



**FOR APPROVAL**

**PUBLIC**

**OPEN SESSION**

**TO:** UTSC Academic Affairs Committee

**SPONSOR:** William Gough, Vice-Principal Academic and Dean  
**CONTACT INFO:** 416-208-7027, vpdean@utsc.utoronto.ca

**PRESENTER:** Mark Schmuckler, Vice-Dean Undergraduate  
**CONTACT INFO:** 416-208-2978, vdundergrad@utsc.utoronto.ca

**DATE:** January 8, 2019 for January 15, 2019

**AGENDA ITEM:** 4

**ITEM IDENTIFICATION:**

Undergraduate Minor Modifications- Out-of-cycle Changes, Department of Computer and Mathematical Sciences, Enrolment Requirements

**JURISDICTIONAL INFORMATION:**

University of Toronto Scarborough Academic Affairs Committee (AAC) “is concerned with matters affecting the teaching, learning and research functions of the Campus” (*AAC Terms of Reference, Section 4*). Under section 5.6 of its terms of reference, the Committee is responsible for approval of “Major and minor modifications to existing degree programs.” The AAC has responsibility for the approval of Major and Minor modifications to existing programs as defined by the University of Toronto Quality Assurance Process (*UTQAP, Section 3.1*).

**GOVERNANCE PATH:**

- 1. UTSC Academic Affairs Committee [For Approval] (January 15, 2019)**

**PREVIOUS ACTION TAKEN:**

No previous action in governance has been taken on this item.

## **HIGHLIGHTS:**

This package includes minor modifications to undergraduate curriculum, submitted by the Department of Computer and Mathematical Sciences, which require governance approval. Minor modifications to curriculum are understood as those that do not have a significant impact on program or course learning outcomes. They require governance approval when they modestly change the nature of a program or course.

The Department of Computer and Mathematical Sciences is revising the enrolment requirements for all of their limited enrolment programs. The revised requirements will make it clear to students that admission is limited and based on academic performance, and will also give the academic unit the flexibility to adjust the requirements as needed depending on the number of applications they receive each term. This change brings the Calendar into line with departmental practice.

These changes are being brought forward to be effective as of the Summer 2019 term and are being implemented out-of-cycle as a result of the decision to change the effective date of the UTSC Undergraduate Academic Calendar from the Summer to the Fall term, which has the following additional impacts:

1. The academic year will change from a Summer-Fall-Winter cycle to a Fall-Winter-Summer cycle.
2. The first application period for limited enrolment programs will move from April to March.
3. The Summer 2019 term will be added to the 2018-19 academic year and will be subject to the rules and regulations outlined in the 2018-19 Calendar.

Approving these changes so that the enrolment requirements go into effect as of Summer 2019 will ensure that the enrolment requirements that students must meet are the same for students who apply to the program in March 2019 and in July 2019.

## **FINANCIAL IMPLICATIONS:**

There are no net financial implications to the campus operating budget.

## **RECOMMENDATION:**

Be It Resolved,

THAT the minor modifications to undergraduate programs, submitted by the Department of Computer and Mathematical Sciences, as described in Undergraduate Minor Curriculum Modifications for Approval, Report: Out of Cycle Computer & Mathematical Sciences, dated December 3, 2018, and recommended by the Vice-Principal Academic and Dean, William Gough, be approved effective for Summer 2019.

**DOCUMENTATION PROVIDED:**

1. 2018-19 Curriculum Cycle: Undergraduate Minor Curriculum Modifications for Approval Report: Out of Cycle Computer & Mathematical Sciences, dated December 3, 2018.



UNIVERSITY OF  
**TORONTO**  
SCARBOROUGH

## 2018-19 Curriculum Cycle

### Undergraduate Minor Curriculum Modifications for Approval Report: Out-of-Cycle Computer & Mathematical Science

December 3, 2018

Computer & Mathematical Sciences (UTSC), Department of

#### SPECIALIST (CO-OPERATIVE) PROGRAM IN COMPUTER SCIENCE (SCIENCE)

##### Enrolment Requirements:

##### Enrolment Requirements

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the program is limited.

##### *Current Co-op Students:*

Students admitted to a Co-op Degree POST in their first year of study must request a Co-op Subject POST on ACORN upon completion of 4.0 credits and must have passed all of the A-level CSC and MAT courses required in the program- **Students with a CGPA of at least 3.0 across the core A-level courses** (CSCA08H3, CSCA48H3, CSCA67H3, MATA22H3, MATA31H3, and MATA37H3). **Students are admitted on the basis on academic performance in program courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA of at least 2.5** ~~2.50~~ **across all attempted courses; are guaranteed admission.**

Admission to the Entrepreneurship Stream also requires the submission of a Supplementary Application Form available from the CMS website.

Students who are not admitted as above, **and who are enrolled in the Minor in Computer Science**, may apply after completing at least 7.5 credits, including the core A-level courses listed above as well as CSCB07H3, CSCB09H3, CSCB36H3, ~~CSCB63H3~~ and one of MATB24H3 or STAB52H3. **Students are admitted on with a CGPA of at least 3.0 across the B-level courses in the above list (CSCB07H3 \*, CSCB09H3 \*, CSCB36H3 \*, CSCB63H3 \*, and the basis best of academic performance in program courses; students should consult the departmental website for more information. In addition MATB24H3 or STAB52H3), they must also have as well as a CGPA of at least 2.5 across all attempted courses; are guaranteed admission.**

\*These courses have a CS subject POST or minimum CGPA prerequisite.

*Prospective Co-op Students:* Prospective students (i.e., those not yet admitted to a Co-op Degree POST) must meet the enrolment requirements noted above and have a CGPA of at least 2.75 across all attempted courses.

In addition to requesting the program on ACORN, prospective Co-op students (i.e., those not yet admitted to a Co-op Degree POST) must also submit a Co-op Supplementary Application Form, which is available from the Arts & Science Co-op Office (<http://www.uts.utoronto.ca/askcoop/future-co-op-students>). Submission deadlines follow the Limited Enrolment Program Application Deadlines set by the Office of the Registrar each year. Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that student's application not being considered.

**Description of Proposed Changes:**

A. Revising the enrolment requirements:

- The calculation of the CGPA requirement will continue to be based on an average over core A-courses, but the specified CGPA will be removed and replaced by "Students will be admitted on the basis of academic performance".
- For students seeking a 'second chance' admission to the program: (1) students must now be enrolled in the Minor in Computer Science; and (2) CSCB63H3 has been deleted from the list of courses that the average is calculated over.

**Rationale:**

A. Regarding the changes to the enrolment requirements:

- The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also gives the academic unit the flexibility to adjust these requirements up or down depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
- Enrolment in the Minor in Computer Science has been added to the enrolment requirements for students applying to the program through the 'second chance' pathway because many students who are underprepared attempt to gain admission through this pathway, leading to inflated enrolments in B-level courses. Removing CSCB63H3 from the 'second chance' pathway makes it possible for a student to complete the necessary courses more quickly, and thus apply for a second chance sooner.

These changes are being proposed to be effective for Summer 2019 to ensure that the enrolment requirements student must meet are the same for students who apply to the program in March 2019 and in July 2019.

**Impact:**

There will be no impact on continuing students.

Students applying to the program in March 2019, and going forward, will be subject to the new enrolment requirements.

**Consultation:**

Approved by the DCC: June 22, 2018

**Resource Implications:**

None

## **SPECIALIST PROGRAM IN COMPUTER SCIENCE (SCIENCE)**

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Specialist in Computer Science(all streams)is limited. Students may apply to enter the program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required in the program- ~~Students~~

with a CGPA of at least 3.0 across the core A-level courses (CSCA08H3, CSCA48H3, CSCA67H3, MATA22H3, MATA31H3, and MATA37H3). Students are admitted on the basis of academic performance in program courses; students should consult the departmental website for more information **guaranteed admission**.

Admission to the Entrepreneurship stream also requires the submission of a Supplementary Application Form (SAF) available from the [CMS website](#).

Students who are not admitted as above, and who are enrolled in the Minor in Computer Science, may apply after completing at least 7.5 credits, including the core A-level courses listed above as well as CSCB07H3, CSCB09H3, CSCB36H3, ~~CSCB63H3~~, and one of MATB24H3 or STAB52H3. Students are admitted on with a CGPA of at least 3.0 across the B-level courses in the above list (~~CSCB07H3~~ \*, ~~CSCB09H3~~ \*, ~~CSCB36H3~~ \*, ~~CSCB63H3~~ \*, and the basis best of academic performance in program courses; students should consult the departmental website for more information ~~MATB24H3 or STAB52H3~~) are guaranteed admission.

\*These courses have a CS subject POST or minimum CGPA prerequisite.

To remain in the program, a student must maintain a CGPA of 2.0 or higher throughout the program.

## Completion Requirements:

### Program Requirements

The program requirements comprise a core of 18 courses (9.0 credits), common to all streams and additional requirements which depend on the stream, for a total of 27 courses (13.5 credits) for the Comprehensive, Software Engineering, and Entrepreneurship streams, 29 courses (14.5 credits) for the Information Systems stream, and 30 courses (15.0 credits) for the Health Informatics stream.

