UNIVERSITY OF WATERLOO | Senate

SENATE UNDERGRAD COUNCIL
TUESDAY, May 14, 2024
1:00 P.M. EST
NH 3318 / Zoom
Governing Documents and Resources

TIMING	AGENDA ITEM	PAGE	ACTION
	OPEN SESSION		
1:00 p.m. (5 mins)	1. Conflict of Interest	3	Declaration
	2. Minutes of April 9, 2024 Meeting	4	Decision (SUC)
	3. Business Arising from the Minutes	Oral	Input
	Consent Agenda *Motion: To approve the items on the consent agenda, listed as item 4a below.*		
	4. Curricular Submissions	6	
	a. Faculty of Mathematics (Cecilia Cotton)	7	Decision (SUC)
	Regular Agenda		
1:05 p.m. (10 mins)	5. Academic Program Reviews a. Final Assessment Report: Computing and Financial Management (James Thomspon)	167	Decision (SUC)
1:15 p.m. (5 mins)	6. Registrar's Office a. Effective Dates Chart (Danielle Jeanneault)	173	Information
1:20 p.m. (40 mins)	7. Campus Support and Accessibility (Jennifer Gilles)	Oral	Input
2:00 p.m. (15 mins)	8. Credentials Framework Recommendation: The Lego Model (Dave DeVidi, Cathy Newel Kelly, & Jennifer Coghlin)	Oral	Input
	9. Other Business	Oral	Input
	CONFIDENTIAL		
2:15 p.m. (10 mins)	10. Senate Effectiveness Survey	177	Information
	11. Other Business		
	12. Adjournment	Oral	Input

"Decision (SUC)" to be approved on behalf of Senate
"Decision (SEN-C)" to be recommended to Senate for approval (consent agenda)
"Decision (SEN-R)" to be recommended to Senate for approval (regular agenda)

May 7, 2024

Tim Weber-Kraljevski
Governance Officer
Secretary to SUC

Important Dates

June 10, 2024	Senate Meeting
June 20, 2024	SUC Meeting
September 19, 2023	SUC Meeting
September 23, 2024	Senate Meeting

Excerpt from Senate Bylaw 1

8. Declarations of conflict of interest

8.01	At the beginning of each meeting of Senate or any of Senate's committees or councils, the chair will call for members to declare any conflicts of interest with regard to any agenda item. For agenda items to be discussed in closed session, the chair will call for declarations of conflict of interest at the beginning of the closed portion of the meeting. Members may nonetheless declare conflicts at any time during a meeting.
8.02	A member shall be considered to have an actual, perceived or potential conflict of interest, when the opportunity exists for the member to use confidential information gained as a member of Senate, or any of Senate's committees or councils, for the personal profit or advantage of any person, or use the authority, knowledge or influence of the Senate, or a committee or council thereof, to further her/his personal, familial or corporate interests or the interests of an employee of the university with whom the member has a marital, familial or sexual relationship.
8.03	Members who declare conflicts of interest shall not enter into debate nor vote upon the specified item upon which they have declared a conflict of interest. The chair will determine whether it is appropriate for said member to remove themselves from the meeting for the duration of debate on the specified item(s).
8.04	Where Senate or a committee or council of Senate is of the opinion that a conflict of interest exists that has not been declared, the body may declare by a resolution carried by two-thirds of its members present at the meeting that a conflict of interest exists and a member thus found to be in conflict shall not enter into debate on the specified item upon which they have declared a conflict of interest. The chair will determine whether it is appropriate for said member to remove themselves from the meeting for the duration of debate on the specified item(s).

University of Waterloo
SENATE UNDERGRADUATE COUNCIL
Minutes of the April 9, 2024 Meeting
[in agenda order]

Present: Katherine Acheson, Victoria Chu, Cecilia Cotton, Vivian Dayeh, Laura Deakin, David DeVidi (chair), Leeann Ferries, Zev Friedman, Jason Grove, Fatma Gzara, Carol Ann MacGregor, Catherine Newell Kelly, Nigharika Senthil Kumar, Helena Shilomboleni, Ryan Trelford, Johanna Wandel, Tim Weber-Kraljevski (secretary).

Resources/Guests: Lisa Aultman-Hall, Martin Cooke, Jennifer Coghlin, Maysah Eid, Danielle Jeanneault, Carrie MacKinnon, Gerald Voorhies.

Absent: Janice Aurini*, Maya Baboolal, Viv Hoang, Alysia Kolentsis, Kristiina Montero, Rory Norris, Charvi Patel, Chris Vigna*, Richard Wikkerink*.
*Regrets

Organization of Meeting: Dave DeVidi took the chair, and Tim Weber-Kraljevski acted as secretary. The secretary advised that a quorum was present. The agenda was approved without formal motion.

The chair thanked those members for who it was their last meeting.

1. CONFLICT OF INTEREST
No conflicts of interest were declared.

2. MINUTES OF THE MARCH 5, 2024 MEETING
The minutes were accepted as distributed.

3. BUSINESS ARISING FROM THE MINUTES
There was no business arising.

CONSENT AGENDA
A motion was heard to approve consent agenda as presented. MacGregor and Ferries. Carried.

4. CURRICULAR SUBMISSIONS
Council approved items a-b as presented.

REGULAR AGENDA

5. ACADEMIC PROGRAM REVIEWS
a. **Final Assessment Report: Systems Design Engineering, and Biomedical Engineering:** Aultman-Hall provided a brief overview of the report. Members commended Aultman-Hall on the report. Aultman-Hall left the meeting.

b. **Progress Report: Communication Studies, and Digital Arts Communication:** Vorhees provided a brief overview of the report. Member discussed recommendation 7 and the space and technology limitations. Vorhees left the meeting.

Motion to approve the Final Assessment Report and Progress Report on behalf of Senate, as presented. Wandel and Trelford. Carried.

6. CURRICULAR SUBMISSIONS

a. **Faculty of Health:** Ferries provided an overview of the report. A motion was heard to recommend Senate approve the proposed major modifications to Recreation and Leisure Studies, and Recreation and Sport Business, as presented. Ferries and Cotton. Carried.

7. ACADEMIC QUALITY ENHANCEMENT (AQUE) COMMITTEE TERMS OF REFERENCE

The Chair provided an overview of the report. Members discussed: the role of the proposed AQuE Committee in reviewing Progress and Final Assessment Reports, and the actions the Committee can take if it has any concerns with a report. A motion was heard to recommend the proposed terms of reference for the AQuE Committee to Senate Executive Council for approval, as presented. Newell Kelly and Grove. Carried.

