UNIVERSITY OF TORONTO SCARBOROUGH

OFFICE OF THE CAMPUS COUNCIL

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
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DATE: December 18, 2017 for January 9, 2018

AGENDA ITEM: 2

ITEM IDENTIFICATION:

Undergraduate Major Modification, New Double Degree Programs

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 9, 2018)**

PREVIOUS ACTION TAKEN:

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

HIGHLIGHTS:

The Department of Management and the Department of Computer and Mathematical Sciences (CMS) at the University of Toronto Scarborough (UTSC) are proposing to introduce analog Co-op and non Co-op double degrees between existing degrees and degree programs.

*Double Degree (Specialist Co-op programs):

- Specialist (Co-operative) Program in Management and Finance, Bachelor of Business Administration (hereafter referred to as the BBA Co-op program), which is housed in the Department of Management at the University of Toronto Scarborough (UTSC); and
- Specialist (Co-operative) Program in Statistics (Quantitative Finance stream), Honours Bachelor of Science (hereafter referred to as the BSc Co-op program), which is housed in the Department of Computer and Mathematical Sciences (CMS) at the University of Toronto Scarborough (UTSC).

*Double Degree (Specialist programs):

- Specialist Program in Management and Finance, Bachelor of Business Administration (hereafter referred to as the BBA program), which is housed in the Department of Management at the University of Toronto Scarborough (UTSC); and the
- Specialist Program in Statistics (Quantitative Finance stream), Honours Bachelor of Science (hereafter referred to as the BSc program), which is housed in the Department of Computer and Mathematical Sciences (CMS) at the University of Toronto Scarborough (UTSC).

The BBA Co-op/BBA and BSc Co-op/BSc programs are well established and produce excellent graduates. However, recent developments in Finance, including innovative products and technologies, such as FinTech and Robo Advising, favour an education that transcends traditional boundaries. Today's financial industry seeks employees with a broad range of expertise, covering business, management, quantitative analysis and IT skills. This phenomenon has also been evident in Co-op programs, where students who possess these skill-sets are in high demand, and consequently are able to secure excellent placements. The BBA Co-op/BBA and BSc Co-op/BSc programs on their own do not allow students to develop such broad expertise within the normal four-year span of an undergraduate degree; the proposed Double Degrees are designed to impart the desired range of knowledge by merging studies in business/management and quantitative analysis/IT.

The proposed Double Degrees create an accelerated pathway for students who would otherwise have to complete two separate Specialist programs. No new elements are being created, and the Double Degrees do not require any new or additional courses to be developed. In addition, the Double Degree (Specialist Co-op programs) does not require additional resources to support the Co-op requirements since both CMS and the Department of Management already have a strong Co-op infrastructure and apparatus in place.

The proposed Double Degrees will explicitly focus on finance and quantitative methods, providing students with a thorough education in both the business and the quantitative aspects of the financial industry. It will take advantage of existing synergies between the BBA Co-op/BBA and BSc Co-op/BSc programs to allow students to complete both undergraduate programs and degrees within five years without compromising the learning outcomes of the undergraduate programs. Students will complete a total of 25.0 credits and, for those enrolled in the Double Degree (Specialist Co-op programs), students must also complete three mandatory Co-op work terms. Of the total 25.0 credits required to complete the Double Degrees, 22.0 credits are allocated to fulfill the core program requirements, and the remaining 3.0 credits are available to fulfill degree breadth requirements and other academic interests.

The core course requirements and learning outcomes for both the BBA Co-op/BBA and BSc Co-op/BSc programs will be preserved. The efficiency gain of 6.5 credits [15.5 (BBA Co-op/BBA program) + 13.0 (BSc Co-op/BSc program) – 22.0 (Double Degree) = 6.5 credits] is achieved through: (1) eliminating duplication; (2) removing redundant courses; (3) combining overlapping courses; and (4) removing electives from each undergraduate program that are already fulfilled, in spirit, by courses from the other program.

The proposed Double Degrees will be the first of their kind offered in the Greater Toronto Area, and they are anticipated to engender considerable interest and attract exceptional students to UTSC. They will be prestigious niche programs with a strong focus on quality. Enrolment will be capped at 20 students per year, in total, for **both** the Co-op and non Co-op options. Admission will be primarily based on GPA, and successful applicants are expected to be among the best and the brightest.

There has been wide consultation regarding the proposal, including: the Department of Management at UTSC, the Rotman School of Management, the University of Toronto Mississauga Institute for Management and Innovation, the UTSC Office of the Dean, the Office of the Vice-Provost, Academic Programs, UT Planning and Budget, and the Office of Government, Institutional and Community Relations. The proposal has also been reviewed by the UTSC Campus Curriculum Committee, and received its support.

FINANCIAL IMPLICATIONS:

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

RECOMMENDATION:

Be It Resolved,

THAT the major modification to introduce 2 new Double Degree Programs: (1) Double Degree: UTSC, Bachelor of Business Administration, Specialist (Co-operative) Program in Management and Finance/UTSC, Honours Bachelor of Science, Specialist (Co-operative) Program in Statistics, Quantitative Finance stream; and (2) Double Degree: UTSC, Bachelor of Business Administration, Specialist Program in Management and Finance/UTSC, Honours Bachelor of Science, Specialist Program in Statistics, Quantitative Finance stream), as described in the proposal dated December 5, 2017 and recommended by the Vice-Principal Academic and Dean, Professor William Gough, be approved effective April 1, 2018 for the academic year 2018-19.

DOCUMENTATION PROVIDED:

1. Major Modification to introduce 2 new Double Degree Programs: (1) Double Degree: UTSC, Bachelor of Business Administration, Specialist (Co-operative) Program in Management and Finance/UTSC, Honours Bachelor of Science, Specialist (Co-operative) Program in Statistics, Quantitative Finance stream; and (2) Double Degree: UTSC, Bachelor of Business Administration, Specialist Program in Management and Finance/UTSC, Honours Bachelor of Science, Specialist Program in Statistics, Quantitative Finance stream, dated December 5, 2017.

University of Toronto
Major Modification Proposal:
Double Degree Programs

*Double Degree Programs Proposed:			
	Campus	**Undergraduate Program**	**Undergrad Degree**
1.	UTSC Department of Management	Specialist (Co-Operative) Program in Management and Finance	Bachelor of Business Administration (BBA)
2.	UTSC Department of Computer and Mathematical Science	Specialist (Co-operative) Program in Statistics, Quantitative Finance stream	Honours Bachelor of Science (BSc)
3.	UTSC Department of Management	Specialist Program in Management and Finance	Bachelor of Business Administration (BBA)
4.	UTSC Department of Computer and Mathematical Science	Specialist Program in Statistics, Quantitative Finance stream	Honours Bachelor of Science (BSc)

*Calendar nomenclature is described in the Summary below.

Faculty(s):	University of Toronto Scarborough
Dean's Office Contact:	Annette Knott, Academic Programs Officer aknott@utsc.utoronto.ca
Department(s) / Unit(s) (if applicable):	Department of Management, UTSC Department of Computer and Mathematical Sciences, UTSC
Department / Unit Contacts:	Jason Wei, Department of Management, UTSC Sotirios Damouras, Department of Computer and Mathematical Sciences, UTSC
Version Date of Proposal *(please change as you edit proposal):*	December 5, 2017

1 Summary

This is a proposal to create analog Co-op and non Co-op double degrees between existing degrees and degree programs.

*Double Degree (Specialist Co-op programs):

- Specialist (Co-operative) Program in Management and Finance, Bachelor of Business Administration (hereafter referred to as the BBA Co-op program), which is housed in the Department of Management at the University of Toronto Scarborough (UTSC); and
- Specialist (Co-operative) Program in Statistics (Quantitative Finance stream), Honours Bachelor of Science (hereafter referred to as the BSc Co-op program), which is housed in the Department of Computer and Mathematical Sciences (CMS) at the University of Toronto Scarborough (UTSC).

The Calendar nomenclature will be "Double Degree: UTSC, Bachelor of Business Administration, Specialist (Co-operative) Program in Management and Finance / UTSC, Honours Bachelor of Science, Specialist (Co-operative) Program in Statistics, Quantitative Finance stream".

*Double Degree (Specialist programs):

- Specialist Program in Management and Finance, Bachelor of Business Administration (hereafter referred to as the BBA program), which is housed in the Department of Management at the University of Toronto Scarborough (UTSC); and the
- Specialist Program in Statistics (Quantitative Finance stream), Honours Bachelor of Science (hereafter referred to as the BSc program), which is housed in the Department of Computer and Mathematical Sciences (CMS) at the University of Toronto Scarborough (UTSC).

The Calendar nomenclature will be "Double Degree: UTSC, Bachelor of Business Administration, Specialist Program in Management and Finance / UTSC, Honours Bachelor of Science, Specialist Program in Statistics, Quantitative Finance stream".

*Note: hereafter, "Double Degrees" will be used when the discussion applies to both Double Degrees.

The BBA Co-op/BBA and BSc Co-op/BSc programs are well established and produce excellent graduates. However, recent developments in Finance, including innovative products and technologies, such as FinTech and Robo Advising, favour an education that transcends traditional boundaries. Today's financial industry seeks employees with a broad range of expertise, covering business, management, quantitative analysis and IT skills. This phenomenon has also been evident in Co-op programs, where students who possess these skill-sets are in high demand, and consequently are able to secure excellent placements. The BBA Co-op/BBA and BSc Co-op/BSc programs on their own do not allow students to develop such broad expertise within the normal four-year span of an undergraduate degree; the proposed Double Degrees are designed to impart the desired range of knowledge by merging studies in business/management and quantitative analysis/IT.

The proposed Double Degrees create an accelerated pathway for students who would otherwise have to complete two separate Specialist programs (any combination of BBA Co-op/BBA and BSc Co-op/BSc). No new elements are being created, and the Double Degrees do not require any new or additional courses to be developed. In addition, the Double Degree (Specialist Co-op programs) does not require additional resources to support the Co-op requirements since both CMS and the Department of Management already have a strong Co-op infrastructure and apparatus in place.

The proposed Double Degrees will explicitly focus on finance and quantitative methods, providing students with a thorough education in both the business and the quantitative aspects of the financial industry. It will take advantage of existing synergies between the BBA Co-op/BBA and BSc Co-op/BSc programs to allow students to complete both undergraduate programs and degrees within five years without compromising the learning outcomes of the undergraduate programs. Students will complete a total of 25.0 credits and, for those enrolled in the Double Degree (Specialist Co-op programs), students must also complete three mandatory Co-op work terms. Of the total 25.0 credits required to complete the Double Degrees, 22.0 credits are allocated to fulfill the core program requirements, and the remaining 3.0 credits are available to fulfill degree breadth requirements and other academic interests. [Note: In order for students in the Double Degree (Specialist Co-op programs) to complete the program in five years, they must take courses during the Summer term; for whose who are unable, or unwilling, to take Summer courses, the program will take longer to complete. Students in the Double Degree (Specialist programs) can complete the program in five years without having to take Summer courses.]

The core course requirements and learning outcomes for both the BBA Co-op/BBA and BSc Co-op/BSc programs will be preserved. The efficiency gain of 6.5 credits [15.5 (BBA Co-op/BBA program) + 13.0 (BSc Co-op/BSc program) – 22.0 (Double Degree) = 6.5 credits] is achieved through: (1) eliminating duplication; (2) removing redundant courses; (3) combining overlapping courses; and (4) removing electives from each undergraduate program that are already fulfilled, in spirit, by courses from the other program.

The proposed Double Degrees will be the first of their kind offered in the Greater Toronto Area, and they are anticipated to engender considerable interest and attract exceptional students to UTSC. They will be prestigious niche programs with a strong focus on quality. Enrolment will be capped at 20 students per year, in total, for **both** the Co-op and non Co-op options. Admission will be primarily based on GPA, and successful applicants are expected to be among the best and the brightest.

2 Effective Date:

The proposed Double Degrees will be available as of the 2018-19 academic year and will be included in the 2018-19 Academic *Calendar*. Interested students will be able to apply for

admission during the 2018 admissions cycle, and the first cohort of students will begin their chosen Double Degree program in September 2018.

The proposed Double Degrees primarily will be direct entry from high school. However, existing BBA Co-op/BBA students will also be considered for admission into Year 2 of the Double Degrees, to make up for any attrition of direct entry students. We anticipate the number of spots in the programs, which are made available through attrition, will be limited, and they will begin to be filled as of the 2019-20 academic year. The details of this arrangement are outlined in Sections 6 and 7, and Appendix C of this proposal.

3 Academic Rationale

3.1 Academic Need

A shift in the economy from a focus on manufacturing to a focus on services has led to a growing need for people with management skills, and graduates with BBA degrees are consequently in high demand. At the same time, technological advances have led to a growing need in all business sectors (and particularly in the Finance sector) for people with quantitative analysis and/or IT skills. Yet most BBA graduates will not have any in-depth training in quantitative analysis/IT, and most quantitative analysis/IT graduates will know very little about business. Thus, there is a new, and growing, demand for people with training in both Finance and the kind of quantitative analysis/IT skills gained through an advanced education in Statistics. The proposed Double Degrees address this gap by producing graduates who are well positioned to fill this employment niche.

Currently, UTSC students interested in both Finance and Statistics choose to complete either the Specialist Co-op/Specialist Program in Management and Finance (BBA) or the Specialist Co-op/Specialist Program in Statistics, Quantitative Finance stream (BSc). A primary impetus for making this choice is an understandable desire to graduate within an average four-year span: students wanting to pursue both disciplines, and complete both sets of program and degree requirements, would take at least seven years to graduate, even taking course exemptions into account. However, the existing BBA programs (Co-op and non Co-op) include a significant number of required quantitative-focused courses, some of which are housed in CMS. Furthermore, the existing BSc programs (Co-op and non Co-op) include introductory business/economics courses and courses focusing on Finance elements, some of which are housed in the Department of Management. By leveraging these existing synergies between the BBA Co-op/BBA and BSc Co-op/BSc programs, we can create a pathway that will better serve the exceptional students who aspire to acquire a much wider set of knowledge than can be provided through the BBA or BSc degrees alone, and allow these students to pursue their studies in a condensed timeframe.

