

# COUNCIL OF THE FACULTY OF SCIENCE



## NOTICE OF MEETING

October 11, 2022

3pm – 4:30pm

via Zoom

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## AGENDA

1. Call to Order and Approval of Agenda
2. Chair's Remarks
3. Approval of September 13, 2022 Minutes
4. Business Arising
5. Inquiries and Communications
  - > September 22, 2022 Senate Synopsis
6. Dean's Remarks
7. Associate Dean and Head of Bethune College Remarks
8. Reports from Science Representatives on Senate Committees
9. Report from Student Caucus Representative
10. Reports from Standing Committees of Council
  - a) Executive Committee:
    - > Ratification and Call for Nominations for Senate and Standing Committee of Council
    - > Vacancies report on the Standing Committees of FSc Council
  - b) Curriculum Committee:
    - > consent agenda items
11. Other Business
  - a) Non-Degree Program Approval Process (for information) – Rui Wang

# ATTENDANCE



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Almira Mun	Joanne Sequeira	Stephen Watson
Anna Burtin	Kathy Young	Tanya Da Sylva
Brad Sheeller (non-voting guest)	Kohitij Kar	Thomas Baumgartner
Bridget Stutchbury	Maksym Stolyarevskyy	Tianna McFarlane
Carl Wolfe	Mandy Ramnaraine	Tom Kirchner
conor douglas	Margaret Mroziejewicz	Tom Salisbury
dasantila golemi-kotra	Mike Scheid	Trevor VandenBoer
Delwar Hossain	Mingming Li	Vera Pavri
Derek Jackson	Neal Madras	Vivian Saridakis
Derek Wilson	Nicole Nivillac	Wendy Booth
Gino Lavoie	Pamela Fernandes	Wendy Taylor
Helen Abraham	Pat Hall	
Hovig Kouyoumdjian	Patricia Lakin-Thomas	
Hugo Chen	Paula Wilson	
Iain Moyles	Robert Tsushima	
Jennifer van Wijngaarden	Robin Metcalfe	
Jerusha Lederman	Rui Wang	
Jill Lazenby	Sibonile Siyakatshana	

# COUNCIL OF THE FACULTY OF SCIENCE



## MINUTES

September 13, 2022

3pm – 4:30pm

via Zoom

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## MINUTES

### 1. Call to Order and Approval of Agenda

A motion was moved, seconded and carried to approve the Agenda as presented.

### 2. Chair's Remarks

T. Kirchner the Chair of Council welcomed members to the meeting and read out the Land Acknowledgment message and discussed the possibility of an in-person Faculty Council meeting in November.

### 3. Approval of May 10, 2022 Minutes

A motion was moved, seconded and carried to approve the Minutes, with an amendment to include Wendy Booth to the attendance.

### 4. Business Arising

There was none.

### 5. Inquiries and Communications

#### > May 26, 2022 Senate Synopsis

Council noted the Senate Synopsis of May 26, 2022.

#### > June 23, 2022 Senate Synopsis

Council noted the Senate Synopsis of June 23, 2022.

### 6. Dean's Remarks

Dean Wang welcomed students, staff and faculty to another successful academic year and acknowledged the new chair of council, Tom Kirchner.

#### Events:

- > Faculty of Science BBQ was a great event with around 100 people in attendance.
- > New Student Orientation organized by Bethune College had around 900 students in attendance.
- > University-wide orientation session with several thousand students in attendance.
- > Summer Undergraduate Research Conference was a success, 55 students attended and shared their research projects and findings through talks and poster presentations.

#### Congratulations:

- > Jianhong Wu (Mathematics & Statistics), Sandra Rehan (Biology), Sapna Sharma

(Biology) were inducted in Royal Society of Canada as Fellows and/or College Members.

- > Jianhong Wu (Mathematics & Statistics) was inducted as a member of the Canadian Academy of Health Science.
- > Jane Heffernan (Mathematics & Statistics) elected as a Fellow of the Society of Mathematical Biology.
- > Jane Heffernan (Mathematics & Statistics) & Jianhong Wu (Mathematics & Statistics) appointed as the newest York Research Chairs.
- > Jude Kong (Mathematics & Statistics) received 7.25 million dollars grant from the International Development Research Centre.

**Leadership:**

- > Hovig Kouyoumdjian is the new Associate Dean Curriculum & Pedagogy.
- > Jennifer van Wijngaarden is the New Chair of Chemistry.
- > Jerusha Lederman is the new Director, Research and Partnerships.

**Highlights:**

- > Data Science program approved by quality council.
- > Faculty of Science Summer Camp was a success.
- > Science Summer Transition Program was successful for a third year in a row.
- > Provost approved Faculty of Science for 12 new or re-authorized hirings of fulltime faculty members.

Dean Wang closed by calling for a volunteer to fill the vacant Faculty of Science representative on the Senate Tenure & Promotion Committee.

**7. Associate Dean and Head of Bethune College Remarks**

**M. Scheid, Associate Dean, Students:**

- > Fall enrolment target: 108%
- > International enrolment target: 107% (High school direct entry) & 106% (not direct entry from High School)
- > Science Summer Transition Program drew in 382 registrations with a 65% completion rate.
- > Summer Undergraduate Research Conference was a success.
- > York Science Scholar Awards recipients will be looking for research supervisors soon.

**V. Saridakis on behalf of G. Audette, Associate Dean, Faculty Affairs**

- > Vice-Chair of Council and Senate Tenure and Promotions Faculty of Science representative memberships are vacant and volunteers are needed.
- > Any Faculty member with the intention of retiring on July 1, 2023 please send an email to [sciadfac@yorku.ca](mailto:sciadfac@yorku.ca) by September 30, 2022.

**V. Saridakis, Associate Dean, Research & Partnerships**

- > Presented an "Overview of Research Services" document highlighting important information when submitting research applications that will be shared with Faculty

members.

**H. Kouyoumdjian, Associate Dean, Curriculum & Pedagogy**

> The role will open many opportunities for collaboration and improvements.

**P. Wilson, Head of Bethune**

> New Student Orientation was held in person for the first time in two years with almost 1000 students in attendance.

> Andrew Skelton, Bethune Academic Coordinator to connect with Faculty members about programs being offered.

> Recruitment for the Science Student Caucus will begin soon.

> Suzanne Park & John Amanatides retirement farewell will take place on October 4 at 12pm – 2pm.

**8. Reports from Science Representatives on Senate Committees**

There was none.

**9. Report from Student Caucus Representative**

There was none.

**10. Reports from Standing Committees of Council**

**a) Executive Committee:**

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

A motion was moved, seconded and carried to ratify the nominations above.

**> Vacancies report on the Standing Committees of FSc Council**

T. Kirchner noted the vacancies and asked for volunteers.

**b) Committee on Equity, Diversity and Inclusivity:**

**> Annual Report**

**c) Committee on Teaching & Learning:**

**> Annual Report**

**d) Curriculum Committee:**

**> Annual Report**

**e) Committee on Examinations and Academic Standards:**

**> Annual Report**

**f) Graduate Education Committee:**

**> Annual Report**

**> Minor modification - BIOL 5081 3.0 Introduction to Biostatistics**

This item was deemed approved by Council.

**g) Petitions Committee:**

**> Annual Report**

**h) Research and Awards Committee:**

**> Annual Report**

**i) Senate T & P Review Committee:**

**> Annual Report**

**j) Appeals Committee**

**> Annual Report**

## **11. Other Business**

There was none.

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

# The Senate of York University

## Synopsis

**The 688<sup>th</sup> Meeting of Senate held on Thursday, September 22, 2022 via Zoom**

### Remarks

The Chair of Senate, Professor Mario Roy of Glendon College, welcomed new and returning Senators, thanked those who had attended the Senate orientation session, and extended wishes for success in research, teaching and learning this year. Senators were encouraged to attend convocation ceremonies in October to celebrate graduates and their families.

To set the context for the 2022-2023 academic year, President Rhonda Lenton highlighted progress to date on advancing University Academic Plan priorities and the UN Social Development Goals, the success of efforts to mitigate the impacts of the pandemic, and opportunities on the horizon such as Markham Campus, the forthcoming globalization strategy, and explorations of the establishment of a medical school. Other updates shared by President Lenton included:

- an expression of appreciation to Senators for their engagement in collegial governance
- condolences on the passing of Her Majesty Queen Elizabeth II and recognition of the opportunity it presents to acknowledge the British monarchy's colonial legacy and focus efforts to advance decolonization
- an announcement of the honorary degree recipients to be recognized at the October convocation ceremonies
- in the context of COVID-19's shift toward endemic status, an update on the University's implementation of a community care approach while continuing to take precautions, track the pattern of the virus and engage with government and public health authorities

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

# The Senate of York University Synopsis

## Approvals

On the recommendation of its Executive Committee, Senate approved revisions to the Rules of Senate pertaining to hortative motions, Senate membership, and nominations rules and procedures to integrate further equity considerations for committee and elected positions, as well as adjustments to enhance clarity and reflect practices including enhanced flexibility with respect to the mode of delivery of Senate meetings.