8. OPEN ENROLMENT: IDEAS AND POSSIBILITIES

Cooke presented on open enrolment, highlighting: what open enrolment is and is not; examples from the University of Waterloo and other institutions; and potential benefits and challenges for the University to do more open enrolment. Members discussed: if there is potential for open enrolment to support specific institutional goals, now or in the future; opportunities on campus and potential benefits; experiences with examples current on campus and externally; and concerns and potential obstacles.

9. OTHER BUSINESS

Members discussed the timing and length of Council's meetings. A motion was heard to move Council meetings to start at 1:00pm and to consider at a future meeting, reducing meeting length to 90 minutes. Newell Kelly and Acheson. Carried.

10. ADJOURNMENT

With no further business, the meeting adjourned. The next meeting is Tuesday May 14, 2024 12:30 to 2:30 p.m. in NH 3318

April 30, 2023

Tim Weber-Kraljevski
Governance Officer

UNIVERSITY OF WATERLOO | Senate

Senate Undergraduate Council
Curriculum Subcommittee

For Approval **Consent Agenda** **Open Session**

To:	**Senate Undergraduate Council**
Sponsor: **Contact Information:**	David DeVidi, Associate Vice-President, Academic david.devidi@uwaterloo.ca
Presenter: **Contact Information:**	David DeVidi, Associate Vice-President, Academic david.devidi@uwaterloo.ca
Date of Meeting:	**May 14, 2024**
Agenda Item Identification:	**Approval of Curricular Items on Behalf of Senate**

Recommendation/Motion:

To approval the included curricular items on behalf of Senate, as presented.

Summary:

The SUC Curriculum Subcommittee has reviewed and agreed, via an e-vote which closed on May 7, 2024, to recommend to SUC for approval as part of the consent agenda, the items included in the appendix of this report. These items include new courses, course changes, course inactivations, and minor plan modifications from the Faculty of Mathematics.

In addition to the appendix, the material is also available to view within Kuali Curriculum Management (CM) via the following link:

- Faculty of Mathematics – Consent Agenda Submissions

Please note that items linking to the Kuali CM platform can only be accessed by Committee members and other campus members who have received training. If you do not have access to the system, please refrain from clicking the above Kuali CM link. If you believe you should have access to view the agenda package content in the platform, reach out to the Council secretary via: senate@uwaterloo.ca.

Documents Included:

- Appendix A: Faculty of Mathematics

SUC Subcommittee Consent Report: Appendix A - Faculty of Mathematics

SUC Curriculum Subcommittee - 2024-04 - Consent Agenda - Faculty of Mathematics

Agenda Page Title

SUC Curriculum Subcommittee - 2024-04 - Consent Agenda - Faculty of Mathematics

Date	Time	Location

Description

The following motions were adopted at UAC meetings (January 29, 2024 and February 26, 2024) and approved at Math Faculty Council (March 19, 2024).

1. Course Retirements, Course Changes and New Courses (Motion 1)

Course Retirements

- **COMM 231** - FARM/MATH BA/MATH IT/MATH CPA students will all be taking either AFM 231 or AFM 335 and SAF (School of Accounting and Finance) has confirmed they can manage all these students. This is essentially the current practice as COMM 231 was last offered in Winter 2022.

Course Changes

- **CS 330** - Add tutorial component.
- **CS 436** - Update antirequisites.
- **CS 442** - Update prerequisites.
- **CS 456** - Update antirequisites.
- **CS 476** - New cross-listing.
- **CS 480** - Update antirequisites.
- **CS 486** - Update antirequisites.
- **MATBUS 470** - Update prerequisites.
- **MATH 137** - Update description.
- **MATH 138** - Update description.
- **PMATH 333** - Update description.
- **PMATH 351** - Update description.
- **PMATH 467** - Update description and prerequisites.

New Courses

- **ACTSC 447 -** New cross-listed course with CS 476. The School of Computer Science and the Department of Statistics and Actuarial Science have decided to co-own the course moving forward. Expertise on this topic is found in both units and co-operation between the units will keep the course content up to date and benefit students.

2. Minor Program/Plan Modifications (Motion 2)

- **H-Computational Mathematics** - add the newly created ACTSC 447 Numerical Computation for Financial Modeling to the plan requirements as a cross-listed course with CS 476 of the same title.
- **ACTSC-Finance Specialization** - update to required courses (ACTSC 447/CS 476) and addition of H-Mathematical Finance to list of invalid combinations.
- **H-Math/FARM - Chartered Financial Analyst Specialization** - updates to required courses.
- **H-Math/FARM - Professional Risk Management Specialization** - updates to required courses.
- **H-Mathematics/Chartered Professional Accountancy** - updates to required courses.
- **H-Mathematical Finance** - update to required courses (ACTSC 447) and addition of ACTSC-Finance Specialization to list of invalid combinations.
- **H-Mathematics/Business Administration** - updates to required courses.
- **H-Information Technology Management** - update to required courses (remove COMM 231).
- **CS-Business Specialization** - updates to required courses, approved courses list, and graduation requirements.
- **SE-Business Specialization** - mirroring changes to the CS-Business Specialization (above).
- **H-Data Science (BMath)** - updates to list of invalid combinations (Computing Minor; Computer Science Minor).
- **H-Data Science (BCS)** - updates to list of invalid combinations (Statistics Minor).

3. Major Program/Plan Modifications

No business.

4. Non-Curricular Items

No business.

5. Other Business

No business.