The proposed Double Degrees provide an excellent alternative for highly motivated and capable students who want to pursue both Finance and Statistics, but currently have no viable way to

do so. It will explicitly focus on finance and quantitative methods, thus equipping students with a thorough education in both the business and the quantitative aspects of the financial industry. It will take advantage of synergies between the existing BBA Co-op/BBA and BSc Co-op/BSc programs to allow students to complete both undergraduate programs and degrees within five years, without compromising the learning outcomes of the undergraduate programs. Students will complete a total of 25.0 credits and, for those enrolled in the Double Degree (Specialist Co-op programs), students must also complete three mandatory Co-op work terms. Of the total 25.0 credits required to complete the Double Degrees, 22.0 credits are allocated to complete core program requirements, and the remaining 3.0 credits are available to fulfill degree breadth requirements and other academic interests. [Note: In order for students in the Double Degree (Specialist Co-op programs) to complete the program in five years, they must take courses during the Summer term; for whose who are unable, or unwilling, to take Summer courses, the program will take longer to complete. Students in the Double Degree (Specialist programs) can complete the program in five years without having to take Summer courses.]

The core course requirements and learning outcomes for both the BBA Co-op/BBA and BSc Co-op/BSc programs will be preserved. The efficiency gain of 6.5 credits [15.5 (BBA Co-op/BBA program) + 13.0 (BSc Co-op/BSc program) – 22.0 (Double Degree) = 6.5 credits] is achieved through: (1) eliminating duplication; (2) removing redundant courses; (3) combining overlapping courses; and (4) removing electives from each undergraduate program that are already fulfilled, in spirit, by courses from the other program. Details of the program structure are given in Section 5.

The proposed Double Degrees are a key priority in the 2015 academic plans of both the Department of Management and CMS.

3.2 Student Demand, and Societal Need

Double degree programs are attracting a great deal of interest and demand in Ontario. Wilfrid Laurier University offers four such programs, two of which are offered jointly with the University of Waterloo. Admission to all four programs is highly competitive; in addition, they take five years to complete, and include a Co-op component. The programs are successful because they produce the graduates today's employers are seeking: trained in both business and quantitative analysis/IT.

- Business and Computer Science
- Business and Computer Science (with University of Waterloo)
- Business and Financial Mathematics
- Business and Mathematics (with University of Waterloo)

For details see the following:
https://uwaterloo.ca/find-out-more/programs/business-administration-mathematics-double-degree

https://uwaterloo.ca/math-business-accounting-programs/programs/business-administration-and-computer-science-double-degree

Currently, there are no double degrees similar to Laurier's offered in the Greater Toronto Area. We therefore believe the proposed Double Degrees will fill a significant gap, by providing students with a useful program that will meet employers' needs.

The table below presents the total annual enrolment across all years in the Specialist Program in Statistics (Quantitative Finance stream):

Year	2011	2012	2013	2014	2015	2016
Co-op	2	4	6	13	12	13
Non Co-op	33	46	51	60	85	97
Total	**35**	**50**	**57**	**73**	**97**	**110**

Enrolment in the programs has tripled in the past five years, suggesting that a growing number of students want to pursue the combination of Finance and Statistics to better prepare themselves for the job market. The dominance of the non Co-op enrolment can be attributed in large part to the unlimited enrolment status of the non Co-op program. This status has recently been changed to limited enrolment. Going forward, enrolments in the Co-op and non Co-op programs are anticipated to be roughly equal.

The proposed Double Degrees will also become excellent feeders to Master's and PhD programs. Currently, typical BBA or BSc graduates are not competitive in terms of entrance to graduate programs in Finance, or in Statistics with a financial economics orientation, for reasons similar to the employment situation in the industry. Specifically, many graduate programs in Finance prefer candidates with both a business degree and strong skills in quantitative analysis. The reverse is true for graduate programs in Statistics with a focus on financial economics. Students coming from the proposed Double Degrees will naturally have an edge over other candidates.

As an elite program – one that attracts excellent students, fills an important employment niche, and provides well-trained students to graduate programs – the proposed Double Degrees will enhance the overall reputation of the University among high schools and employers.

4 Enrolment Projections

As the proposed Double Degrees will be the first of their kind in the GTA, demand is expected to be high. However, to ensure high quality, and in line with the elite nature of the program, enrolment in the both the Double Degree (Specialist Co-op programs) and the Double Degree (Specialist programs) will be capped at 20 students, in total, per year; in steady state, there will

be 100 students across five years of study. The top 20 students will be selected each year, and the students will select either the Double Degree (Specialist Co-op programs) or Double Degree (Specialist programs) in accordance with their interests/aspirations.

Most students will be admitted directly to the Double Degrees from high school, and for the inaugural 2018-19 academic year, the entire intake will come from high schools. However, beyond the first cohort in the 2018-19 academic year, existing BBA Co-op/BBA students will be considered for any spaces made available through normal attrition to enter the Double Degree programs in Year 2 of the program. A nuanced enrolment plan will be developed in close coordination with the UTSC Registrar's Office that will ensure an enrolment of 20 high quality students per year, while also providing an opportunity to aspiring excellent BBA Co-op/BBA students.

Since all of the courses included in the proposed Double Degrees already exist, and are regularly offered, enrolments will not have significant impacts on the budgets for either the Departments of Management or CMS. In other words, students enrolled in the Double Degrees will be dispersed in existing classes. A minimum cohort size is unnecessary since there won't be a need to offer any courses that are specifically designated for the double-degree program.

Table 1: Projections of Total Enrolment in Co-op and Non Co-op Double Degrees*

Yr in program	2018-19	2019-20	2020-21	2021-22	2022-23*
1	20	20	20	20	20
2		20	20	20	20
3			20	20	20
4				20	20
5					20
Total	20	40	60	80	100

**Steady State projected in 2022-23*

5 Program Requirements

5.1 Degree Requirements

To qualify for the Bachelor of Business Administration Degree (BBA), students must:

- Pass a minimum of 20.0 credits, including
  - 6.0 credits at the C- or D-level, of which 1.0 credit must be at the D-level;
  - 2.5 credits in breadth requirement courses
- Complete one Specialist program in Management, or Economics for Management Studies
- Earn a cumulative grade point average of at least 1.85

***Note**: the CGPA requirement to complete certain programs is higher than 1.85.

To qualify for the Honours Bachelor of Science Degree (BSc), students must:

- Pass a minimum of 20.0 credits, including
    - 6.0 credits at the C- or D-level, of which 1.0 credit must be at the D-level;
    - 2.5 credits in breadth requirement courses
- Complete one Specialist program, two Major programs, or one Major and two Minor programs; the combination of programs completed must include at least 12.0 different full credits
- Earn a cumulative grade point average of at least 1.85

The proposed Double Degrees complete the requirements to qualify for both the BBA and BSc degrees as follows:

- Students must pass a minimum of 25.0 credits, including
    - At least 8.5 credits at the C- or D-level, of which at least 2.0 credits must be at the D-level
    - 2.5 credits in breadth requirement courses
- Students must pass a tailored set of course requirements designated as completing two Specialist programs: either the Specialist (Co-operative) Program in Management and Finance, and Specialist (Co-operative) Program in Statistics, Quantitative Finance stream; or the Specialist Program in Management and Finance and Specialist Program in Statistics, Quantitative Finance stream. For both options, the combination of courses includes at least 12.0 different full credits
- Students enrolled in the Double Degree (Specialist Co-op programs) must also complete 3 Co-op terms
- Students must earn a cumulative grade point average of at least 2.5 to remain in the Double Degree (Specialist Co-op programs) and 2.0 to remain in the Double Degree (Specialist programs)

5.2 Program Requirements

The existing BBA Co-op/BBA programs require students to complete 15.5 to 16.5 credits (depending on the combination of courses taken): 12.5 credits comprise the common core for all BBA Specialist programs (components 1, 2, 3 and 4), and 3.0-4.0 credits are Finance specific cores (components 5 and 6). Of the 15.5 to 16.5 credits required for the BBA Co-op/BBA programs, 4.5 credits are electives chosen from a given menu. Since students must complete a total of 20.0 credits as part of the requirements for the BBA degree, beyond the 15.5-16.5 credits required to complete the BBA Co-op/BBA programs, students must complete a further 3.5-4.5 credits; these are free electives that may be used to fulfill breadth requirements, or deepen the core area of study. Descriptions of the BBA Co-op/BBA programs are given in Appendix A.

The existing BSc Co-op/BSc programs require students to complete 13.0 credits in total: 7.5 credits compromise the common core for all streams of the BSc (components 1, 2, 3, 4 and 5), and 5.5 credits are Quantitative-Finance cores (components 6, 7 and 8). Of the 13.0 credits required for the BSc Co-op/BSc programs, 2.5 credits are electives chosen from a given menu.

Since students must complete a total of 20.0 credits as part of the requirements for the BSc degree, beyond the 13.0 credits to complete the BSc Co-op/BSc programs, students must complete a further 7.0 credits; these are free electives that may be used to fulfill breadth requirements, or deepen the core area of study. Description of the BSc Co-op/BSc programs are given in Appendix B.

The proposed Double Degrees require students to complete a total of 25.0 credits. Of the 25.0 credits, 22.0 credits are used towards the completion of program requirements, and 3.0 credits are available to fulfill degree breadth requirements and to allow students to take other courses of interest to them. Descriptions of the Double Degrees are given in Appendix C.

The core course requirements and learning outcomes of the existing BBA Co-op/BBA and BSc Co-op/BSc programs are preserved in the proposed Double Degrees. The efficiency gain of 6.5 credits (15.5 + 13 – 22 = 6.5) is achieved through:

1. Eliminating duplication;
2. Removing redundant courses;
3. Combining overlapping courses; and
4. Removing electives from each program that are already fulfilled, in spirit, by courses from the other program.

Appendix D shows the core requirements in the BBA Co-op/BBA and BSc Co-op/BSc programs, broken down into Fall and Winter terms for each year. Whenever a core requirement can be met by choosing from a given menu, we call it an "elective".

Eliminating Duplication (0.5 credit):

The existing BBA Co-op/BBA and BSc Co-op/BSc programs all require MGEA02H3 (Introduction to Microeconomics: A Mathematical Approach). For both Double Degrees, MGEA02 will be required only once.

Removing Redundant Courses (2.5 credits):

- The BBA Co-op/BBA programs require MATA32H3 (Calculus for Management I) and MATA33H3 (Calculus for Management II), which are calculus courses designed specifically for Management programs. In the BSc Co-op/BSc programs, MATA30H3 (Calculus I for Physical Sciences) and MATA36H3 (Calculus II for Physical Sciences), when combined with MATA22H3 (Linear Algebra I for Mathematical Sciences) and MATB61H3 (Linear Program and Optimization), cover the content and achieve the learning outcomes of MATA32/33.
    - Since MATA30 and MATA36 are prerequisites for upper-level BSc core courses, for the proposed Double Degrees, MATA30 and MATA36 will be retained, while MATA32 and MATA33 will be eliminated. Note: in the BSc Co-op/BSc programs, students have the option of completing either [MATA30 and MATA36] or [MATA31H3 and MATA37H3]; [MATA30 and MATA36]* are being retained because they are techniques-based courses that focus on examples and real world practices,

whereas MATA31 and MATA37 are proof-based courses that focus on mathematical rigour.

- The BBA Co-op/BBA programs require MGEB11H3 (Quantitative Methods in Economics I) and MGEB12H3 (Quantitative Methods in Economics II), which are quantitative methods courses. In the BSc Co-op/BSc programs, the combination of STAB52H3 (An Introduction to Probability), STAB57H3 (An Introduction to Statistics) and STAC67H3 (Regression Analysis) covers the content and achieves the learning outcomes of MGEB11 and MGEB12.
    - Since STAB52 and STAB57 are prerequisites for upper-level BSc core courses, for the proposed Double Degrees, STAB52 and STAB57 will be retained, while MGEB11 and MGEB12 will be eliminated.

- The BBA Co-op/BBA programs include a communications requirement – MGTA35H3 (Management Communications) and a targeted oral and written communications requirement – MGTA36H3 (Management Communications for Co-op). The 0.5 credit writing requirement of the BSc Co-op/BSc programs (see component 1 of the program requirements in Appendix B) can be satisfied by either of these two courses.
    - For the proposed Double Degree (Specialist Co-op programs), MGTA36 will be retained, while the 0.5 credit writing requirement of the BSc program will be eliminated.
    - For the proposed Double Degree (Specialist non Co-op programs), the 0.5 credit writing requirement of the BSc program can be replaced by either MGTA35 or MGTA36.

Combining Overlapping Courses (1.0 credit):

- MGFB10H3 (Principles of Finance), which is required in the BBA Co-op/BBA programs, and ACTB40H3 (Fundamentals of Investment and Credit), which is required in the BSc Co-op/BSc programs, are both introductory finance courses with similar contents and learning outcomes.
    - For the proposed Double Degrees, MGFB10 will be retained and ACTB40 will be eliminated. MGFB10 is being retained because it provides foundational knowledge that is necessary for success in MGFC10H3 (Intermediate Finance).