**Note:** Many Computer Science courses are offered both at U of T Scarborough and at the St. George campus. When a course is offered at both campuses in a given session, U of T Scarborough students are expected to take that course at U of T Scarborough. The Department of Computer Science at the St. George campus cannot guarantee space for U of T Scarborough students in their courses, especially those offered at both campuses.

### Core (9.0 credits)

#### 1. Writing Requirement (0.5 credit)\*

*0.5 credit from the following:* ANTA01H3, ANTA02H3, (CLAA02H3), (CTLA19H3), CTLA01H3, ENGA10H3, ENGA11H3, ENGB06H3, ENGB07H3, ENGB08H3, ENGB09H3, ENGB17H3, ENGB19H3, ENGB50H3, (ENGB51H3), GGRA02H3, GGRA03H3, GGRB05H3, (GGRB06H3), (HISA01H3), (HLTA01H3), ACMA01H3, (HUMA01H3), (HUMA11H3), (HUMA17H3), (LGGA99H3), LINA01H3, PHLA10H3, PHLA11H3, WSTA01H3.

\***Note:** It is recommended that this requirement be satisfied by the end of the second year.

#### 2. A-level courses (3.0 credits)

CSCA08H3 Introduction to Computer Science I  
CSCA48H3 Introduction to Computer Science II  
CSCA67H3 Discrete Mathematics  
MATA22H3 Linear Algebra I for Mathematical Sciences  
MATA31H3 Calculus I for Mathematical Sciences  
MATA37H3 Calculus II for Mathematical Sciences

#### 3. B-level courses (3.5 credits)

CSCB07H3 Software Design  
CSCB09H3 Software Tools and Systems Programming  
CSCB36H3 Introduction to the Theory of Computation  
CSCB58H3 Computer Organization  
CSCB63H3 Design and Analysis of Data Structures  
MATB24H3 Linear Algebra II

STAB52H3 Introduction to Probability

**4. C-level courses (1.5 credits)**

CSCC43H3 Introduction to Databases

CSCC69H3 Operating Systems

CSCC73H3 Algorithm Design and Analysis

**5. D-level courses (0.5 credit)**

CSCD03H3 Social Impact of Information Technology

**A. Comprehensive Stream**

This stream requires a total of 27 courses (13.5 credits). In addition to the core requirements 1-5 common to all streams, 9 other distinct courses (4.5 credits) must be chosen satisfying all of the following requirements:

**6. Additional required courses (2.5 credits)**

MATB41H3 Techniques of the Calculus of Several Variables I

CSCC24H3 Principles of Programming Languages

CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics

CSCC63H3 Computability and Computational Complexity

CSCD37H3 Analysis of Numerical Algorithms for Computational Mathematics

**7. Electives from courses on computer systems and applications (1.0 credit)**

Choose from:

CSCC01H3 Introduction to Software Engineering

CSCC09H3 Programming on the Web

CSCC10H3 Human-Computer Interaction

CSCC11H3 Introduction to Machine Learning and Data Mining

CSCC46H3 Social and Information Networks

CSCC85H3 Introduction to Embedded Systems

CSCD01H3 Engineering Large Software Systems

CSCD18H3 Computer Graphics

CSCD27H3 Computer and Network Security

CSCD43H3 Database System Technology

CSCD58H3 Computer Networks

**CSCD70H3 Compiler Optimization**

CSCD84H3 Artificial Intelligence

CSC320H Visual Computing

CSC321H Introduction to Neural Networks and Machine Learning

CSC401H Natural Language Computing

CSC469H Operating Systems Design and Implementation

CSC485H Computational Linguistics

CSC488H Compilers and Interpreters

**8. Electives from courses related to the theory of computing (0.5 credit)**

Choose from:

MATC09H3 Introduction to Mathematical Logic

MATC32H3 Graph Theory and Algorithms for its Applications

MATC44H3 Introduction to Combinatorics

MATD16H3 Coding Theory and Cryptography

CSC438H Computability and Logic

CSC448H Formal Languages and Automata

CSC465H Formal Methods in Software Design

**9. CSC, MAT, or STA elective (0.5 credit)**

Any C- or D-level CSC, MAT, or STA course, excluding MATC82H3, MATC90H3, and STAD29H3.

## **B. Software Engineering Stream**

This stream requires a total of 27 courses (13.5 credits). In addition to the core requirements 1-5 common to all streams, 9 other distinct courses (4.5 credits) must be chosen satisfying all of the following requirements:

### **6. Additional required courses (3.0 credits)**

MATB41H3 Techniques of the Calculus of Several Variables I  
CSCC01H3 Introduction to Software Engineering  
CSCC24H3 Principles of Programming Languages  
CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics  
CSCC63H3 Computability and Computational Complexity  
CSCD01H3 Engineering Large Software Systems

### **7. Electives from courses on computer systems and applications (1.5 credits)**

Choose from:

CSCC09H3 Programming on the Web  
CSCC10H3 Human-Computer Interaction  
CSCC11H3 Introduction to Machine Learning and Data Mining  
CSCC46H3 Social and Information Networks  
CSCC85H3 Introduction to Embedded Systems  
CSCD18H3 Computer Graphics  
CSCD27H3 Computer and Network Security  
CSCD43H3 Database System Technology  
CSCD58H3 Computer Networks  
**CSCD70H3 Compiler Optimization**  
CSCD84H3 Artificial Intelligence  
CSC320H Visual Computing  
CSC321H Introduction to Neural Networks and Machine Learning  
CSC401H Natural Language Computing  
CSC469H Operating Systems Design and Implementation  
CSC485H Computational Linguistics  
CSC488H Compilers and Interpreters

## **C. Information Systems Stream**

This stream requires a total of 29 courses (14.5 credits). In addition to the core requirements 1-5 common to all streams, 11 other distinct courses (5.5 credits) must be chosen satisfying all of the following requirements:

### **6. Required management courses (1.5 credits)**

MGTA01H3/(MGTA03H3) Introduction to Business  
MGTA02H3/(MGTA04H3) Managing the Business Organization  
MGHB02H3 Managing People and Groups in Organizations

### **7. Additional required mathematics and computer science courses (3.0 credits)**

MATB41H3 Techniques of the Calculus of Several Variables I  
CSCC01H3 Introduction to Software Engineering  
CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics  
CSCC63H3 Computability and Computational Complexity  
CSCD01H3 Engineering Large Software Systems  
CSCD43H3 Database System Technology

### **8. Electives from courses on computer systems and applications (1.0 credit)**

Choose from:

CSCC09H3 Programming on the Web  
CSCC10H3 Human-Computer Interaction  
CSCC11H3 Introduction to Machine Learning and Data Mining



CSCC46H3 Social and Information Networks  
CSCC85H3 Introduction to Embedded Systems  
CSCD18H3 Computer Graphics  
CSCD27H3 Computer and Network Security  
CSCD58H3 Computer Networks  
**CSCD70H3 Compiler Optimization**  
CSCD84H3 Artificial Intelligence  
CSC320H Visual Computing  
CSC321H Introduction to Neural Networks and Machine Learning  
CSC401H Natural Language Computing  
CSC469H Operating Systems Design and Implementation  
CSC485H Computational Linguistics  
CSC488H Compilers and Interpreters

#### **D. Health Informatics Stream**

This stream requires a total of 30 courses (15.0 credits). In addition to the core requirements 1-5 common to all streams, 12 other distinct courses (6.0 credits) must be chosen satisfying all of the following requirements:

##### **6. Additional courses related to health studies (2.0 credits)**

PHLB09H3 Biomedical Ethics  
(MGTA06H3) Introduction to Health Management\*  
*and*

*0.5 credit from the following:* (courses on health policy and politics)

HLTB16H3 Introduction to Public Health  
(HLTB17H3) Conceptual Models of Health  
HLTB40H3 Health Policy and Health Systems  
(HLTC40H3) Introduction to Health Economics  
*and*

*0.5 credit from the following:* (other courses on health studies)

HLTB22H3 Biological Determinants of Health  
(HLTC05H3) Society, Health and Illness\*

(\*) These courses have prerequisites not included in this program's requirements.

##### **7. Additional required computer science and statistics courses (1.5 credits)**

CSCC01H3 Introduction to Software Engineering  
STAB57H3 Introduction to Statistics  
STAC50H3 Data Collection

##### **8. Additional CSC, MAT and STA courses (2.5 credits)**

MATB41H3 Techniques of the Calculus of Several Variables I  
2.0 credits in any other C- or D-level CSC or STA courses, excluding STAD29H3\*\* †

**Note:** Of the five courses taken to satisfy this requirement, at least one must be a D-level course, and at least three must be CSC courses.

\*\* Some C- and D-level CSC and STA courses have prerequisites that are not included among the required courses for this stream. Review the prerequisites carefully before selecting courses for this requirement. One or more courses taken to satisfy this requirement can be prerequisites for other courses also taken to satisfy this requirement.