Attachment(s)

Course Proposals

Code	Title	Type	Workflow Step
ACTSC 447	Numerical Computation for Financial Modelling	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
COMM 231	Commercial and Business Law for Mathematics Students	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 330	Management Information Systems	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 436	Networks and Distributed Computer Systems	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 442	Principles of Programming Languages	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 456	Computer Networks	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 476	Numerical Computation for Financial Modelling	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 480	Introduction to Machine Learning	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
CS 486	Introduction to Artificial Intelligence	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
MATBUS 470	Derivatives	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
MATH 137	Calculus 1 for Honours Mathematics	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
MATH 138	Calculus 2 for Honours Mathematics	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
PMATH 333	Introduction to Real Analysis	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
PMATH 351	Real Analysis	Course	SUC, Senate Undergraduate Council (SUC) | Under Review
PMATH 467	Algebraic Topology	Course	SUC, Senate Undergraduate Council (SUC) | Under Review

Program/Plan Proposals

Code	Title	Type	Workflow Step
H-Computational Mathematics	Computational Mathematics (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
ACTSC-Finance Specialization	Finance Specialization	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Math/FARM - Chartered Financial Analyst Spec	Mathematics/Financial Analysis and Risk Management - Chartered Financial Analyst Specialization (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Math/FARM - Professional Risk Management Spec	Mathematics/Financial Analysis and Risk Management - Professional Risk Management Specialization (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Mathematics/Chartered Professional Accountancy	Mathematics/Chartered Professional Accountancy (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Mathematical Finance	Mathematical Finance (Bachelor of Mathematics - Honours)	Program	SUC Subcommittee, SUC Curricular Subcommittee | Under Review
H-Mathematics/Business Administration	Mathematics/Business Administration (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Information Technology Management	Information Technology Management (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
CS-Business Specialization	Business Specialization	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
SE-Business Specialization	Business Specialization	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Data Science (BMath)	Data Science (Bachelor of Mathematics - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review
H-Data Science (BCS)	Data Science (Bachelor of Computer Science - Honours)	Program	SUC, Senate Undergraduate Council (SUC) | Under Review

Regulations Proposals

No proposals have been added.

Subject Code / Number
Numerical Computation for Financial Modelling

Under Review | Fall 2025

Proposal Information

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Effective Date & Career

Career
Undergraduate

Important!

Quest Course ID
3352

Effective Term and Year
Fall 2025

Offering Number

Proposal Details

Proposal Type
New

Academic Unit Approval

Rationale for New Course
CS 476 is a course currently offered by the School of Computer Science (SCS). This motion creates a cross-listed version of the courses with an Actuarial Science course code. The SCS and the Department of Statistics and Actuarial Science (SAS) have decided to co-own the course moving forward. This includes working jointly on the content and staffing of the course. Expertise on this topic is found in both units and co-operation between the units will keep the course content up to date and benefit students.
Titles are being updated to match Canadian spelling of "modelling" - standardization was missed during the 2024-25 Calendar work.

Consultations
School of Computer Science

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Subject Code
ACTSC

Number
447

Course Level
400

Title
Numerical Computation for Financial Modelling

Abbreviated Title
Num Computation: Fin Modelling

Description
The interaction of financial models, numerical methods, and computing environments. Basic computational aspects of option pricing and hedging. Numerical methods for stochastic differential equations, strong and weak convergence. Generating correlated random numbers. Time-stepping methods. Finite difference methods for the Black-Scholes equation. Discretization, stability, convergence. Methods for portfolio optimization, effect of data errors on portfolio weights.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
Yes

Cross-Listed Courses
CS 476 - Numeric Computation for Financial Modeling (0.50)

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- Complete all of the following
  - Must have completed at least 1 of the following:
    - AMATH242 - Introduction to Computational Mathematics (0.50)
    - CS370 - Numerical Computation (0.50)
    - CS371 - Introduction to Computational Mathematics (0.50)
  - Complete 1 of the following
    - Must have completed at least 1 of the following:
      - STAT231 - Statistics (0.50)
      - STAT241 - Statistics (Advanced Level) (0.50)
    - Earned a minimum grade of 60% in each of the following:
      - STAT206 - Statistics for Software Engineering (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans
There are no dependencies

Subject Code / Number
Commercial and Business Law for Mathematics Students

Under Review | Fall 2025

Proposal Information

Status

Changes

~~Active~~**Retired**

Warning: All versions that start after the retired version will be deleted.

Workflow Status

In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲

Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Effective Term and Year
- participants

Effective Date & Career

Career ?

Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2023

Quest Course ID

6938

Offering Number

1

Proposal Details

Proposal Type ?

Retire

Academic Unit Approval

Retired Impact
Yes

Retired Impact Details
FARM/MATH BA/MATH IT/MATH CPA students will all be taking either AFM 231 or AFM 335 and SAF (School of Accounting and Finance) has confirmed they can manage all these students. This is essentially the current practice as COMM 231 was last offered in Winter 2022.

Rationale for Change
FARM/MATH BA/MATH IT/MATH CPA students will all be taking either AFM 231 or AFM 335 and SAF (School of Accounting and Finance) has confirmed they can manage all these students. This is essentially the current practice as COMM 231 was last offered in Winter 2022.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Subject Code
COMM

Number
231

Course Level
200

Title
Commercial and Business Law for Mathematics Students

Abbreviated Title
Commercial & Business Law

Description
The judicial process, contract law, agency, bankruptcy, negotiable instruments, law of banking, insurance law, partnership law, company law, torts, real estate law.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
Lecture

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites
No Rules

Corequisites
No Rules

Antirequisites

- Complete all of the following
  - Not completed nor concurrently enrolled in:
    - AFM231 - Business Law (0.50)
    - CIVE491 - Engineering Law and Ethics (0.50)
    - ENVS201 - Introduction to Canadian Environmental Law (0.50)
    - LS283 - Business Law (0.50)
  - Not completed nor concurrently enrolled in: ECE290, GENE411, ME401, MTHEL100
  - (For students in the Faculty of Mathematics only), not completed nor concurrently enrolled in: BUS231W

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- AFM 335 - Business Law for Financial Managers — View Courses
- LS 283 - Business Law — View Courses
- AFM 231 - Business Law — View Courses
- CIVE 491 - Engineering Law and Ethics — View Courses
- BUS 231W - Business Law (WLU) — View Courses

COURSE REQUIREMENTS (NO UNITS)

- H-Mathematics/Chartered Professional Accountancy - Mathematics/Chartered Professional Accounta... — View Programs
- H-Math/FARM - Chartered Financial Analyst Spec - Mathematics/Financial Analysis and Risk Managem... — View Programs
- H-Information Technology Management - Information Technology Management (Bachelor of Mathemat... — View Programs
- H-Mathematics/Business Administration - Mathematics/Business Administration (Bachelor of Mathem... — View Programs
- H-Math/FARM - Professional Risk Management Spec - Mathematics/Financial Analysis and Risk Mana... — View Programs

Subject Code / Number
Management Information Systems

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Components
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
4385

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change ?
In cases when CS 330 is offered online without synchronous lectures, a tutorial provides a scheduled synchronous meet time.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code
CS

