1280 3.00; ECON 1000 3.00; ECON 1010 3.00; ECON 4400 3.00; ECON 4410 3.00; ADMS 2500 3.00 – total 18 credits.

GenEd requirements: AP/WRIT 1702 6.00 (HUMA) or both ESL 1010 3.00 and ESL 1015 3.00 (HUMA), AP/MODR 1770 6.00 (MODR); 12 additional credits with at least six credits from Social Science (no more than 9 credits in each subject counting towards the general education requirement) – total 24 credits.

	Fall Term	Winter Term
Year 1	MATH 1300 3.00 MATH 1130 3.00 (CIA) MATH 1131 3.00 (Exam P of the SOA) ECON 1280 3.00 (Recommended Elective) ECON 1000 3.00 (Recommended Elective, CIA, VEE of the SOA)	MATH 1310 3.00 MATH 1025 3.00 MATH 1200 3.00 ADMS 2500 3.00 (Recommended Elective, CIA, VEE of the SOA) ECON 1010 3.00 (Recommended Elective, CIA, VEE of the SOA)
Year 2	MATH 2030 3.00 (CIA, Exam P of the SOA) MATH 2280 3.00 (CIA, Exam FM of the SOA) MATH 2001 3.00 MATH 2015 3.00	MATH 2131 3.00 (CIA, Exam P of the SOA) MATH 2281 3.00 (CIA) LE/EECS 1560 3.00 MATH 2130 3.00 (CIA)
	WRIT 1702 6.00 or AP/ESL 1010/1015 (General Education, Humanities)	
Year 3	MATH 3131 3.00 (CIA, VEE of the SOA) MATH 3280 3.00 (CIA, Exams FAM-L, some of ALTAM of the SOA) MATH 3330 3.00 (Exam SRM of the SOA) ECON 4400 3.00 (Recommended Elective, VEE of the SOA) MATH 4430 3.00 or MATH 4431 3.00 (CIA)	MATH 3283 3.00 or MATH 3284 3.00 MATH 3281 3.00 (CIA, Exams FAM-L, some of ALTAM of the SOA) ECON 4410 3.00 (Recommended Elective, VEE of the SOA)
	MODR 1770 6.00 (General Education, Modes of Reasoning)	

Year 4	MATH 4280 3.00 (CIA, Exam FAM-S, ASTAM of the SOA) MATH 4331 3.00 (CIA, Exam SRM of the SOA) MATH 4282 3.00 (CIA, Exam ALTAM of the SOA)	MATH 4281 3.00 (CIA, Exam FAM-S, ASTAM of the SOA) MATH 3333 3.00 (CIA, Exam SRM of the SOA) MATH 4283 3.00 or MATH 4284 3.00 (Some of CAS Exam 5)
	Twelve additional credits in General Education	

BA Honours – New (courses in red are newly added)

Math/Stats Core: MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; MATH 2015 3.00; MATH 1025 3.00; MATH 1131 3.00; MATH 2030 3.00 - total 21 credits.

Major requirement: LE/EECS 1560 3.00; MATH 1130 3.00; MATH 2130 3.00; MATH 2131 3.00; MATH 2280 3.00; MATH 2281 3.00; MATH 3131 3.00; MATH 3280 3.00; MATH 3281 3.00; MATH 4282 3.00; MATH 3330 3.00; MATH 3333 3.00; MATH 4280 3.00; MATH 4281 3.00; MATH 4331 3.00; MATH 4430 3.00 (or MATH 4431 3.00); MATH 4283 3.00 (or MATH 4284 3.00); two additional courses 6 credits – total 57 credits.

Suggested electives: ECON 1000 3.00; ECON 1010 3.00; ECON 4400 3.00; ECON 4410 3.00; ADMS 2500 3.00; one additional elective 3 credits – total 18 credits.

GenEd requirements: AP/WRIT 1702 6.00 (HUMA) or both ESL 1010 3.00 and ESL 1015 3.00 (HUMA), AP/MODR 1770 6.00 (MODR); 12 additional credits with at least six credits from Social Science (no more than 9 credits in each subject counting towards the general education requirement) – total 24 credits.

	Fall Term	Winter Term
Year 1	MATH 1300 3.00 MATH 1130 3.00 (CIA) MATH 1131 3.00 (Exam P of the SOA) ECON 1000 3.00 (Recommended Elective, CIA, VEE of the SOA)	MATH 1310 3.00 MATH 1025 3.00 MATH 1200 3.00 ADMS 2500 3.00 (Recommended Elective, CIA, VEE of the SOA) ECON 1010 3.00 (Recommended Elective, CIA, VEE of the SOA)
Year 2	MATH 2030 3.00 (CIA, Exam P of the SOA) MATH 2280 3.00 (CIA, Exam FM of the SOA) MATH 2015 3.00	MATH 2131 3.00 (CIA, Exam P of the SOA) MATH 2281 3.00 (CIA) LE/EECS 1560 3.00 MATH 2130 3.00 (CIA)
	WRIT 1702 6.00 or AP/ESL 1010/1015 (General Education, Humanities)	
Year 3	MATH 3131 3.00 (CIA, VEE of the SOA) MATH 3280 3.00 (CIA, Exams FAM-L, some of ALTAM of the SOA) MATH 3330 3.00 (Exam SRM of the SOA) ECON 4400 3.00 (Recommended Elective, VEE of the SOA) MATH 4430 3.00 or MATH 4431 3.00 (CIA)	MATH 3281 3.00 (CIA, Exams FAM-L, some of ALTAM of the SOA) ECON 4410 3.00 (Recommended Elective, VEE of the SOA)
	MODR 1770 6.00 (General Education, Modes of Reasoning)	
Year 4	MATH 4280 3.00 (CIA, Exam FAM-S, ASTAM of the SOA) MATH 4331 3.00 (CIA, Exam SRM of the SOA) MATH 4282 3.00 (CIA, Exam ALTAM of the SOA)	MATH 4281 3.00 (CIA, Exam FAM-S, ASTAM of the SOA) MATH 3333 3.00 (CIA, Exam SRM of the SOA) MATH 4283 3.00 or MATH 4284 3.00 (Some of CAS Exam 5)
	Twelve additional credits in General Education	

2. Provide a rationale for the proposed modifications.

York University's Actuarial Science program was recognized as a Centre of Actuarial Excellence (CAE) by the Society of Actuaries in January 2025 — the highest distinction awarded to actuarial programs worldwide.

Building on this achievement, we intentionally launched the Canadian Institute of Actuaries (CIA) accreditation process for September 2025 to capitalize on the momentum and comprehensive preparation undertaken for the CAE designation. Using essentially the same application package allows us to streamline the process and maximize the benefits of these closely timed initiatives. This Canadian accreditation is of significant importance to our program, the Faculty, and York University as a whole, as it will enable our students to obtain the Associate of the CIA (ACIA) designation more efficiently, without the need to complete numerous professional exams.