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

- approve the establishment of the degree and programs of Bachelor and Bachelor (Honours) of Sport Management, School of Human Resources Management, LA&PS, Markham Campus, effective FW2024-2025
- approve the closure of the York-Seneca Dual Credential Program in Sustainable Environmental Management and Advanced Diploma in Environmental Technology, the York-Seneca Dual Credential program in Urban Sustainability, and the York-Humber Dual Credential in International Development, Faculty of Environmental and Urban Change, effective FW2022-2023
- approve revisions to Faculty of Graduate Studies Regulations pertaining to Thesis and Dissertation Formats (effective May 1, 2024), Doctoral Dissertation Proposal Milestones (effective September 1, 2023), and Academic Honesty (effective January 1, 2023)
- authorize the granting of degrees, certificates and diplomas at the University's convocations held in Fall 2022, February 2023 (Convocation In Absentia) and Spring 2023, and individually to students at any point during the year who have fulfilled the degree program requirements for receipt of degrees

## Senate Elections

Senate approved a slate of candidates presented by the Executive Committee for the contract faculty seat on ASCP with the result that an election will be held beginning September 28, 2022.

## Committee Information Reports

### Executive Committee

Information items included the following:

## **The Senate of York University Synopsis**

- its efforts to continue to fill remaining vacancies on the Tenure & Promotion and Awards committees and the Joint Sub-Committee on Quality Assurance, and to seek Vice-Chair / Chair of Senate candidates
- its ongoing monitoring of the pandemic disruption, with a focus on the circumstances at the start of this term and criteria to be taken into account to determine the timing of declaring the disruption ended
- its plan to hold at least one meeting in the Fall term in each of the virtual, hybrid and in-person formats, with details for the October and November meetings to be announced as soon as possible
- its review of the Senator and Senate Committee member survey results and plan to hold a series of facilitated discussions at Senate meetings

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

On behalf of the Committee, the Chair shared updates on the information items outlined in the written report.

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

On behalf of the Committee, the Chair spoke to the information items covered in the written report.

### **Additional Information about this Meeting**

Please refer to the full Senate agenda and supplementary material posted online with the **September 22, 2022** meeting for details about these items.

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

### **October Meeting of Senate**

Senate's next meeting will be held at **3:00 pm on October 27, 2022**.

# 2022-2023 FSc Report on vacancies for Senate and FSc Standing Committees of Council

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## Executive Committee 2022-23

### RATIFICATION OF NOMINATIONS

#### **Undergraduate Student Nominations for 2022-2023 Faculty Council** TBC

#### **Committee on Examinations and Academic Standards**

I. Moyles, Department of Mathematics & Statistics (term until 2024)

#### **Tenure & Promotion Committee**

C. Bergevin, Department of Physics & Astronomy (term until 2023)

#### **Committee on Teaching and Learning**

H. Kouyoumdjian, Associate Dean – Curriculum & Pedagogy, Designated

#### **Graduate Curriculum Committee**

M. Scheid, Associate Dean - Student Affairs, ex officio

2022-2023 FSc Report on vacancies for Senate and FSc Standing Committees

Committee	Rules of Faculty Council - membership	Meeting time / Membership	Term	
			From	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. Wang	Designated	
	Member at large	G. Audette	Designated	
	Member at large	VACANT, Physics & Astronomy	2022	2025
	Member at large	VACANT, Mathematics & Statistics	2022	2025
	Member at large	J. van Wijngaarden, Chemistry	2021	2024
	Member at large	J. Lazenby, Science, Technology & Society	2022	2025
	Member at large	P. Lakin-Thomas, Biology	2021	2024
	Member at large	V. Saridakis, Biology	2021	2024
	Department Chair	V. Pavri, Department of Science, Technology & Society	2021	2024
	Department Chair	R. Tsushima, Department of Biology	2021	2024
	Department Chair	S. Watson, Department of Mathematics & Statistics	2022	2025
	Director of NATS	R. Metcalfe	Designated	
	Student representative	Yashna Manek	2021	2023
Student representative	Ailiya Ritwan	2021	2023	
Faculty Council	Chair of Council	T. Kirchner	2022	2023
	Vice-Chair of Council	VACANT (to become Chair of Council in 2023)	2022	2023
		W. Booth	2022	2023
Staff Representatives		D. Hossain	2022	2023
		M. Xu	2022	2023
FSc Reps on Senate Committees				
Senate Executive	1 member from FSc	G. Audette	2021	2024
Academic Policy, Planning and Research Committee (APPRC)	1 member from FSc	D. Golemi-Kotra	2020	2023
ASCP (Academic Standards, Curriculum and Pedagogy Committee)	1 member from FSc	Mary-Helen Armour	2021	2024
Sub-Committee on Honorary Degrees & Ceremonials	1 member from FSc	M. Yousaf	2021	2024
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 and Technology Studies/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.	The Executive Committee will normally meet the first Tuesday of each month (September to May) from 3:00pm - 4:30pm in LUM 305B		
	Chair of Council	T. Kirchner	2022	2023
	Vice-Chair of Council	VACANT	2022	2023
	Dean, Ex officio	R. Wang	Designated	
	Asst. Dean - SEM & SEP	A. Mun	Designated	
	Staff representative	W. Booth	2022	2023
	Undergraduate Student Rep	VACANT	2022	2023
	Biology	D. Golemi-Kotra	2020	2023
	Chemistry	D. Wilson	2022	2025
	Math & Stats	E. J Janse Van Rensburg	2022	2025
	Physics & Astronomy	C. Storry	2022	2023
	STS	C. Douglas	2021	2023
	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 and Technology Studies/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 Affairs, Ex officio		G. Audette	Designated	
Head of Bethune College		P. Wilson	Designated	
Undergraduate Student Representative		VACANT	2022	2023
Elected staff representative		M. Xu	2022	2023
Biology		VACANT	2022	2025
Chemistry		C. Caputo	2022	2025
Math & Stats		P. Sargent	2022	2025
Physics & Astronomy		E. Hessels	2022	2023
STS		S. Domenikos	2022	2025
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 1:30 pm - 3:00 pm		
	Member at Large	VACANT	2022	2025
	Member at Large	VACANT	2022	2025
	Dean, Ex officio	R. Wang	Designated	
	Associate Dean - Students, Ex officio	M. Scheid	Designated	
	Undergraduate Student Rep	VACANT	2022	2023
	Undergraduate Student Rep	VACANT	2022	2023
	Biology	M. Vicari	2022	2025
	Chemistry	D. Jackson	2022	2025
	Math & Stats	Jihyeon (Jessie) Yang	2022	2025
	Physics & Astronomy	M. George	2021	2024
	STS	R. Metcalfe	2022	2025
	Member at Large	VACANT	2022	2025