- MGFC30H3 (Introduction to Derivatives Markets), which is required in the BBA Co-op/BBA programs, and STAB41H3 (Financial Derivatives), which is required in the BSc Co-op/BSc programs, are both introductory courses on derivatives with similar contents and learning outcomes.
    - For the proposed Double Degrees, students will be able to choose either MGFC30 or STAB41 to complete their course requirements.

Removing Electives (2.5 credits):

As noted above, the BBA Co-op/BBA programs include 4.5 credits in courses that are electives chosen from a given menu, while the BSc Co-op/BSc programs include 2.5 credits in this type of elective course. In contrast to the core courses that are meant to ensure breadth within the field (e.g., MGMA01H3 in the BBA Co-op/BBA programs, and CSCA48H3 in the BSc Co-op/BSc programs), and the core courses that are meant to ensure depth within the field (e.g., MGFC30H3 in the BBA Co-op/BBA programs and STAC70H3 in the BSc Co-op/BSc programs), the elective courses are designed to enrich the subject. As the BBA Co-op/BBA and BSc Co-op/BSc programs are merged, certain core courses from one program will automatically enrich relevant areas of the other program. More importantly, some of the courses that can be used to satisfy the elective requirements in one program have substantial overlap with core courses in the other, and therefore can reasonably be replaced by the core courses from the original program without compromising the content and learning outcomes associated with the BBA Co-op/BBA and BSc Co-op/BSc programs. 2.5 credits of elective courses are identified for the above purpose and the rationale for their removal is described below.

- Component 3 of the BBA Co-op/BBA programs require students to complete 0.5 credit in Strategic Management, and can be satisfied by choosing one of nine relevant courses (see Appendix A, Specialist in Management and Finance, component 3 of the program requirements). Strategic Management is not a core BBA requirement, and removing this component allows students greater flexibility in completing the Double Degrees. Students who want exposure to Strategic Management can achieve this using the 3.0 credits allocated for the completion of the Breadth Requirement and pursing areas of interest.

- Component 4 of the BBA Co-op/BBA programs require students to complete 1.0 credit at the C-level in Economics for Management Studies courses (see Appendix A). This requirement can be satisfied by econometric courses that significantly overlap with the BSc core. For example, MGEC11H3 (Introduction to Regression Analysis) can reasonably be replaced by STAC67H3 (Regression Analysis), and MGEC72H3 (Financial Economics) can be replaced by STAC70 (Statistics & Finance I) and STAD70 (Statistics and Finance II) combined. STAC67, STAC70, and STAC70 are all core courses in the proposed Double Degrees (see Appendix C).

- Component 8 of the BSc Co-op/BSc programs requires students to complete 1.0 credit in upper level mathematics and statistics courses that focus on theories or techniques relevant to Quantitative Finance (see Appendix B). This requirement can be satisfied by related upper-level courses in the BBA program, which also have a significant quantitative component: for example, MGOC10H3 (Analysis for Decision-Making), MGOC20H3 (Operations Management: A Mathematical Approach), MGFD30H3 (Risk Management) and MGFD60H3 (Financial Modeling and Trading Strategies). MGOC10 and MGOC20 are core courses in the proposed Double Degrees, while MGFD30 and MGFD60 are elective courses (see Appendix C).

5.3 Breadth Requirements for the BBA and BSc Degrees

Both the BBA and BSc degree requirements include 2.5 credits in breadth requirements. To achieve this requirement students must complete 0.5 credit from each of the following categories:

- Arts, Literature & Language
- History, Philosophy & Cultural Studies
- Social & Behavioural Sciences
- Natural Sciences
- Quantitative Reasoning

Note: program requirements may be used to fulfill any breadth requirement.

Students in the proposed Double Degrees will have no difficulty in completing the breadth requirements for both the BBA and BSc degrees. Most of the core courses in the BBA Co-op/BBA programs are categorized as Social & Behavioural Sciences, especially courses in Marketing and Human Resources. Most of the core courses in the BSc Co-op/BSc programs are categorized as Quantitative Reasoning. MGTA35H3 (Management Communications for non Co-op) and MGTA36H3 (Management Communications for Co-op) are categorized as Arts, Literature & Language. Thus, the core courses in the proposed Double Degrees already fulfil the breadth requirement in three categories: Arts, Literature & Language, Social & Behavioural Sciences, and Quantitative Reasoning. Students will therefore only need to complete 0.5 credit in History, Philosophy & Cultural Studies, and 0.5 credit in Natural Sciences. After fulfilling their breadth requirements, students will still have 2.0 credits available to take any courses of interest to them.

5.4 The Co-op Component in the Proposed Double Degree (Specialist Co-op programs)

The existing BBA Co-op and BSc Co-op programs require students to complete three work terms. Students usually begin their Co-op terms after three to five study terms. In other words, the earliest work term is in the Fall of Year 2. The proposed Double Degree (Specialist Co-op programs) will also have three work terms. The purpose of the Co-op component is to offer an integrative workplace experience, where students can apply what they have learned through their studies in a real-world environment. As such, the Co-op component is complementary to the learning outcomes of a program of study. Three Co-op work-terms are sufficient for students to gain such experience, while at the same time ensuring the necessary flexibility in completing the program.

All students in Co-op programs at UTSC are required to participate in Co-op preparation activities. In Management, Co-op students are required to take a mandatory Co-op preparation course in which they are taught about the world of work, job search and interviewing techniques, resume writing and have expectations established for their conduct and performance on work terms. As students in the proposed Double Degree (Specialist Co-op programs) will be served by Management Co-op, they will be required to take the Management Co-op preparatory course.

The ideal Co-op sequence is one where work terms alternate with study terms. Accordingly, a possible sequencing of the three Co-op terms is provided in Appendix E. It should be noted that other pathways are possible, including two consecutive Co-op terms.

Note: for completeness, Appendix F presents a possible sequencing of courses for the Double Degree (Specialist programs). Two points are noteworthy. First, the course sequencing in the first year is identical to that for the Double Degree (Specialist Co-op programs). This is to facilitate potential transfers from the non Co-op track to the Co-op track, and vice-versa. Second, while Summer courses are necessary to complete the Double Degree (Specialist Co-op programs) in five years, they are not necessary to complete Double Degree (Specialist programs) in five years.

6 Admission Process

Direct entry from high school:
Students will normally apply to the proposed Double Degrees directly from high-school. The Double Degree (Specialist Co-op Programs) and Double Degree (Specialist Programs) will appear as separate codes on the OUAC application. Enrolments will be limited – with a cap of 20 students, in total, in both the Double Degree (Specialist Co-op programs) and the Double Degree (Specialist programs). High school students applying to the Double Degree programs will also be required to complete the standard Supplementary Application Form required of all BBA students.

Entry after first year:
Given normal attrition, a limited number of places will be available for BBA Co-op/BBA students who wish to apply to the Double Degrees in Year 2 – these students will be directed to consult with the BBA Academic Director to create a course plan.

Students will apply via ACORN either at the end of the Winter term (March/April) or the end of the Summer term (June/July); normally students will have a month to apply. BBA students applying to the Double Degree (Specialist Co-op programs) must also submit a resume and covering letter to the Management Co-op Office. Once the application period closes, and all grades have been received, the Departments of Management and CMS will be given access to the Limited Subject POSt Applications (via eService), where they will be able to see the list of students who have applied, their transcripts, grades in specific courses, etc. The Departments of Management and CMS will make their decisions known via eService, and students will be given a deadline to accept their offer on ACORN.

7 Enrolment Requirements

Direct entry from high school – both Double Degrees:

Students will be admitted on the basis of academic performance. They must have completed Grade 12 English, Grade 12 Advanced Functions, and Grade 12 Calculus & Vectors. Given the quantitative focus of the Double Degrees, students must obtain a minimum grade of 85% in Grade 12 Calculus & Vectors, and an overall average in the high 80s, to be considered. Expected high volumes of applications may raise the admission cut-off higher.

Students who do not qualify for the proposed Double Degrees will be considered for admission to either the BBA Co-op/BBA or BSC Co-op/BSC programs.

Entry after first year – both Double Degrees:
For BBA Co-op/BBA students applying to the Double Degrees in Year 2, the minimum Cumulative Grade Point Average (CGPA) for admission will be calculated for each application period (but will not be less than 2.5), and will be based on University of Toronto courses only.

Students seeking to enter after first year must have completed at least 4.5 credits (none of which can be designated as CR/NCR), including: MGTA05H3, MGEA02H3, MGEA06H3, MGAB01H3, MGAB02H3, [MGTA35H3 or MGTA36H3], MATA22H3, MATA30H3, and MATA36H3. Students who have taken the sequence [MATA32H3 and MATA33H3] instead of [MATA30H3 and MATA36H3] can still apply to the Double Degrees if they are taking or plan to take MATA36H3 at the time of application and could receive admission conditional on their grade in MATA36H3 being above a threshold to be specified each year.

Students may apply until they have completed up to 10.0 credits. Students who have completed more than 10.0 credits will not be able to apply to the Double Degrees. For those who apply with more than 4.5 credits, their CGPA at the time of application will be calculated with more weight assigned to the required courses listed under the 4.5 credits.

BBA Co-op/BBA students applying to the Double Degree (Specialist Co-op programs) must also submit a resume and covering letter to the Management Co-op Office during the limited Subject POSt request period outlined on the Registrar's website (https://www.utsc.utoronto.ca/registrar/dates-and-deadlines). Information on what to include in the resume and covering letter is provided on the Management Co-op website (http://www.utsc.utoronto.ca/mgmt/management-admissions). An interview may also be required.

CGPA Requirement to Remain in the Double Degree (Specialist Co-op programs):
To remain in the Double Degree (Specialist Co-op programs) students must maintain a CGPA of 2.5 or higher after having attempted at least 4.0 credits. Students whose CGPA falls below 2.5 will be placed on probation. Students on probation will be reinstated to the Double Degree (Specialist Co-op programs) if they complete at least 2.0 credits (none of which can be designated as CR/NCR) in the following session and raise their CGPA to at least 2.5. Students who cannot get out of probation in two consecutive sessions, or whose CGPA falls below 2.3, will be removed from the Double Degree (Specialist Co-op programs). Students removed from the Double Degree (Specialist Co-op programs) can pursue the Double Degree (Specialist

programs), or one of its constituent non Co-op programs (i.e., the BBA Specialist Program in Management and Finance, or the BSc Specialist Program in Statistics, Quantitative Finance stream).

CGPA Requirement to Remain in the Double Degree (Specialist programs):
To remain in the Double Degree (Specialist programs) students must maintain a CGPA of 2.0 or higher after having attempted at least 4.0 credits. Students whose CGPA falls below 2.1 (but not below 2.0) will be given the opportunity to move to either the BBA Specialist Program in Management and Finance, or the BSc Specialist Program in Statistics, Quantitative Finance stream. Students choosing to remain in the Double Degree (Specialist programs) whose CGPA falls below 2.0, will be removed from the Double Degree (Specialist programs). Students removed from the program for this reason may request re-instatement if they complete at least 2.0 credits (none of which can be designated as CR/NCR) in the following session and raise their CGPA to at least 2.0. This opportunity will be provided only once. Students removed from the program will receive guidance regarding their academic options from the Departments of Management and CMS.

Course Sequencing in the Proposed Double Degrees:
Recommended course sequencing for the proposed Double Degree (Specialist Co-op programs) is given in Appendix E, and for the proposed Double Degree (Specialist programs) in Appendix F. Sequencing for Year 1 of both Double Degrees will be highly structured in order to ensure students have passed any necessary prerequisites for upper-year courses. Sequencing in Years 2 through 5 can be more flexible.

Path to Completion:
The proposed Double Degrees will normally take five years to complete. This minimum time to completion requires students in the Double Degree (Specialist Co-op programs) to take courses during the Summer term; for students who are unable, or unwilling, to take Summer courses the program will take longer than five years to complete. Students in the Double Degree (Specialist programs) can complete the program in five years without having to take Summer courses.

The proposed Double Degrees can be completed with many possible course sequences, and for the Double Degree (Specialist Co-op programs), sequencing of Co-op terms can also vary. As shown in Appendix E, no more than five courses are required per term. If students take more courses in the Summer term and/or take six courses in some Fall or Winter terms, then the extent of flexibility increases.

Options for students who wish to exit from the Double Degree:

- Students in the Double Degree (Specialist Co-op programs), whose CGPA is 2.5 or higher, may select the Double Degree (Specialist programs), the BBA Co-op/BBA programs or the BSc Co-op/BSc programs.
- Students in the Double Degree (Specialist Programs), whose CGPA is 2.1 or higher, will be given the opportunity to select either the non Co-op BBA program or the non Co-op BSc

program.

Options for students who do not complete all of the program requirements:

- Students in the Double Degree (Specialist Co-op programs), whose CGPA is 2.5 or higher, and complete all of the program requirements but do not complete all three work terms, will graduate with a Double Degree (Specialist programs).

8 Calendar Copy

Please see Appendices A and B for *Calendar* descriptions of the existing BBA Co-op/BBA and BSc Co-op/BSc programs. See Appendix C for the *Calendar* description of the proposed Double Degrees.

9 Consultation

9.1 Impacts

The proposed Double Degrees will provide an opportunity for exceptional students, with an interest in business/management and quantitative analysis/IT, the opportunity to enrol in one of two high quality niche offerings designed to meet their academic and career aspirations. For those students who do not qualify for the Double Degrees, UTSC will continue to offer a broad range of both non Co-op and Co-op programs in either business/management or quantitative analysis/IT, so no students will be disadvantaged.

The proposed Double Degrees have the full support of the Departments of Management and CMS at UTSC. They do not impact any other academic units at UTSC, or any other divisions.

9.2 Consultation

The proposed Double Degrees have been discussed widely in the Departments of Management and CMS over the last three years. The desire to create these offerings was articulated in the 2015 academic plans of both departments, and this proposal has been approved by the Curriculum Committees in both departments. The proposal has subsequently been discussed with the UTSC Registrar, and the in the Dean's Office. There has been extensive consultation with the Provost's Office.