† Among the CSC courses that can be used to satisfy this requirement there are two categories of courses that are particularly well aligned with the goals of the Health Informatics stream: software engineering and systems, and computer science applications. Courses in the category of software engineering and systems include: CSCC09H3, CSCC85H3, CSCD01H3, CSCD43H3, and CSCD58H3. Courses in the category of computer science applications include: CSCC11H3, CSCD18H3, and CSCD84H3.

#### **E. Entrepreneurship Stream**

This stream requires a total of 27 courses (13.5 credits). In addition to the core requirements 1-5 common to all streams, 9 other distinct courses (4.5 credits) must be chosen satisfying all of the following requirements:

### **6. Additional required courses (3.0 credits)**

CSCC01H3 Introduction to Software Engineering  
CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics  
CSCC63H3 Computability and Computational Complexity  
CSCD01H3 Engineering Large Software Systems  
CSCD54H3 Technology Innovation and Entrepreneurship  
CSCD90H3 The Startup Sandbox

### **7. Electives from courses in computer science, mathematics, and statistics (1.5 credits)**

Choose from:

MATB41H3 Techniques of the Calculus of Several Variables I  
STAB57H3 Introduction to Statistics  
CSCC09H3 Programming on the Web  
CSCC10H3 Human-Computer Interaction  
CSCC11H3 Introduction to Machine Learning and Data Mining  
CSCC24H3 Principles of Programming Languages  
CSCC46H3 Social and Information Networks  
CSCC85H3 Introduction to Embedded Systems  
CSCD18H3 Computer Graphics  
CSCD27H3 Computer and Network Security  
CSCD43H3 Database System Technology  
CSCD58H3 Computer Networks  
**CSCD70H3 Compiler Optimization**  
CSCD84H3 Artificial Intelligence  
CSC320H Visual Computing  
CSC321H Introduction to Neural Networks and Machine Learning  
CSC401H Natural Language Computing  
CSC469H Operating Systems Design and Implementation  
CSC485H Computational Linguistics  
CSC488H Compilers and Interpreters

### **Description of Proposed Changes:**

A. Revising the enrolment requirements:

- The calculation of the CGPA requirement will continue to be based on an average over core A-courses, but the specified CGPA will be removed and replaced by "Students will be admitted on the basis of academic performance".
- For students seeking a 'second chance' admission to the program: (1) students must now be enrolled in the Minor in Computer Science; and (2) CSCB63H3 has been deleted from the list of courses that the average is calculated over.

B. CSCD70H3 is being added as an optional course to the list of electives for each of the following streams in the program (Comprehensive; Software Engineering; Information Systems; Entrepreneurship).

### **Rationale:**

A. Regarding the changes to the enrolment requirements:

- The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also gives the academic unit the flexibility to adjust these requirements up or down depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
- Enrolment in the Minor in Computer Science has been added to the enrolment requirements for students applying to the program through the 'second chance' pathway because many students who are underprepared attempt to gain admission through this pathway, leading to inflated enrolments in B-level courses. Removing CSCB63H3 from the 'second chance' pathway makes it possible for a student to complete the necessary courses more quickly, and thus apply for a second chance sooner.

B. Regarding the addition of CSCD70H3 as an optional course to the list of electives for each stream: CSCD70 is a suitable option to complete this component of each stream course requirements.

These changes are being proposed to be effective for Summer 2019 to ensure that the enrolment requirements student must meet are the same for students who apply to the program in March 2019 and in July 2019.

**Impact:**

There will be no impact on continuing students.

Students applying to the program in March 2019, and going forward, will be subject to the new enrolment requirements.

**Consultation:**

Approved by the DCC: June 22, 2018

**Resource Implications:**

None

## MAJOR (CO-OPERATIVE) PROGRAM IN COMPUTER SCIENCE (SCIENCE)

**Description:**

Supervisor of Studies: R. Pancer(416-287-7679)E-mail: [pancer@utsc.utoronto.ca](mailto:pancer@utsc.utoronto.ca)

Co-op Contact: [askcoop@utsc.utoronto.ca](mailto:askcoop@utsc.utoronto.ca)

The Major (Co-op) Program in Computer Science is a Work Integrated Learning (WIL) program that combines academic studies with paid work terms in the public, private, and/or non-profit sectors. The program provides student with the opportunity to develop the academic and professional skills required to pursue employment in these areas, or to continue on to graduate training in an academic field related to Computer Science upon graduation.

In addition to their academic course requirements, students must successfully complete the additive Arts & Science Co-op Work Term Preparation courses and a minimum of three Co-op work terms.

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Program is limited.

*Current Co-op Students:*

Students admitted to a Co-op Degree POST in their first year of study must request a Co-op Subject POST on ACORN upon completion of 4.0 credits and must have passed all of the A-level CSC and MAT courses required in the program: **Students with a CGPA of at least 3.0 across the core A-level courses**(CSCA08H3, CSCA48H3, CSCA67H3, MATA22H3, MATA31H3, and MATA37H3). **Students are admitted on the basis of academic performance in program courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA of at least 2.5** ~~2.50~~ **across all attempted courses; are guaranteed admission.**

Students who are not admitted as above, **and who are enrolled in the Minor in Computer Science**, may apply after completing at least 7.5 credits, including the core A-level courses listed above as well as CSCB07H3 \*, CSCB09H3 \*, CSCB36H3 \*, ~~CSCB63H3~~ **and at least one of MATB24H3 or STAB52H3.** **Students are admitted on with a CGPA of at least 3.0 across the B-level courses in the above list (CSCB07H3 \*, CSCB09H3 \*, CSCB36H3 \*, CSCB63H3 \*, and the basis best of academic performance in program courses; students should consult the departmental website for more information. In addition** ~~MATB24H3 or STAB52H3~~ **), they must also have as well as a CGPA of at least 2.5 across all attempted courses; are guaranteed admission.**

\*These courses have a CS subject POST or minimum CGPA prerequisite.

*Prospective Co-op Students:*

Prospective students (i.e., those not yet admitted to a Co-op Degree POST) must meet the enrolment requirements noted above and have a CGPA of at least 2.75 across all attempted courses.

In addition to requesting the program on ACORN, prospective Co-op students (i.e., those not yet admitted to a Co-op Degree POST) must also submit a Co-op Supplementary Application Form, which is available from the Arts & Science Co-op Office (<http://www.utsc.utoronto.ca/askcoop/future-co-op-students>). Submission deadlines follow the Limited Enrolment Program Application Deadlines set by the Office of the Registrar each year.

Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that student's application not being considered.

**Completion Requirements:**

**Program Requirements**

The course requirements of the Co-operative Major Program in Computer Science are identical to those of the Major Program in Computer Science.

To remain in the program, students must maintain a CGPA of 2.5 or higher throughout the program. To complete the program, students must meet the work term and course requirements described below.

**Co-op Work Term Requirements**

Students must satisfactorily complete three Co-op work terms, each of four-months duration, one of which can be during the summer. To be eligible for their first work term, students must be enrolled in the Major (Co-op) Program in Computer Science and have completed at least 7.0 credits, including all first year required courses (CSCA08H3, CSCA48H3, CSCA67H3, MATA22H3, MATA31H3, MATA37H3).

In addition to their academic program requirements, Co-op students complete up to five Co-op specific courses. These courses are designed to prepare students for their job search and work term experience, and to maximize the benefits of their Co-op work terms. They cover a variety of topics intended to assist students in developing the skills and tools required to secure work terms that are appropriate to their program of study, and to perform professionally in the workplace. These courses must be completed in sequence, and are taken in addition to a full course load. They are recorded on transcripts as credit/no credit (CR/NCR) and are considered to be additive credit to the 20.0 required degree credits. No additional course fee is assessed as registration is included in the Co-op Program fee.

*Co-op Preparation Course Requirements:*

1. COPD01H3 – Foundations for Success in Arts & Science Co-op
  - Students entering Co-op from outside of UTSC (high school or other postsecondary) will complete this course in fall of their first year at UTSC
  - Current UTSC students entering Co-op in April/May will complete this course in the summer term
  - Current UTSC students entering Co-op in July/August will complete this course in the fall term
2. COPD03H3 – Preparing to Compete for your Co-op Work Term
  - Prerequisite: COPD01H3
  - This course will be completed eight months in advance of the first scheduled work term
3. COPD11H3 – Managing your Work Term Search & Transition to Work
  - Prerequisite: COPD03H3
  - This course will be completed four months in advance of the first work scheduled work term
4. COPD12H3 – Integrating Your Work Term Experience Part I
  - Prerequisite: COPD11H3 and one Co-op work term
  - This course will be completed four months in advance of the second scheduled work term

#### 5. COPD13H3 – Integrating Your Work Term Experience Part II

- Prerequisite: COPD12H3 and two Co-op work terms
- This course will be completed four months in advance of the third scheduled work term

Students must be available for work terms in each of the Fall, Winter and Summer sessions and must complete at least one of their required work terms in either a Fall or Winter session. This in turn requires that students take courses during at least one Summer session.