Number
330

Course Level
300

Title
Management Information Systems

Abbreviated Title
Management Information Systems

Description
An introduction to information systems and their strategic role in business. Topics include types of information systems, organizational requirements, systems development strategies, decision support systems, data and information management, and information systems management, control, and implementation.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Proposed
Components
LectureTest SlotTutorial

Primary Component
Lecture

Existing
Components
LectureTest Slot

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Complete all of the following
    - Complete 1 of the following
        - Must have completed at least 1 of the following:
            - CS106 - Introduction to Computer Programming 2 (0.50)
            - CS116 - Introduction to Computer Science 2 (0.50)
            - CS136 - Elementary Algorithm Design and Data Abstraction (0.50)
            - CS138 - Introduction to Data Abstraction and Implementation (0.50)
            - CS146 - Elementary Algorithm Design and Data Abstraction (Advanced Level) (0.50)
        - Complete all of the following
            - Earned a minimum grade of 60% in each of the following:
                - CS114 - Principles of Computing for Science (0.50)
            - Must have completed at least 1 of the following:
                - CS115 - Introduction to Computer Science 1 (0.50)
                - CS135 - Designing Functional Programs (0.50)
                - CS145 - Designing Functional Programs (Advanced Level) (0.50)
    - Students must be in level 2B or higher

Corequisites
No Rules

Antirequisites

- Complete all of the following
  - Not completed nor concurrently enrolled in:
    - AFM241 - Impact of Technology on Business (0.50)
    - CS490 - Information Systems Management (0.50)
  - Not completed nor concurrently enrolled in: BUS415W, BUS486W
  - Not open to students enrolled in H-BBA & BCS Double Degree, H-Computer Science (BCS), H-Computer Science (BMath), JH-Computer Science (BCS), JH-Computer Science (BMath), Computer Science Minor, H-Computing & Financial Management, H-Data Science (BCS), or H-Software Engineering

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

AFM 241 - Impact of Technology on Business — View Courses

COURSE REQUIREMENTS (NO UNITS)

H-Chemistry - Computational Specialization - Chemistry - Computational Specialization (Bachelor of Sci... — View Programs
ACTSC-Predictive Analytics Specialization - Predictive Analytics Specialization — View Programs
H-Global Business & Digital Arts - Global Business and Digital Arts (Bachelor of Global Business and Di... — View Programs
H-Mathematical Optimization - Operations Research Specialization - Mathematical Optimization - Oper... — View Programs
H-Math/FARM - Chartered Financial Analyst Spec - Mathematics/Financial Analysis and Risk Managem... — View Programs
H-BBA & BMath Double Degree - Business Administration and Mathematics Double Degree (Bachelor of... — View Programs
H-Information Technology Management - Information Technology Management (Bachelor of Mathemat... — View Programs
H-Mathematical Optimization - Business Specialization - Mathematical Optimization - Business Speciali... — View Programs
H-Mathematics/Business Administration - Mathematics/Business Administration (Bachelor of Mathem... — View Programs
MS-Business Specialization - Business Specialization — View Programs
H-Mathematics/Teaching - Mathematics/Teaching (Bachelor of Mathematics - Honours) — View Programs
H-Math/FARM - Professional Risk Management Spec - Mathematics/Financial Analysis and Risk Mana... — View Programs

COURSE REQUIREMENTS (UNITS)

Health Informatics Option - Health Informatics Option — View Programs
Bioinformatics Option - Bioinformatics Option — View Programs
Collaborative Design Specialization - Collaborative Design Specialization — View Programs

PREREQUISITES

AFM 443 - E-business: Introduction to Electronic Commerce — View Courses
AFM 442 - E-business: Enterprise Systems — View Courses
COMM 432 - Electronic Business — View Courses
CS 430 - Applications Software Engineering — View Courses
CS 431 - Data-Intensive Distributed Analytics — View Courses
CS 338 - Computer Applications in Business: Databases — View Courses

Subject Code / Number
Networks and Distributed Computer Systems

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Antirequisites
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
4407

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change ?
ECE 428 no longer exists. The content of CS 436 overlaps significantly with ECE 358 and ECE 416.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code
CS

Number
436

Course Level
400

Title
Networks and Distributed Computer Systems

Abbreviated Title
Networks & Distrib Comp Sys

Description
An introduction to networks, protocols, and distributed systems. Layered models, resource management, naming, addressing and routing, reliable communication, security, and higher-level services.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- Must have completed at least 1 of the following:
  - CS230 - Introduction to Computers and Computer Systems (0.50)
  - CS241 - Foundations of Sequential Programs (0.50)
  - CS241E - Foundations of Sequential Programs (Enriched) (0.50)
  - CS246 - Object-Oriented Software Development (0.50)
  - CS246E - Object-Oriented Software Development (Enriched) (0.50)
  - CS251 - Computer Organization and Design (0.50)
  - CS251E - Computer Organization and Design (Enriched) (0.50)

Corequisites

No Rules

Antirequisites

Fetching rules...

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

CS 456 - Computer Networks View Courses

COURSE REQUIREMENTS (NO UNITS)

H-Information Technology Management - Information Technology Management (Bachelor of Mathemat... View Programs

H-Mathematics/Teaching - Mathematics/Teaching (Bachelor of Mathematics - Honours) View Programs

COURSE REQUIREMENTS (UNITS)

Health Informatics Option - Health Informatics Option View Programs

Subject Code / Number
Principles of Programming Languages

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Prerequisites
- participants
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
4410

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

The existing prerequisite of CS 240/240E transitively ensures the new prerequisites being made explicit. The content of CS 442 depends on concepts in the new prerequisites, but does not depend on concepts in CS 240/240E. The change will give students more flexibility to take the course earlier, which is important for scheduling because the course is offered only once a year.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code
CS

Number
442

Course Level
400

Title
Principles of Programming Languages

Abbreviated Title
Princ of Programming Languages

Description
An exposure to important concepts and issues in contemporary programming languages. Data types, abstraction, and polymorphism. Program structure. Lambda calculus and functional programming, logic programming, object-oriented programming. Semantics of programming languages. Critical comparison of language features and programming methodologies using examples drawn from a variety of programming languages including Lisp, Prolog, ML, Ada, Smalltalk, Icon, APL, and Lucid. Programming assignments involve the use of some of these languages.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites
Fetching rules...