Once this accreditation is achieved, York's Actuarial Science program will provide students with the same level of professional recognition as other leading Canadian and international programs, including those at the University of Toronto and the University of Waterloo.

This request for a minor program modification is intended to align our program requirements with those of the CIA, ensures that our students fully benefit from this upcoming accreditation, and ultimately increases enrolment in the program.

3. How will the proposed modification support the achievement of Program Learning Outcomes?

Below are the Program Learning Outcomes as listed in the 2020/2021 cyclical review. Each of these outcomes will be strengthened by the proposed minor modification, with brief illustrations provided for each in red.

A. Depth and Breadth of Knowledge

Integrate knowledge acquired in all (Actuarial) Mathematics, Statistics, Economics, and Mathematical Finance to pose relevant questions, formulate and solve problems, apply methodologies across a wide range of distinct sub-areas of Actuarial Science (also, more generally, in Quantitative Risk Management (QRM)) such as corporate finance and enterprise risk management, quantitative finance and investment, life and annuity, general insurance., etc.

Depth of Knowledge: In the proposed version of the program, we have achieved full coverage of the actuarial curriculum across both life insurance and property & casualty insurance by adding MATH 4282 and MATH 4283 (offered in alternating years with MATH 4284). These new courses have been approved by the Faculty Council earlier..

Breadth of Knowledge: In the proposed version of the program, we have expanded the curriculum to include innovative courses like Economics of Insurance and Decision Making under Risk (MATH 3283 3.00) and Climate Risk Management (MATH 3284 3.00), broadening students' perspectives and understanding of emerging topics. These new courses have been approved by the Faculty Council earlier.

B. Knowledge of Methodologies

a. Rigorously analyze proposed actuarial set-ups, assumptions, and arguments; develop supporting arguments and counterexamples at the appropriate level tailored for an appropriate audience.
b. Analyze, develop, validate, and interpret actuarial models using appropriate concepts and methods from (Actuarial) Mathematics, Statistics, Economics, and Mathematical Finance.
c. Analyze, develop, test, and interpret linear and non-linear statistical inferences using appropriate concepts and methods in Statistics.
d. Effectively employ technology – including scientific computing software and coding – to investigate Actuarial Science problems and implement solutions to these problems.
e. Analyze set-ups, assumptions, and arguments in Actuarial Science, and more generally in QRM, develop and test solutions by using the – somewhat alternative to Actuarial Science - approach inspired by the microeconomic principles underlying financial markets and instruments, as well as by the macroeconomic role of Actuarial Science.

Adding courses to cover key subject areas creates more opportunities for in-depth discussions about specific actuarial methods and approaches. For example, with three courses now dedicated to the mathematics of life contingencies (MATH 3280 3.00, MATH 3281 3.00, and MATH 4282 3.00), we are able to explore, e.g., the implications of stochastic dependence for life insurance and annuity pricing and reserving, as well as the topics of pension valuations, and insurance-linked securities.

C. Application of Knowledge

Evaluate the appropriateness of distinct approaches to solving problems in Actuarial Science and, more generally, in QRM.

As noted in B above, adding courses to cover key subject areas creates more opportunities to explore practical applications of the material. In addition, the revised program allows time to invite external speakers — practicing actuaries — to present on real-world actuarial problems they address in their day-to-day work.

D. Communication Skills

Communicate actuarial/mathematical/statistical assumptions, concepts, models, reasoning, explanations, interpretations, solutions, and recommendations clearly to multiple audiences in multiple forms, including oral, written, and visually.

In addition to the existing courses that develop communication skills, ECON 1280 3.00, MATH 3283 3.00, MATH 3284 3.00, MATH 4283 3.00, and MATH 4284 3.00 include a group written report to strengthen students' writing abilities, while interactions with external speakers provide valuable opportunities to practice and refine oral communication skills.

E. Awareness of Limits of Knowledge

Recognize the limits of the person's knowledge of Actuarial Science, the limits of Actuarial Science today as a discipline, as well as distinguish between what Actuarial Science inherently cannot accomplish and what it might be able to achieve in the future with advances of scientific methodologies and computing.

This is significantly improved through explicit exploration of the limits of actuarial knowledge in new courses, e.g., insurability of climate risks (MATH 3284 3.00), rationality of insureds (MATH 3283 3.00), longevity risk modelling and ESG investment (MATH 4282 3.00).

F. Autonomy and Professional Capacity

a. Work independently and in collaborations to learn and present new material, as well as to identify relevant material not included.
b. Identify and describe some of the current professional and ethical issues and challenges with Actuarial Science, as well as related ones in Data Science and Quantitative Methods.

This is also significantly improved through group projects in ECON 1280 3.00, MATH 3283 3.00, MATH 3284 3.00, MATH 4283 3.00, and MATH 4284 3.00, all but the first one of these courses are new and have been approved by the Faculty Council earlier.

4. Describe how students currently enrolled in the program will be accommodated.

Currently enrolled students will be allowed to complete their degrees based on the program requirements in effect at the time of their admission.

5. Describe any resource implications and how they are being addressed (e.g., through a reallocation of existing resources). If new/additional resources are required, provide a statement from the relevant Dean(s)/Principal confirming resources will be in place to implement the changes.

No new resource implications, as all the new courses have already been approved by Faculty Council.

6. If relevant, summarize the consultation undertaken with relevant academic units, including commentary on the impact of the proposed changes on other programs. Provide individual statements from the relevant program(s) confirming consultation and their support.

Not relevant.

APPENDIX

Attach a Side-by-Side Academic Calendar Copy Comparison

Ensure that deletions are indicated with strikethrough (e.g., ~~strikethrough~~) text and additions are made in a contrasting colour (e.g., KINE 1000)

Specialized Honours BA

Current Calendar Copy:	**Proposed Calendar Copy:**
MAJOR REQUIREMENTS AP/WRIT 1702 6.00, or AP/ESL 1010 3.00 and AP/ESL 1015 3.00 (Note: these courses may be used towards the humanities category of the Bachelor of Arts General Education requirement.) AP/MODR 1770 6.00 (Note: This course may be used towards the Bachelor of Arts General Education requirement.) LE/EECS 1560 3.00 the mathematics/statistics core (24 credits): MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; ~~MATH 2310 3.00~~; ~~MATH 1021 3.00~~; ~~MATH 2022 3.00~~; MATH 1131 3.00; MATH 2030 3.00 SC/MATH 2001 3.00; SC/MATH 2131 3.00; ~~SC/MATH 2270 3.00~~; SC/MATH 2280 3.00; SC/MATH 2281 3.00 SC/MATH 3131 3.00; ~~SC/MATH 3132 3.00~~; SC/MATH 3280 3.00; SC/MATH 3281 3.00; SC/MATH 3330 3.00	**MAJOR REQUIREMENTS** AP/WRIT 1702 6.00, or AP/ESL 1010 3.00 and AP/ESL 1015 3.00 (Note: these courses may be used towards the humanities category of the Bachelor of Arts General Education requirement.) AP/MODR 1770 6.00 (Note: This course may be used towards the Bachelor of Arts General Education requirement.) LE/EECS 1560 3.00 the mathematics/statistics core (21 credits)**:** MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; MATH 2015 3.00; MATH 1025 3.00; MATH 1131 3.00; MATH 2030 3.00 MATH 1130 3.00; MATH 2001 3.00; MATH 2130 3.00; MATH 2131 3.00; MATH 2280 3.00; MATH 2281 3.00; MATH 3131 3.00; MATH 3280 3.00; MATH 3281 3.00; MATH 4282 3.00; MATH 3283 3.00 (or MATH 3284 3.00); MATH 3330 3.00; MATH 3333 3.00; MATH 4280 3.00; MATH 4281 3.00; MATH 4331