For information on fees, status in Co-op programs, and certification of completion of Co-op programs, see Section 6B.5 of the *UTSC Calendar*.

#### **Description of Proposed Changes:**

- 1) The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".
- 2) For students seeking a 'second chance' admission to the program: (a) students must now be enrolled in the Minor in Computer Science; and (a) CSCB63H3 has been deleted from the list of courses that the average is calculated over. Note: there are no changes to the program completion requirements.

#### **Rationale:**

- 1) The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
- 2) Enrolment in the Minor in Computer Science has been added to the enrolment requirements for students applying to the program through the 'second chance' pathway because many students who are underprepared attempt to gain admission through this pathway, leading to inflated enrolments in B-level courses. Removing CSCB63H3 from the 'second chance' pathway makes it possible for a student to complete the necessary courses more quickly, and thus apply for a second chance sooner.

#### **Impact:**

The changes reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program. Regarding students admitted through the 'second chance' pathway: requiring students to be in a CS minor in order to apply will ensure students are prepared to be successful in the program.

#### **Consultation:**

Approved by the DCC: Oct 9, 2018

#### **Resource Implications:**

None

## **MAJOR PROGRAM IN COMPUTER SCIENCE (SCIENCE)**

#### **Enrolment Requirements:**

#### **Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Major in Computer Science is limited.

Students may apply to enter the program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required in the program: **Students with a CGPA of at least 3.0 across the core A-level courses** (CSCA08H3, CSCA48H3, CSCA67H3, MATA22H3, MATA31H3, and MATA37H3). **Students are admitted on the basis of academic performance in program courses; students should consult the departmental website for more information guaranteed admission.**

Students who are not admitted as above, **and who are enrolled in the Minor in Computer Science**, may apply after completing at least 7.5 credits, including the core A-level courses listed above as well as [CSCB07H3](#) \*, [CSCB09H3](#) \*, [CSCB36H3](#) \*; [CSCB63H3](#), and at least one of [MATB24H3](#) or [STAB52H3](#) . **Students are admitted on with a CGPA of at least 3.0 across the B-level courses in the above list (CSCB07H3 \*, CSCB09H3 \*, CSCB36H3 \*, CSCB63H3 \*, and the basis best of academic performance in program courses; students should consult the departmental website for more information MATB24H3 or STAB52H3) are guaranteed admission.**

\*These courses have a CS subject POST or minimum CGPA prerequisite.

## **Completion Requirements:**

### **Program Requirements**

This program requires a total of 16 distinct courses (8.0 credits) satisfying all of the requirements listed below.

**Note:** Many Computer Science courses are offered both at U of T Scarborough and at the St. George campus. When a course is offered at both campuses in a given session, U of T Scarborough students are expected to take that course at U of T Scarborough. The Department of Computer Science at the St. George campus cannot guarantee space for U of T Scarborough students in their courses, especially those offered at both campuses.

#### **1. A-level courses (3.0 credits)**

CSCA08H3 Introduction to Computer Science I  
CSCA48H3 Introduction to Computer Science II  
CSCA67H3 Discrete Mathematics  
MATA22H3 Linear Algebra I for Mathematical Sciences  
MATA31H3 Calculus I for Mathematical Sciences  
MATA37H3 Calculus II for Mathematical Sciences

#### **2. B-level courses (3.0 credits)**

CSCB07H3 Software Design  
CSCB09H3 Software Tools and Systems Programming  
CSCB36H3 Introduction to the Theory of Computation  
CSCB58H3 Computer Organization  
CSCB63H3 Design and Analysis of Data Structures  
*and*

*0.5 credit from the following\*:*

MATB24H3 Linear Algebra II  
STAB52H3 Introduction to Probability

\* **Note:** In making this choice, students should consider the prerequisites of courses they plan to take to satisfy requirements 3-4.

#### **3. C-level courses in numerical computation and theory of computing (1.0 credit)**

CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics  
*and*

*0.5 credit from the following:*

CSCC63H3 Computability and Computational Complexity  
CSCC73H3 Algorithm Design and Analysis

#### **4. CSC electives (1.0 credit)**

*1.0 credits in any C- or D-level CSC courses.*



**Writing Recommendation:**

Students are urged to take a course from the following list of courses by the end of their second year: ANTA01H3, ANTA02H3, (CLAA02H3), (CTLA19H3), CTLA01H3, ENGA10H3, ENGA11H3, ENGB06H3, ENGB07H3, ENGB08H3, ENGB17H3, ENGB19H3, ENGB50H3, (ENGB51H3), GGRA02H3, GGRA03H3, GGRB05H3, (GGRB06H3), (HISA01H3), (HLTA01H3), (HUMA01H3), (HUMA11H3), (HUMA17H3), (LGGA99H3), LINA01H3, PHLA10H3, PHLA11H3, WSTA01H3.

**Description of Proposed Changes:**

- 1) The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".
  - 2) For students seeking a 'second chance' admission to the program: (a) students must now be enrolled in the Minor in Computer Science; and (b) CSCB63H3 has been deleted from the list of courses that the average is calculated over.
- Note: there are no changes to the program completion requirements.

**Rationale:**

- 1) The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
- 2) Enrolment in the Minor in Computer Science has been added to the enrolment requirements for students applying to the program through the 'second chance' pathway because many students who are underprepared attempt to gain admission through this pathway, leading to inflated enrolments in B-level courses. Removing CSCB63H3 from the 'second chance' pathway makes it possible for a student to complete the necessary courses more quickly, and thus apply for a second chance sooner.

**Impact:**

The changes reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program. Regarding students admitted through the "second chance" pathway: requiring students to be in a CS minor in order to apply will ensure students are prepared to be successful in the program.

**Consultation:**

Approved by the DCC: Oct 9, 2018

**Resource Implications:**

None

## MINOR PROGRAM IN COMPUTER SCIENCE (SCIENCE)

**Enrolment Requirements:****Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Minor in Computer Science is limited.

Students may apply to enter the program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required in for the program [CSCA08H3, Minor. Students with a CGPA of at least 3.0 across CSCA48H3, and their chosen MAT course (one of: CSCA67H3/MATA67H3, MATA22H3, MATA23H3, MATA30H3, MATA31H3, MATA32H3, or MATA32H3 CSCA67H3/MATA67H3)]. Students, and at least a B in CSCA48H3 are admitted on the basis of academic performance in program courses; students should consult the departmental website for more information

**guaranteed admission.** Students in the Minor may take a maximum of 3 CSC elective courses (1.5 credits) at the C-level and D-level.

**Description of Proposed Changes:**

1) The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".

**Rationale:**

1) The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.

**Impact:**

The changes reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program.

**Consultation:**

Approved by the DCC: Oct 9, 2018

**Resource Implications:**

None

## SPECIALIST (CO-OPERATIVE) PROGRAM IN MATHEMATICS (SCIENCE)

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Specialist(Co-operative)Program in Mathematics is limited.

*Current Co-op Students:*

Students admitted to a Co-op Degree POST in their first year of study must request a Co-op Subject POST on ACORN upon completion of 4.0 credits and must have passed all of the A-level CSC and MAT courses required in the program ([CSCA08H3 or CSCA20H3], CSCA67H3/MATA67H3, MATA22H3, MATA31H3, and MATA37H3). Students are admitted on with a CGPA of 2.5 or greater across the basis of academic performance eore A-level courses required in the program courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA of at least 2.5 across all attempted courses are guaranteed admission.

*Prospective Co-op Students:*

Prospective students (i.e., those not already admitted to a Co-op Degree POST) may apply to the Co-op Program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required in the program ([CSCA08H3 or CSCA20H3], CSCA67H3/MATA67H3, MATA22H3, MATA31H3, and MATA37H3). Students are admitted on Only students with a CGPA of at least 2.5 across the basis of academic performance in program eore A-level courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA of at least 2.5 across all attempted courses; will be considered for admission to the Co-op Program.



In addition to requesting the program on ACORN, prospective Co-op students (i.e., those not yet admitted to a Co-op Degree POST) must also submit a Co-op Supplementary Application Form, which is available from the Arts & Science Co-op Office (<http://www.uts.utoronto.ca/askcoop/future-co-op-students>). Submission deadlines follow the Limited Enrolment Program Application Deadlines set by the Office of the Registrar each year. Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that student's application not being considered.

**Description of Proposed Changes:**

The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".

**Rationale:**

The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.

**Impact:**

The changes reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program.

**Consultation:**

Approved by the DCC: Nov 1, 2018

**Resource Implications:**

None

## SPECIALIST PROGRAM IN MATHEMATICS (SCIENCE)

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Specialist Program in Mathematics (all streams) is limited.

Students may apply to enter the program after completing 4.0 credits, and must have passed all of the A-level MAT and CSC courses required in the program ([CSCA08H3 or CSCA20H3], CSCA67H3/MATA67H3, MATA22H3, MATA31H3, and MATA37H3). Students are admitted on ~~with a CGPA of at least 2.5 across~~ the basis of academic performance in ~~program core A-level~~ courses; students should consult the departmental website for more information ~~are guaranteed admission~~.