There has been consultation with the Department of Statistical Sciences at St. George, and the Department of Mathematical and Computational Sciences at UTM. No concerns were raised.

There has also been consultation with Rotman Commerce at St. George and the Department

of Management at UTM. Both are strongly supportive of the initiative.

9.3 MOA
The proposed Double Degrees are not interdivisional. An MOA is not applicable.

10 Resources

The impact on resources will be minor. The existing BBA Co-op/BBA and BSc Co-op/BSc programs, upon which the proposed Double Degrees are based, are already well established. Moreover, the proposed Double Degrees will rely on existing courses. If a net gain in enrolment is experienced, then an additional section of some courses may need to be mounted. However, given the small size of the target cohort (i.e., a total of 20 students per year), the increased demand for certain courses can be managed within existing departmental budgets.

Any additional demand for space and libraries will also be minimal.

Most of the costs of the Double Degrees lie with the coordination between the Departments of Management and CMS. To streamline the day-to-day operations of the program, and to avoid issues regarding differences in admission requirements, tuition fees, and Co-op programming fees, student recruitment, admissions, and Co-op will be handled through the Department of Management. Student advising will primarily be the responsibility of the program Academic Supervisors.

Tuition fees will be based on the fees for the existing BBA and BSc programs, and related to the pattern of registration in the Double Degrees. Claims for government funding will be optimized based on claims for the existing programs and the pattern of registration in the Double Degrees. UTSC is working with the Office of Planning and Budget to confirm the details prior to implementation.

For general program supervision and decisions about the Double Degrees, both departments (Management and CMS) will be equally involved.
Revenue sharing will be coordinated with the Dean's Office. The intention is to share revenues equally, given the balanced mix of courses in the program from Management and CMS.

11 Governance Process

Levels of Approval Required	Date
Academic Unit Curriculum Committee	Department of Computer and Mathematical Sciences: September 23, 2016 Department of Management: October 13, 2016
• **Dean's Office Sign-off** • **Provost's Office Sign-off**	November 13, 2017 November 16, 2017
Reviewed by Campus Curriculum Committee	December 4, 2017
Approved by UTSC Academic Affairs Committee	
Submitted to Provost's Office	
Report to AP&P (by P.O.)	
Report to Ontario Quality Council (by P.O.)	

Appendix A: Current Calendar Description for the Specialist/Specialist (Co-operative) Program in Management and Finance

SPECIALIST PROGRAM IN MANAGEMENT AND FINANCE (BACHELOR OF BUSINESS ADMINISTRATION)

Academic Director: S. Ahmed *Email*: mgmtss@utsc.utoronto.ca

This Program builds on the core of the Specialist in Management Program and offers a deeper and wider coverage of Finance topics. The Program will equip students with a comprehensive understanding of financial issues and concepts, and with a firm mastery of methodologies and problem solving skills required in modern-day finance.

Enrolment Requirements
Enrolment in this Program is limited.

1. Students enrolling directly from high school are admitted on the basis of academic performance. They must have completed Grade 12 English and Grade 12 Calculus.
Course Guidelines for Students Admitted to B.B.A. Programs Directly from High School Students must complete the following courses in their first year of study: MGTA05H3, MGEA02H3, MGEA06H3, MATA32H3, MATA33H3, MGAB01H3, MGAB02H3, MGMA01H3 and MGTA35H3.

2. Students requesting admission after first year must request ONLY ONE Management Subject POSt on ACORN. Students may apply at the end of the Winter semester and/or at the end of the Summer semester. Application for admission will be considered only for the round during which the student has made the Subject POSt request.

The minimum Cumulative Grade Point Average (CGPA) for Program admission is calculated for each application period, and is based on University of Toronto courses only. Decisions are made when all grades have been received.

Students must have completed at least 4.0 credits (none of which can be designated as CR/NCR), including MGTA01H3, MGTA02H3, MGEA02H3, MGEA06H3, MATA32H3, and MATA33H3. [MATA32H3 and MATA33H3] are strongly recommended, however [MATA30H3/ A31H3 and MATA35H3/A36H3/A37H3] may also be used to satisfy the calculus requirement. Students may apply until they have completed up to 10.0 credits. Students who have completed more than 10.0 credits will not be able to enrol in the Program.

In order to remain in the Program, students must maintain a CGPA of 2.0 or higher after having attempted at least 4.0 credits. Students whose CGPA falls below 2.0 will be removed from the Program. Students removed from the program for this reason may request re-instatement if

they complete at least 2.0 credits (none of which can be designated as CR/NCR) in the following session and raise their CGPA to at least 2.0. This opportunity will be provided only once.

Program Requirements
The Program requires the completion of 15.5 to 16.5 credits as part of a twenty-credit B.B.A. degree.

Note: A single course may only be used once to fulfill one of the following requirements:

1. (7.0 to 8.0 credits, depending on the combination of courses completed):
MGMA01H3/(MGTB04H3) Principles of Marketing
MGTA05H3 Foundations of Business Management or [(MGTA01H3/MGTA03H3) and (MGTA02H3/MGTA04H3)]
[MGTA35H3 Management Communications for non Co-op or MGTA36H3 Management Communications for Co-op or (MGTC36H3)]
MGAB01H3/(MGTB05H3) Introductory Financial Accounting I
MGAB02H3/(MGTB06H3) Introductory Financial Accounting II
MGAB03H3/(MGTB03H3) Introductory Management Accounting
MGFB10H3/(MGTB09H3) Principles of Finance
[MGHB02H3 Managing People and Groups in Organizations or [(MGTB23H3) and (MGTB29H3)] or (MGTB27Y3)]
MGHB12H3/(MGTC22H3) Human Resource Management
MGMB01H3/(MGTC05H3) Marketing Management
MGFC10H3/(MGTC09H3) Intermediate Finance
MGHC02H3/(MGTC90H3) Management Skills
MGOC10H3/(MGTC74H3) Analysis for Decision Making
MGOC20H3/(MGTC75H3) Operations Management: A Mathematical Approach

2. (1.0 credit):
[MATA32H3 and MATA33H3] strongly recommended, or
[MATA30H3/A31H3 and MATA35H3/A36H/A37H3]

3. At least 0.5 credit of courses emphasizing strategic management, chosen from:
MGSC01H3/(MGTC41H3) Corporate Strategy
MGSC03H3/(MGTC42H3) Public Management
MGSC05H3/(MGTC45H3) The Changing World of Business-Government Relations
MGSC12H3/(MGTC35H3) Narrative and Management
MGSC14H3/(MGTC59H3) Management Ethics
MGSC20H3/(MGTC19H3) Consulting and Contracting: New Ways of Work
MGSB22H3/(MGSC22H3/MGTC38H3) Entrepreneurship
MGSD24H3/(MGSC24H3/MGTC39H3) New Venture Creation and Planning
MGSC30H3/(MGTC31H3) The Legal Environment of Business I

4. (4.0 credits):
MGEA02H3/(ECMA04H3) Introduction to Microeconomics: A Mathematical Approach
MGEA06H3/(ECMA06H3) Introduction to Macroeconomics: A Mathematical Approach
MGEB02H3/(ECMB02H3) Price Theory: A Mathematical Approach
MGEB06H3/(ECMB06H3) Macroeconomic Theory and Policy: A Mathematical Approach
MGEB11H3/(ECMB11H3) Quantitative Methods in Economics I
MGEB12H3/(ECMB12H3) Quantitative Methods in Economics II and
1 full credit of C-level Economics for Management Studies courses [excluding MGEC91H3/(ECMC91H3), MGEC92H3/(ECMC92H3), MGEC93H3/(ECMC93H3)]

5. (1.0 credit):
MGFC30H3/(MGTC71H3) Introduction to Derivative Markets
MGFD10H3/(MGTD75H3) Investments

6. At least 2.0 full credits from:
MGEC71H3/(ECMC48H3) Money and Banking
MGFC20H3/(MGTC70H3) Personal Financial Management
MGFC50H3/(MGTC76H3) International Financial Management
MGFC60H3/(MGTC77H3) Financial Statement Analysis & Security Valuation
MGFD15H3 Special Topics in Finance: Private Equity
MGFD30H3/(MGTD78H3) Risk Management
MGFD40H3/(MGTD73H3) Investor Psychology & Behavioural Finance
MGFD50H3/(MGTD72H3) Mergers & Acquisitions: Theory & Practice
MGFD60H3/(MGTD77H3) Financial Modelling & Trading Strategies
MGFD70H3/(MGTD71H3) Advanced Financial Management

NOTE: In selecting options and electives, students should refer to the guidelines for program breadth and depth found in section 6A.2 (Degree Requirements) of this *Calendar*.

SPECIALIST (CO-OPERATIVE) PROGRAM IN MANAGEMENT AND FINANCE (BACHELOR OF BUSINESS ADMINISTRATION)

Academic Director: S. Ahmed E-mail: mgmtss@utsc.utoronto.ca
Program Director: C. Arsenault E-mail: mgmtcoop@utsc.utoronto.ca

The Specialist (Co-operative) Program in Management and Finance is a Work Integrated Learning (WIL) program that combines academic studies with paid work terms in public and private enterprises. Depending on their needs and abilities, students work in areas such as accounting, public administration, auditing, communications, economic development, finance, human resources/personnel, information systems, marketing, policy, strategic planning and entrepreneurship.

This program builds on the core of the Specialist and Specialist Co-op Programs in Management, and offers a deeper and wider coverage of Finance topics. The Program will equip students with a comprehensive understanding of financial issues and concepts, and with a firm mastery of methodologies and problem solving skills required in modern-day finance. The Program operates on a trimester schedule, featuring three terms (Fall, Winter and Summer) in each Calendar year. Students work or study in all three terms for four years, or until graduation requirements are met. The Program requires eight four-month terms of study and three four-month work terms. Students normally begin with three to five study terms (Fall, Winter and Summer), then alternate study and work terms. Students always conclude their degree with a study term.

Enrolment Requirements

Enrolment in this Program is limited.

1. Students applying directly from high school are admitted on the basis of academic performance. They must have completed Grade 12 English and Grade 12 Calculus.
Course Guidelines for Students Admitted to B.B.A. Co-op Programs Directly from High School
Students must complete the following courses in their first year of study: MGTA05H3, MGEA02H3, MGEA06H3, MATA32H3, MATA33H3, MGAB01H3, MGAB02H3, MGMA01H3 and MGTA36H3.

2. Students requesting admission after first year must request ONLY ONE Management Co-op Subject POSt on ACORN. Students may apply at the end of the Winter semester and/or at the end of the Summer semester. Application for admission will be considered only for the round during which the student has made the Subject POSt request.

The minimum Cumulative Grade Point Average (CGPA) for Program admission is calculated for each application period, and is based on University of Toronto courses only. Normally, the minimum CGPA requirement for Co-op Programs will be higher than for non Co-op Programs. Decisions are made when all grades have been received.

Students must have completed at least 4.0 credits (none of which can be designated as CR/NCR), including: MGTA01H3, MGTA02H3, MGEA02H3, MGEA06H3, MATA32H3, and MATA33H3. [MATA32H3 and MATA33H3] are strongly recommended, however [MATA30H3/A31H3 and MATA35H3/A36H3/A37H3] may also be used to satisfy the calculus requirement.

Students may apply until they have completed up to 10.0 credits. Students who have completed more than 10.0 credits will not be able to apply to the Program.

Applicants must submit a resume and covering letter to the Management Co-op Office during the limited Subject POSt request period outlined on the Registrar's website (https://www.utsc.utoronto.ca/registrar/dates-and-deadlines). For information on what to

include in your resume and covering letter, visit the Management Co-op website (http://www.utsc.utoronto.ca/mgmt/management-admissions). An interview may also be required.

CGPA Requirement to Remain in the Program
Students whose CGPA falls below 2.5 will be placed on probation; Students whose CGPA falls below 2.3 will be removed from co-op; and Students whose CGPA falls below 2.0 will be removed from all BBA programs. A student may request reinstatement to the non Co-op Specialist Program only, if they complete at least 2.0 credits (none of which can be designated as CR/NCR) in the following session and raise their CGPA to at least 2.0. This opportunity will be provided only once.

Most internal admissions to Management Co-op will be done at the end of the Winter term. Based on availability, a small number of students who apply at the end of the Summer term may be admitted.

Program Requirements
The Program requires the completion of 15.5 to 16.5 credits as part of a twenty-credit B.B.A. degree.