~~SC/MATH 4130B 3.00~~; ~~SC/MATH 4143 3.00~~; SC/MATH 4280 3.00; SC/MATH 4281 3.00; SC/MATH 4430 3.00 or SC/MATH 4431 3.00 additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or above, at least 18 of which must be at the 4000 level. In addition, students should take the following courses as electives: AP/ECON 1000 3.00, AP/ECON 1010 3.00 for the 'Economics' VEE; and ~~AP/ECON 2300 3.00~~, ~~AP/ECON 2350 3.00~~, AP/ECON 4400 3.00, AP/ECON 4410 3.00 for the 'Corporate Finance' VEE. Note that to be granted VEE credit from the Society of Actuaries, students must achieve a grade of B or higher in each VEE requirement.	3.00; MATH 4430 3.00 (or MATH 4431 3.00); MATH 4283 3.00 (or MATH 4284 3.00) – total 54 credits. In addition, students should take the following courses as electives: ECON 1280 3.00; ECON 1000 3.00; ECON 1010 3.00 for the Economics VEE); ECON 4400 3.00; ECON 4410 3.00 (for the Finance VEE); ADMS 2500 3.00 (for the Accounting VEE); one addition 3.00 elective – total 18 credits.

Bachelors BA

Current Calendar Copy: **MAJOR REQUIREMENTS** AP/WRIT 1702 6.00, or AP/ESL 1010 3.00 and AP/ESL 1015 3.00 (Note: these courses may be used towards the humanities category of the Bachelor of Arts General Education requirement.)	**Proposed Calendar Copy:** **MAJOR REQUIREMENTS** AP/WRIT 1702 6.00, or AP/ESL 1010 3.00 and AP/ESL 1015 3.00 (Note: these courses may be used towards the humanities category of the Bachelor of Arts General Education requirement.)

• AP/MODR 1770 6.00 (Note: This course may be used towards the Bachelor of Arts General Education requirement.) • LE/EECS 1560 3.00 • the mathematics/statistics core (24 credits): MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; ~~MATH 2310 3.00~~; ~~MATH 1021 3.00~~; ~~MATH 2022 3.00~~; MATH 1131 3.00; MATH 2030 3.00 • SC/MATH 2131 3.00; SC/MATH 2280 3.00; SC/MATH 2281 3.00 • SC/MATH 3131 3.00; ~~SC/MATH 3132 3.00~~; SC/MATH 3280 3.00; SC/MATH 3281 3.00 • SC/MATH 3330 3.00 • ~~SC/MATH 4130B 3.00~~; SC/MATH 4280 3.00; SC/MATH 4281 3.00; SC/MATH 4430 3.00 or SC/MATH 4431 3.00 • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or above, at least 18 of which must be at the 4000 level.	• AP/MODR 1770 6.00 (Note: This course may be used towards the Bachelor of Arts General Education requirement.) • LE/EECS 1560 3.00 • the mathematics/statistics core (21 credits)**:** MATH 1200 3.00; MATH 1300 3.00; MATH 1310 3.00; MATH 2015 3.00; MATH 1025 3.00; MATH 1131 3.00; MATH 2030 3.00 • MATH 1130 3.00; MATH 2001 3.00; MATH 2130 3.00; MATH 2131 3.00; MATH 2280 3.00; MATH 2281 3.00; MATH 3131 3.00; MATH 3280 3.00; MATH 3281 3.00; MATH 4282 3.00; MATH 3330 3.00; MATH 3333 3.00; MATH 4280 3.00; MATH 4281 3.00; MATH 4331 3.00; MATH 4430 3.00 (or MATH 4431 3.00); MATH 4283 3.00 (or MATH 4284 3.00) – total 51 credits. • In addition, students should take the following courses as electives: ECON 1280 3.00; ECON 1000 3.00; ECON 1010 3.00 for the Economics VEE); ECON 4400 3.00; ECON 4410 3.00 (for the Finance VEE); ADMS 2500 3.00 (for the Accounting VEE); one addition 3.00 elective – total 18 credits. • additional elective credits, as required for an overall total of at least 120 credits, of which at least 36 credits are at the 3000 level or above, at least 18 of which must be at the 4000 level.

Changes to Existing Course

Faculty: Science

Department: Bethune College

Date of Submission: September 4, 2025

Course Number: BC 1800

Effective Session: FW26

Course Title: First-Year Success Seminar

Type of Change:

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

Change From:	**To:**
SC/BC 1800 3.00 First-Year Success Seminar This course is designed to help students gain the knowledge, skills, and resourcefulness they will need to be successful students at York University. The course will help students adapt to their Faculty and university by providing academic skills training, peer-peer connections and a sense of university culture. Students will develop skills and individualized learning plans that will help them be successful throughout their time as a student at York. Using the in-class and online environment, students will apply their knowledge through activities, discussions and interactions with staff, faculty and peers.	SC/BC 1800 3.0 Skills for Success This course is designed to help students develop the academic buoyancy needed to thrive in the university setting. This course will help students build confidence, coordination, control, composure and commitment to their learning, by strengthening skills such as time management, note taking, study habits, managing stress, and self-esteem. Students will develop individualized learning plans that will help them find their success and participate in activities, discussions and interactions with staff, faculty and peers. Two lecture hours and one two hour tutorial per week. One Term. Three Credits.

Rationale:

To support students who may be underprepared for the transition to university, the Faculty of Science, through Bethune College, has offered a for-credit learning skills course—**BC 1800**—since 2015. The course is designed to help students develop academic habits, time management strategies, and other foundational skills linked to student success. It is typically recommended during advising to students identified as "high risk," but until now, little was known about how well this targeting aligns with actual need or long-term outcomes.

Last year, Andrew Skelton conducted a longitudinal study using nearly a decade of BC 1800 data to explore who gets recommended, who participates, and who benefits. The study looked not just at academic outcomes like GPA and retention, but also at how factors like grade background, age, gender, and prior schooling influence who gets into the course—and who benefits from it. The aim was to understand whether BC 1800 is actually reaching the students who need it most, and whether those students are getting something meaningful out of the experience.