**Completion Requirements:**

**Program Requirements**

The Program requirements consist of a core 15 courses (7.5 credits), common to all streams, and additional requirements that depend on the stream, for a total of 26-27 courses (13.0-13.5 credits).

The structure of the programs allows for easy switching between streams until relatively late. Consequently, these programs should not be viewed as rigidly separated channels feeding students to different career paths, but as a flexible structure that provides guidance to students in their course selection based on their broad (but possibly fluid) interests.

## Core (7.5 credits)

### 1. Writing Requirement (0.5 credit) (\*)

0.5 credits from the following: ANTA01H3, ANTA02H3, (CLAA02H3), (CTLA19H3), CTLA01H3, ENGA10H3, ENGA11H3, ENGB06H3, ENGB07H3, ENGB08H3, ENGB09H3, ENGB17H3, ENGB19H3, ENGB50H3, (ENGB51H3), GGRA02H3, GGRA03H3, GGRB05H3, (GGRB06H3), (HISA01H3), (HLTA01H3), ACMA01H3, (HUMA01H3), (HUMA11H3), (HUMA17H3), (LGGA99H3), LINA01H3, PHLA10H3, WSTA01H3.

(\*) It is recommended that this requirement be satisfied by the end of the second year.

### 2. A-level courses (2.5 credits)

[CSCA08H3 Introduction to Computer Science I or CSCA20H3 Introduction to Programming]

MATA22H3 Linear Algebra I for Mathematical Sciences

MATA31H3 Calculus I for Mathematical Sciences

MATA37H3 Calculus II for Mathematical Sciences

[MATA67H3 or CSCA67H3 Discrete Mathematics]

### 3. B-level courses (3.5 credits)

MATB24H3 Linear Algebra II

MATB41H3 Techniques of the Calculus of Several Variables I

MATB42H3 Techniques of the Calculus of Several Variables II

MATB43H3 Introduction to Analysis

MATB44H3 Differential Equations I

STAB52H3 Introduction to Probability (\* \*)

STAB57H3 Introduction to Statistics (\* \*)

(\* \*) This course may be taken after second year, except for the Statistics stream.

### 4. C-level courses (1.0 credit)

MATC01H3 Groups and Symmetry

MATC34H3 Complex Variables

### A. Comprehensive Stream

This stream requires a total of 27 courses (13.5 credits) In addition to the core requirements 1-4 common to all streams, 12 other distinct courses must be chosen satisfying all of the following requirements:

### 5. Additional courses in analysis and algebra (1.5 credits):

MATC37H3 Introduction to Real Analysis

MATC46H3 Differential Equations II

MATD01H3 Fields and Groups

### 6. Courses in key areas of mathematics (1.0 credit):

1.0 credit from the following:

MATC15H3 Introduction to Number Theory

MATC27H3 Introduction to Topology

MATC63H3 Differential Geometry

MATD02H3 Classical Plane Geometries and their Transformations

MATD34H3 Complex Variables II

### 7. Mathematics of computation (1.0 credit):

1.0 credit from the following:

CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics

CSCC63H3 Computability and Computational Complexity

CSCC73H3 Algorithm Design and Analysis

MATC09H3 Introduction to Mathematical Logic

MATC32H3 Graph Theory and Algorithms for its Applications

MATC44H3 Introduction to Combinatorics

## MATD16H3 Coding Theory and Cryptography

### **8. Electives (2.5 credits):**

2.5 credits from CSC/MAT/STA/PHY of which at least 1.5 must be at the C- or D-level MAT courses (excluding MATC90H3).

### **B. Statistics Stream**

This stream requires a total of 26 courses (13.0 credits). In addition to the core requirements 1-4 common to all streams, 11 other distinct courses must be chosen, satisfying all of the following requirements (in choosing courses to satisfy requirements 7-9, students must select at least one D-level course).

### **5. Algebra and Analysis (1.5 credits):**

MATB61H3 Linear Programming and Optimization

MATC46H3 Differential Equations II

MATD01H3 Fields and Groups

### **6. Regression Analysis (0.5 credit):**

STAC67H3 Regression Analysis

### **7. Discrete mathematics and geometry (0.5 credit):**

0.5 credit from the following:

MATC32H3 Graph Theory and Algorithms for its Applications

MATC44H3 Introduction to Combinatorics

MATD02H3 Classical Plane Geometries and their Transformations

### **8. Upper-level MAT electives (1.0 credit):**

1.0 credit from any C- or D-level MAT courses (\*)

(\*) For students wishing to pursue graduate studies in Mathematics or Statistics it is recommended that MATC37H3 be chosen as one of these two courses.

### **9. Upper-level STA electives (2.0 credits):**

2.0 credits from the following:

(ACTB47H3) Introductory Life Contingencies

Any C- or D-level STA course, excluding STAD29H3

### **C. Teaching Stream**

This stream requires a total of 26 courses (13.0 credits). In addition to the core requirements 1-4 common to all streams, 11 other distinct courses must be chosen, satisfying all of the following requirements:

### **5. Algebra, analysis, and geometry (1.5 credits):**

MATC15H3 Introduction to Number Theory

MATD01H3 Fields and Groups

MATD02H3 Classical Plane Geometries and their Transformations

### **6. Discrete mathematics (0.5 credit):**

0.5 credit from the following:

MATC32H3 Graph Theory and Algorithms for its Applications

MATC44H3 Introduction to Combinatorics

### **7. MAT electives (1.5 credits):**

1.5 credits of any C- or D-level MAT courses

### **8. MAT/STA/CSC electives (2.0 credits):**

2.0 credits of any C- or D-level MAT, STA, CSC courses, excluding STAD29H3

It is recommended that students obtain a TA-ship within the Department of Computer and Mathematical Sciences.

**Description of Proposed Changes:**

The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".

**Rationale:**

The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.

**Impact:**

The changes reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program. Regarding students admitted through the "second chance" pathway: requiring students to be in a CS minor in order to apply will ensure students are prepared to be successful in the program.

**Consultation:**

Approved by the DCC: Nov 1, 2018

**Resource Implications:**

None

## MAJOR (CO-OPERATIVE) PROGRAM IN MATHEMATICS (SCIENCE)

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Major(Co-operative)Program in Mathematics is limited.

*Current Co-op Students:*

Students admitted to a Co-op Degree POST in their first year of study must request a Co-op Subject POST on ACORN upon completion of 4.0 credits and must have passed all of the A-level CSC and MAT courses required in the program (CSCA08H3, CSCA67H3/MATA67H3, MATA22H3, ~~[MATA30H3 or MATA31H3]~~; and ~~[MATA36H3 or MATA37H3]~~). Students are admitted on with a CGPA of at least 2.5 across the basis of academic performance in program ~~core A-level~~ courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA of at least 2.5 across all attempted courses; are guaranteed admission.

*Prospective Co-op Students:*

Prospective students (i.e., those not already admitted to a Co-op Degree POST) may apply to the Co-op Program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required in the program (CSCA08H3, CSCA67H3/MATA67H3, MATA22H3, ~~[MATA30H3 or MATA31H3]~~; and ~~[MATA36H3 or MATA37H3]~~). Students are admitted on Only students with a CGPA of at least 2.5 across the basis of academic performance in program ~~core A-level~~ courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA of at least 2.5 across all attempted courses; will be considered for admission to the Co-op Program.

In addition to requesting the program on ACORN, prospective Co-op students (i.e., those not yet admitted to a Co-op Degree POST) must also submit a Co-op Supplementary Application Form, which is available from the Arts & Science Co-op Office (<http://www.uts.utoronto.ca/askcoop/future-co-op-students>). Submission deadlines follow the Limited Enrolment Program Application Deadlines set by the Office of the Registrar's Office each year. Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that student's application not being considered.

**Description of Proposed Changes:**

1. The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".
2. MATA30H3 and MATA36H3 are being removed as optional courses to complete component 1 of the program requirements; MATA31H3 and MATA37H3 will now be required. This change has been reflected in the program enrolment requirements.

**Rationale:**

1. The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
2. MATA30/36 do not provide adequate preparation for C- and D-level courses. MATA31/37 will ensure students are successful at the upper level.

**Impact:**

The changes to the enrolment requirements reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program. The changes to the completion requirements will make the program less flexible, but also will ensure students are prepared.

**Consultation:**

Approved by DCC: October 9, 2018

Consultation outside the academic unit:

This change does not affect programs offered by other departments.

**Resource Implications:**

None: the shift of students from MATA30H3/MATA36H3 to MATA31H3/MATA37H3 may result in an additional section of MATA31H3/MATA37H3 and one less section of 30/36; thus, the total number of calculus tutorials offered is likely to remain unchanged.

## MAJOR PROGRAM IN MATHEMATICS (SCIENCE)

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Major Program in Mathematics is limited.