2022-2023 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 ( <i>ex officio</i> ), five members elected by Council from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science and Technology Studies/Natural Science, and one student member of Council.	CEAS will normally meet every alternate Wed / Thurs from 1:00 - 3:00 pm year round.		
	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 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	VACANT	2022	2023
	Undergraduate Student Rep	VACANT	2022	2023
	Biology	VACANT/ ALT J. Atallah	2022/2021	2025/2024
	Chemistry	T. Mirkovic / ALT. P. Potvin	2020/2022	2023/2025
	Math & Stats	J. Moyles, N.Puritzsky, ALT. Yun Gao	2021/2022	2024/2025
	Physics & Astronomy	Committee A: S. Jerzak (Fall) , Committee B: G. Orchard (Fall) [July 1 - December 31]	2022	2023
	STS	Committee A: E. Hyde (Winter), Committee B: Randy Lewis (Winter) [Jan 1 - June 30] J. Elwick/J. Rogerson	2020/2023	2020/2023
Petitions	The Petitions Committee for the purpose of hearing student petitions shall consist of an Associate Dean ( <i>ex officio</i> ), 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	VACANT	2022	2023
	Undergraduate Student Rep	VACANT	2022	2023
	Member at Large	K. Belozarov	2020	2023
	Biology	C. Jang	2022	2025
	Chemistry	R. Fournier	2022	2025
	Physics & Astronomy	C. Bergevin (Fall), B. Radics (Winter), VACANT (Summer)	2022	2023
	Math & Stats	D. Liang	2022	2025
	STS	C. Rozins	2022	2025
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 and Technology Studies/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	G. Audette	Designated	
	Undergraduate Student	VACANT	2022	2025
	Biology	K. Hudak / ATL Jean-Paul Paluzzi	2020/2020	2023/2023
	Chemistry	D. Ifa/G. Laviole	2020/2022	2023/2025
	Physics & Astronomy	C. Storry /ALT. C. Bergevin	2022/2023	2022/2023
	Math & Stats	Y. Gao / ALT Jianhong Wu	2021/2022	2024/2025
	STS	E. Hamm/ ALT VACANT	2022	2023
	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	
Associate Dean - Curriculum & Pedagogy		H. Kouyoumdjian	Designated	
Graduate Student Representative		Gabriella Gerzon	2022	2023
Graduate Student Representative		VACANT	2022	2023
Undergraduate Student Representative		VACANT	2022	2023
Stacie Science Library, Designated		M. Wang	Designated	
IT Representative		V. Gotcheva	Designated	
Teaching Commons Rep		K. Pabst	Designated	
Staff representative, Elected		D. Hossain	2022	2023
Biology		D. Golemi-Kotra	2020	2023
Biology		C. Jang	2020	2023
Chemistry		T. Mirkovic	2020	2023
Chemistry		T. Zeng	2022	2025
Physics & Astronomy		C. Marsan	2022	2023
Physics & Astronomy		S. Rughelmer	2022	2023
Math & Stats		J. Cao	2022	2025
Math & Stats	P. Sargent	2021	2024	
STS	R. Marushia	2022	2025	
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 and Technology Studies/Natural Science, and Physics and Astronomy, one student member of Council and an Associate Dean ( <i>ex officio</i> ).	The Research & Awards Committee will meet when grants and awards need to be adjudicated.		
	Associate Dean - Research & Partnerships, ex officio	Vivian Saridakis	Designated	
	Undergraduate Student Representative	VACANT	2022	2023
	Graduate Student	A. Angelucci	2022	2023
	Biology	R. Kwong	2020	2023
	Chemistry	S. Morin	2022	2025
	Physics & Astronomy	A. Kumar	2022	2023
Math & Stats	H. Zhu	2022	2023	
STS	H. Miallet	2020	2023	
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 ( <i>ex officio</i> ) 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	G. Audette	Designated	
	Undergraduate Student Representative	VACANT	2022	2023
	Undergraduate Student Representative	VACANT	2022	2023
	Member at Large	VACANT	2022	2025
	Biology	N. Kovinich	2020	2023
	Chemistry	M. Hempstead	2020	2023
	Physics & Astronomy	S. Tulin (Fall), M. Horbatsch (Winter)	2022	2023
	Math & Stats	Y. Wu	2022	2025
	STS	M. H. Armour	2022	2025

2022-2023 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	B. Stutchbury	2020	2023
	Chemistry	R. McLaren	2022	2025
	Physics & Astronomy	M. Johnson	2020	2023
	Math & Stats	S. Moghadas	2020	2023
	STS	VACANT	2021	2024
	Member from Faculty of Health OR Lassonde	VACANT	2021	2024
	Member at Large	VACANT	2022	2025
	Graduate student	VACANT	2022	2025
Committee on Equity, Diversity & Inclusion (EDI)	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 & Graduate Education (ex officio) • One primary and one alternate member from each of Biology, Chemistry, Mathematics & Statistics, Physics & Astronomy and Science & Technology Studies. • 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	G. Audette	Designated	
	Associate Dean, Research & Partnerships (ex officio)	Vivian Saridakis	Designated	
	Undergraduate Student Representative	VACANT	2022	2023
	Graduate Student	VACANT	2022	2023
	Graduate Student	VACANT	2022	2023
	Biology	T. Kelly	2021	2024
	Chemistry	C. Le	2020	2023
	Physics & Astronomy	D. Harris	2020	2023
	Math & Stats	A. Woldegerima	2022	2025
	STS	V. Pavri	2020	2023

# CURRICULUM COMMITTEE REPORT

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

Details regarding these proposals (and other minor changes to Calendar/Repository course descriptions and prerequisites which were approved by the Committee but are not reported here) are included in the working papers of September 27, 2022, meeting of the Curriculum Committee, which are on file for your inspection in the Office of the Dean, with all members of the Curriculum Committee or by contacting the Secretary of the Committee at [scicurri@yorku.ca](mailto:scicurri@yorku.ca)

## 1. BIOLOGY

- a) Change in cross-listing: SC/BIOL 3171 3.0 – Population Ecology
- b) Change in cross-listing: SC/BIOL 3172 3.0 – Community Ecology (**submitted by Prof. Nicole Nivillac**)

## 2. SCIENCE

- a) New Course: SC/CAPS 4xxx 6.0 - C4 Capstone Project (**submitted by Prof. Mike Scheid**)

## 3. MATHEMATICS AND STATISTICS

- a) New Course: SC/MATH 1515 3.0 – General Mathematics for Software Development (**submitted by Prof. Jihyeon Jessie Yang**)
- b) Change in pre-requisite and Calendar description: SCMATH 1581 3.0 – Business Mathematics I. (**submitted by Hyejin Ku**)

## 4. PHYSICS AND ASTRONOMY

- a) Non-Major Modification: change in program core - Minor in Physics and Astronomy Streams – addition of PHYS 3030 program core. (**submitted by Prof. Matthew George**)

# Changes to Existing Course

Faculty: SCIENCE

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

## Type of Change:

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

Change From:

To:

	(Crosslisted to: SC/ENVB 3171 3.00)
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**Rationale:**

This is to correct an oversight:

SC/BIOL 3171 should have been cross-listed to SC/ENVB 3171 when the Course Proposal for SC/BIOL 3171 was initially drafted, reviewed, and approved.

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

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

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

# Changes to Existing Course

Faculty: SCIENCE

Department:

Date of Submission:

Course Number:

Effective Session:

Course Title:

## Type of Change:

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

Change From:

To:

	(Crosslisted to: SC/ENVB 3172 3.00)
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**Rationale:**

This is to correct an oversight:

SC/BIOL 3172 should have been cross-listed to SC/ENVB 3172 when the Course Proposal for SC/BIOL 3172 was initially drafted, reviewed, and approved.

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

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

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

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

**NEW COURSE PROPOSAL FORM**

**Faculty:**  
Indicate all relevant  
Faculty(ies)

Faculty of Science

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

Not Department Specific

**Date of Submission:** Fall 2022

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

SC/CAPS 4000

**Var:**

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

6.0

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

C4 Capstone Project

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

C4 Capstone Project

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

**Brief Course Description:**

**Maximum 2000 characters**

(approximately 300 words including spaces and punctuation).

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

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

The C4 Capstone Project brings together upper-year undergraduate from Faculties across the university to work in multidisciplinary teams on pressing, "real-world" challenges, which are posed by organizations operating in both the for-profit and not-for-profit worlds. They research, design, test, and reflect on potential solutions to their challenge that build on their existing skills and knowledge within their disciplines.

**Pre-requisite:** Students should normally be in their 4<sup>th</sup> year of study and must have completed a minimum of 21 credits in 3000- and 4000- level courses in the Honours Bachelor of Science or Honours Bachelor of Arts degree or by special permission. Cannot be used to satisfy the *Natural Science* credit requirement of the Honours Bachelor of Arts degree.

**Generic Course Description:**

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

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

**Expanded Course  
Description:**

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

The C4 Capstone Project brings together upper-year undergraduate from across the university to work together in multi-disciplinary teams on pressing, “real-world” challenges, which are posed by organizations operating in both the for-profit and not-for-profit worlds. In this full-year course, students work in teams with peers who are led by Faculty team leaders. They research, design, test potential solutions, and reflect on how the “real-world” challenges build on their existing skills and knowledge within their disciplines. This experience, in turn, offers them an opportunity to gain new insights into other ways of thinking through intensive teamwork. By collaborating with team members from other disciplines, students can experience the relevancy of their major fields of study and the ways in which they intersect with other disciplines to create new ways of approaching complex issues in a rapidly changing world. This course begins with a Fall Pitch Day where students learn about the range of socially relevant projects from which they can choose based on their interests and goals. It ends with a Spring Capstone Day where completed projects will be publicly showcased and recognized through awards and prizes. Throughout the course, students work together to mobilize and hone their critical, creative, and strategic thinking skills, in collaboration with their teammates, by researching and designing effective solutions to their chosen challenge.