Note: A single course may only be used once to fulfill one of the following requirements:

1. (7.0 to 8.0 credits, depending on the combination of courses completed):
MGMA01H3/(MGTB04H3) Principles of Marketing
MGTA05H3 Foundations of Business Management or [(MGTA01H3/MGTA03H3) and (MGTA02H3/MGTA04H3)]
[MGTA35H3 Management Communications for non Co-op or MGTA36H3 Management Communications for Co-op or (MGTC36H3)]
MGAB01H3/(MGTB05H3) Introductory Financial Accounting I
MGAB02H3/(MGTB06H3) Introductory Financial Accounting II
MGAB03H3/(MGTB03H3) Introductory Management Accounting
MGFB10H3/(MGTB09H3) Principles of Finance
[MGHB02H3 Managing People and Groups in Organizations or [(MGTB23H3) and (MGTB29H3)] or (MGTB27Y3)]
MGHB12H3/(MGTC22H3) Human Resource Management
MGMB01H3/(MGTC05H3) Marketing Management
MGFC10H3/(MGTC09H3) Intermediate Finance
MGHC02H3/(MGTC90H3) Management Skills
MGOC10H3/(MGTC74H3) Analysis for Decision Making
MGOC20H3/(MGTC75H3) Operations Management: A Mathematical Approach

2. (1.0 credit):
[MATA32H3 and MATA33H3] strongly recommended, or
[MATA30H3/A31H3 and MATA35H3/A36H/A37H3]

3. At least 0.5 credit of courses emphasizing strategic management, chosen from:
MGSC01H3/(MGTC41H3) Corporate Strategy
MGSC03H3/(MGTC42H3) Public Management
MGSC05H3/(MGTC45H3) The Changing World of Business-Government Relations
MGSC12H3/(MGTC35H3) Narrative and Management
MGSC14H3/(MGTC59H3) Management Ethics
MGSC20H3/(MGTC19H3) Consulting and Contracting: New Ways of Work
MGSB22H3/(MGSC22H3/MGTC38H3) Entrepreneurship
MGSD24H3/(MGSC24H3/MGTC39H3) New Venture Creation and Planning
MGSC30H3/(MGTC31H3) The Legal Environment of Business l

4. (4.0 credits):
MGEA02H3/(ECMA04H3) Introduction to Microeconomics: A Mathematical Approach
MGEA06H3/(ECMA06H3) Introduction to Macroeconomics: A Mathematical Approach
MGEB02H3/(ECMB02H3) Price Theory: A Mathematical Approach
MGEB06H3/(ECMB06H3) Macroeconomic Theory and Policy: A Mathematical Approach
MGEB11H3/(ECMB11H3) Quantitative Methods in Economics l
MGEB12H3/(ECMB12H3) Quantitative Methods in Economics ll and
1 full credit of C-level Economics for Management Studies courses [excluding MGEC91H3/(ECMC91H3), MGEC92H3/(ECMC92H3), MGEC93H3/(ECMC93H3)]

5. (1.0 credit):
MGFC30H3/(MGTC71H3) Introduction to Derivative Markets
MGFD10H3/(MGTD75H3) Investments

6. At least 2.0 full credits from:
MGEC71H3/(ECMC48H3) Money and Banking
MGFC20H3/(MGTC70H3) Personal Financial Management
MGFC50H3/(MGTC76H3) International Financial Management
MGFC60H3/(MGTC77H3) Financial Statement Analysis & Security Valuation
MGFD15H3 Special Topics in Finance: Private Equity
MGFD30H3/(MGTD78H3) Risk Management
MGFD40H3/(MGTD73H3) Investor Psychology & Behavioural Finance
MGFD50H3/(MGTD72H3) Mergers & Acquisitions: Theory & Practice
MGFD60H3/(MGTD77H3) Financial Modelling & Trading Strategies
MGFD70H3/(MGTD71H3) Advanced Financial Management

NOTE: In selecting options and electives, students should refer to the guidelines for program breadth and depth found in section 6A.2 (Degree Requirements) of this *Calendar*.

Co-op Work Term Requirements

All Co-op students must take MGTA36H3 prior to commencement of their first work term. Students are advised to consult regularly with the Academic Director, or the Program Advisor, if they have questions regarding course selection and scheduling. It is however the students' individual responsibility to ensure that they have completed the correct courses to make them eligible for each work term and that they have correctly completed program and degree requirements for graduation.

Students who apply after first year and are successful in receiving a June offer to any Management Co-op program will be expected to complete a Co-op Work Term Preparation Course (WTPC) beginning in the third week of June, and continuing throughout the summer.

To compete for a work term a student must maintain a 2.5 CGPA, and must have completed:

1. For the first work term:
a) 7.0 credits, including: [MGTA05H3 or [MGTA01H3 and MGTA02H3]], MGEA02H3, MGEA06H3, MGAB01H3, MGAB02H3, MGMA01H3, MGTA36H3, MATA32H3, and MATA33H3. [MATA32H3 and MATA33H3] are strongly recommended, however [MATA30H3/A31H3 and MATA35H3/A36H3/A37H3] may also be used to satisfy the calculus requirement.
b) The Management Co-op Work Term Preparation Course (WTPC): COPD07Y3.

2. For the second work term: 9.0 credits.

3. For the third work term: 11.0 credits.
For information on fees, status in Co-op programs, and certification of completion of Co-op programs, see Section 6B.5 of this Calendar.

Appendix B: Current Calendar Description for the Specialist/Specialist (Co-operative) Program in Statistics

SPECIALIST PROGRAM IN STATISTICS (SCIENCE)

Supervisor of Studies: S. Damouras Email: sdamouras@utsc.utoronto.ca (416-208-4794)

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 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 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. Admission for students with a CGPA of less than 2.5 will depend on their CGPA and the available space in the program.

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 Mining stream requires 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) (*)
One of: 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 for Mathematical Sciences
O**ne of**:
- MATA31H3* Calculus I for Mathematical Sciences
- MATA30H3 Calculus I for Physical Sciences

One of:
- 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
Two of:
- 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

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 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 (1.0 credit)
Two of:
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 (4.0 credits)
CSCC11H3 Introduction to Machine Learning and Data Mining
STAC58H3 Statistical Inference
STAD68H3 Advanced Machine Learning and Data Mining
Five of: *
- Any C or D-level CSC, MAT or STA courses (excluding STAD29H3), 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.

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

Supervisor of Studies: S. Damouras (416-208-4794) Email: sdamouras@utsc.utoronto.ca
Co-op Contact: askcoop@utsc.utoronto.ca

The Specialist (Co-operative) Program in Statistics 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 students 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 Statistics 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 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, MATA24H3, MATA30H3/

MATA31H3 and MATA36H3/MATA37H3), as well as a 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, MATA24H3, MATA30H3/MATA31H3 and MATA36H3/MATA37H3), as well as a 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 Co-op students 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 Registrars Office each year. Failure to submit both the Supplementary Application Form and the program request on ACORN will result in that students application not being considered.

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 Mining stream requires 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) (*)
One of: 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 for Mathematical Sciences
O**ne of**:
- MATA31H3* Calculus I for Mathematical Sciences
- MATA30H3 Calculus I for Physical Sciences
One of:
- 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

Two of:
- 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

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 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 (1.0 credit)
Two of:
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 (4.0 credits)
CSCC11H3 Introduction to Machine Learning and Data Mining
STAC58H3 Statistical Inference
STAD68H3 Advanced Machine Learning and Data Mining
Five of: *
- Any C or D-level CSC, MAT or STA courses (excluding STAD29H3), 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.

Co-op Work Term Requirements

Students must satisfactorily complete three Co-op work terms, each of four-months duration. To be eligible for their first work term, students must be enrolled in the Specialist (Co-op) Program in Statistics.

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 Navigating the World of Work
- 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 Job Search Preparation
- Prerequisite: COPD01H3
- This course will be completed eight months in advance of the first scheduled work term

3. COPD11H3 Job Search Competition I
- Prerequisite: COPD03H3
- This course will be completed four months in advance of the first work scheduled work term

4. COPD12H3 Job Search Competition II
- 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 Job Search Competition III
- 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.*

Appendix C: Proposed Calendar Copy

DOUBLE DEGREE: BACHELOR OF BUSINESS ADMINISTRATION, SPECIALIST PROGRAM IN MANAGEMENT AND FINANCE / HONOURS BACHELOR OF SCIENCE, SPECIALIST PROGRAM IN STATISTICS, QUANTITATIVE FINANCE STREAM

Academic Supervisors: S. Ahmed Email: mgmtss@utsc.utoronto.ca (BBA)
S. Damouras Email: sdamouras@utsc.utoronto.ca (BSc)

This Double Degree combines the Specialist Program in Management and Finance and the Specialist Program in Statistics, Quantitative Finance stream. Students completing the Double Degree will qualify to graduate with two degree designations – the Bachelor of Business Administration (BBA) and the Honours Bachelor of Science (BSc), assuming all other degree criteria are met.

Enrolment Requirements

Enrolment in this Double Degree is limited.

1. Students applying directly from high school are admitted on the basis of academic performance. They must have completed Grade 12 English, Grade 12 Advanced Functions, and Grade 12 Calculus & Vectors. Applicants must also submit a Supplementary Application Form.

Course Guidelines for Students Admitted to the Double Degree Directly from High School
Students must complete the following courses in their first year of study: MGTA05H3, MGEA02H3, MGEA06H3, MATA22H3, MATA30H3, MATA36H3, MGAB01H3, MGAB02H3, MGMA01H3 and MGTA35H3.

2. Students already pursuing a BBA program and degree may apply to enter the Double Degree. The application can be made before the end of the Winter semester and/or before the end of the Summer semester. Application for admission will be considered only for the round during which the student has made the Subject POSt request. Students considering switching to the Double Degree should consult with the program supervisors as soon as possible.

The minimum Cumulative Grade Point Average (CGPA) for admission is calculated for each application period, and is based on University of Toronto courses only. Decisions are made when all grades have been received.

Students must have completed at least 4.5 credits (none of which can be designated as CR/NCR), including: MGTA05H3, MGEA02H3, MGEA06H3, MGAB01H3, MGAB02H3, MGTA35H3, MATA22H3, MATA30H3, and MATA36H3. Students who have taken the sequence [MATA32H3 and MATA33H3] instead of [MATA30H3 and MATA36H3] can still apply to the

Double Degree if they are taking or plan to take MATA36H3 at the time of application and could receive admission conditional on their grade in MATA36H3 being above a threshold to be specified each year. Note that MATA36H3 will be treated as an Extra (EXT) course in this case.

Students may apply until they have completed up to 10.0 credits. Students who have completed more than 10.0 credits will not be admitted to the Double Degree. For those who apply with more than 4.5 credits, their CGPA at the time of application will be calculated with more weight assigned to the required courses listed under the 4.5 credits.

CGPA Requirement to Remain in the Double Degree (Specialist Programs)
In order to remain in the Double Degree, students must maintain a CGPA of 2.0 or higher after having attempted at least 4.0 credits. Students whose CGPA falls below 2.1 (but not below 2.0) will have the opportunity to move to either the non Co-op BBA Specialist Program in Management and Finance, or the non Co-op BSc Specialist Program in Statistics, Quantitative Finance stream. If they choose to stay in the Double Degree program and their CGPA falls below 2.0, they will be removed from the Double Degree program. Students removed from the program for this reason may request re-instatement if they complete at least 2.0 credits (none of which can be designated as CR/NCR) in the following session and raise their CGPA to at least 2.0. This opportunity will be provided only once.

Program Requirements
The Double Degree requires the completion of 25.0 credits. 22.0 credits are core program requirements as listed below, and 3.0 further credits are required to complete degree requirements.

1. Communications requirement (0.5 credit)
MGTA35H3 Management Communications

2. Management requirements (5.5 credits)
MGAB01H3 Introductory Financial Accounting I
MGAB02H3 Introductory Financial Accounting II
MGAB03H3 Introductory Management Accounting
[MGHB02H3 Managing People and Groups in Organizations or [(MGTB23H3) and (MGTB29H3)] or (MGTB27Y3)]
MGHB12H3 Human Resource Management
MGHC02H3 Management Skills
MGMA01H3 Principles of Marketing
MGMB01H3 Marketing Management
MGOC10H3 Analysis for Decision-Making
MGOC20H3 Operations Management: A Mathematical Approach
MGTA05H3 Foundations of Business Management or [(MGTA01H3) and (MGTA02H3)]

3. Science requirements (9.0 credits)
CSCA08H3 Introduction to Computer Science I
CSCA48H3 Introduction to Computer Science II
CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics
MATA22H3 Linear Algebra I for Mathematical Sciences
MATA30H3 Calculus I for Physical Sciences
MATA36H3 Calculus II for Physical Sciences
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
MATB61H3 Linear Programming and Optimization
MATC46H3 Differential Equations II
STAB52H3 An Introduction to Probability
STAB57H3 An Introduction to Statistics
STAC62H3 Stochastic Processes
STAC67H3 Regression Analysis
STAD37H3 Multivariate Analysis
STAD57H3 Time Series Analysis

4. Economics requirements (2.0 credits)
MGEA02H3 Introduction to Microeconomics: A Mathematical Approach
MGEA06H3 Introduction to Macroeconomics: A Mathematical Approach
MGEB02H3 Price Theory: A Mathematical Approach
MGEB06H3 Macroeconomic Theory and Policy: A Mathematical Approach

5. Finance requirements (5.0 credits)
MGFB10H3 Principles of Finance
MGFC10H3 Intermediate Finance
[MGFC30H3 Introduction to Derivatives Markets or STAB41H3 Financial Derivatives]
MGFD10H3 Investments
STAC70H3 Statistics and Finance I
STAD70H3 Statistics and Finance II

At least four courses (2.0 credits) from:
MGEC71H3 Money and Banking
MGFC20H3 Personal Financial Management
MGFC50H3 International Financial Management
MGFC60H3 Financial Statement Analysis & Security Valuation
MGFD15H3 Special Topics in Finance: Private Equity
MGFD30H3 Risk Management
MGFD40H3 Investor Psychology and Behavioural Finance
MGFD50H3 Mergers and Acquisitions: Theory and Practice

MGFD60H3 Financial Modeling and Trading Strategies
MGFD70H3 Advanced Financial Management

NOTE: In selecting options and electives, students should refer to the guidelines for program breadth and depth found in section 6A.2 (Degree Requirements) of the Calendar.