Students may apply to enter the program after completing 4.0 credits, and must have passed all of the A-level MAT and CSC courses required in the program (CSCA08H3, CSCA67H3/MATA67H3, MATA22H3, ~~MATA30H3 or MATA31H3~~, and ~~MATA36H3 or MATA37H3~~). Students are admitted on with a CGPA of at least 2.0 across the basis of academic performance in program core A-level courses; students should consult the departmental website for more information are guaranteed admission.

## Completion Requirements:

### Program Requirements

This stream requires a total of 8.5 credits, chosen so as to satisfy all of the following requirements:

#### 1. Foundational courses - 5.5 credits from the following:

[MATA67H3 or CSCA67H3 Discrete Mathematics]

MATA22H3 Linear Algebra I for Mathematical Sciences

~~[MATA30H3 Calculus I for Physical Sciences OR MATA31H3 Calculus I for Mathematical Sciences]~~

~~[MATA36H3 Calculus II for Physical Sciences OR MATA37H3 Calculus II for Mathematical Sciences (\*)]~~

CSCA08H3 Introduction to Computer Science I

MATB24H3 Linear Algebra II

MATB41H3 Techniques of the Calculus of Several Variables I

MATB42H3 Techniques of the Calculus of Several Variables II

MATB44H3 Differential Equations I

STAB52H3 Introduction to Probability

[MATC01H3 Groups and Symmetry OR MATC15H3 Introduction to Number Theory]

~~(\*) MATA31H3 is required for MATA37H3~~

#### 2. Further analysis courses - 1.0 credit from the following:

MATB43H3 Introduction to Analysis

MATC27H3 Introduction to Topology

MATC34H3 Complex Variables

MATC37H3 Introduction to Real Analysis

MATC46H3 Differential Equations II

MATD34H3 Complex Variables II

#### 3. Further algebra, geometry, and discrete mathematics courses - 1.0 credit from the following:

MATC01H3 Groups and Symmetry

MATC09H3 Introduction to Mathematical Logic

MATC15H3 Introduction to Number Theory

MATC32H3 Graph Theory and Algorithms for its Applications

MATC44H3 Introduction to Combinatorics

MATC63H3 Differential Geometry

MATD01H3 Fields and Groups

MATD02H3 Classical Plane Geometries and their Transformations

#### 4. Elective courses - 1.0 credit from the following:

MATB61H3 Linear Programming and Optimization

STAB57H3 Introduction to Statistics

Any C- or D-level MAT, STA, or CSC course, excluding STAD29H3

### Recommended Writing Course

Students are urged to take a course from the following list of courses by the end of their second year.

ANTA01H3, ANTA02H3, (CLAA02H3), (CTLA19H3), CTLA01H3, ENGA10H3, ENGA11H3, ENGB06H3,

ENGB07H3, ENGB08H3, ENGB09H3, ENGB17H3, ENGB19H3, ENGB50H3, (ENGB51H3), GGRA02H3,

GGRA03H3, GGRB05H3, (GGRB06H3), (HISA01H3), (HLTA01H3), ACMA01H3, (HUMA01H3), (HUMA11H3),

(HUMA17H3), (LGGA99H3), LINA01H3, PHLA10H3, PHLA11H3, WSTA01H3.

### Description of Proposed Changes:

1. The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".

2. MATA30H3 and MATA36H3 are being removed as optional courses to complete component 1 of the program

requirements; MATA31H3 and MATA37H3 will now be required. This change has been reflected in the program enrolment requirements.

**Rationale:**

1. The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
2. MATA30/36 do not provide adequate preparation for C- and D-level courses. MATA31/37 will ensure students are successful at the upper level.

**Impact:**

The changes to the enrolment requirements reflect actual practice and will not have any impact on students. Prior to each application period students will be notified regarding the exact calculation of the CGPA that will guarantee admission to the program. The changes to the completion requirements will make the program less flexible, but also will ensure students are prepared.

**Consultation:**

Approved by DCC: October 9, 2018

Consultation outside the academic unit:

This change does not affect programs offered by other departments.

**Resource Implications:**

None. The shift of students from A30/A36 to A31/37 may result in an additional section of A31/A37 and one less section of 30/36; thus, the total number of calculus tutorials offered is likely to remain unchanged.

## SPECIALIST (CO-OPERATIVE) PROGRAM IN STATISTICS (SCIENCE)

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment is limited.

*Current Co-op Students:*

Students admitted to a Co-op Degree POST in their first year of study must request a Co-op Subject POST on ACORN upon completion of 4.0 credits and must have passed all of the A-level CSC and MAT courses required in the program: **Students with a cumulative GPA of 2.5 or greater across the core A-level courses**(CSCA08H3, CSCA48H3, MATA22H3, MATA30H3/MATA31H3 and MATA36H3/MATA37H3). **Students are admitted on the basis of academic performance in program courses; students should consult the departmental website for more information. In addition, they must also have achieved a CGPA of at least 2.5 across all attempted courses.**

Students who are not admitted as above, may apply after completing at least 7.5 credits, including the core A-level courses listed above as well as MATB24H3, MATB41H3, MATB61H3, STAB52H3, and STAB57H3. **Students are admitted on the basis of academic performance; students should consult the departmental website for more information. In addition, they must also have a CGPA cumulative GPA of at least 2.5 across all attempted courses; are guaranteed admission.**

*Prospective Co-op Students:*



Prospective students (i.e., those not already admitted to a Co-op Degree POST) may apply to the Co-op Program after completing 4.0 credits, and must have passed all of the core A-level courses required in the program: **Only students with a cumulative GPA of 2.5 or greater across the core A-level courses** (CSCA08H3, CSCA48H3, MATA22H3, MATA30H3/MATA31H3 and MATA36H3/MATA37H3). **Students are admitted on the basis of academic performance in program courses; students should consult the departmental website for more information. In addition, they must also have achieved as well as a CGPA cumulative GPA of at least 2.75 across all attempted courses; will be considered for admission to the Co-op Program.**

In addition to requesting the Co-op Program on ACORN, prospective students must also submit a Co-op Supplementary Application Form, which is available from the Arts & Science Co-op Office (<http://www.uts.utoronto.ca/askcoop/future-co-op-students>). Submission deadlines follow the Limited Enrolment Program Application Deadlines set by the Office of the Registrar each year. Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that student's application not being considered.

### **Description of Proposed Changes:**

1. The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses". In addition, a second chance pathway for admission into the program is being added.

The following changes, which have been proposed for the Specialist Program in Statistics, will also be implemented for the Specialist (Co-operative) Program in Statistics. They are noted here for convenience - for rationale, impact on students, and impact on resources see the minor modification proposal for the Specialist Program in Statistics.

2. The title for the Statistical Machine Learning and Data Mining Stream has been changed to Statistical Machine Learning and Data Science Stream.

3. Component 7 of the program requirements for the Statistical Machine Learning and Data Science Stream has been increased from a total of 1.0 credit to 2.0 credits; where students used to complete 2 of 4 courses, they must now complete all 4 courses; the courses in the bin are unchanged.

4. Component 8 of the program requirements for the Statistical Machine Learning and Data Science Stream has been reduced from a total of 4.0 credits to 3.0 credits - specifically, students will complete 1.5 credits in additional C- or D-level CSC, MAT, or STA courses rather than 2.5 credits.

5. In Component 8 of the program requirements for the Statistical Machine Learning and Data Science Stream, two additional STA courses have been added to the list of STA excluded courses: STAC32H3 and STAC53H3.

### **Rationale:**

1. The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students. In addition, similarly to the Computer Science programs, students will be given a "second chance" pathway to the Specialist in Statistics. This pathway ensures that students have the necessary academic aptitude and are on track with the program, without penalizing them for their previous performance.

### **Impact:**

Continuing students: Students who are already enrolled in the subject POST will be grandfathered, and will be able to follow the requirements at the time when they first selected the program. Where necessary, accommodations for specific course requirements will be made.

New students: Students who are admitted to the subject POST for the first time will follow the new program requirements.

### **Consultation:**

Consultation within the academic unit:

These proposed changes have been circulated and discussed in two departmental meetings, on April 13 2018, and June 22, 2018, and they were approved in the latter.

Consultation outside the academic unit:

These changes have no impact on other academic units.

### **Resource Implications:**



The proposed addition of a second chance pathway will increase enrolments in the Statistics Specialist program, however, the Department anticipates the program has the capacity to manage the increase without additional resources; if that changes in the future, the Department will address it by increasing the admission cutoff.

## SPECIALIST PROGRAM IN STATISTICS (SCIENCE)

### Description:

Supervisor of Studies : M. Samarakoon Email: [mahinda@utsc.utoronto.ca](mailto:mahinda@utsc.utoronto.ca) (416-208-4748)

### Program Objectives

This program provides training in the discipline of Statistics. Students are given a thorough grounding in the theory underlying statistical reasoning and learn the methodologies associated with current applications. A full set of courses on the theory and methodology of the discipline represent the core of the program. In addition students select one of two streams, each of which provides immediately useful, job-related skills. The program also prepares students for further study in Statistics and related fields.