Topics will vary from project to project. Topics could range from: community engagement, digital integration, social impact, and disciplinary boundary crossing.

The expected course learning outcomes include:

- Communicate strategically in professional contexts using a range of modes, genres, and media.
- Collaborate effectively in the management and completion of a large, complex research-design project.
- Develop, assess, and articulate personal and interpersonal competencies.
- Analyze and integrate multidisciplinary and emerging forms of knowledge to create new approaches to “real-world” 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.

## Course Design

Students enter the C4 Capstone Project because they see value in taking a "finishing year" experience to consolidate their academic learning and prepare them for after graduation through a hands-on multi-disciplinary experience with external partners ("organizational mentors"). The 6.0 credit course is Y term, beginning in the Fall.

Students are expected to attend Pitch Day to learn about current organizational issues/challenges. After identifying a challenge that interests them, they will work collaboratively in a cross-campus multi-disciplinary team to identify, design, and lead their own project addressing the real-world issue identified by the organization.

Throughout the course, there will be various informal opportunities to work on effective communication, utilize different communication technologies, hone collaboration skills, develop personal and interpersonal competencies, and mobilize interdisciplinary knowledge to create new approaches to "real-world" problems, through team and course director meetings and organizational mentor check-ins.

The C4 Capstone course also includes formal submission of material. By late November/early December, the team will submit a short proposal for their intended large, complex research-design project, along with reference materials outlining their foundation for their capstone project to their course director and organizational mentor.

In late-January/early-February, the team will submit a progress-check-in to their course director and/or organizational mentor for feedback and make revisions accordingly.

Students will be expected to present their projects publicly to faculty, external organizations, and students at C4 Capstone Day in April.

Finally, at the end of the term, students will submit an individual critical self-reflection to their course director on their journey of developing their personal and interpersonal competencies.

The University C4 teaching team will be responsible for the day-to-day operations and delivery of the course. The instructor who is assigned as the course director to SC/CAPS 4000 6.0 will be the designate to manage the grading in this course.

### **Learning Outcome: Communicate strategically in professional contexts using a range of modes, genres and media.**

Strategic professional communication will be developed through student meetings, and work in their multi-disciplinary teams; communication, meetings and feedback with their organizational mentor, and student to course director meetings, communication, and evaluation. The format

and mode of the meetings will vary from project to project. Students will be expected to utilize a variety of communication applications, such as Zoom, Microsoft Teams and Google Docs. Students will be expected to model professional behaviors that will be valuable for their future careers.

Additionally, at Capstone Celebration Day in April, students will be expected to present their projects publicly to faculty, external organizations, and students. Students may choose to use posters, videos, or other information technologies to present their final projects.

**Learning Outcome: Collaborate effectively in the management and completion of a large, complex research-design project.**

Effective collaborative learning leading to the completion of a high-quality complex research-design project is cornerstone of the C4 Capstone Project and is inherent in the course design. The C4 Capstone Project requires considerable student-led team collaboration.

Students will attend Capstone Pitch Day to hear about challenges posed by organizations operating in both the for-profit and not-for profit worlds. After identifying a pitch that interests them, they will work collaboratively in cross-campus multi-disciplinary team to identify, design, and lead their own project addressing the real-world issue identified by the organization. Students will have the autonomy to design and lead their own project in a collaborative setting.

The culmination of working effectively in their teams on the C4 capstone project will be the team presentation at the Capstone Celebration Day in April, where students will present their projects publicly to faculty, external organizations, and students.

**Learning Outcome: Develop, assess, and articulate personal and interpersonal competencies.**

Students will have opportunities to develop, assess, and articulate personal and interpersonal competencies throughout the C4 Capstone Project. Throughout the course, there will be various informal opportunities to work on personal and interpersonal competencies through team meetings and discussion with the organizational mentor.

There will also be opportunity for formal opportunities to develop, assess, and articulate personal and interpersonal competencies. In late September/early October, in their team's students will hand in a short abstract of their intended large, complex research -design project, along with reference materials outlining their foundation for their capstone project. This abstract will be formally reviewed by the course director. This formal review will be an opportunity to start to develop their personal and interpersonal competencies with the course director, and organizational mentor.

In mid-January students will submit a progress-check-in to their course supervisor and/or organizational mentor for feedback and make revisions accordingly. Once again, this is a formal opportunity to continue to develop, assess and articulate personal and interpersonal competencies.

At the end of the term, students will submit a critical self-reflection to their course director on their journey of developing their personal and interpersonal competencies.

**Learning Outcome: Analyze and integrate multidisciplinary and emerging forms of knowledge to create new approaches to “real-world” problems.**

The course structure is designed so students utilize high-impact practices that require advanced critical and creative thinking to apply their disciplinary knowledge and skills to real-world situations in a team setting.

Students will analyze current information to identify and design a multidisciplinary research project to address a current issue/challenge facing a for-profit, or not-for profit organization. Using knowledge mobilization techniques, students in different disciplines working in teams will be challenged to recognize the transferability of their skills and knowledge to create new approaches to the “real-world” problem they identified.

### **Contact Hours**

Beyond the Pitch Day in early September, and the Capstone Day Celebration in April, C4 teams meet weekly for 3 hours with their course director and/or organizational mentor. Students are expected to engage in about 10 hours per week on their C4 Capstone Project.

### **Course Design Encourages Student Engagement and Supports Students in Achieving the Learning Outcomes**

Students will be undertaking a team-directed deep exploration of an issue/challenge posed by an external organization to develop a project to address the identified issue. Engagement in the project is facilitated by a course director, who will manage the course, and will offer formative feedback advice and assessment throughout the course, and as well through valuable mentorship by the associated external organizational mentor.

**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. SC/CAPS 4000 6.0 will be offered each Fall starting in Fall 2023 and run as a full year course (Term Y).
2. C4 Capstone program is organized by a multidisciplinary team of professors and instructors that spans both of York's campuses (<https://www.yorku.ca/c4/about-us/our-team/>). The Faculty Supervisor position can be filled by any faculty member from the Faculty of Science.
3. The Course Director for C4 Capstone Project will be determined, but this individual will be selected from among the Faculty of Science.
4. Students will be expected to attend weekly 3-hour class meetings plus to spend 6-7 hours of work per week in preparation, team engagement, reading, research, and assignment/presentation preparation.

### 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.)

### Marking Scheme:

- Core Skills training (3% each on Ethics, Teamwork, Project Management, Inclusive Design and Storytelling for Design): 15%
- Team engagement (1.5% each on 4 Peer Reviews and 6 Team Evaluations using ITP Metrics questionnaires): 15%
- Project Materials:
  - Research/design portfolio: 25%
  - Full portfolio: 35%
- Capstone Day presentation: 10%

Total: 100%

Rubric marking will be extensively used, with the rubrics included in a document detailing the assignments.

### 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

Due the unique experiential cross-curricular nature of the course required reading will vary based on the specific capstone project. In general, the existing electronic journal subscriptions should be sufficient for the course.

Online Resources include:

For faculty members, students, and external mentors there are many useful resources on the C4 cross-campus capstone classroom website: <https://capstone.yorku.ca/>. There are specific resources, question & answers, and support information specific to faculty, students, and mentors on the website.

Faculty members, may also find useful online resources on experiential education, such as structured reflection, core competencies and post experiential activities, at the Teaching Commons website: <https://ee-guide.info.yorku.ca/>

AACU (American Academy of Colleges (<https://www.aacu.org/value-rubrics>)) has developed and provides free of charge various rubrics for evaluating teamwork, and presentation skills that could be used for evaluation purposes for this course.

included. If no additional readings are to be required, a rationale should be supplied.

**LIBRARY SUPPORT STATEMENT MUST BE INCLUDED.**

York also offers a great free online resource for students on writing, which could help students with the writing submissions in this course.  
<https://spark.library.yorku.ca/>

**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 new physical resources are required to mount this course. No new faculty will need to be hired for this course.

**Course Rationale:**

*The following points should be addressed in the rationale:*

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

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

*The expected enrolment in the course.*

The rationale for the course is to provide students with a for-credit multidisciplinary team-based “finishing year” experience to consolidate their academic learning and prepare them for after graduation through addressing complex real-world challenges using advanced research and design methodologies with external partner mentorship. The aim is for the students to make real social impact. It will contribute 6.0 credits towards the requirement of *science outside of the major* for the Honours Bachelor of Science degree. In this respect, specific program requirements including major credits, such as *Honours Thesis*, are not replaced by the C4 Capstone Project course.