DOUBLE DEGREE: BACHELOR OF BUSINESS ADMINISTRATION, SPECIALIST (CO-OPERATIVE) PROGRAM IN MANAGEMENT AND FINANCE / HONOURS BACHELOR OF SCIENCE, SPECIALIST (CO-OPERATIVE) PROGRAM IN STATISTICS, QUANTITATIVE FINANCE STREAM

Academic Supervisors: S. Ahmed Email: mgmtss@utsc.utoronto.ca (BBA)
S. Damouras Email: sdamouras@utsc.utoronto.ca (BSc)

Program Director: C. Arsenault E-mail: mgmtcoop@utsc.utoronto.ca

This Double Degree combines the Specialist (Co-operative) Program in Management and Finance and the Specialist (Co-operative) Program in Statistics, Quantitative Finance stream. Students completing the Double Degree will qualify to graduate with two degree designations – the Bachelor of Business Administration (BAA) and the Honours Bachelor of Science (BSc), assuming all other degree criteria are met.

This Double Degree is a Work Integrated Learning (WIL) program that combines academic studies with paid work terms in public and private enterprises. Depending on their needs and abilities, students work in areas such as finance, insurance, data analytics, accounting, consulting, business intelligence, marketing, policy, strategic planning and entrepreneurship. The Double Degree will equip students with a comprehensive understanding of financial markets, and develop the business and quantitative skills required to function in them.

This Double Degree operates on a trimester schedule, featuring three terms (Fall, Winter and Summer) in each Calendar year. Students work or study in all three terms for five years, or until graduation requirements are met. The Double Degree program requires 11 four-month terms of study and 3 four-month work terms.

Enrolment Requirements

Enrolment in this Double Degree is limited.

1. Students applying directly from high school are admitted on the basis of academic performance. They must have completed Grade 12 English, Grade 12 Advanced Functions, and Grade 12 Calculus & Vectors. Applicants must also submit a Supplementary Application Form.

Course Guidelines for Students Admitted to Double Degree Program Directly from High School
Students must complete the following courses in their first year of study: MGTA05H3, MGEA02H3, MGEA06H3, MATA22H3, MATA30H3, MATA36H3, MGAB01H3, MGAB02H3, MGMA01H3 and MGTA36H3.

2. Students already pursuing a BBA program and degree may apply to enter this Double Degree. The application can be made before the end of the Winter semester and/or before the end of the Summer semester. Application for admission will be considered only for the round during

which the student has made the Subject POSt request. Students considering switching to the Double Degree should consult with the program supervisors as soon as possible.

The minimum Cumulative Grade Point Average (CGPA) for Program admission is calculated for each application period, and is based on University of Toronto courses only. Decisions are made when all grades have been received.

Students must have completed at least 4.5 credits (none of which can be designated as CR/NCR), including: MGTA05H3, MGEA02H3, MGEA06H3, MGAB01H3, MGAB02H3, MGTA35H3 or MGTA36H3, MATA22H3, MATA30H3, and MATA36H3. Students who have taken the sequence [MATA32H3 and MATA33H3] instead of [MATA30H3 and MATA36H3] can still apply to the Double Degree Program if they are taking or plan to take MATA36H3 at the time of application and could receive admission conditional on their grade in MATA36H3 being above a threshold to be specified each year. Note that MATA36H3 will be treated as an Extra (EXT) course in this case.

Students may apply until they have completed up to 10.0 credits. Students who have completed more than 10.0 credits will not be able to apply to the Program. For those who apply with more than 4.5 credits, their CGPA at the time of application will be calculated with more weight assigned to the required courses listed under the 4.5 credits.

Applicants must submit a resume and covering letter to the Management Co-op Office during the limited Subject POSt request period outlined on the Registrar's website (https://www.utsc.utoronto.ca/registrar/dates-and-deadlines). For information on what to include in your resume and covering letter, visit the Management Co-op website (http://www.utsc.utoronto.ca/mgmt/management-admissions). An interview may also be required.

CGPA Requirement to Remain in the Double Degree Co-op Program
Students must maintain a CGPA of 2.5 or higher. Students whose CGPA falls below 2.5 will be placed on probation. Students on probation will be reinstated to the Double Degree if they complete at least 2.0 credits (none of which can be designated as CR/NCR) in the following session and raise their CGPA to at least 2.5. Students who cannot get out of probation in two consecutive sessions, or whose CGPA falls below 2.3, will be removed from the Double Degree Co-op Program. Students removed from the Double Degree (Specialist Co-op Programs) can pursue the Double Degree (Specialist Programs), or one of its non Co-op constituent programs (i.e., the BBA Specialist Program in Management and Finance, or the BSc Specialist Program in Statistics, Quantitative Finance stream).

Program Requirements
The Double Degree requires the completion of 25.0 credits. 22.0 credits are core program requirements as listed below, and 3.0 further credits are required to complete degree requirements.

1. Communications requirement (0.5 credit)
MGTA36H3 Management Communications for Co-op

2. Management requirements (5.5 credits)
MGAB01H3 Introductory Financial Accounting I
MGAB02H3 Introductory Financial Accounting II
MGAB03H3 Introductory Management Accounting
[MGHB02H3 Managing People and Groups in Organizations or [(MGTB23H3) and (MGTB29H3)] or (MGTB27Y3)]
MGHB12H3 Human Resource Management
MGHC02H3 Management Skills
MGMA01H3 Principles of Marketing
MGMB01H3 Marketing Management
MGOC10H3 Analysis for Decision-Making
MGOC20H3 Operations Management: A Mathematical Approach
MGTA05H3 Foundations of Business Management or [(MGTA01H3) and (MGTA02H3)]

3. Science requirements (9.0 credits)
CSCA08H3 Introduction to Computer Science I
CSCA48H3 Introduction to Computer Science II
CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics
MATA22H3 Linear Algebra I for Mathematical Sciences
MATA30H3 Calculus I for Physical Sciences
MATA36H3 Calculus II for Physical Sciences
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
MATB61H3 Linear Programming and Optimization
MATC46H3 Differential Equations II
STAB52H3 An Introduction to Probability
STAB57H3 An Introduction to Statistics
STAC62H3 Stochastic Processes
STAC67H3 Regression Analysis
STAD37H3 Multivariate Analysis
STAD57H3 Time Series Analysis

4. Economics requirements (2.0 credits)
MGEA02H3 Introduction to Microeconomics: A Mathematical Approach
MGEA06H3 Introduction to Macroeconomics: A Mathematical Approach
MGEB02H3 Price Theory: A Mathematical Approach
MGEB06H3 Macroeconomic Theory and Policy: A Mathematical Approach

5. Finance requirements (5.0 credits)
MGFB10H3 Principles of Finance
MGFC10H3 Intermediate Finance
[MGFC30H3 Introduction to Derivatives Markets or STAB41H3 Financial Derivatives]
MGFD10H3 Investments
STAC70H3 Statistics and Finance I
STAD70H3 Statistics and Finance II

At least four courses (2.0 credits) from:
MGEC71H3 Money and Banking
MGFC20H3 Personal Financial Management
MGFC50H3 International Financial Management
MGFC60H3 Financial Statement Analysis & Security Valuation
MGFD15H3 Special Topics in Finance: Private Equity
MGFD30H3 Risk Management
MGFD40H3 Investor Psychology and Behavioural Finance
MGFD50H3 Mergers and Acquisitions: Theory and Practice
MGFD60H3 Financial Modeling and Trading Strategies
MGFD70H3 Advanced Financial Management

NOTE: In selecting options and electives, students should refer to the guidelines for program breadth and depth found in section 6A.2 (Degree Requirements) of the Calendar.

Co-op Work Term Requirements

All Double Degree Co-op students must take MGTA36H3 prior to commencement of their first work term. Students are advised to consult regularly with the Academic Supervisors, or the Program Director, if they have questions regarding course selection and scheduling. It is however the students' individual responsibility to ensure that they have completed the correct courses to make them eligible for each work term and that they have correctly completed program and degree requirements for graduation.

Students who apply after first year and are successful in receiving a June offer will be expected to complete a Co-op Work Term Preparation Course (WTPC) beginning in the third week of June, and continuing throughout the summer.

To compete for a work term a student must maintain a 2.5 CGPA, and must have completed:

1. For the first work term:
a) 7.0 credits, including: MGTA05H3, MGEA02H3, MGEA06H3, MGAB01H3, MGAB02H3,

MGTA35H3 or MGTA36H3, MATA22H3, and [MATA32H3, and MATA33H3] or [MATA30H3 and MATA36H3].
b) The Management Co-op Work Term Preparation Course (WTPC): COPD07Y3.

2. For the second work term: 9.0 credits.

3. For the third work term: 11.0 credits.

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

List of Courses (see Appendix G)

Appendix D

Current program requirements broken down by semester of study, for the BBA program (15.5 credits) and BSc program (13.0 credits)

Year	*Fall*	*Winter*
1	CSCA08 Intro to Computer Science I * MATA30/31 Calculus I * † MGEA02 Intro to Microeconomics: A Math Approach † MATA32 Calculus for Mgmt I * † MGEA02 Intro to Microeconomics: A Math Approach † MGMA01 Principles of Marketing * MGTA05 Foundations of Business Mgmt *	CSCA48 Intro to Computer Science II MATA36/37 Calculus II † MATA22 Linear Algebra I for Mathematical Sciences (BSC elective 1) MATA33 Calculus for Mgmt II † MGEA06 Intro to Macroeconomics: A Math Approach MGTA35 Mgmt Communications *
2	ACTB40 Fundamentals of Investment & Credit † MATB24 Linear Algebra II MATB41 Multivariate Calculus I MATB44 Differential Equations I STAB52 Intro to Probability † MGAB01 Intro to Financial Accounting I * MGAB03 Intro to Mgmt Accounting * MGEB02 Price Theory: A Math Approach * MGEB11 Quantitative Methods in Economics I * † MGHB02 Managing People and Groups * MGMB01 Marketing Management *	MATB42 Multivariate Calculus II MATB61 Linear Programming & Optimization STAB41 Financial Derivatives † STAB57 Intro to Statistics * † MGAB02 Intro to Financial Accounting II * MGEB06 Macroeconomic Theory: A Math Approach * MGEB12 Quantitative Methods in Economics II * † MGFB10 Principles of Finance *† MGHB12 Human Resource Management *
3	CSCC37 Intro to Scientific Computing STAC62 Stochastic Processes STAC67 Regression Analysis MGFC10 Intermediate Finance * MGFC30 Intro to Derivatives Markets * † MGOC10 Analysis for Decision Making * (BBA elective 2)	MATC46 Differential Equations II STAC70 Statistics & Finance I (BSC elective 2) MGHC02 Management Skills * MGOC20 Operations Mgmt: A Math Approach * (BBA elective 1) (BBA elective 2)
4	STAD57 Time Series Analysis STAD37 Multivariate Analysis MGFD10 Investments * (BBA elective 3) (BBA elective 3)	STAD70 Statistics & Finance II (BSC elective 2) (BBA elective 3) (BBA elective 3)

Key: * = offered in both semesters, † = overlapping or exclusion courses
(BSC elective 1) = 0.5 credits writing requirement {any English language course with writing component}
(BSC elective 2) = 1.0 credits from {APM462, MATAC37, STAC51/58/63, STAD68/94}
(BBA elective 1) = 0.5 credits from {MGSC01/03/05/12/14/20/30, MGSB22, MGSD24}
(BBA elective 2) = 1.0 credits from {C-level MGE courses}
(BBA elective 3) = 2.0 credits from {MGEC71, MGFC20/50/60, MGFD15/30/40/50/60/70}

Appendix E

Proposed Course Sequencing – Double Degree (Specialist Co-op programs)

Year	*Fall*	*Winter*	*Summer*
1	MATA30 Calculus I MGEA02 Intro to Microeconomics: A Math Approach MGMA01 Principles of Marketing MGTA05 Foundations of Business Mgmt MGAB01 Intro to Financial Accounting I	MATA22 Linear Algebra I for Math Sciences MATA36 Calculus II MGEA06 Intro to Macroeconomics: A Math Approach MGTA36 Mgmt Communications for Co-op MGAB02 Intro to Financial Accounting II	STAB52 Intro to Probability MGEB02 Price Theory: A Mathematical Approach (Breadth requirement)
2	CSCA08 Intro to Computer Science I MATB24 Linear Algebra II MATB41 Multivariate Calculus I MGEB06 Macroeconomic Theory: A Math Approach MGFB10 Principles of Finance	MATB42 Multivariate Calculus II MATB61 Linear Programming & Optimization STAB57 Intro to Statistics MGFC10 Intermediate Finance [MGFC30 Intro to Derivatives Markets or STAB41 Financial Derivatives]	Co-op term 1
3	MATB44 Differential Equations I STAC62 Stochastic Processes STAC67 Regression Analysis MGAB03 Intro to Mgmt Accounting MGOC10 Analysis for Decision Making	Co-op term 2	CSCA48 Intro to Computer Science II MGHB02 Managing People and Groups (Breadth requirement)
4	Co-op term 3	MATC46 Differential Equations II STAC70 Statistics & Finance I MGFD10 Investments (BBA elective 3) (Breadth requirement)	MGMB01 Marketing Management MGOC20 Operations Mgmt: A Math Approach (Breadth requirement) (Breadth requirement)
5	CSCC37 Intro to Scientific Computing STAD37 Multivariate Analysis STAD57 Time Series Analysis MGHC02 Management Skills (BBA elective 3)	STAD70 Statistics & Finance II MGHB12 Human Resource Management (BBA elective 3) (BBA elective 3) (Breadth requirement)	

Appendix F

Proposed Course Sequencing – Double Degree (Specialist programs)

Year	*Fall*	*Winter*	*Summer*
1	MATA30 Calculus I MGEA02 Intro to Microeconomics: A Math Approach MGMA01 Principles of Marketing MGTA05 Foundations of Business Mgmt MGAB01 Intro to Financial Accounting I	MATA22 Linear Algebra I for Math Sciences MATA36 Calculus II MGEA06 Intro to Macroeconomics: A Math Approach MGTA35 Mgmt Communications MGAB02 Intro to Financial Accounting II	
2	MATB24 Linear Algebra II MATB41 Multivariate Calculus I STAB52 Intro to Probability MGEB02 Price Theory: A Math Approach MGEB06 Macroeconomic Theory: A Math Approach	MATB42 Multivariate Calculus II MATB61 Linear Programming & Optimization STAB57 Intro to Statistics MGFB10 Principles of Finance MGOC10 Analysis for Decision Making	
3	CSCA08 Intro to Computer Science I MATB44 Differential Equations I STAC67 Regression Analysis MGAB03 Intro to Mgmt Accounting MGFC10 Intermediate Finance	MATC46 Differential Equations II [MGFC30 Intro to Derivatives Markets or STAB41 Financial Derivatives] MGFD10 Investments MGHB02 Managing People and Groups (Breadth requirement)	
4	CSCC37 Intro to Scientific Computing STAC62 Stochastic Processes STAD37 Multivariate Analysis MGHC02 Management Skills (BBA elective 3)	CSCA48 Intro to Computer Science II STAC70 Statistics & Finance I MGMB01 Marketing Management (BBA elective 3) (Breadth requirement)	
5	STAD57 Time Series Analysis MGOC20 Operations Mgmt: A Math Approach (BBA elective 3) (Breadth requirement) (Breadth requirement)	STAD70 Statistics & Finance II MGHB12 Human Resource Management (BBA elective 3) (Breadth requirement) (Breadth requirement)	

Appendix G

List of Courses for the Double Degree Program

CSCA08H3 Introduction to Computer Science I

Programming in an object-oriented language such as Python. Program structure: elementary data types, statements, control flow, functions, classes, objects, methods. Lists; searching, sorting and complexity. This course is intended for students having a serious interest in higher level computer science courses, or planning to complete a computer science program.
Prerequisite: Grade 12 Calculus and Vectors and one other Grade 12 mathematics course.
Exclusion: CSCA20H3, CSC108H, CSC120H. CSCA08H3 may not be taken after or concurrently with CSCA48H3.
Breadth Requirements: Quantitative Reasoning
Note: This course does not require any prior exposure to computer programming.