**The Quantitative Finance Stream** focuses on teaching the computational, mathematical and statistical techniques associated with modern day finance. Students acquire a thorough understanding of the mathematical models that underlie financial modeling and the ability to implement these models in practical settings. This stream prepares students to work as quantitative analysts in the financial industry, and for further study in Quantitative Finance.

**The Statistical Machine Learning and Data Science Mining Stream** focuses on applications of statistical theory and concepts to the discovery (or “learning”) of patterns in massive data sets. This field is a recent development in statistics with wide applications in science and technology including computer vision, image understanding, natural language processing, medical diagnosis, and stock market analysis. This stream prepares students for direct employment in industry and government, and further study in Statistical Machine Learning.

### Enrolment Requirements:

#### Enrolment Requirements

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Specialist in Statistics(all streams)is limited. Students may apply to enter the program after completing 4.0 credits, and must have passed all of the core A-level courses in the program- **Students with a CGPA of 2.5 or greater across the core A-level courses** (CSCA08H3, CSCA48H3, MATA22H3, MATA30H3/MATA31H3, and MATA36H3/MATA37H3) **are guaranteed admission**. Students are admitted **Admission for students with a CGPA of less than 2.5 will depend on their CGPA and the basis of academic performance available space in the program courses**; students should consult the departmental website for more information.

Students who are not admitted as above, may apply after completing at least 7.5 credits, including the core A-level courses listed above as well as MATB24H3, MATB41H3, MATB61H3, STAB52H3, and STAB57H3. Students are admitted on the basis of academic performance; students should consult the departmental website for more information.

### Completion Requirements:

#### Program Requirements

To complete the program, a student must meet the course requirements described below- **(One credit is equivalent to two courses)**-

The first year requirements of the two streams are almost identical, except that the Quantitative Finance stream requires MGEA02H3/(ECMA04H3) while the Statistical Machine Learning and Data Science Mining stream requires [CSCA67H3 or MATA67H3] CSCA67H; these courses need not be taken in the first year. In the second year the two streams have considerable overlap. This structure makes it relatively easy for students to switch between the two streams as their interests in Statistics become better defined.

**Note:** There are courses on the St. George campus that can be taken to satisfy some of the requirements of the program. STAB52H3, STAB57H3 and STAC67H3, however, must be taken at the University of Toronto Scarborough; no substitutes are permitted without permission of the program supervisor.

## Core (7.5 credits)

### 1. Writing Requirement (0.5 credit) (\*)

*0.5 credit from the following:* ANTA01H3, ANTA02H3, (CLAA02H3), (CTLA19H3), CTLA01H3, ENGA10H3, ENGA11H3, ENGB06H3, ENGB07H3, ENGB08H3, ENGB09H3, ENGB17H3, ENGB19H3, ENGB50H3, (ENGB51H3), GGRA02H3, GGRA03H3, GGRB05H3, (GGRB06H3), (HISA01H3), (HLTA01H3), ACMA01H3, (HUMA01H3), (HUMA11H3), (HUMA17H3), (LGGA99H3), LINA01H3, PHLA10H3, PHLA11H3, WSTA01H3.

(\*) It is recommended that this requirement be satisfied by the end of the second year.

### 2. A-level courses (2.5 credits)

CSCA08H3 Introduction to Computer Science I  
CSCA48H3 Introduction to Computer Science II  
MATA22H3 Linear Algebra I or Mathematical Sciences

*and*

*0.5 credit from the following:*

MATA31H3\*Calculus I for Mathematical Sciences  
MATA30H3 Calculus I for Physical Sciences

*and*

*0.5 credit from the following:*

MATA37H3\*Calculus II for Mathematical Sciences  
MATA36H3 Calculus II for Physical Sciences

(\*) MATA31H3 and MATA37H3 are recommended; the latter requires the former.

### 3. B-level courses (2.5 credits)

MATB24H3 Linear Algebra II  
MATB41H3 Techniques of the Calculus of Several Variables I  
MATB61H3 Linear Programming and Optimization  
STAB52H3 Introduction to Probability  
STAB57H3 Introduction to Statistics

### 4. C-level courses (1.5 credits)

CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics  
STAC62H3 Stochastic Processes  
STAC67H3 Regression Analysis

### 5. D-level courses (0.5 credit)

STAD37H3 Multivariate Analysis

## A. Quantitative Finance Stream

This stream requires a total of 26 courses (13.0 credits). In addition to the core requirements, 11 other courses (5.5 credits) must be taken satisfying all of the following requirements:

### 6. Additional A-level courses (0.5 credit)

MGEA02H3/(ECMA04H3) Introduction to Microeconomics: A Mathematical Approach

**7. Additional B-level courses (2.0 credits)**

ACTB40H3 Fundamentals of Investment and Credit  
MATB42H3 Techniques of Calculus of Several Variables II  
MATB44H3 Differential Equations I  
STAB41H3 Financial Derivatives

**8. Additional Upper Level courses (3.0 credits)**

MATC46H3 Differential Equations II  
STAC70H3 Statistics and Finance I  
STAD57H3 Time Series Analysis  
STAD70H3 Statistics and Finance II  
and

1.0 credit from the following:

~~APM462H1 Nonlinear Optimization~~

CSCC11H3 Introduction to Machine Learning and Data Mining  
MATC37H3 Introduction to Real Analysis  
STAC51H3 Categorical Data Analysis  
STAC58H3 Statistical Inference  
STAC63H3 Probability Models  
STAD68H3 Advanced Machine Learning and Data Mining  
STAD94H3 Statistics Project  
APM462H1 Nonlinear Optimization

**Note:** Students enrolled in this stream should also consider taking complementary courses in economics and finance (e.g. MGEA06H3/(ECMA06H3), MGEB02H3/(ECMB02H3), MGEB06H3/(ECMB06H3), MGEC72H3/(ECMC49H3)), or a Minor in Economics for Management Studies.

**B. Statistical Machine Learning and Data Science Mining Stream**

This stream requires a total of 26 courses (13.0 credits). In addition to the core requirements, 11 other courses (5.5 credits) must be taken satisfying all of the following requirements:

**6. Additional A-level courses (0.5 credit)**

[CSCA67H3 or MATA67H3 Discrete Mathematics]

**7. Additional B-level courses (2.0 credits ~~1.0 credit~~)**

~~1.0 credit from the following:~~

CSCB07H3 Software Design  
CSCB20H3 Introduction to Databases and Web Applications  
CSCB36H3 Introduction to the Theory of Computation  
CSCB63H3 Design and Analysis of Data Structures

**8. Additional Upper Level courses (3.0 ~~4.0~~ credits)**

CSCC11H3 Introduction to Machine Learning and Data Mining  
STAC58H3 Statistical Inference  
STAD68H3 Advanced Machine Learning and Data Mining  
and

1.5 ~~2.5~~ credits from the following (\*):

Any C or D-level CSC, MAT or STA courses (excluding STAC32H3, STAC53H3 and STAD29H3), two ~~three~~ of which must be STA courses.

(\*) Some of the courses on this list have prerequisites that are not included in this program; in choosing courses to satisfy this requirement, check the prerequisites carefully and plan accordingly.

**Description of Proposed Changes:**

1. The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses". In addition, a second chance pathway for admission into the

program is being added.

2. The title for the Statistical Machine Learning and Data Mining Stream has been changed to Statistical Machine Learning and Data Science Stream.

3. Component 7 of the program requirements for the Statistical Machine Learning and Data Science Stream has been increased from a total of 1.0 credit to 2.0 credits; where students used to complete 2 of 4 courses, they must now complete all 4 courses; the courses in the bin are unchanged.

4. Component 8 of the program requirements for the Statistical Machine Learning and Data Science Stream has been reduced from a total of 4.0 credits to 3.0 credits - specifically, students will complete 1.5 credits in additional C- or D-level CSC, MAT, or STA courses rather than 2.5 credits.

5. In Component 8 of the program requirements for the Statistical Machine Learning and Data Science Stream, two additional STA courses have been added to the list of STA excluded courses: STAC32H3 and STAC53H3.

**Rationale:**

1. The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students. In addition, similarly to the Computer Science programs, students will be given a "second chance" pathway to the Specialist in Statistics. This pathway ensures that students have the necessary academic aptitude and are on track with the program, without penalizing them for their previous performance.

2. The Statistical Machine Learning and Data Mining Stream has been renamed to clarify the character of the stream, which is primarily focused on Statistical Data Analysis and Machine Learning, and has little coverage of Data Mining. The SMLDS curriculum does not place sufficient emphasis on the sophisticated computer technologies that are needed for dealing with data at scale. For example, it does not require the upper level CSC courses dealing with database technologies. Data Science, on the other hand, has recently emerged as a field comprising “the science of planning for, acquisition, management, analysis of, and inference from data” (<https://www.nsf.gov/cise/ac-data-science-report/CISEACDataScienceReport1.19.17.pdf>). Data Science places more emphasis on concepts and methods for achieving similar goals, and is closer to Statistics than to Computer Science. As such, the term “Data Science” offers a better description of the stream.