C4 capstone projects enable students to engage with off-campus partners to gain new ways of thinking about challenges, get to know potential employers, and develop managerial experience, and teamwork skills. Successfully completing this course will contribute to the students’ ability to achieve the following program expectations:

- Evaluate and carry out appropriate experimental and observational methodologies to answer questions in science, safely, and effectively.
- Gather, organize, synthesize, and critically evaluate information (textual, numerical and graphical) from scientific literature and other sources
- 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.
- Speak and write effectively and clearly for a diversity of audiences.
- Effectively communicate scientific concepts, data, and arguments through written, visual and oral methods to peers and scientists
- Identify limitations of scientific knowledge, experiments and evidence-based inquiry, both in one’s own research and that of others.
- Work effectively and collaboratively with others as part of a team.
- Demonstrate academic integrity, social responsibility, and respect for diversity and different points of view.
- Exercise self-reflection, self-assessment and independence in learning and goal setting, take responsibility for decisions and actions.

**Faculty and Department Approval for Cross-listings:**

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

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

Accessible format can be provided upon request.

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

**NEW COURSE PROPOSAL FORM**

**Faculty:**  
Indicate all relevant  
Faculty(ies)

Faculty of Science
--------------------

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

Mathematics and Statistics
----------------------------

**Date of Submission:**

--

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

MATH 1515
-----------

**Var:**

--

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

3.00
------

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

General Mathematics for Software Development
--

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

General Math for Software Development
---------------------------------------

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

**Brief Course Description:**

**Maximum 2000 characters**

*(approximately 300 words including spaces and punctuation).*

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

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

This course introduces general mathematics for software development. It builds a foundation for quantitative and communication fluency for software developers. Students learn introductory and fundamental topics from broad areas of mathematics. The broad areas include Algebra, Set Theory, Calculus, Statistics, and Probability. As necessity arises, students are expected to learn more advanced and/or specialized subjects through just-in-time learning. While the concepts and skills that students are required to master are on the introductory level, the course presents and encourages applications to software development and possible interdisciplinary projects.

**Prerequisite:** 12U Advanced Functions (MHF4U) or equivalent, or SC/MATH 1510 3.00.

**Notes:** This course may not be taken by any student who has taken or is currently taking another university course in mathematics or statistics except MATH 1510.

**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.

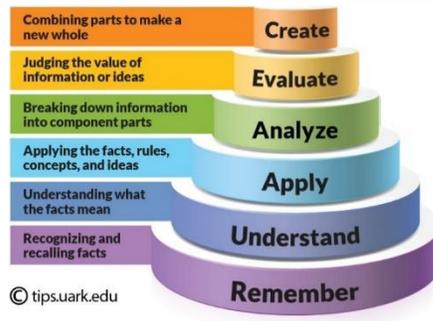
This course introduces general mathematics for software development. It builds a foundation for quantitative and communication fluency for software developers. Students learn introductory and fundamental topics from broad areas of mathematics. The broad areas include Algebra, Set Theory, Calculus, Statistics, and Probability. As necessity arises, students are expected to learn more advance and/or specialized subjects through just-in-time learning. While the concepts and skills that students are required to master are on the introductory level, the course presents and encourages applications to software development and possible interdisciplinary projects.

**Prerequisite:** 12U Advanced Functions (MHF4U) or equivalent, or SC/MATH 1510 3.00.

**Course Learning Objectives (CLO)**

There are six CLOs that students should achieve after the successful completion of this course. Mastery of each CLO is demonstrated by Lesson Objectives (LO) which will be assessed via summative assessments (see Assessment). The following learning objectives map to CSSD PLOs 3, 7, and DT PLOs 5,6,8,9.

The following diagram shows the hierarchical levels of learning (Bloom’s taxonomy, [https://en.wikipedia.org/wiki/Bloom's\\_taxonomy](https://en.wikipedia.org/wiki/Bloom's_taxonomy)). (credit: Jessica Shabatura, <https://tips.uark.edu/using-blooms-taxonomy/>)



While the summative assessments will assess higher levels of the taxonomy, the formative assessments will assess lower levels of the taxonomy throughout the course to support the students’ learning process. In the following table, the cognitive processes are in *italics* and the subject matter content is in **bold**. The verbs in the parentheses indicate the levels in the taxonomy.

“Upon successful completion of this course, students are expected to be able to”

CLO	LO
(analyze) <i>effectively use matrix algebra</i> to solve the given problem.	<ol style="list-style-type: none"> <li>(apply) <i>carry out</i> by hands <b>matrix operations</b> including addition, scalar multiplication, product, and finding the inverse up to the size of 3 by 3.</li> <li>(analyze) <i>write up</i> a <b>matrix equation</b> to solve the given verbal problem.</li> <li>(analyze) <i>analyze</i> the mathematical result of a matrix equation in terms of <b>the original verbal problem</b>.</li> </ol>
(evaluate) <i>strategically</i>	<ol style="list-style-type: none"> <li>(evaluate) <i>determine</i> basic attributes of</li> </ol>

<p>solve the given problem by using fundamental concepts in <b>differential calculus</b>.</p>	<p><b>functions</b> including domain, range, intervals of in/decreasing, continuity, an differentiability by using various methods including examining the graphs of functions.</p> <ol style="list-style-type: none"> <li>2. (apply) <i>carry out</i> evaluation of limits using <b>limit laws</b>. (This course does not assess the limit evaluation of indeterminate forms)</li> <li>3. (evaluate) <i>find</i> horizontal/vertical <b>asymptotes</b></li> <li>4. (evaluate) <i>determine</i> <b>continuity and types of discontinuity</b> of functions using the definition of continuity.</li> <li>5. (apply) <i>find</i> the <b>derivative</b> of basic functions by the definition. (This course does not cover differentiation techniques.)</li> <li>6. (evaluate) <i>effectively use</i> the concept, derivative, to solve the given problem. It requires a <b>correct interpretation of the derivative</b> which includes slope of tangent, velocity, and rate of change.</li> </ol>
<p>(analyze) <i>apply</i> basic concepts in <b>set theory</b> in the study of probability theory.</p>	<ol style="list-style-type: none"> <li>1. (apply) <i>carry out</i> <b>set operations</b> with correct usage of set notations, which include union, intersection, and complement.</li> <li>2. (analyze) <i>visualize</i> a sample space and its events in probability theory using <b>Venn diagrams</b>.</li> </ol>
<p>(evaluate) <i>critically organize, describe and measure data</i> (descriptive statistics)</p>	<ol style="list-style-type: none"> <li>1. (analyze) recognize and differentiate between <b>key terms</b>.</li> <li>2. (evaluate) <i>apply and critically evaluate</i> various types of <b>sampling methods</b> to data collection.</li> <li>3. (analyze) <i>analyze</i> data using <b>graphical methods</b> including stemplots, histograms, and box plots.</li> <li>4. (analyze) analyze data using <b>numerical methods</b> measuring the location (quartiles and percentiles), center (mean, median, mode), and spread (variance, standard deviation, range) of data.</li> </ol>
<p>(analyze) <i>Systematically solve</i> <b>probability problems</b>.</p>	<ol style="list-style-type: none"> <li>1. (analyze) <i>solve</i> counting problems using suitable counting concepts including <b>permutation and combination</b>.</li> <li>2. (analyze) <i>solve</i> probability problems for the following cases: <ol style="list-style-type: none"> <li>a. <b>finite sample space with/without equally likely outcomes</b></li> <li>b. <b>mutually exclusive</b> events</li> <li>c. <b>independent</b> events</li> <li>d. <b>conditional</b> probability</li> </ol> </li> <li>3. (apply) <i>describe</i> discrete random variables using <b>histograms (probability distribution), probability mass function, and cumulative distribution function</b></li> </ol>

	<p>4. (apply) <i>compute mean (expected value) and variance</i> of a discrete random variable.</p> <p>5. (analyze) distinguish case problems as <b>special discrete random variables</b> to carry out computations. They include <b>Bernoulli</b> and <b>binomial random variables</b> (extra ones: Poisson, geometric, hypergeometric)</p>
(create) <i>construct</i> written arguments to demonstrate <b>communication fluency</b>	Refer to the basic rubric given in the section of Evaluation.