CSCA48H3 Introduction to Computer Science II

Abstract data types and data structures for implementing them. Linked data structures. Object Oriented Programming. Encapsulation and information-hiding. Testing. Specifications. Analyzing the efficiency of programs. Recursion.
Prerequisite: CSCA08H3
Exclusion: CSC148H
Breadth Requirements: Quantitative Reasoning

CSCC37H3 Introduction to Numerical Algorithms for Computational Mathematics

An introduction to computational methods for solving problems in linear algebra, non-linear equations, approximation and integration. Floating-point arithmetic; numerical algorithms; application of numerical software packages.
Prerequisite: [MATA36H3 or MATA37H3] & MATA23H3 & [CGPA 3.0 or enrolment in a CSC Subject POSt]
Exclusion: (CSCC36H3), (CSCC50H3), (CSCC51H3), CSC336H, CSC350H, CSC351H, CSC338H
Breadth Requirements: Quantitative Reasoning

MATA22H3 Linear Algebra I for Mathematical Sciences

A conceptual and rigorous approach to introductory linear algebra that focuses on mathematical proofs, the logical development of fundamental structures, and essential computational techniques. This course covers complex numbers, vectors in Euclidean n-space, systems of linear equations, matrices and matrix algebra, Gaussian reduction, structure theorems for solutions of linear systems, dependence and independence, rank equation, linear transformations of Euclidean n-space, determinants, Cramer's rule, eigenvalues and eigenvectors, characteristic polynomial, and diagonalization.
Prerequisite: Grade 12 Calculus and Vectors or [Grade 12 Advanced Functions and Introductory Calculus and Geometry and Discrete Mathematics]
Exclusion: MATA23H3, MAT223H
Breadth Requirements: Quantitative Reasoning

MATA30H3 Calculus I for Physical Sciences

An introduction to the basic techniques of Calculus. Elementary functions: rational, trigonometric, root, exponential and logarithmic functions and their graphs. Basic calculus: limits, continuity, derivatives, derivatives of higher order, analysis of graphs, use of derivatives; integrals and their applications.
Prerequisite: Grade 12 Calculus and Vectors
Exclusion: (MATA20H3), (MATA27H3), MATA31H3, MATA32H3, MAT123H, MAT124H, MAT125H, MAT126H, MAT133Y, MAT135Y, MAT137Y, MAT157Y, JMB170Y
Breadth Requirements: Quantitative Reasoning

MATA36H3 Calculus II for Physical Sciences

This course is intended to prepare students for the physical sciences. Topics to be covered include: techniques of integration, Newton's method, approximation of functions by Taylor polynomials, numerical methods of integration, complex numbers, sequences, series, Taylor series, differential equations.
Prerequisite: MATA30H3 or MATA31H3
Exclusion: (MATA21H3), MATA33H3, MATA35H3, MATA37H3, MAT123H, MAT124H, MAT125H, MAT126H, MAT133Y, MAT135Y, MAT137Y, MAT157Y, JMB170Y
Breadth Requirements: Quantitative Reasoning

MATB24H3 Linear Algebra II

Fields, vector spaces over a field, linear transformations; inner product spaces, coordinatization and change of basis; diagonalizability, orthogonal transformations, invariant subspaces, Cayley-Hamilton theorem; hermitian inner product, normal, self-adjoint and unitary operations. Some applications such as the method of least squares and introduction to coding theory.
Prerequisite: MATA22H3 or MAT223H
Exclusion: MAT224H
Breadth Requirements: Quantitative Reasoning

MATB41H3 Techniques of the Calculus of Several Variables I

Partial derivatives, gradient, tangent plane, Jacobian matrix and chain rule, Taylor series; extremal problems, extremal problems with constraints and Lagrange multipliers, multiple integrals, spherical and cylindrical coordinates, law of transformation of variables.
Prerequisite: [MATA22H3 or MATA23H3 or MAT223H] and [[MATA36H3 or MATA37H3] or MAT137Y or MAT157Y]]
Exclusion: MAT232H, MAT235Y, MAT237Y, MAT257Y
Breadth Requirements: Quantitative Reasoning

MATB42H3 Techniques of the Calculus of Several Variables II

Fourier series. Vector fields in Rn, Divergence and curl, curves, parametric representation of curves, path and line integrals, surfaces, parametric representations of surfaces, surface integrals. Green's, Gauss', and Stokes' theorems will also be covered. An introduction to differential forms, total derivative.

Prerequisite: MATB41H3
Exclusion: MAT235Y, MAT237Y, MAT257Y, MAT368H
Breadth Requirements: Quantitative Reasoning

MATB44H3 Differential Equations I

Ordinary differential equations of the first and second order, existence and uniqueness; solutions by series and integrals; linear systems of first order; non-linear equations; difference equations.
Prerequisite: [MATA36H3 or MATA37H3] and [MATA22H3 or MATA23H3]
Corequisite: MATB41H3 r
Exclusion: MAT244H, MAT267H
Breadth Requirements: Quantitative Reasoning

MATB61H3 Linear Programming and Optimization

Linear programming, simplex algorithm, duality theory, interior point method; quadratic and convex optimization, stochastic programming; applications to portfolio optimization and operations research.
Prerequisite: [MATA22H3 or MATA23H3] and MATB41H3
Exclusion: APM236H
Breadth Requirements: Quantitative Reasoning

MATC46H3 Differential Equations II

Sturm-Liouville problems, Green's functions, special functions (Bessel, Legendre), partial differential equations of second order, separation of variables, integral equations, Fourier transform, stationary phase method.
Prerequisite: MATB44H3
Corequisite: MATB42H3
Exclusion: APM346H
Breadth Requirements: Quantitative Reasoning

MGAB01H3 Introductory Financial Accounting I

Together with MGAB02H3/(MGTB06H3), this course provides a rigorous introduction to accounting techniques and to the principles and concepts underlying these techniques.
The preparation of financial statements is addressed from the point of view of both preparers and users of financial information.
Exclusion: (MGTB05H3), VPAB13H3, MGT120H, MGT201H, MGT220H, RSM219H, RSM220H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGAB02H3 Introductory Financial Accounting II

This course is a continuation of MGAB01H3/(MGTB05H3). Students are encouraged to take it immediately after completing MGAB01H3/(MGTB05H3). Technical topics include the reporting and interpretation of debt and equity issues, owners' equity, cash flow statements and analysis.

Through cases, choices of treatment and disclosure are discussed, and the development of professional judgment is encouraged.
Prerequisite: MGAB01H3/(MGTB05H3)
Exclusion: (MGTB06H3), VPAB13H3, MGT120H, MGT201H, MGT220H, RSM219H, RSM220H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGAB03H3 Introductory Management Accounting

An introduction to management and cost accounting with an emphasis on the use of accounting information in managerial decision-making. Topics include patterns of cost behaviour, transfer pricing, budgeting and control systems.
Prerequisite: [[MGEA02H3/(ECMA04H3) and MGEA06H3/(ECMA06H3)] or [MGEA01H3/(ECMA01H3) and MGEA05H3/(ECMA05H3)]] and MGAB01H3/(MGTB05H3)
Exclusion: (MGTB03H3), MGT223H, MGT323H, RSM222H, RSM322H, VPAB13H3
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGFB10H3 Principles of Finance

An introduction to basic concepts and analytical tools in financial management. Building on the fundamental concept of time value of money, the course will examine stock and bond valuations and capital budgeting under certainty. Also covered are risk-return trade-off, financial planning and forecasting, and long-term financing decisions.
Prerequisite: MGEB11H3/(ECMB11H3) and MGAB01H3/(MGTB05H3)
Exclusion: (MGTB09H3), MGT2338H, RSM332H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGFC10H3 Intermediate Finance

This course covers mainstream finance topics. Besides a deeper examination of certain topics already covered in MGFB10H3/(MGTB09H3), the course will investigate additional subjects such as working capital management, capital budgeting under uncertainty, cost of capital, capital structure, dividend policy, leasing, mergers and acquisitions, and international financial management.
Prerequisite: MGFB10H3/(MGTB09H3) or (MGTC03H3)
Exclusion: (MGTC09H3), MGT339H, RSM333H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGFC20H3 Personal Financial Management

This course covers goal setting, personal financial statements, debt and credit management, risk management, investing in financial markets, real estate appraisal and mortgage financing, tax saving strategies, retirement and estate planning. The course will benefit students in managing their personal finances, and in their future careers with financial institutions.

Prerequisite: MGFB10H3/(MGTB09H3)
Exclusion: (MGTC70H3)
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGFC30H3 Introduction to Derivatives Markets

This course introduces students to the fundamentals of derivatives markets covering futures, swaps, options and other financial derivative securities. Detailed descriptions of, and basic valuation techniques for popular derivative securities are provided. As each type of derivative security is introduced, its applications in investments and general risk management will be discussed.
Corequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTC71H3), MGT438H, RSM435H
Enrolment Limits: 50
Breadth Requirements: Social & Behavioural Sciences

MGFC50H3 International Financial Management

This course provides students with a framework for making financial decisions in an international context. It discusses foreign exchange markets, international portfolio investment and international corporate finance. Next to covering the relevant theories, students also get the opportunity to apply their knowledge to real world issues by practicing case studies.
Prerequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTC76H3), RSM437H, (MGT439H)
Enrolment Limits: 50
Breadth Requirements: Social & Behavioural Sciences

MGFC60H3 Financial Statement Analysis and Security Valuation

This course introduces the tools and skills required to perform a comprehensive financial statement analysis from a user perspective. Students will learn how to integrate the concepts and principles in accounting and finance to analyze the financial statements and to utilize that information in earnings-based security valuation.
Prerequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTC77H3), RSM429H
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGFD10H3 Investments

This course deals with fundamental elements of investments. Basic concepts and techniques are introduced for various topics such as risk and return characteristics, optimal portfolio construction, security analysis, investments in stocks, bonds and derivative securities, and portfolio performance measurements.
Corequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTD75H3), MGT330H, RSM330H

Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGFD15H3 Special Topics in Finance: Private Equity

This course explores the private equity asset class and the private equity acquisition process. It covers both the academic and practical components of private equity investing, including: deal sourcing, financial modelling and valuations, transaction structuring, financing, diligence, negotiations, post transaction corporate strategy and governance.
Prerequisite: MGAB02H3/(MGTB06H3) and MGFC10H3/(MGTC09H3)
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGFD30H3 Risk Management

This course develops analytical skills in financial risk management. It introduces techniques used for evaluating, quantifying and managing financial risks. Among the topics covered are market risk, credit risk, operational risk, liquidity risk, bank regulations and credit derivatives.
Prerequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTD78H3), ECO460H, ECO461H, RSM432H
Enrolment Limits: 50
Breadth Requirements: Social & Behavioural Sciences

MGFD40H3 Investor Psychology and Behavioural Finance

This course is designed to help students understand how different psychological biases can affect investor behaviours and lead to systematic mispricing in the financial market. With simulated trading games, students will learn and practice various trading strategies to take advantage of these market anomalies.
Prerequisite: MGFC10H3/(MGTC09H3) and MGEB12H3/(ECMB12H3)
Exclusion: (MGTD73H3), MGT430H
Enrolment Limits: 30
Breadth Requirements: Social & Behavioural Sciences

MGFD50H3 Mergers and Acquisitions: Theory and Practice

This course provides a general introduction to the important aspects of M&A, including valuation, restructuring, divestiture, takeover defences, deal structuring and negotiations, and legal issues.
Prerequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTD72H3), MGT434H
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGFD60H3 Financial Modeling and Trading Strategies