The full report is provided along side this proposal, but in the spirit of TL; DR, the conclusions were:

- Does BC 1800 work? Yes.
  - Engagement in the course associated with decreased risk of attrition
  - The strength of the benefit is relatively small
  - Effect restricted to students with low incoming admission grades
- Is enrollment aligned with risk? No.
  - Advising recommendations heavily driven by missing high school prerequisites
  - The greatest risk factor for students is incoming grades
  - It is very difficult to know who is truly at risk with the knowledge at hand
- Not enough students participate in BC 1800 intervention
  - Need larger and better aligned cohorts to truly test effect of course
  - The course is not cost-effective as currently mounted

After discussion with Bethune College Head Paula Wilson, and past and present Bethune College Academic Coordinators Andrew Skelton, Tanya Da Sylva and Christopher Jang, Director of Student Eva Hughes, and AD Students Michael Scheid, it was decided that the best solution involved reimagining this course as a `bounce-back' support similar to the FND 1000: Fundamentals of Learning: Essentials for a Successful University Experience run in LA&PS.

This course will be made available as a 'bounce back' option in the Fall of second year to students who proven themselves to be at risk, defined as:

- Students with <2.5 GPA on 24 credits taken and are Required to Withdraw for a year can be allowed to continue without interruption if they enroll and stay enrolled in this course
- Remaining seats can be filled by students with <4.0 GPA on 24 credits taken who are placed on Academic Warning – there is no 'carrot' for such students beyond a recommendation that this course can help- incoming GPA can be used as a factor here for stronger recommendations.

FORMAT CHANGE

The format of the course is currently 1 section mounted in the Y semester with an average yearly enrollment of 24. The proposed format of the course is 1 section mounted in the F semester with a capacity of 100 students. We are proposing to add tutorials to the course, normally offering 4 tutorial sections, each with 25 students. A Resource Implication Form has been submitted with this proposal to justify the additional resources. One of the main features of this type of course in the pedagogical literature is small group discussion and individual mentorship, so the addition of tutorials will allow the program to scale up to reach more students.

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.

FS Resource Implications Form Unit: Bethune College Date: September 4/25

		Course Modified: BC 1800	
Complete Course Designation		SC/BC 1800: First-Year Success Seminar 3.0	SC/BC 1800: Skills for Success 3.0
Enrolment (Estimate or Last Offering)		Capacity: 48 Average Yearly Enrollment: 24 2025 Enrollment: 12	Capacity: 100
Number of:	**Lecture Sections:**	1 x 0.5 FCE	1 x 0.5 FCE
	Lab Sections:	0	0
	Tutorial Sections:	0	4
Number of:	**Course Coordinators (Tutor 1):**	0	4 x 0.5
	Lab Demonstrators (Tutor 2):	0	0
	Mark/Graders (Tutor 3):	0	150 h
Prerequisites (P) Corequisites (C) Credit Exclusions (E)		None	None
For which degree program is this required (if applicable)?		This is not required for any degree, but was recommended to students deemed at-risk in their advising intake appointment.	This is not required for any degree, but see the attached course change form to see how it will be recommended to students.
Other resource implications (please specify)		This course has traditionally been hosted from of the Bethune College Office of the Head space	Additional classrooms will be needed and will need to be assigned centrally
Cost Analysis		YUFA Overload Rate: $12,625 From the historical analysis of BC 1800, it was found that for students with Very Low incoming grades (<77.5 high school grade or <4 equivalent GPA), there was a decrease in attrition rates from 57% to 36%, which, given an average of 12 students in this category every year, represented the retention of an average of 2.4 students per year given historical enrollment demographics. Only 1 retained student is needed to pay for this intervention, so the program pays for itself in its current form.	YUFA Overload Rate: $12,625 CUPE Tutor 1 Cost: 4 x $3,827 CUPE Tutor 3 Cost: $6,516 With the additional cost, we would only need to retain 2 students to break even (from a minimum enrollment of 10, assuming the same retention benefit). In FW24, there were 99 students with <2.5 GPA on 24 credits Required to Withdraw, many of whom currently leave the university because they have no viable path back, plus additional students on Academic Warning. The program will most definitely pay for itself, and likely stands to earn money for the faculty.

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty: Indicate all relevant Faculty(ies)	SCIENCE
Department: Indicate department and course prefix (e.g. Languages, GER)	Division of Natural Science (NATS)
Date of Submission:	May 23, 2025
Course Number: Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is "C")	NATS 1661
Var:	
Academic Credit Weight: Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6	3
Course Title: The official name of the course as it will appear in the Undergraduate Calendar and on the Repository	Mating in the Natural World
Short Title: Appears on any documents where space is limited - e.g. transcripts and lecture schedules - **maximum 40 characters**	Mating in the Natural World

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

Brief Course Description:

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

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

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

Mating in the Natural World explores the many ways animals — including humans — reproduce through sex, and the sometimes surprising effects this has on their bodies and behaviours. The course examines a wide range of species to better understand how and why different mating strategies evolve, how physical traits are inherited and develop, the pros and cons of sexual versus asexual reproduction, and how mate choice and competition shape behaviour. Finally, the course compares different mating systems, from monogamy to more common non-monogamous patterns seen in nature.

Course Credit Exclusions: SC/NATS 1610 6.00, SC/NATS 1660 6.00, SC/NATS 1675 6.00, SC/NATS 1680 6.00, SC/NATS 1690 6.00. NCR: any student who has passed or is taking SC/BIOL 1000 3.00 or SC/BIOL 1001 3.00.

Generic Course Description:

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

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

Expanded Course Description:

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

A. Course Outcomes and Learning Objectives

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

- Explain various aspects of sexual reproduction and evolution using the language of the field, including inheritance, natural and sexual selection, and mating systems and parental care
- Compare theories, test hypotheses, and evaluate costs and benefits pertaining to sexual conflict and resolution and how reproduction shapes behaviour and development.
- Identify big ideas from scientific studies and formulate evidenced-based arguments to explain evolutionary changes and mating strategies.
- Evaluate diverse methodological approaches to studying mating.
- Analyze scientific data from sexual reproduction research, learning to interpret graphs and datasets and to assess whether evidence supports key hypotheses, like sexual selection or co-evolved behaviours, building strong skills in scientific reasoning and interpretation.

B. Selected Topics

1. **Review of fundamentals and introduction**
   The course begins with foundational concepts: the nature of science, approaches to explaining behaviour, and systems of biological classification. Graph interpretation is introduced, along with terminology related to sex and mating, including the fundamental differences between egg and sperm in reproduction.

2. **Plant sex and Mendel's experiments in reproduction**
   Plants reproduce sexually, with flower structures and pollination systems shaped by coevolution with animals. Mendel's pea plant experiments provide the foundation for understanding inheritance, illustrating how traits pass between generations and how plants contributed to the early development of genetic science.