### Schedule with topics

Module	Week	Topics
Matrix Algebra	week 1	<ul style="list-style-type: none"> <li>matrix operations</li> <li>matrix equations</li> <li>applications of matrix algebra</li> </ul>
Differential Calculus	week 2	<ul style="list-style-type: none"> <li>attributes of functions</li> </ul>
	week 3	<ul style="list-style-type: none"> <li>limits with limit laws</li> <li>asymptotes</li> <li>application to running time computation by good approximating functions (if time permits)</li> </ul>
	week 4-5	<ul style="list-style-type: none"> <li>continuity</li> <li>rate of change and derivative</li> <li>L'Hospital's rule and application to running time computation by good approximating functions (if time permits)</li> </ul>
Statistics	week 6	<ul style="list-style-type: none"> <li>key terms</li> <li>sampling methods with critical evaluation</li> </ul>
	week 7	<p>descriptive statistics</p> <ul style="list-style-type: none"> <li>graphical methods</li> <li>numerical methods to measure the</li> </ul>

		location, center, and spread of data
Probability	week 8	<ul style="list-style-type: none"> <li>• basic counting (combinatorics)</li> </ul>
	week 9	<ul style="list-style-type: none"> <li>• basic set operations, notations, and Venn diagrams</li> <li>• basic probability</li> </ul>
	week 10	<ul style="list-style-type: none"> <li>• conditional probability</li> <li>• Bayes theorem</li> </ul>
	week 11	<ul style="list-style-type: none"> <li>• discrete random variables</li> </ul>
	week 12	<ul style="list-style-type: none"> <li>• special discrete random variables: Bernoulli, binomial (Poisson, geometric, hypergeometric)</li> <li>• If time permits, continuous random variables are introduced, especially normal distribution.</li> </ul>

### 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.

As this course covers a wide breadth of introductory mathematics concepts, it provides a structured weekly learning plan through which students can experience the learning process. It also promotes engagement as a community and supports the students to make their own learning plans that work best for their individual needs.

Also, this course is required for BASc in Computer Science for Software Development (CSSD) and BASc Honours in Digital Technologies (DT) which are expected to begin at the Markham Campus in Fall 2023. These programs emphasize experiential learning with community integration. In particular, DT work - integrated with partnerships with employers. To accommodate students' needs for scheduling, all 3 hours of lectures per week will be delivered asynchronously. Optional in-person support such as the office hours of the instructor and weekly tutorials by teaching assistants (1 hour per week) will be provided.

The weekly learning plan consists of Objectives, Pre-Class, Learn, Share, Assess, Reflect.

- Pre-Class: Students study at their own pace through an asynchronous activity. The activity includes pre-recorded videos and quiz questions. Through this activity, students experience reflecting on their own previous knowledge and take time to get familiar with new concepts, notations, and terminology.
- Learn: Based on the pre-class activity, students are engaged in solving more advanced problems. Various asynchronous activities are provided, including pre-recorded videos. Through this activity, students experience transforming given knowledge into a mathematical setting to solve and analyze the results.
- Share: Students share their learning with peers through a discussion forum. They are encouraged to solve practice problems together to prepare for the assessment. Through this activity, students experience many aspects of collaboration.
- Assess: There is an online quiz based on the practice problems. Students are encouraged to learn from their own mistakes through a retake opportunity. Through this activity, students experience taking responsibility for their learning and understanding the minimum requirement to move to the next week's study.
- Reflect: Students reflect on their confidence in achieving each learning objective. Also, to promote a positive environment, let them brag about the best thing they did.

Self-assessment with learning plan: students without proper prerequisites, especially algebraic skills, will have crucial difficulties having positive learning experiences in this course. To promote equity in learning, students will have an opportunity to get ready for the course. Within the first two weeks, students will take self-assessment tests (for example, tests from ALEKS) and a suitable support plan should be made (minimum 80 points from ALEKS test; alternative/learning plan with advising).

Technology:

Students will be using eClass and various tools integrated with eClass such as iClicker and Zoom. Microsoft Class Notebook may be suggested to use for group collaboration. Microsoft OneNote will be used for lecture notes. Desmos

and other online math applications can be used. WebWork (online homework system) can be used if it will be available.

Written Assignments for applications: there will be assignments that students have about 2 weeks to complete. Through this activity, students experience the components of research.

**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. In 2023-24, we anticipate having one section for each term (Fall and Winter). From 2024 onward, we anticipate having one or two sections in Falls and one section in Winters.
2. Every faculty in the department is competent to teach the course.
3. It is open to every faculty in the department.
4. 3 lecture hours per week.

**Evaluation:**

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

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

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

In keeping with principles of universal course design, the course assessments include aspects of flexibility, accessibility, and student choice. Additionally, a focus on equity, diversity, and inclusion is at the forefront of these assessments.

There are two types of assessments for the final grade for the course: **formative one (30%)** to assess the progress in learning. This is to encourage students to actively own their learning through consistent class participation and keep up with the learning schedule. To successfully achieve the course learning objectives by the end of the course, it is essential to study on a regular schedule to experience deepening their knowledge. The other one is **summative assessment (70%)**. This is to assess the achievements of the course learning objectives, i.e., how much students have learned. More details follow:

**Formative assessment:****10% Class Participation:**

- The weekly asynchronous learning plan has various activities including pre-class quizzes and reflections which should be completed within the week. To add flexibility for individual situations including technical problems, there will be 20% excuse points. For example, suppose the total points for these activities by the end of the course is 300 points, students are excused for 60 points for any reason. That is, they will get the maximal grade by obtaining 240 points (80%).
- Various brief activities throughout the course including surveys.

**20% Weekly online Quiz & retake (5 x 4%):**

- The quiz will be available any time between 9:00 AM and 11:59 PM. Students will have 50 minutes to complete the quiz. The 50 minutes begins when they start the quiz. They will be given a list of practice problems on which the quiz will be based. The quiz questions are of basic to medium difficulty level. This activity is to make sure that students study at least the minimum to continue to the next topics and to encourage them to study by themselves using many resources including the textbook.
- Students can retake the quiz on the next quiz day. However, they can only claim up to 70% of the full score of the quiz. For example, if a student's eQuiz 2 score is 5 out of 10 and they retake eQuiz 2 and get a score 9 out of 10, their retake score will be 7 out of 10. Then, their final eQuiz 2 score is the larger one, 7 out of 10. This is to encourage students to learn from their mistakes while preventing discouraging them to do their best at the first take.
- There will be up to 8 eQuizzes in total. Their grade will be based on their best 5 quizzes. Each of the best 5 quizzes is worth 4% of the final grade. This is again to add flexibility for the individual situations including technical problems. Thus, there will be neither extensions nor make-up quizzes.

**Summative assessment:****30% Term Tests (2 x 15%)**

There will be two term tests during in-class times, each worth 15% of the final grade. These are in-person tests on campus.

Sample tests will be available one week in advance.

**10% Written Assignments (2 x 5%)**

There will be two written assignments available, each worth 5% of the final grade. To allow for any technical difficulties or upload issues, and in accordance with Universal Design for Learning (UDL), submissions will be accepted without penalty up until 11:59pm (EST) on the Sunday immediately following the deadline (Fridays). Assignments submitted after midnight Sunday will have a 5% per hour lateness penalty applied.

**30% Final Examination**

The Final Exam will cover all material from the entire course. This is an in-person test on campus.

Sample tests will be available one week in advance.

**Basic Rubric:** Each question follows its own grading scheme. However, the following may guide you when you write up your answers, especially for the written assignments.

Well-Executed	Well-Communicated	Essentially Correct
<ul style="list-style-type: none"> <li>• Applies a strategy that makes sense for the given question</li> <li>• Applies appropriate mathematical concepts and processes</li> <li>• Does not introduce superfluous material</li> <li>• Technology is used appropriately</li> <li>• Work is logical and includes a sanity check of the final answer</li> </ul>	<ul style="list-style-type: none"> <li>• Readable: Work stands alone (retains context) and is neat and professional in appearance</li> <li>• Organized: Provides a clear logical flow from beginning to end</li> <li>• Provides sufficient supporting detail and explanation throughout</li> <li>• Work is free from grammatical errors</li> <li>• Mathematical composition, terminology, and notation is correct</li> <li>• Results and/or conclusions are clearly annotated</li> </ul>	<ul style="list-style-type: none"> <li>• Precision: Performs mathematical operations correctly and derives the correct results</li> <li>• Uses an appropriate degree of accuracy</li> <li>• Draws correct inferences from graphical or numerical data</li> <li>• Any computational or algebraic errors are trivial and isolated</li> <li>• Correct units are used</li> </ul>

A: This is well-executed, well communicated, and essentially correct.  
 B: You know how to solve the problem, but there are some mathematical and/or errors that need addressing.  
 C: You have an impressive “D”. For example, you have made a serious mistake and communicated how you know that it is a mistake.