Corequisites
No Rules

Antirequisites
No Rules

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

COURSE LISTS

H-Software Engineering - Software Engineering (Bachelor of Software Engineering - Honours) View Programs

COURSE REQUIREMENTS (NO UNITS)

CS-Software Engineering Specialization - Software Engineering Specialization View Programs

Subject Code / Number
Computer Networks

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Effective Term and Year
- Antirequisites

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2023

Quest Course ID
10167

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change ?
ECE 428 no longer exists. The content of CS 456 overlaps significantly with ECE 416.

Consultations ?

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code
CS

Number
456

Course Level
400

Title
Computer Networks

Abbreviated Title
Computer Networks

Description
An introduction to network architectures and protocols, placing emphasis on protocols used in the Internet. Specific topics include application layer protocols, network programming, transport protocols, routing, multicast, data link layer issues, multimedia networking, network security, and network management.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- Complete all of the following
  - Must have completed at least 1 of the following:
    - CS350 - Operating Systems (0.50)
    - SE350 - Operating Systems (0.50)
  - Enrolled in H-BBA & BCS Double Degree, H-Computer Science (BCS), H-Computer Science (BMath), JH-Computer Science (BCS), JH-Computer Science (BMath), Computer Science Minor, H-Computing & Financial Management, H-Data Science (BCS), or H-Software Engineering

Corequisites

No Rules

Antirequisites

- Not completed nor concurrently enrolled in:
  - CS436 - Networks and Distributed Computer Systems (0.50)
  - ECE358 - Computer Networks (0.50)
  - **ECE416 - Advanced Topics in Networking (0.50)**
- ~~Not completed nor concurrently enrolled in: ECE428~~

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- CS 436 - Networks and Distributed Computer Systems — View Courses
- ECE 416 - Advanced Topics in Networking — View Courses

COREQUISITES

- CS 459 - Privacy, Cryptography, Network and Data Security — View Courses

COURSE REQUIREMENTS (NO UNITS)

- CS-Digital Hardware Specialization - Digital Hardware Specialization — View Programs
- CS-Software Engineering Specialization - Software Engineering Specialization — View Programs

Subject Code / Number
Numerical Computation for Financial Modelling

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Title
- Abbreviated Title
- Is this course cross-listed?
- participants
- Effective Term and Year

Show All ▼

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
3352

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

New cross-listing: This motion adds a cross-list with the newly created ACTSC447. The School of Computer Science (SCS) and the Department of Statistics and Actuarial Science (SAS) have decided to co-own the course moving forward. This includes working jointly on the content and staffing of the course. Expertise on this topic is found in both units and co-operation between the units will keep the course content up to date and benefit students.

Title change: The word “numerical” is more consistent with common usage in this context and with the titles of other courses (e.g., CS 370). Titles are being updated to match Canadian spelling of "modelling" - standardization was missed during the 2024-25 Calendar work.

Removal of notes in the course description: The Registrar’s Office recommends removal of notes related to scheduling from the calendar; such notes belong in the Schedule of Classes. The note about CS 335 is imprecise (i.e., what constitutes a “good grade”) and thus is only advice; the RO recommends removal of advice from the calendar. Note: these notes have already been removed from Kuali so the change is not visible in the motion but is supported by the SCS.

Consultations

Consulted with Statistics and Actuarial Science department.

Supporting Documentation

Course Information

Faculty

Faculty of Mathematics

Academic Unit

David R. Cheriton School of Computer Science

Subject Code

CS

Number

476

Course Level

400

Proposed

Title

Numerical Computation for Financial Modelling

Existing

Title

Numeric Computation for Financial Modeling

Proposed

Abbreviated Title

Num Computation: Fin Modelling

Existing

Abbreviated Title

Num Computation: Fin Modeling

Description

The interaction of financial models, numerical methods, and computing environments. Basic computational aspects of option pricing and hedging. Numerical methods for stochastic differential equations, strong and weak convergence. Generating correlated random numbers. Time-stepping methods. Finite difference methods for the Black-Scholes equation. Discretization, stability, convergence. Methods for portfolio optimization, effect of data errors on portfolio weights.

Units

0.50

Undergraduate Communication Requirement Identifier

No

Components

LaboratoryLectureTest Slot

Primary Component

Lecture

Grading Information

Standard Course Grading

Yes

Cross-Listing Information

Proposed

Is this course cross-listed?

Yes

Existing

Is this course cross-listed?

No

Proposed

Cross-Listed Courses

ACTSC 447 - Numerical Computation for Financial Modelling (0.50) | **Under Review**

Existing

Cross-Listed Courses

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Complete all of the following
  - Must have completed at least 1 of the following:
    - AMATH242 - Introduction to Computational Mathematics (0.50)
    - CS370 - Numerical Computation (0.50)
    - CS371 - Introduction to Computational Mathematics (0.50)
  - Complete 1 of the following
    - Must have completed at least 1 of the following:
      - STAT231 - Statistics (0.50)
      - STAT241 - Statistics (Advanced Level) (0.50)
    - Earned a minimum grade of 60% in each of the following:
      - STAT206 - Statistics for Software Engineering (0.50)

Corequisites
No Rules

Antirequisites
No Rules

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

COURSE REQUIREMENTS (NO UNITS)

H-Mathematical Finance - Mathematical Finance (Bachelor of Mathematics - Honours)	View Programs
ACTSC-Finance Specialization - Finance Specialization	View Programs
H-Math/FARM - Chartered Financial Analyst Spec - Mathematics/Financial Analysis and Risk Managem...	View Programs
H-Math/FARM - Professional Risk Management Spec - Mathematics/Financial Analysis and Risk Mana...	View Programs
Computational Mathematics Minor - Computational Mathematics Minor	View Programs
H-Computational Mathematics - Computational Mathematics (Bachelor of Mathematics - Honours)	View Programs

Subject Code / Number
Introduction to Machine Learning

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Antirequisites
- participants
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
15515

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change ?
The content of CS 480 overlaps significantly with MSE 446 (formerly, MSCI 446). MSE 446 already lists CS 480 as an antirequesite so this creates consistency between the two courses.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code
CS