3. **Mendel's two laws of inheritance in species that mate**
   Mendel's pioneering pea plant studies established key principles of inheritance. The Law of Segregation and the Law of Independent Assortment are introduced, along with the Punnett Square as a tool for predicting genetic outcomes and understanding how traits are transmitted in sexually reproducing species.

4. **Sex linkage and Sex determination**
   Systems of sex determination, both genetic and environmental, are surveyed, with particular focus on mammals. The role of the Y chromosome in determining sex is highlighted. Patterns of sex-linked inheritance are examined, including the transmission of sex-linked traits and diseases across generations.

5. **Evolution of mating**
   The evolutionary role of sex and mating is explored through principles of natural selection and genetic mutation. Both costs and benefits of sexual reproduction are considered, along with the role of sex in driving adaptation, increasing diversity, and facilitating the emergence of new species.

6. **Mating and the changing gene pool**
   Evolution is understood as change in a gene pool. Population genetics is introduced with Hardy-Weinberg Equilibrium, representing conditions of no change. The influence of mating patterns on disrupting equilibrium and driving evolutionary processes is emphasized, showing how reproduction shapes genetic diversity within populations.

7. **Sexual selection: Mate choice and same-sex competition**
   Sexual selection is presented as a major evolutionary force. Concepts of mate choice and same-sex competition are analyzed, alongside hypotheses such as good genes, runaway selection, and resource-based selection. Examples illustrate how non-random mating shapes traits, reproductive strategies, and disparities in reproductive investment between sexes.

8. **Sexual conflict in mating**
   Sexual conflict arises when male and female reproductive strategies diverge. Conflict is considered at stages from courtship to parenting, with emphasis on mechanisms such as sperm competition and female cryptic choice. Evidence for sexually antagonistic co-evolution is highlighted as a driver of evolutionary change.

9. **Mating systems: Monogamy and Non-monogamy**
   Mating systems are examined in relation to reproductive strategies, sexual selection, and conflict. Monogamy is contrasted with polygyny, polyandry, and promiscuity. Theories such as resource defense, mate defense, reproductive skew, and the polygyny threshold model are introduced, along with cooperative breeding and variations in parental care.

Exercises to support lecture material:

- Creating a dichotomous key
- Pedigree analysis exercise
- Mendelian genetics problem sets
- Sex Linkage problem sets
- Transcription and translation: How DNA makes organisms
- Creation of an evolutionary tree
- Patterns of inheritance at the gene pool level

Course Design:

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

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

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

The course supports the achievement of learning objectives by means of face-to-face communication with the Course Director during lecture hours and drop-in office hours, and with TAs during weekly drop-in tutorial sessions for assistance with the ten weekly exercises. Lectures may be designed on, or partly on, a flipped classroom model, given that there will likely be a course textbook for assigned readings. The use of case studies in lecture material, as well as assigned textbook readings, will supplement the theoretical and other in-lecture material.

Instruction:

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

1. This 3-credit, 12-week course could be offered once or twice a year, preferably in the Fall or Winter terms, although there is nothing in its design to prevent if from also or alternatively being offered in the Summer term, either on a normal schedule or a twice-as-fast schedule. It does not have to be coordinated with any other courses, given there are no lab requirements, and it is not part of any prerequisite scaffolding.

2. This course could be taught by at least 3 faculty members including Alex Mills, Jill Lazenby, and Tanya De Silva.

3. Professor Alex Mills taught the 6-credit NATS 1660 *Biology of Sex* course many times between 2009 and 2025, and there is some overlap in material between the two. He also authored the textbook *Biology of Sex* (University of Toronto Press, 2018), which is designed to support courses for undergraduate non-science students. Accordingly, Alex Mills is the professor most likely to teach it if it is offered in FW26.

4. (a) Three lecture hours per week, (b) one or more drop-in or digital tutorials per week, and (c) at least one Course Director office hour per week.

Note: On average, students will be required to do about three hours of preparation per week for each class, divided between assigned or

recommended readings and completing exercises related to lecture material taught.

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.)

Mark Breakdown

- Ten weekly exercises (3% each; 2nd through 11th weeks) 30%
- Mid-term test #1 (mix multiple choice & short answer) 15%
- Mid-term test #2 (mix multiple choice & short answer) 20%
- Final exam (cumulative; multiple choice & short answer) 35%

The exercises will be delivered via eClass. They will be posted two weeks in advance of their due dates. They will be changed from year-to-year to minimize plagiarism, and they will be checked with AI detection software where appropriate. They may be submitted through an eClass portal or in hard copy, depending upon TA support and TA preferences. The Mid-term tests and Final exam will be conducted in-person, with invigilation.

The Course Director will be available weekly during course office hours to assist with lecture material. The course TA or TAs will be available through in-person or digital office hour(s) for assistance with the ten weekly exercises.

The Midterm Test and the Final Exam will thoroughly assess all the course material, and assess mainly the student's depth and breadth of knowledge of the course topics, including the assessment of outcomes set out above.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

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

Also please list any online resources.

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

LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.

This course is designed to have a recommended text, but to provide sufficient in-course materials through lectures and postings on eClass to allow student to be proficient without the text if they so choose.

The most likely recommended text:

Mills, Alex. 2018. Biology of Sex. University of Toronto Press. ISBN: 978-1-4875-9337-7

This is a ten-chapter, 411-page book that was published to support courses of this type for non-majors students. It was the course text for all offerings of NATS 1660 6.0 *Biology of Sex* beginning since FW19. Eight of its ten chapter titles match the weekly themes proposed (Introduction; Sex and reproduction; Sex and inheritance; Sex and evolution; Sexual selection; Mating systems; Sexual conflict; Sex determination and differentiation) match the weekly themes proposed for this 3-credit version of the course. Not all material in each chapter will be covered in the course, since there are half as many contact hours proposed in this 3-credit version in contrast to the 6-credict version.

As this is a general education science course for non-science students, this resource will be more than enough to support the achievement of the learning outcomes, and it is likely to remain current for this level of analysis for several more years. Each session, multiple copies of this textbook could be placed on reserve in Steacie Library.

There are other resources available in the digital commons that support this subject matter. For example:

Bastawros, H. 2023. Human reproduction. Iowa State University Digital Press. (Open Textbook Library).

https://open.umn.edu/opentextbooks/textbooks/1545

There are alternatives to the Mills textbook for Course Directors who may wish to focus on or weight material differently. For instance:

Fusco, G. and A. Minelli. 2023. Understanding reproduction. Cambridge University Press. $19.99 USD.

https://doi.org/10.1017/9781009225922

Other Resources:

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

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

This proposal is for a 3-credit lecture course that does not rely on labs and instead relies more conventionally on lecture hall space and perhaps access to a drop-in tutorial room. Accordingly, it does not require significant or unusual physical resources.

It will be a partial alternative to the existing 6-credit NATS 1660 *Biology of Sex* lab course which does require dedicated lab space in Lumbers.

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.