This course integrates finance theories and practice by using financial modeling and simulated trading. Students will learn how to apply the theories they learned and to use Excel and VBA to

model complex financial decisions. They will learn how the various security markets work under different simulated information settings.
Corequisite: MGFC30H3/(MGTC71H3) and MGFD10H3/(MGTD75H3)
Exclusion: (MGTD77H3), MGT435H, RSM434H
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGFD70H3 Advanced Financial Management

This course reinforces and expands upon the topics covered in MGFB10H3/(MGTB09H3), (MGTC03H3) and MGFC10H3/(MGTC09H3). It examines more advanced and complex decision making situations a financial manager faces in such areas as capital budgeting, capital structure, financing, working capital management, dividend policy, leasing, mergers and acquisitions, and risk management.
Prerequisite: MGFC10H3/(MGTC09H3)
Exclusion: (MGTD71H3), RSM433H
Enrolment Limits: 50
Breadth Requirements: Social & Behavioural Sciences

MGEA02H3 Introduction to Microeconomics: A Mathematical Approach

Economic theory of the firm and the consumer. Calculus, algebra and graphs are used extensively. The course is oriented towards students interested in the Specialist Program in Management, the Specialist program in Economics for Management Studies, and the Major Program in Economics for Management Studies.
Exclusion: MGEA01H3/(ECMA01H3), (ECMA04H3), ECO100Y, ECO105Y
Recommended Preparation: Completion of Grade 12 Calculus is strongly recommended. It is also recommended that MATA32H3 and MATA33H3 (or equivalents) be taken simultaneously with MGEA02H3/(ECMA04H3) and MGEA06H3/(ECMA06H3).
Breadth Requirements: Social & Behavioural Sciences

MGEA06H3 Introduction to Macroeconomics: A Mathematical Approach

Study of the determinants of output, employment, prices, interest rates and exchange rates. Calculus, algebra and graphs are used extensively. The course is oriented towards students interested in the Specialist Program in Management, the Specialist program in Economics for Management Studies, and the Major Program in Economics for Management Studies.
Exclusion: MGEA05H3/(ECMA05H3), (ECMA06H3), ECO100Y, ECO105Y
Recommended Preparation: Completion of Grade 12 Calculus is strongly recommended. It is also recommended that MATA32H3 and MATA33H3 (or equivalents) be taken simultaneously with MGEA02H3/(ECMA04H3) and MGEA06H3/(ECMA06H3).
Breadth Requirements: Social & Behavioural Sciences

MGEB02H3 Price Theory: A Mathematical Approach

Intermediate level development of the principles of microeconomic theory. The course will cover the same topics as MGEB01H3/(ECMB01H3), but will employ techniques involving

calculus so as to make the theory clearer to students. Enrolment is limited to students registered in programs requiring this course.
Prerequisite: MGEA02H3/(ECMA04H3) and MGEA06H3/(ECMA06H3) and [[MATA32H3 and MATA33H3] (or equivalents) or (MATA27H3)]. Students who have completed MGEA01H3/(ECMA01H3) and MGEA05H3/(ECMA05H3) and [MATA32H3 and MATA33H3] (or equivalents) may be admitted with the permission of the Supervisor of Studies.
Exclusion: MGEB01H3/(ECMB01H3), (ECMB02H3), ECO200Y, ECO204Y, ECO206Y
Enrolment Limits: 80 per section
Breadth Requirements: Social & Behavioural Sciences

MGEB06H3 Macroeconomic Theory and Policy: A Mathematical Approach

Intermediate level development of the principles of macroeconomic theory. The course will cover the same topics as MGEB05H3/(ECMB05H3), but will employ techniques involving calculus so as to make the theory clearer to students. Enrolment is limited to students registered in programs requiring this course.
Prerequisite: MGEA02H3(ECMA04H3) and MGEA06H3/(ECMA06H3) and [MATA32H3 and MATA33H3] (or equivalents). Students who have completed MGEA01H3/(ECMA01H3) and MGEA05H3/(ECMA05H3) and [MATA32H3 and MATA33H3] (or equivalents) may be admitted with the permission of the Supervisor of Studies.
Exclusion: MGEB05H3/(ECMB05H3), (ECMB06H3), ECO202Y, ECO208Y, ECO209Y
Enrolment Limits: 80 per section
Breadth Requirements: Social & Behavioural Sciences

MGEC71H3 Money and Banking

There will be a focus on basic economic theory underlying financial intermediation and its importance to growth in the overall economy. The interaction between domestic and global financial markets, the private sector, and government will be considered.
Prerequisite: MGEB05H3/(ECMB05H3) or MGEB06H3/(ECMB06H3)
Exclusion: (ECMC48H3)
Enrolment Limits: 60 per section
Breadth Requirements: Social & Behavioural Sciences

MGHB02H3 Managing People and Groups in Organizations

An introduction to micro- and macro-organizational behaviour theories from both conceptual and applied perspectives. Students will develop an understanding of the behaviour of individuals and groups in different organizational settings. Topics covered include: individual differences, motivation and job design, leadership, organizational design and culture, group dynamics and inter-group relations.
Prerequisite: [[MGTA01H3/(MGTA03H3) and MGTA02H3/(MGTA04H3)] or MGTA05H3]] and [MGTA35H3 or MGTA36H3 or (MGTC36H3)]
Exclusion: (MGTB23H3), (MGTB29H3), MGIB02H3, (MGTB27Y3), MGT262H, RSM260H, PSY332H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGHB12H3 Human Resource Management

An introduction to current human resource practices in Canada, emphasizing the role of Human Resource Management in enhancing performance, productivity and profitability of the organization. Topics include recruitment, selection, training, career planning and development, diversity and human rights issues in the work place.
Prerequisite: MGHB02H3 or MGIB02H3 or [(MGTB23H3) and (MGTB29H3)] or (MGTB27Y3)
Exclusion: MGIB12H3/(MGTB22H3), (MGTC22H3), MGT460H, RSM460H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGHC02H3 Management Skills

This course will help students develop the critical skills required by today's managers. Topics covered include self-awareness, managing stress and conflict, using power and influence, negotiation, goal setting, and problem-solving. These skills are important for leadership and will enable students to behave more effectively in their working and personal lives.
Prerequisite: MGHB02H3 or MGIB02H3 or (MGTB23H3)
Exclusion: (MGTC24H3), (MGTC90H3), MGIC02H3/(MGTC91H3)
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGMA01H3 Principles of Marketing

An introduction to basic concepts and tools of marketing designed to provide students with a conceptual framework for the analysis of marketing problems. The topics include an examination of buyer behaviour, market segmentation; the basic elements of the marketing mix. Enrolment is limited to students registered in Programs requiring this course.
Prerequisite: Enrolment in any Bachelor of Business Administration (BBA) program.
Exclusion: (MGTB04H3), MGIA01H3/(MGTB07H3), (MGT252H), RSM250H
Enrolment Limits: 60
Breadth Requirements: Social & Behavioural Sciences

MGMB01H3 Marketing Management

This course builds on the introductory course in marketing and takes a pragmatic approach to develop the analytical skills required of marketing managers. The course is designed to help improve skills in analyzing marketing situations, identifying market opportunities, developing marketing strategies, making concise recommendations, and defending these recommendations. It will also use case study methodology to enable students to apply the concepts learned in the introductory course to actual issues facing marketing managers.
Prerequisite: [MGMA01H3/(MGTB04H3) or MGIA01H3/(MGTB07H3)] and [MGTA35H3 or MGTA36H3 or (MGTC36H3)]
Exclusion: (MGTC05H3), (MGTD20H3)
Enrolment Limits: 40
Breadth Requirements: Social & Behavioural Sciences

MGOC10H3 Analysis for Decision-Making

The course develops understanding and practical skills of applying quantitative analysis for making better management decisions. Studies methodologies include linear and integer programming; multi-criteria optimization; waiting line models; decision analysis. Methodologies are practiced in a broad range of typical business problems drawn from different areas of management.
Prerequisite: [[MATA32H3 and MATA33H3] or (MATA27H3)] and MGEB02H3/(ECMB02H3)) and MGEB11H3/(ECMB11H3) and MGEB12H3/(ECMB12H3
Exclusion: (MGTC74H3)
Enrolment Limits: 60
Breadth Requirements: Quantitative Reasoning

MGOC20H3 Operations Management: A Mathematical Approach

An introduction to a broad scope of major strategic and tactical issues in Operations Management. Topics include: project management, inventory management, supply chain management, forecasting, aggregate planning, material requirements planning, production scheduling.
Prerequisite: MGOC10H3/(MGTC74H3)
Exclusion: (MGTC75H3), MGT374H, RSM370H
Enrolment Limits: 60
Breadth Requirements: Quantitative Reasoning

MGTA05H3 Foundations of Business Management

This course is the basic foundation to the core areas of the program. It covers the process of management, the role of the manager in an increasingly networked economy of global reach, some aspects of leadership in business strategy and business administration, the place of the business in its larger economic context, and the economic perspective of business.
Prerequisite: Enrolment in a Bachelor of Business Administration (B.B.A.) program.
Exclusion: MGTA01H3/(MGTA03H3), MGTA02H3/(MGTA04H3), RSM100Y, MGM101H, COM110H
Breadth Requirements: Social & Behavioural Sciences

MGTA35H3 - Management Communications for non Co-op

In this course students will learn skills and techniques to communicate effectively in an organization. Creativity, innovation and personal style will be emphasized. Students will build confidence in their ability to communicate effectively in every setting. This course is a mandatory requirement for non-co-op students.
Exclusion: MGTA36H3, (MGTC36H3)
Enrolment Limits: 30
Breadth Requirements: Arts, Literature & Language

MGTA36H3 Management Communications for Co-op

In this course students will learn skills and techniques to communicate effectively in an organization. Creativity, innovation and personal style will be emphasized. Students will build

confidence in their ability to communicate effectively in every setting. Those completing this course will experience a high degree of personal satisfaction.
Exclusion: MGTA35H3, (MGTC36H3)
Enrolment Limits: 40
Breadth Requirements: Arts, Literature & Language

STAB41H3 Financial Derivatives
A study of the most important types of financial derivatives, including forwards, futures, swaps and options (European, American, exotic, etc). The course illustrates their properties and applications through examples, and introduces the theory of derivatives pricing with the use of the no-arbitrage principle and binomial tree models.
Prerequisite: ACTB40H3
Exclusion: MGFC30H3/(MGTC71H3)
Breadth Requirements: Quantitative Reasoning

STAB52H3 An Introduction to Probability
A mathematical treatment of probability. The topics covered include: the probability model, density and distribution functions, computer generation of random variables, conditional probability, expectation, sampling distributions, weak law of large numbers, central limit theorem, Monte Carlo methods, Markov chains, Poisson processes, simulation, applications. A computer package will be used.
Prerequisite: MATA33H3 or MATA36H3 or MATA37H3
Exclusion: PSYB07H3, STAB22H3, STA107H, STA257H
Breadth Requirements: Quantitative Reasoning

STAB57H3 An Introduction to Statistics
A mathematical treatment of the theory of statistics. The topics covered include: the statistical model, data collection, descriptive statistics, estimation, confidence intervals and P-values, likelihood inference methods, distribution-free methods, bootstrapping, Bayesian methods, relationship among variables, contingency tables, regression, ANOVA, logistic regression, applications. A computer package will be used.
Prerequisite: STAB52H3
Exclusion: STA261H
Breadth Requirements: Quantitative Reasoning

STAC62H3 Stochastic Processes
This course continues the development of probability theory begun in STAB52H3. Topics covered include finite dimensional distributions and the existence theorem, discrete time Markov chains, discrete time martingales, the multivariate normal distribution, Gaussian processes and Brownian motion.
Prerequisite: MATB41H3 and STAB52H3
Breadth Requirements: Quantitative Reasoning

STAC67H3 Regression Analysis
Orthogonal projections. Univariate normal distribution theory. The linear model and its statistical analysis, residual analysis, influence analysis, collinearity analysis, model selection procedures. Analysis of designs. Random effects. Models for categorical data. Nonlinear models. Instruction in the use of SAS.
Prerequisite: STAB57H3
Exclusion: STA302H
Breadth Requirements: Quantitative Reasoning

STAC70H3 Statistics and Finance I
A mathematical treatment of option pricing. Building on Brownian motion, the course introduces stochastic integrals and It calculus, which are used to develop the Black-Scholes framework for option pricing. The theory is extended to pricing general derivatives and is illustrated through applications to risk management.
Prerequisite: [STAB41H3 or MGFC30H3/(MGTC71H3)] and STAC62H3
Corequisite: MATC46H3
Exclusion: APM466H, ACT460H
Breadth Requirements: Quantitative Reasoning

STAD37H3 Multivariate Analysis
Linear algebra for statistics. Multivariate distributions, the multivariate normal and some associated distribution theory. Multivariate regression analysis. Canonical correlation analysis. Principal components analysis. Factor analysis. Cluster and discriminant analysis. Multidimensional scaling. Instruction in the use of SAS.
Prerequisite: STAC67H3
Exclusion: STA437H, (STAC42H3)
Breadth Requirements: Quantitative Reasoning

STAD57H3 Time Series Analysis
An overview of methods and problems in the analysis of time series data. Topics covered include descriptive methods, filtering and smoothing time series, identification and estimation of times series models, forecasting, seasonal adjustment, spectral estimation and GARCH models for volatility.
Prerequisite: STAC62H3 and STAC67H3
Exclusion: STA457H, (STAC57H3)
Breadth Requirements: Quantitative Reasoning

STAD70H3 Statistics and Finance II
A survey of statistical techniques used in finance. Topics include mean-variance and multi-factor analysis, simulation methods for option pricing, Value-at-Risk and related risk-management methods, and statistical arbitrage. A computer package will be used to illustrate the techniques using real financial data.

Prerequisite: STAC70H3 and STAD37H3
Corequisite: STAD57H3
Breadth Requirements: Quantitative Reasoning