3. All of the courses in component 7 of the program requirements for the Statistical Machine Learning and Data Science are now required courses to ensure the computational learning outcomes are achieved. The overarching goal is for students to be able to effectively develop and implement data-driven software solutions. Beyond basic programming skills (which are covered by the required A-level courses CSCA08 and CSCA48), this requires students to be adept in all three topic areas listed below:

- Algorithmic thinking (covered by CSCB36 + CSCB63)
- Software development fundamentals (covered by CSCB07)
- Specific skills/technologies for working with data (covered by CSCB20)

4. Component 8 of the Statistical Machine Learning and Data Science stream has been reduced by 1.0 credit to offset the increase in total credits for component 7 of the stream. This change will bring the Statistical Machine Learning and Data Science Stream into line with the Quantitative Finance stream; i.e. both streams in the Statistics Specialist program will have:

- 1 additional A-level course (required)
- 4 additional B-level courses (required)
- 6 additional upper (C/D) level courses

The removal of the elective upper-level 1.0 credit will not compromise the overall learning outcomes of the SMLDS stream, since the courses selected to satisfy this credit could be chosen from a wide selection aimed at breadth (any C or D-level CSC, MAT, or STA courses). The change will effectively guarantee the computational learning outcomes of the program, while still allowing enough flexibility for students to pursue their interests with 1.5 elective credits.

5. STAC32H3 and STAC53H3 have been added to the list of excluded STA courses to complete component 8 of the program requirements for the Statistical Machine Learning and Data Science Stream because they are geared towards the Minor Program in Applied Statistics. Both courses focus on practical applications, with minimal mathematical prerequisites. The department will offer theoretical versions of these courses, specifically geared towards the Major & Specialist Programs.

**Impact:**

Continuing students: Students who are already enrolled in the subject POST will be grandfathered, and will be able to follow the requirements at the time when they first selected the program. Where necessary, accommodations for specific course requirements will be made.

New students: Students who are admitted to the subject POST for the first time will follow the new program requirements.

#### **Consultation:**

Consultation within the academic unit:

These proposed changes have been circulated and discussed in two departmental meetings, on April 13 2018, and June 22, 2018, and they were approved in the latter.

Consultation outside the academic unit:

These changes have no impact on other academic units.

#### **Resource Implications:**

The proposed changes to the program completion requirements will increase enrolments in the relevant B-level CSC courses, since students will have to take all four B-level courses. This increase can be accommodated within the Department's current resources.

The proposed addition of a second chance pathway will increase enrolments in the Statistics Specialist program, however, the Department anticipates the program has the capacity to manage the increase without additional resources; if that changes in the future, the Department will address it by increasing the admission cutoff.

## **MAJOR (CO-OPERATIVE) PROGRAM IN STATISTICS (SCIENCE)**

### **Enrolment Requirements:**

#### **Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Major(Co-operative)Program in Statistics is limited.

#### *Current Co-op Students:*

Students admitted to a Co-op Degree POST in their first year of study must request a Co-op Subject POST on ACORN upon completion of 4.0 credits and must have passed all of the A-level CSC and MAT courses required in the program ([CSCA08H3 or CSCA20H3], MATA22H3, [MATA30H3 or MATA31H3], and [MATA36H3 or MATA37H3]). Students are admitted on ~~with a CGPA of 2.5 or greater across~~ the basis of academic performance in program ~~core A-level~~ courses; ~~students should consult the departmental website for more information. In addition, they must also have achieved as well as~~ a CGPA of at least 2.5 across all attempted courses; ~~are guaranteed admission.~~

#### *Prospective Co-op Students:*

Prospective students (i.e., those not already admitted to a Co-op Degree POST) may apply to the Co-op Program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required in the program ([CSCA08H3 or CSCA20H3], MATA22H3, [MATA30H3 or MATA31H3], and [MATA36H3 or MATA37H3]). ~~Students are admitted on~~ ~~Only students with a CGPA of 2.5 or greater across~~ the basis of academic performance in program ~~core A-level~~ courses; ~~students should consult the departmental website for more information. In addition, they must also have achieved as well as~~ a CGPA of at least 2.5 across all attempted courses; ~~will be considered for admission to the Co-op Program.~~

In addition to requesting the program on ACORN, prospective Co-op students (i.e., those not yet admitted to a Co-op Degree POST) must also submit a Co-op Supplementary Application Form, which is available from the Arts & Science Co-op Office (<http://www.uts.utoronto.ca/askcoop/future-co-op-students>). Submission deadlines follow the Limited

Enrolment Program Application Deadlines set by the Office of the Registrar each year. Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that student's application not being considered.

**Description of Proposed Changes:**

1. The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".

The following changes, which have been proposed for the Major Program in Statistics, will also be implemented for the Major (Co-operative) Program in Statistics. They are noted here for convenience - for rationale, impact on students, and impact on resources see the minor modification proposal for the Major Program in Statistics.

2. In Component 3 of the program requirements, two additional STA courses have been added to the list of STA excluded courses: STAC32H3 and STAC53H3.

**Rationale:**

1. The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.

**Impact:**

Continuing students: Students who are already enrolled in the subject POST will be grandfathered, and will be able to follow the requirements at the time when they first selected the program. Where necessary, accommodations for specific course requirements will be made.

New students: Students who are admitted to the subject POST for the first time will follow the new program requirements.

**Consultation:**

Approved by the Departmental Curriculum Committee: June 22, 2018.

Consultation outside the academic unit: Not required

**Resource Implications:**

None.

## MAJOR PROGRAM IN STATISTICS (SCIENCE)

**Enrolment Requirements:**

**Enrolment Requirements**

The following enrolment requirements are effective as of the Summer 2019 session; Students applying to begin the program in Summer 2019, or in any subsequent session, must meet these requirements. These requirements are not retroactive to previous academic sessions.

Enrolment in the Major Program in Statistics is limited.

Students may apply to enter the program after completing 4.0 credits, and must have passed all of the A-level CSC and MAT courses required for the program ([CSCA08H3 or CSCA20H3], MATA22H3, [MATA30H3 or MATA31H3] and [MATA36H3 or MATA37H3]). Students are admitted on with a CGPA of 2.0 or greater across the basis of academic performance in program core A-level courses; students should consult the departmental website for more information are guaranteed admission.

**Completion Requirements:**

**Program Requirements**

This program requires 8.0 credits.

**1. A-level courses**

MATA22H3 Linear Algebra I for Mathematical Sciences

[CSCA08H3 Introduction to Computer Science I or CSCA20H3 Computer Science for the Sciences]

[MATA30H3 Calculus I for Physical Sciences or MATA31H3 Calculus I for Mathematical Sciences \*]

[MATA36H3 Calculus II for Physical Sciences or MATA37H3 Calculus II for Mathematical Sciences \*]

\*The sequence MATA31H3 and MATA37H3 is recommended. MATA31H3 is the pre-requisite for MATA37H3.

## 2. B-level courses

MATB24H3 Linear Algebra II

MATB41H3 Techniques of the Calculus of Several Variables I

MATB42H3 Techniques of the Calculus of Several Variables II

STAB52H3 An Introduction to Probability\*

STAB57H3 An Introduction to Statistics\*

## 3. Upper-level courses

STAC67H3 Regression Analysis\*

and

2.0 credits from the following:

any C- or D-level (or 300-400 on St. George) STA courses, except **STAC32H3, STAC53H3 and STAD29H3**

and

1.0 credit from the following:

ACTB40H3, or any C- or D-level (or 300-400 on St. George) CSC, MAT or STA courses

\*STAB52H3, STAB57H3, STAC67H3 - These courses must be taken at UTSC. No substitutes are permitted without permission of the program supervisor.

### Description of Proposed Changes:

1. The enrolment requirements are being revised to remove the specified CGPA, and replace it with "Students are admitted on the basis of academic performance in program courses".
2. In Component 3 of the program requirements, two additional STA courses have been added to the list of STA excluded courses: STAC32H3 and STAC53H3.

### Rationale:

1. The revised enrolment requirements make it clear to students that admission is limited and based on academic performance, but also give the academic unit the flexibility to adjust these requirements depending on the number of applications each year – something that actually takes place in practice. Each Fall, CMS will decide upon the specific CGPA requirements that will guarantee admission to programs, and will communicate the requirements to students.
2. STAC32H3 and STAC53H3 have been added to the list of excluded STA courses to complete component 3 of the program requirements because they are geared towards the Minor Program in Applied Statistics. Both courses focus on practical applications, with minimal mathematical prerequisites. The department will offer theoretical versions of these courses, specifically geared towards the Major & Specialist Programs.

### Impact:

Continuing students: Students who are already enrolled in the subject POST will be grandfathered, and will be able to follow the requirements at the time when they first selected the program. Where necessary, accommodations for specific course requirements will be made.

New students: Students who are admitted to the subject POST for the first time will follow the new program requirements.

### Consultation:

Approved by the Departmental Curriculum Committee: June 22, 2018.

Consultation outside the academic unit: Not required

### Resource Implications:

None.