Specific NATS courses are not part of any program or degree. Instead, NATS courses are offered to non-science students to fulfil general education science credit requirements for non-science degrees. NATS courses are also available to science students who may be interested in particular NATS courses as electives (providing there is no CCE or NCR restriction). NATS courses encourage scientific literacy, and this proposal presents the subject through the lens of scientific discovery, scientific methodology, and theory building. Students are exposed to enquiry systems based on empirical evidence and reason. In addition, as detailed in the learning outcomes, this proposal includes elements that promote breadth (broadening of student horizons) in the life sciences, critical skill development, and learning independence.

This course is a much-needed 3-credit addition to the suite of popular life science-themed courses in NATS. At present, NATS has **zero** 3-credit course offerings in this area, making it difficult for students to fit a life science-themed NATS course into their schedules. NATS1661 is also an excellent complement to the newly-proposed NATS1662 *The Science of Hormones*, for students who take either course and want to pursue additional topics in that area. It is expected that in their first iterations, NATS1661 3.0 and NATS1662 3.0 will replace NATS1660 6.0, though NATS1660 6.0 may be offered again in the future depending on instructor availability.

There is some potential overlap with other NATS offerings, just as there was with the 6-credit NATS 1660. Where the overlap might be significant, the CCE and NCR provisions will protect the integrity of student transcripts.

The expected enrolment cap in this course will be similar to other NATS courses (150-200 students).

Faculty and Department Approval for Cross-listings:

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

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

MEMORANDUM

York University Libraries

To: Alexander Mills

From: William Denton (York University Libraries)

Date: 30 May 2025

Subject: Library Statement of Support – NATS 1661 (Biology of Mating)

Summary

York University Libraries (YUL) can well support this proposed course, just as it supports its current six-credit instantiation. As always, NATS students can make use of an array of library resources and services to meet their research and learning needs.

Collections

The Libraries' collections echo the curricular and research priorities of students and faculty. Care is given to select materials that reflect new and ongoing courses taught at York, as well as research and publishing trends. 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.

Specific to this course, Prof. Mill's *Biology of Sex* (2018) is in our collection, available in print and electronically. More copies can be purchased in either format on request.

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:

- Biology
- Gender/Sexuality/Women's Studies
- Natural Science

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.

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty: Indicate all relevant Faculty(ies)	Science
Department: Indicate department and course prefix (e.g. Languages, GER)	Natural Science
Date of Submission:	Sept 2025
Course Number: Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is "C")	NATS 1662
Var:	
Academic Credit Weight: Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6	3.0
Course Title: The official name of the course as it will appear in the Undergraduate Calendar and on the Repository	Humans and Hormones: The Biology and Sociological Impact of the Endocrine System
Short Title: Appears on any documents where space is limited - e.g. transcripts and lecture schedules - **maximum 40 characters**	Humans and Hormones

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

Brief Course Description:

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

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

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

This interdisciplinary course explores the fascinating world of hormones and the endocrine system, offering students a foundational understanding of how hormones influence human physiology and behavior. Through accessible scientific explanations, case studies, and contemporary societal discussions, the course examines topics such as stress, growth, reproduction, metabolism, and the hormonal basis of gender and identity. Special attention is given to the medical, ethical, and cultural dimensions of hormonal research and treatments, including debates around hormone replacement therapy, endocrine disruptors, and the evolving science of gender-affirming care. Students critically engage with how hormonal science intersects with public health, media, policy, and personal identity.

CCEs: 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.

An interdisciplinary introduction to the role of hormones in human physiology and society.

Expanded Course Description:

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

This course introduces students to the critical role of hormones in regulating physiological processes and influencing behavior. It covers the basic principles of endocrinology and integrates contemporary societal issues related to hormonal science.

Major topics include:

1. Introduction to the Endocrine System
  - Hormone definition and functions
  - Major endocrine glands
  - Signaling pathways: autocrine, paracrine, pheromonal

2. Hormones and Daily Life
  - Stress, sleep, mood regulation
  - Metabolism and appetite (e.g., insulin, leptin, ozempic)

3. Growth, Development, and Reproduction
  - Puberty, growth hormones, sex hormones (estrogen, testosterone)

4. Hormones and Gender
  - Hormonal variation and biological sex
- Gender identity and hormone therapy
  - Societal and medical perspectives

5. Hormones in Medicine
  - Hormone replacement therapy
  - Endocrine disorders (diabetes, thyroid disease, PCOS)
- Pharmaceuticals and biotech

6. Endocrine Disruptors and Environmental Impact
- Plastics, cosmetics, food contaminants
  - Public health and regulatory challenges

7. Ethical, Cultural, and Policy Issues
  - Hormonal enhancements in sports
  - Gender-affirming care and legal considerations
- Misinformation and media narratives

Learning Outcomes:

Upon successful completion, students will be able to:
- Describe the endocrine system and its role in human health.
- Explain hormonal influences on physiological and behavioral processes.
- Analyze the societal, ethical, and cultural implications of hormonal science.
- Critically evaluate media and policy discussions related to hormones.

Course Design:

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

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

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

The course can be delivered in-person (LECT) or online with in-person exams (ONCA). It consists of 3 lecture hours per week over 12 weeks (36 hours total). Active learning strategies (think-pair-share, case studies, discussions) and contemporary readings will support student engagement. The ONCA format would typically be reserved for the summer term to enable students to complete some of their NATS credits while working/travelling. In this format, lecture material will be delivered asynchronously via pre-recorded lectures and active learning assessments will be conducted via forum discussions. In both LECT and ONCA formats, students will also complete a reflection assignment and a small research project.

Instruction:

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

Instruction:

1. Planned frequency: Annually (Fall or Winter term)

2. Number of instructors: At least 2 qualified faculty members in Natural Science and related departments, including Dr. Michael Cardinal-Aucoin and Dr. Jill Lazenby.

3. Initial instructor: Dr. Michael Cardinal-Aucoin

4. Contact hours: 3 lecture hours per week, total of 36 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 utilizes online assessments, please identify how the integrity of learning evaluation will be maintained.

Evaluation (for both LECT and ONCA):

- Participation and in-class activities: 10% (in the ONCA mode, this will be conducted via forum discussions)

- Reflection assignments (x2): 10%

- Midterm test: 25%

- Final project: 25%

Students will work in groups of 2-3 to develop a 15min video podcast on a topic selected from a list which explores current research in endocrinology/hormones and its links and implications for society, politics, culture, ethics, health, and/or the environment. The project will include a preliminary proposal as well as a peer-evaluated component, in which students are evaluated on their feedback on other submissions.

- Final exam: 30%

In both the LECT and ONCA formats, academic integrity is addressed by requiring that over 50% of the course assessments are done in person.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

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

Also please list any online resources.

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

Assigned readings will be drawn from the extensive literature available from scientific journals and popular science journals that can be accessed using the York library at no cost to the student.

In addition, selected short readings may be drawn from the resources below and made available to the students via eClass.