Number
480

Course Level
400

Title
Introduction to Machine Learning

Abbreviated Title
Intro Machine Learning

Description
Introduction to modelling and algorithmic techniques for machines to learn concepts from data. Generalization: underfitting, overfitting, cross-validation. Tasks: classification, regression, clustering. Optimization-based learning: loss minimization. regularization. Statistical learning: maximum likelihood, Bayesian learning. Algorithms: nearest neighbour, (generalized) linear regression, mixtures of Gaussians, Gaussian processes, kernel methods, support vector machines, deep learning, sequence learning, ensemble techniques. Large scale learning: distributed learning and stream learning. Applications: Natural language processing, computer vision, data mining, human computer interaction, information retrieval.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Complete all of the following
  - Must have completed the following:
    - CS341 - Algorithms (0.50)
  - Must have completed at least 1 of the following:
    - STAT206 - Statistics for Software Engineering (0.50)
    - STAT231 - Statistics (0.50)
    - STAT241 - Statistics (Advanced Level) (0.50)
  - Enrolled in H-BBA & BCS Double Degree, H-Computer Science (BCS), H-Computer Science (BMath), JH-Computer Science (BCS), JH-Computer Science (BMath), Computer Science Minor, H-Computing & Financial Management, H-Data Science (BCS), H-Data Science (BMath), or H-Software Engineering

Corequisites
No Rules

Antirequisites

- **Complete all of the following**
  - **Not completed nor concurrently enrolled in:**
    - **MSE446 - Introduction to Machine Learning (0.50)**
  - **Not completed nor concurrently enrolled in: MSCI446**

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- AFM 241 - Impact of Technology on Business — View Courses
- GEOG 484 - Machine Learning in Geospatial Science — View Courses
- MSE 446 - Introduction to Machine Learning — View Courses
- SYDE 522 - Foundations of Artificial Intelligence — View Courses

COURSE LISTS

- H-Software Engineering - Software Engineering (Bachelor of Software Engineering - Honours) — View Programs

COURSE REQUIREMENTS (NO UNITS)

- CS-Artificial Intelligence Specialization - Artificial Intelligence Specialization — View Programs
- SE-Artificial Intelligence Specialization - Artificial Intelligence Specialization — View Programs
- SE-Human-Computer Interaction Specialization - Human-Computer Interaction Specialization — View Programs
- H-Data Science (BMath) - Data Science (Bachelor of Mathematics - Honours) — View Programs
- Computational Mathematics Minor - Computational Mathematics Minor — View Programs
- Cognitive Science Minor - Cognitive Science Minor — View Programs
- H-Data Science (BCS) - Data Science (Bachelor of Computer Science - Honours) — View Programs
- CS-Human-Computer Interaction Specialization - Human-Computer Interaction Specialization — View Programs
- CS-Software Engineering Specialization - Software Engineering Specialization — View Programs
- Artificial Intelligence Option - Artificial Intelligence Option — View Programs
- Management Science Option - Management Science Option — View Programs
- H-Computational Mathematics - Computational Mathematics (Bachelor of Mathematics - Honours) — View Programs

PREREQUISITES

- MSE 546 - Advanced Machine Learning — View Courses

Subject Code / Number
Introduction to Artificial Intelligence

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Antirequisites
- participants
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
4435

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change ?
The content of CS 486 overlaps significantly with SYDE 522. SYDE 522 already lists CS 486 as an antirequesite so this creates consistency between the two courses.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Subject Code
CS

Number
486

Course Level
400

Title
Introduction to Artificial Intelligence

Abbreviated Title
Intro Artificial Intelligence

Description
Goals and methods of artificial intelligence. Methods of general problem solving. Knowledge representation and reasoning. Planning. Reasoning about uncertainty. Machine learning. Multi-agent systems. Natural language processing.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- Complete all of the following
  - Must have completed the following:
    - CS341 - Algorithms (0.50)
  - Enrolled in H-BBA & BCS Double Degree, H-Computer Science (BCS), H-Computer Science (BMath), JH-Computer Science (BCS), JH-Computer Science (BMath), Computer Science Minor, H-Computing & Financial Management, H-Data Science (BCS), H-Data Science (BMath), or H-Software Engineering

Corequisites

- Completed or concurrently enrolled in at least 1 of the following:
  - STAT206 - Statistics for Software Engineering (0.50)
  - STAT231 - Statistics (0.50)
  - STAT241 - Statistics (Advanced Level) (0.50)

Antirequisites

- **Not completed nor concurrently enrolled in:**
  - **SYDE522 - Foundations of Artificial Intelligence (0.50)**

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path

Committee approvals

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- ECE 457B - Fundamentals of Computational Intelligence — View Courses
- SYDE 522 - Foundations of Artificial Intelligence — View Courses

COURSE LISTS

- H-Software Engineering - Software Engineering (Bachelor of Software Engineering - Honours) — View Programs

COURSE REQUIREMENTS (NO UNITS)

- CS-Artificial Intelligence Specialization - Artificial Intelligence Specialization — View Programs
- H-Statistics - Statistics (Bachelor of Mathematics - Honours) — View Programs
- SE-Artificial Intelligence Specialization - Artificial Intelligence Specialization — View Programs
- SE-Human-Computer Interaction Specialization - Human-Computer Interaction Specialization — View Programs
- H-Data Science (BMath) - Data Science (Bachelor of Mathematics - Honours) — View Programs
- Cognitive Science Minor - Cognitive Science Minor — View Programs
- H-Data Science (BCS) - Data Science (Bachelor of Computer Science - Honours) — View Programs
- CS-Human-Computer Interaction Specialization - Human-Computer Interaction Specialization — View Programs
- CS-Software Engineering Specialization - Software Engineering Specialization — View Programs
- Artificial Intelligence Option - Artificial Intelligence Option — View Programs
- Medical Artificial Intelligence Specialization - Medical Artificial Intelligence Specialization — View Programs

Subject Code / Number Derivatives

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Prerequisites
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Quest Course ID
13755

Offering Number
1

Proposal Details

Proposal Type
Change

Academic Unit Approval

Rationale for Change
This change better aligns the pre-requisites of MATBUS 470 with those of ACTSC/STAT 446 as the two courses have significant overlap. For both MATBUS 470 and ACTSC/STAT 446, a knowledge of stochastic processes is what is needed; students can get it by completing either STAT 334 or STAT 333.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Subject Code
MATBUS

Number
470

Course Level
400

Title
Derivatives

Abbreviated Title
Derivatives

Description
Overview of the derivatives markets. Pricing of derivatives, including futures, forwards, swaps, and options. Hedging vs. speculating. Option Greeks. Trading strategies. Case studies.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest Slot