D: Adequately executed but there is at least one serious flaw or inconsistent communication  
F: Unsatisfactory execution and/or communication with fundamental errors

**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.**

1. For matrix algebra: A First Course in Linear Algebra, Ken Kuttler, open source at [https://math.libretexts.org/Bookshelves/Linear\\_Algebra/A\\_First\\_Course\\_in\\_Linear\\_Algebra\\_\(Kuttler\)](https://math.libretexts.org/Bookshelves/Linear_Algebra/A_First_Course_in_Linear_Algebra_(Kuttler))
2. For differential calculus: Calculus, Gilbert Strang & Edwin Herman, open source at [https://math.libretexts.org/Bookshelves/Calculus/Book%3A\\_Calculus\\_\(OpenStax\)](https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Calculus_(OpenStax))
3. For statistics: Introductory Statistics, open source at <https://openstax.org/details/books/introductory-statistics>
4. For probability: Introductory Probability, Grinstead and Snell, open source at [https://stats.libretexts.org/Bookshelves/Probability\\_Theory/Book%3A\\_Introductory\\_Probability\\_\(Grinstead\\_and\\_Snell\)](https://stats.libretexts.org/Bookshelves/Probability_Theory/Book%3A_Introductory_Probability_(Grinstead_and_Snell))

Also recommended:

Biocalculus: Calculus, Probability, and Statistics for the Life Sciences, Stewart and Day, 2016, Cengage Learning. The library should have copies.

**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.**

- (1) Rooms for in-person exams for about 200 students (two exams during the term)
- (2) Classrooms for weekly one-hour tutorials for about 200 students, which are equipped with audio/visual facilities and writing boards.
- (3) Teaching assistants to provide the weekly one-hour tutorials.

**Course Rationale:**

*The following points should be addressed in the rationale:*

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

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

*The expected enrolment in the course.*

This course is required for BAsC in Computer Science for Software Development (CSSD) and BAsC Honours in Digital Technologies (DT) that are expected to begin at the Markham Campus in Fall 2023. It covers general mathematics for students who major in software development. More precisely, students learn introductory and fundamental topics from broad areas of mathematics. It is expected that students will learn more advanced and/or specialized subjects through just-in-time learning as necessity arises. In this aspect, there is no overlap with other existing offerings. The expected enrolment in the course for the inaugural year is 200 students, 100 from each program.

This course maps to the following program outcomes:

CSSD PLO 3	Formulate solutions for problems related to systems and organizations while reconciling conflicting objectives and finding trade-offs.
CSSD PLO 7	Communicate technical information with a variety of audiences.
DT PLO 5	Demonstrate personal and interpersonal competencies in order to engage effectively at all levels within an organisation
DT PLO 6	Clearly communicate, both orally and in writing, complex ideas to a variety of audiences using a range of appropriate strategies and media
DT PLO 8	Apply critical analysis and logical reasoning, including mathematical foundations, algorithmic principles, and computer science theory, to the theoretical, conceptual and practical issues central to developing digital solutions
DT PLO 9	Demonstrate problem-solving and modelling skills appropriate to developing digital solutions by selecting and using well-defined engineering processes that iteratively integrate requirements, design, construction, validation, and other phases of development

**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:** Jihyeon Jessie Yang

**From:** William Denton

**Date:** 21 September 2022

**Subject:** Library Statement of Support – MATH 1515 General Mathematics for Software Development

### Summary

I applaud the use of open educational resources for textbooks in this course. York University Libraries (YUL) [supports and encourages OERs](#) and I and my colleagues are always happy to see them used. Furthermore, the Libraries' Open Scholarship department offers [support to researchers on digital publishing](#), open repositories, and Creative Commons licensing.

Beyond that, 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.

### 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.

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:

- [Mathematics and Statistics](#)
- [Computer Science](#)

## Research Help

Online [research assistance](#) is available in both French and English via chat, text, and email. In addition, students and faculty can book [one-hour research consultations](#) with a specialist librarian. The Libraries also offer a virtual drop-in service hosted through Zoom for help in real-time.

## Accessibility Services

Located on the first floor of the Scott Library (Keele Campus), [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.

		Course(s) Created X or Modified to <input type="checkbox"/> (check one)	Course(s) Retired <input type="checkbox"/> or Modified from <input type="checkbox"/>
<b>Complete Course Designation</b>		Math 1515 General Mathematics for Software Development	
<b>Enrolment (Estimate)</b>		200 (2 sections of 100)	
<b>Number of:</b>	<b>Lecture Sections:</b>	2 (1 fall, 1 winter)	
	<b>Lab Sections:</b>	None	
	<b>Tutorial Sections:</b>	2 (1 fall, 1 winter)	
<b>Number of:</b>	<b>Course Coordinators (Tutor 1):</b>	None	
	<b>Lab Demo (Tutor 2):</b>	None	
	<b>Mark/Graders (Tutor 3):</b>	Depending on enrolment. Estimate is 150 hours marking/grading.	
<b>Prerequisites (P) Corequisites (C) Credit Exclusions (E)</b>		<b>Prerequisite:</b> 12U Advanced Functions (MHF4U) or equivalent, or SC/MATH 1510 3.00. <b>Notes:</b> This course may not be taken by any student who has taken or is currently taking another university course in mathematics or statistics except MATH 1510.	
<b>For which degree program is this required (if applicable)?</b>		BASc in Computer Science for Software Development (CSSD) and BASc Hons in Digital Technologies (DT) for Markham starting Fall 2023.	

<b>Other resource implications (please specify)</b>	Rooms for in-person exams (two exams during the term). Classrooms for weekly one-hour tutorials equipped with audio/visual facilities and writing boards.		
<b>Reason(s) for creation/ modification/ retirement</b>	To support the new programs, BAsC in Computer Science for Software Development (CSSD) and BAsC Honours in Digital Technologies (DT) which are expected to begin at the Markham Campus in Fall 2023.		

# Changes to Existing Course

Faculty:

Department:

Mathematics and Statistics

Date of Submission:

Course Number:

MATH 1581

Effective Session:

FW 22/23

Course Title:

Business Mathematics I

Type of Change:

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

Change From:

To:

Introduction to interest rates (simple, compound), annuities (ordinary, due, deferred), amortization (mortgages, other debts), sinking funds, bonds (face value, bond rate, price, yield rate) and depreciation (straight line, constant percentage).

Prerequisite: Ontario Grade 11 mathematics or equivalent.

Course credit exclusion: SC/MATH 2580 6.00 (prior to Fall 2010), SC/MATH 2280 3.00, GL/ECON1950 3.00, GL/MATH 1950 3.00, GL/MATH 2680 6.00, GL/MODR 1950 3.00.

Introduction to interest rates and the time value of money. Topics include simple and compound interest, equations of value, annuities, loans, mortgages, and bonds. Spreadsheets (e.g. Excel/Open Office/Google Sheets) will be taught and used extensively.

Prerequisite: Ontario Grade 12 Advanced Functions or equivalent.

Course credit exclusion: SC/MATH 2580 6.00 (prior to Fall 2010), SC/MATH 2280 3.00, GL/ECON1950 3.00, GL/MATH 1950 3.00, GL/MATH 2680 6.00, GL/MODR 1950 3.00.

**Rationale:**

We're moving from using calculators to spreadsheet software as the most effective and relevant computational tool. This shift serves the students that take this course by preparing them better to the relevant best practices in Financial Services.

The requirement for Advanced Functions brings this course in line with existing prerequisites in the programs which this course primarily serves.

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.

## Non-Major Modification Program Changes

1. Program:
  2. Honours Minor Program- Physics Stream  
Honours Minor Program- Astronomy Stream.
  3. Degree Designation: B.Sc.
  4. Type of Modification: change to definition of Program Core
  5. Effective Date: Fall 2022
- 

6. State what the changes are (Example: increase / decrease to the number of major credits)

SC\PHYS 3030 3.00 Statistical and Thermal Physics has been added to the program core for most Physics and Astronomy programs and streams. The Minor- Physics stream is increasing from 33 to 36 credits. The Minor- Astronomy stream will remain unchanged at 39 credits.