Scientific Textbooks:

- Johnson, S., & Roskams-Edworthy, N. (2014). Hormones: A very short introduction. Oxford University Press.

Popular Science Books:

- Epstein, Randi Hutter. *Aroused : The History of Hormones and How They Control Just about Everything*. First edition. New York: W. W. Norton & Company, 2018. Print.

In addition, the following more advanced texts will be used primarily as instructor resources but short excerpts may be assigned:

- Norris, D.O. and Carr, J.A. (2021) Vertebrate Endocrinology, 6th edition. Academic Press: London, UK.

- Nelson, R.J., & Kriegsfeld, L.J. (2017). An Introduction to Behavioral

required, a rationale should be supplied. **LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.**	Endocrinology (5th ed.) - Fausto-Sterling, A. (2020). Sexing the Body: Gender Politics and the Construction of Sexuality

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.**	Standard lecture hall facilities and A/V equipment are required. No special physical resources are necessary.

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.	**How the course contributes to the learning objectives of the program:** The key learning objectives of general-education 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" by reaching beyond the sciences to include scholarship focused on social, historical, and environmental impacts and influences related to the development of science and technology - Develop skills, problem-solving tools and assessment strategies, some of which are specific to the courses discipline ("critical skills" and "critical thinking")

The expected enrolment in the course.	Most of us have heard the words hormone, hormonal, or even endocrinologist at some point, but fewer have a deeper understanding of what these terms mean. This course will expand the breadth of students' knowledge of endocrinology beyond what they may have encountered in the media or simple associations with hormonal cycles and introduce them to the importance of the science of hormones. Students will be equipped with fundamental scientific knowledge in the field of endocrinology through examination of the biological principles of the endocrine system in health and disease. As students study the science of hormones, class discussions and assignments will extend into various multi-disciplinary contexts in which students will apply critical thinking and analysis to consider how biological processes intersect with public discourse, health policy, and cultural debates. **The relationship of the proposed course to other existing offerings:** This course fills a gap in general education offerings as there are no other 1000-level general education courses at York which merge the biological and sociological aspects of hormone science in an accessible way for students with no background in the life and/or health sciences. Moreover, hormone science is not taught in BIOL1000 and BIOL1001, negating the need for an NCR with those courses. NATS1662 is also a much-needed 3-credit addition to the suite of popular life science-themed courses in NATS. At present, NATS has zero 3-credit course offerings in this area, making it difficult for students to fit a life science-themed NATS course into their schedules. NATS1662 would be an excellent complement to the newly-proposed NATS1661 The Science of Mating, for students who take either course and want to pursue additional topics in that area. The expected enrolment cap in this course will be similar to other NATS courses (150-200 students).

Faculty and Department Approval for Cross-listings:

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

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

Accessible format can be provided upon request.

MEMORANDUM

York University Libraries

To: Robin Metcalfe

From: William Denton (Associate Librarian, York University Libraries)

Date: 11 September 2025

Subject: NATS 1662 Science of Hormones (library statement of support)

Summary

York University Libraries (YUL) is, as usual, well positioned to support this proposed NATS course. Faculty and students can make use of an array of library resources and services to meet their teaching and learning needs.

Collections

I'm happy to report that YUL already holds most of the books in the bibliography. We have *Hormones: A Very Short Introduction* (one of the excellent series from Oxford University Press) by Johnson and Roskams-Edworthy (print and electronic), *Vertebrate Endocrinology* (2021, 6th ed.) by Norris and Carr (in the print reserve collection), and *Sexing the Body: Gender Politics and the Construction of Sexuality* by Fausto-Sterling (print and electronic). The fifth edition (2017) of *An Introduction to Behavioral Endocrinology* by Nelson and Kriegsfeld is out of print, so I ordered the sixth (2023); the fifth is available in the Omni network if needed. We did not have *Aroused: The History of Hormones and How They Control Just about Everything* by Hutter so I ordered a copy for York; aside from supporting our local community this will complement the one other that is available through the Omni network—this very proposal has led to an improvement in Ontario's shared university library collections, which is always a happy occasion.

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:

- Gender, Sexuality, Women's Studies
- Natural Science

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.

COMMITTEE ON ACADEMIC STANDARDS, CURRICULUM AND PEDAGOGY TEMPLATE

NEW COURSE PROPOSAL FORM

Faculty: Indicate all relevant Faculty(ies)	Science
Department: Indicate department and course prefix (e.g. Languages, GER)	Natural Science
Date of Submission:	Aug 29, 2025
Course Number: Special Topics courses Include variance (e.g. HUMA 3000C 6.0, Variance is "C")	NATS1725
Var:	
Academic Credit Weight: Indicate both the fee, and MTCU weight if different from academic weight (e.g. AC=6, FEE=8, MET=6	
Course Title: The official name of the course as it will appear in the Undergraduate Calendar and on the Repository	The Science of Light: Exploring Waves, Vision, and Color
Short Title: Appears on any documents where space is limited - e.g. transcripts and lecture schedules - **maximum 40 characters**	The Science of Light

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

Brief Course Description:

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

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

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

This course invites students to explore the fascinating world of light—its physical properties and behaviors and how it can be produced, measured and manipulated. The course then applies these concepts to explain how we perceive light in the natural world, including topics such as vision in different species, colour mixing, fluorescence, bioluminescence, mirages, rainbows, oil slicks and butterfly wings. Students also learn how light is manipulated for use in technology, such as in microscopes and telescopes, cameras, lasers, and in data transmission. In addition, the course explores the wave-particle duality of light and examines differences between light waves and sound waves to differentiate phenomena like thunder, lightening, shock waves and the implications of superluminal speed. By examining real-world applications of light, students gain a deeper appreciation of how light shapes our perception of the natural world as well as its role in scientific discovery and the evolution of technology.

CCE: SC/NATS1720 6.0, SC/NATS 1870 6.00, SC/NATS 1945 6.00
NCR: This course is not open to any student enrolled in a Physics program.

Generic Course Description:

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

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

Expanded Course Description:

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

This course invites students to explore the fascinating world of light—its physical properties and behaviors and how it can be produced, measured and manipulated. The course then applies these concepts to explain how we perceive light in the natural world and how we can manipulate light for use in technology. By examining real-world applications of light, students gain a deeper appreciation of how light shapes our perception of the natural world as well as its role in scientific discovery and the evolution of technology.

CCE: SC/NATS1720 6.0, SC/NATS 1870 6.00
NCR: This course is not open to any student enrolled in a Physics program.