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- Complete all of the following
    - Complete 1 of the following
        - Must have completed at least 1 of the following:
            - ACTSC372 - Investment Science and Corporate Finance (0.50)
            - ACTSC391 - Corporate Finance (0.50)
            - AFM275 - Corporate Finance (0.50)
        - Must have completed at least 1 of the following: ACTSC371, AFM372, BUS393W
    - ~~Complete 1 of the following~~
        - ~~Must have completed the following:~~
            - ~~STAT330 - Mathematical Statistics (0.50)~~
            - ~~STAT333 - Stochastic Processes 1 (0.50)~~
        - ~~Must have completed the following:~~
            - ~~STAT334 - Probability Models for Business and Accounting (0.50)~~
    - **Must have completed at least 1 of the following:**
        - **STAT333 - Stochastic Processes 1 (0.50)**
        - **STAT334 - Probability Models for Business and Accounting (0.50)**

Corequisites

No Rules

Antirequisites

- Complete all of the following
    - Not completed nor concurrently enrolled in:
        - ACTSC446 - Mathematics of Financial Markets (0.50)
        - AFM322 - Derivative Securities (0.50)
        - ECON372 - Business Finance 2 (0.50)
    - Not completed nor concurrently enrolled in: AFM474, BUS423W, STAT446

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- AFM 322 - Derivative Securities — View Courses
- ACTSC 446 - Mathematics of Financial Markets — View Courses

COURSE REQUIREMENTS (NO UNITS)

- CPA-Finance Specialization - Finance Specialization — View Programs
- H-Math/FARM - Chartered Financial Analyst Spec - Mathematics/Financial Analysis and Risk Managem... — View Programs
- H-Math/FARM - Professional Risk Management Spec - Mathematics/Financial Analysis and Risk Mana... — View Programs

Subject Code / Number
Calculus 1 for Honours Mathematics

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Description
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
6880

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

In Fall 2023 the a cross-faculty committee reviewed the topics covered in Math 137/138. For Math 137 the proposed changes are the removal of one lecture from derivatives, two lectures on Taylor polynomials and Big-O notation (to be moved to Math 138), and 0.5 lectures on basic antiderivatives. This will allow instructors time to include an additional one lecture for pre-calculate review, one lecture on related rates, and 1.5 lectures on optimization. This motion updates the course description to accurately reflect the topics to be taught in this course.

Consultations

Supporting Documentation

- MATH_137_and_138 Results.pdf

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Subject Code
MATH

Number
137

Course Level
100

Title
Calculus 1 for Honours Mathematics

Abbreviated Title
Calculus 1 (Honours)

Proposed
Description
Absolute values and inequalities. Sequences and their limits. Limits of functions and continuity. The Intermediate Value theorem and approximate solutions to equations. Derivatives, linear approximation, and Newton's method. Applications of derivatives. The Mean Value theorem and error bounds. Applications of the Mean Value theorem. Suitable topics are illustrated using computer software.

Existing
Description
Absolute values and inequalities. Sequences and their limits. Introduction to series. Limits of functions and continuity. The Intermediate Value theorem and approximate solutions to equations. Derivatives, linear approximation, and Newton's method. The Mean Value theorem and error bounds. Applications of the Mean Value theorem, Taylor polynomials and Taylor's theorem, Big-O notation. Suitable topics are illustrated using computer software.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LaboratoryLectureTest SlotTutorial

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Must have completed the following: 4U Calculus and Vectors

Corequisites
No Rules

Antirequisites

- Not completed nor concurrently enrolled in:
    - MATH116 - Calculus 1 for Engineering (0.50)
    - MATH117 - Calculus 1 for Engineering (0.50)
    - MATH127 - Calculus 1 for the Sciences (0.50)
    - MATH147 - Calculus 1 (Advanced Level) (0.50)

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

MATH 147 - Calculus 1 (Advanced Level)	View Courses
MATH 104 - Introductory Calculus for Arts and Social Science	View Courses
MATH 116 - Calculus 1 for Engineering	View Courses
MATH 117 - Calculus 1 for Engineering	View Courses
MATH 124 - Calculus and Vector Algebra for Kinesiology	View Courses
MATH 127 - Calculus 1 for the Sciences	View Courses
SYDE 111 - Calculus 1	View Courses

COREQUISITES

PHYS 121 - Mechanics	View Courses
PHYS 122 - Waves, Electricity and Magnetism	View Courses

COURSE LISTS

Degree Reqs: BMath - Bachelor of Mathematics Degree Requirements	View Programs

COURSE REQUIREMENTS (NO UNITS)

Applied Mathematics Minor - Applied Mathematics Minor	View Programs
JH-Mathematics - Mathematics (Joint Honours)	View Programs
H-Mathematical Studies - Mathematical Studies (Bachelor of Mathematics - Honours)	View Programs
Pure Mathematics Minor - Pure Mathematics Minor	View Programs
H-Mathematics/Chartered Professional Accountancy - Mathematics/Chartered Professional Accounta...	View Programs
H-Mathematical Economics (BA) - Mathematical Economics (Bachelor of Arts - Honours)	View Programs
3G-Mathematics - Mathematics (Bachelor of Mathematics, Three-Year General)	View Programs
H-Computer Science (BCS) - Computer Science (Bachelor of Computer Science - Honours)	View Programs
H-Computing & Financial Management - Computing and Financial Management (Bachelor of Computin...	View Programs
H-BBA & BCS Double Degree - Business Administration and Computer Science Double Degree (Bachelo...	View Programs
H-Data Science (BCS) - Data Science (Bachelor of Computer Science - Honours)	View Programs
H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours)	View Programs
JH-Computer Science (BCS) - Computer Science (Bachelor of Computer Science - Joint Honours)	View Programs

COURSE REQUIREMENTS (UNITS)

Combinatorics & Optimization Minor - Combinatorics and Optimization Minor	View Programs

PREREQUISITES

ACTSC 231 - Introductory Financial Mathematics	View Courses
PMATH 320 - Euclidean Geometry	View Courses
PMATH 321 - Non-Euclidean Geometry	View Courses
STAT 230 - Probability	View Courses
STAT 240 - Probability (Advanced Level)	View Courses
PHYS 225 - Modeling Biological Physics	View Courses
MATH 118 - Calculus 2 for Engineering	View Courses
MATH 119 - Calculus 2 for Engineering	View Courses
MATH 128 - Calculus 2 for the Sciences	View Courses
MATH 138 - Calculus 2 for Honours Mathematics	View Courses
BIOL 364 - Mathematical Modelling in Biology	View Courses
PHYS 175 - Introduction to the Universe	View Courses