7. Provide the rationale for the proposed changes that is rooted in the program learning outcomes.

Statistical and Thermal Physics are integral parts of an undergraduate curriculum for Physics, Astronomy students around the world. It is essential for understanding topics as diverse as White Dwarfs, Brownian motion, modelling DNA and macromolecular processes, Atmospheric Radiative Transfer, Semiconductors etc. They represent 10% of the material covered by the physics Graduate Record Examination, only exceeded by Classical Mechanics (20%), Electromagnetism (18%) and Quantum Mechanics (12%).<sup>1</sup> Our research has not found a single Canadian university that does not require undergraduates enrolled in Astronomy, Astrophysics, Biophysics or Physics programs to take this course.<sup>2</sup> Indeed, many programs mandate a separate Thermodynamics in addition to a Statistical

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1 Education Testing Service Graduate Record Examination:  
[www.ets.org/gre/subject/about/content/physics/](http://www.ets.org/gre/subject/about/content/physics/)

2 We checked websites giving course requirements for Physics or Astronomy Degrees at the following universities: Alberta, British Columbia, Manitoba, McGill, McMaster, New Brunswick, Toronto, Waterloo, Western Ontario, Windsor.

Mechanics course. Statistical and Thermal Physics topics are not covered in any other course within our program core. Finally, an understanding of Statistical Mechanics is prerequisite for Condensed Matter, Advanced Materials, Nanoscience; fields that have a growing number of research intensive private sector companies employing very large numbers of physicists.

PHYS3030 is already part of Physics and Astronomy Major program degree cores, and of the Biophysics Program Core.

8. Provide an updated mapping of the program requirements to the program learning outcomes to illustrate how the proposed requirements will support the achievement of program learning objectives.
9. 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.

This only affects our unit. A motion to include PHYS3030 in the program core was passed by the PHAS Curriculum Committee on Sept 8, 2021, and by the PHAS Department on Sept 15, 2021. The initial round of changes implemented only included the Major degrees. Unintentionally, the minor degree requirements were not considered. Adding PHYS 3030 to "Program Core" however did affect the minor requirements. Given that the department and the FSc CC did not weigh in on the changes to the minor programs, an ad hoc degree change was implemented in Dec 2021 (by S. Ribeiro and M. George, PHAS UPD) to remove the reference to the "Program Core" for the minors thus keeping the minor degree requirements effectively unchanged.

The PHAS curriculum committee discussed the effect on the Minor degrees in Winter 2022 and presented these changes to the department on April 20, 2022. These changes will allow the minor degrees to again refer to the "Program Core" which was most recently updated in Fall 2021 for implementation in Sept 2022.

10. 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.

SC\PHYS 3030 3.0 has been taught every year, and will continue to be. There is no change to the resources required.

11. Provide a summary of how students currently enrolled in the program will be.

This will have no impact on the number or selection of PHYS courses being offered.

12. Provide as an appendix a side-by-side comparison of the existing and proposed program requirements as they will appear in the Undergraduate or Graduate Calendar.

For reference, the Program Core effective Sept. 2022 :

The program core is defined to be (27 credits): SC/PHYS 1011 3.00 and SC/PHYS 1012 3.00, or SC/PHYS 1010 6.00; SC/PHYS 2010 3.00; SC/PHYS 2020 3.00; SC/PHYS 2040 3.00; SC/PHYS 2060 3.00; SC/PHYS 3030 3.00; SC/PHYS 3040 6.00.

## Honours Minor

Students may follow a stream in physics or a stream in astronomy in the minor subject area.

### Physics Stream

- SC/PHYS 1011 3.00 and SC/PHYS 1012 3.00, or SC/PHYS 1010 6.00; SC/PHYS 2010 3.00; SC/PHYS 2020 3.00; SC/PHYS 2040 3.00; SC/PHYS 2060 3.00; SC/PHYS 3040 6.00 (24 credits including six credits at the 3000 level);
- SC/PHYS 2213 3.00; SC/PHYS 3220 3.00;
- three credits from SC/PHYS 3010 3.00, SC/PHYS 3020 3.00, SC/PHYS 3030 3.00, SC/PHYS 3090 3.00 for an overall total of 33 credits from PHYS courses.

### Astronomy and Astrophysics Stream

- SC/PHYS 1011 3.00 and SC/PHYS 1012 3.00, or SC/PHYS 1010 6.00; SC/PHYS 2010 3.00; SC/PHYS 2020 3.00; SC/PHYS 2040 3.00; SC/PHYS 2060 3.00; SC/PHYS 3040 6.00 (24 credits including six credits at the 3000 level);
- SC/PHYS 1070 3.00;
- SC/PHYS 2070 3.00; SC/PHYS 2213 3.00; SC/PHYS 3070 3.00 or SC/PHYS 4270 3.00;
- three credits from SC/PHYS 3010 3.00, SC/PHYS 3020 3.00, SC/PHYS 3030 3.00, SC/PHYS 3090 3.00 for an overall total of at least 39 credits from PHYS courses.

## Honours Minor

Students may follow a stream in physics or a stream in astronomy in the minor subject area.

### Physics Stream

- the program core, as specified above (27 credits including six credits at the 3000 level);
- SC/PHYS 2213 3.00; SC/PHYS 3220 3.00;
- three credits from SC/PHYS 3010 3.00, SC/PHYS 3020 3.00, SC/PHYS 3090 3.00 for an overall total of 36 credits from PHYS courses.

### Astronomy and Astrophysics Stream

- the program core, as specified above (27 credits including six credits at the 3000 level);
- SC/PHYS 1070 3.00;
- SC/PHYS 2070 3.00; SC/PHYS 2213 3.00; SC/PHYS 3070 3.00 or SC/PHYS 4270 3.00;
- for an overall total of at least 39 credits from PHYS courses.

## Non-Degree Activities in the Faculty of Science

### Introduction

1. The Senate of the University requires that each Faculty have an approval process for activities that are designated *Non-Degree activities*.

Definition: Non-degree activities are “all courses of instruction associated with the name of York University or its Faculties that are neither offered nor approved as degree credit for which a fee beyond incidental costs is paid. Non-degree activities may include courses, course modules and workshops (Senate, June 2019)”.

2. Further, this policy does not apply to symposia and colloquia organized by internal units or external entities, lecture series, professional development programs for undergraduate and/or graduate students, or community outreach activities. This policy does not apply to Engagement Programs, such as the *Science Summer Transition Program* or other enrichment programming for children and youth.

3. Further, the *Senate-approved Principles and Procedures Governing Non-Degree Studies* stipulates that,

“Non-degree activities advance the overarching priorities of academic quality, student success and community engagement that are reflected in York University’s planning documents. The Advisory Committee on Non-Degree Studies is mandated to provide oversight to ensure that high quality courses and programs offered outside of the ‘for credit’ approval structures enhance the University’s reputation and provide real benefits in terms of student success, whether through an access lens, or as a professional development, or life-long learning opportunity.

- a. Non-degree studies will complement the academic mission of a Faculty or of the University and not compete with degree programs.
- b. Faculties and other offering units will be responsible for their own non-degree studies activities.
- c. Non-degree studies activities should be self-sufficient, preferably returning a profit to the Faculty or the University to assist in the funding of degree program activity.
- d. Faculties and other offering units will act co-operatively in non-degree studies activities and in relation to degree studies so that duplication and competition are avoided.

- e. The regulatory framework governing non-degree studies will be flexible and efficient, maintaining the principles indicated above and ensuring appropriate administrative, budgetary and academic oversight.”

4. In addition, it is acknowledged that the University must respond quickly to non-degree opportunities in an evolving educational and labour market landscape to remain current and competitive. It is acknowledged that the expertise for program development and the responsibility for approving programs reside with the offering Faculty/Unit.

## Faculty of Science Approval Process for Non-Degree Activities

All new proposals for non-degree activities are to be submitted to the Dean, and must include the following:

1. Objective of the non-degree activity and how the activity:
  - a. will complement the academic mission of the Faculty or of the University.
  - b. does not compete with degree programs.
2. Identification of the target audience.
3. Development of a business model that includes detailed description of:
  - a. Market analysis demonstrating need and demand.
  - b. Budget that clearly defines all costs, including instructor commitments, and expected revenue.
  - c. Description of marketing, advertising, and promotion.
4. Proposed instructors, e.g. YUFA/CUPE/others, with a description of the relevant qualification requirements.
5. Consultation process followed, including consultation with other relevant Faculties/degree-offering units.
6. Letters indicating support from participating Faculties, Departments/Units, if any.
7. Criteria and procedures for assessing quality.
8. Governance of the program.
9. Approval by the Dean or Associate Dean of the Faculty of Science, in the form of a letter of support.

Decisions regarding frequency of offerings or program closure will rest with the Dean. The Director of the relevant non-degree activities should provide a status report to the Associate Dean *Curriculum and Pedagogy* within 1 month of the completion of the activities. The Dean will report to Faculty Council on the status of non-degree activities in FSC annually.