Topics covered:

1. Waves and their physical properties, including a comparison of sound and light waves.
2. How light is produced both naturally and artificially, including applications such as fluorescence, bioluminescence, lasers and data transmission
3. The speed of light compared to the speed of sound and understanding phenomena such as thunder, lightening and shock waves.
4. How we measure light and produce images, both with our senses and with artificial detectors (eg, cameras)
5. Comparisons of vision in different species (eg, cats, birds, snakes, mosquitos)
6. Colour mixing of light and dyes
7. Diffraction, refraction and reflection of light and their applications (eg, mirrors and lenses, rainbows and mirages)
8. Coherence and interference of light (eg, oil spills, butterfly wings)
9. Connections between particles and waves and the impact of the wave-particle duality on the evolution of modern physics and technology (eg, electron microscopes and quantum tunneling)

Course learning outcomes:

- Explain the physical properties of light waves and compare and contrast with the properties of sound waves
- Explain how light waves can produced, measured, predicted and manipulated in a variety of contexts in both natural and technology
- Explain the origin of the colour of natural objects as well as artificial sources of colour
- Describe the significance of the study of light for the development of modern physics and illustrate some of the key findings
- Interpret data presented in tabular and graphical form, and apply rules and formulae provided to solve simple problems

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 or as an online, asynchronous course with in-person exams (ONCA). The two delivery formats provide students with flexibility when scheduling their courses, thereby increasing the likelihood that they can find a course in their area of interest. Both formats will include in-person assessments in the form of a midterm and final exam.

LECT: All components of the course will be held in person. In class meets will consist of lectures that are mixed with active learning exercises such as clicker surveys, hands-on experiments and group discussions followed by group surveys.

ONCA (Summer only): In this format, the clicker surveys will be replaced by questionnaires that the students must fill out while they are watching the lectures. This will encourage the students to stop the lecture and process the material at a deeper level while they are hearing the recorded lecture. In addition, group discussions and surveys will be held via online forum discussions and hands-on learning will be conducted via experiments that can be completed independently outside of the classroom.

Instruction:

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

1. 1-2 offerings per year, depending on popularity and availability of instructor resources.

2. There are currently 4 departmental members with the expertise to teach this course,

3. Deborah Harris is expected to teach the course in the coming year.

4. In the LECT format, the course will have 36 contact hours, in the form of 3 in-person lecture hours per week over 12 weeks.

   In the ONCA format, the course will have recorded lectures equivalent to, on average, 2.5 lecture hours/week plus an additional 0.5 hours/week devoted to forum discussions, amounting to 36 equivalent learning hours in total.

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 utilizes online assessments, please identify how the integrity of learning evaluation will be maintained.

Evaluation scheme for both LECT and ONCA formats:

- Midterm in-person exam: 30%
- Final in-person exam: 30%
- Weekly Pre-Flight Assignments: 15%

  These involve weekly "pre-flight" questions, where the students complete a reading before class, followed by a short-answer questionnaire.

- Project: 25%

  Students research an object or scene of their own choosing and prepare a 5-minute video of themselves in which they use the principles of light to explain why the object or scene appears as it does. This project will include a peer assessment component, giving students the opportunity to learn about the objects/scenes researched by their classmates.

In both the LECT and ONCA formats, academic integrity is addressed by requiring that over 50% of the course assessments are done in person.

Bibliography:

A READING LIST MUST BE INCLUDED FOR ALL NEW COURSES

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

Also please list any online resources.

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

Required readings will be drawn from one of the existing texts for NATS1720 6.0 Light and Sound, *Physics in the Arts (3rd Ed.)* by P.U.P.A. Gilbert (2021)

Additional reading materials will be drawn from *Let There Be Light: The Story Of Light From Atoms To Galaxies (2nd Ed.)* by A. Montwill and A. Breslin (2013).

On occasion, articles from popular science journals will be assigned on topical subjects.

should be supplied.
LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.

Other Resources: A statement regarding the adequacy of physical resources (equipment, space, etc.) must be appended. If other resources will be required to mount this course, please explain **COURSES WILL NOT BE APPROVED UNLESS IT IS CLEAR THAT ADEQUATE RESOURCES ARE AVAILABLE TO SUPPORT IT.**	Standard lecture hall facilities and A/V equipment are required. No special physical resources are necessary

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.	**How the course contributes to the learning objectives of the program:** The key learning objectives of general-education 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" by reaching beyond the sciences to include scholarship focused on social, historical, and environmental impacts and influences related to the development of science and technology • Develop skills, problem-solving tools and assessment strategies, some of which are specific to the courses discipline ("critical skills" and "critical thinking") *NATS1725 Science of Light* achieves the **breadth** requirement by broadening students' understanding about the natural and artificial world by examining the physics of how the behaviour of light affects the way we perceive the world around us. **Multi-disciplinarity** is addressed by the inclusion of historical topics pertaining to discoveries about the wave-particle duality of light as well as contemporary topics which address the

	impacts of the study of light on advancements in technology and the evolution of modern physics. Students acquire **scientific knowledge** and **critical skills** by learning about the physical properties of light and by applying the concepts to predict how light behaves in various contexts, as well as to think critically about the significance of the study of light to the evolution of science and technology. **The relationship of the proposed course to other existing offerings:** *NATS1725 Science of Light* is a much-needed addition to our complement of 3-credit courses in the physical sciences. A number of other departments have transitioned their core requirements from 6-credit courses to 3-credit courses, making it increasingly difficult for students to fit 6-credit NATS courses into their schedule. In addition, 3-credit NATS courses provide students with the opportunity to explore two different subject areas for their 6-credit general education science requirement. NATS currently has no 3-credit courses which focus on the science of light and colour. NATS1725 3.0 therefore enables us to retire a section of NATS1870 6.0 Understanding Colour and replace it with a 3-credit option, so students who only have room for 3-credit courses can still explore this fascinating area. It is also an excellent pairing with NATS1520 3.0 The Science of Music, providing a compelling 6-credit option particularly suited for AMPD students. The expected enrolment cap in this course will be similar to other NATS courses (150-200 students).

Faculty and Department Approval for Cross-listings:

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

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

Accessible format can be provided upon request.

MEMORANDUM

York University Libraries

To: Robin Metcalfe

From: William Denton (Associate Librarian, York University Libraries)

Date: 11 September 2025

Subject: NATS 1725 Science of Light (library statement of support)

Summary

York University Libraries (YUL) is, as usual, well positioned to support this proposed NATS course. Faculty and students can make use of an array of library resources and services to meet their teaching and learning needs.

Collections

The bibliography says the course will use *Physics in the Arts* (third edition, 2021) by P.U.P.A. Gilbert (DOI: 10.1016/C2020-0-02281-4) which is already in YUL's collection and used in other courses. This e book is available for use by multiple users simultaneously and they can all download the entire book as a PDF or EPUB. This is the ideal situation we want for all library users, and I am delighted to see such an excellent textbook so easily accessible. *Let There Be Light* by Montwill and Breslin (2013) we have in print and online; sadly the e version has some use restrictions on it, but if more access is needed we can buy it.

YUL subscribes to many popular science magazines and journals (*New Scientist*, *Scientific American*, and so on) and faculty and students will find current topics well covered there. The library branches themselves are also, of course, well stocked with photons during opening hours.

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:

- Natural Science
- Physics

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.