Subject Code / Number
Calculus 2 for Honours Mathematics

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Description
- participants
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
6881

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

In Fall 2023 the a cross-faculty committee reviewed the topics covered in Math 137/138. For Math 138 the proposed changes are the removal of one lecture from improper integrals (namely absolute convergence and comparison) and one lecture from volumes of revolution. This will allow instructors time to include two lectures on Taylor polynomials and Big-O notation (previously covered in Math 137). This motion updates the course description to accurately reflect the topics to be taught in this course.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Subject Code
MATH

Number
138

Course Level
100

Title
Calculus 2 for Honours Mathematics

Abbreviated Title
Calculus 2 (Honours)

Proposed

Description
Introduction to the Riemann integral and approximations. Antiderivatives and the fundamental theorem of calculus. Change of variables, methods of integration. Applications of the integral. Improper integrals. Linear and separable differential equations and applications. Tests for convergence for series. Taylor polynomials and Taylor's Theorem, Big-O notation. Binomial series, functions defined as power series and Taylor series. Suitable topics are illustrated using computer software.

Existing

Description
Introduction to the Riemann integral and approximations. Antiderivatives and the fundamental theorem of calculus. Change of variables, methods of integration. Applications of the integral. Improper integrals. Linear and separable differential equations and applications. Tests for convergence for series. Binomial series, functions defined as power series and Taylor series. Vector (parametric) curves in R2. Suitable topics are illustrated using computer software.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
LectureTest SlotTutorial

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Complete 1 of the following
  - Must have completed the following:
    - MATH147 - Calculus 1 (Advanced Level) (0.50)
  - Earned a minimum grade of 70% in at least 1 of the following:
    - MATH116 - Calculus 1 for Engineering (0.50)
    - MATH117 - Calculus 1 for Engineering (0.50)
    - MATH127 - Calculus 1 for the Sciences (0.50)
  - Earned a minimum grade of 60% in each of the following:
    - MATH137 - Calculus 1 for Honours Mathematics (0.50)

Corequisites
No Rules

Antirequisites

- Not completed nor concurrently enrolled in:
    - MATH118 - Calculus 2 for Engineering (0.50)
    - MATH119 - Calculus 2 for Engineering (0.50)
    - MATH128 - Calculus 2 for the Sciences (0.50)
    - MATH148 - Calculus 2 (Advanced Level) (0.50)

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- MATH 148 - Calculus 2 (Advanced Level) — View Courses
- MATH 118 - Calculus 2 for Engineering — View Courses
- MATH 119 - Calculus 2 for Engineering — View Courses
- MATH 128 - Calculus 2 for the Sciences — View Courses
- SYDE 112 - Calculus 2 — View Courses

COREQUISITES

- PHYS 225 - Modeling Biological Physics — View Courses
- MATH 235 - Linear Algebra 2 for Honours Mathematics — View Courses

COURSE LISTS

- Degree Reqs: BMath - Bachelor of Mathematics Degree Requirements — View Programs

COURSE REQUIREMENTS (NO UNITS)

- Applied Mathematics Minor - Applied Mathematics Minor — View Programs
- JH-Mathematics - Mathematics (Joint Honours) — View Programs
- H-Mathematical Studies - Mathematical Studies (Bachelor of Mathematics - Honours) — View Programs
- Pure Mathematics Minor - Pure Mathematics Minor — View Programs
- H-Mathematics/Chartered Professional Accountancy - Mathematics/Chartered Professional Accounta... — View Programs
- H-Mathematical Economics (BA) - Mathematical Economics (Bachelor of Arts - Honours) — View Programs
- 3G-Mathematics - Mathematics (Bachelor of Mathematics, Three-Year General) — View Programs
- H-Computer Science (BCS) - Computer Science (Bachelor of Computer Science - Honours) — View Programs
- H-Computing & Financial Management - Computing and Financial Management (Bachelor of Computin... — View Programs
- H-BBA & BCS Double Degree - Business Administration and Computer Science Double Degree (Bachelo... — View Programs
- H-Data Science (BCS) - Data Science (Bachelor of Computer Science - Honours) — View Programs
- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours) — View Programs
- JH-Computer Science (BCS) - Computer Science (Bachelor of Computer Science - Joint Honours) — View Programs

PREREQUISITES

- AMATH 343 - Discrete Models in Applied Mathematics — View Courses
- MATH 213 - Signals, Systems, and Differential Equations — View Courses
- ECON 290 - Models of Choice in Competitive Markets — View Courses
- AMATH 362 - Mathematics of Climate Change — View Courses
- AMATH 251 - Introduction to Differential Equations (Advanced Level) — View Courses
- AMATH 250 - Introduction to Differential Equations — View Courses
- AMATH 271 - Introduction to Theoretical Mechanics — View Courses
- CS 370 - Numerical Computation — View Courses
- PHYS 396 - Biophysics of Imaging — View Courses
- PMATH 370 - Chaos and Fractals — View Courses
- STAT 230 - Probability — View Courses
- STAT 231 - Statistics — View Courses
- STAT 240 - Probability (Advanced Level) — View Courses
- STAT 241 - Statistics (Advanced Level) — View Courses
- BIOL 382 - Computational Modelling of Cellular Systems — View Courses
- AMATH 390 - Mathematics and Music — View Courses
- CO 380 - Mathematical Discovery and Invention — View Courses
- CO 480 - History of Mathematics — View Courses
- CHEM 240 - Mathematical Methods for Chemistry — View Courses
- CHEM 254 - Introductory Chemical Thermodynamics — View Courses
- CO 367 - Nonlinear Optimization — View Courses
- ECE 404 - Geometrical and Physical Optics — View Courses
- MATH 207 - Calculus 3 (Non-Specialist Level) — View Courses
- MATH 228 - Differential Equations for Physics and Chemistry — View Courses
- PHYS 233 - Introduction to Quantum Mechanics — View Courses
- PHYS 242 - Electricity and Magnetism 1 — View Courses

PHYS 256 - Geometrical and Physical Optics	View Courses
PHYS 263 - Classical Mechanics and Special Relativity	View Courses
PHYS 383 - Medical Physics	View Courses
STAT 220 - Probability (Non-Specialist Level)	View Courses
STAT 221 - Statistics (Non-Specialist Level)	View Courses
PMATH 333 - Introduction to Real Analysis	View Courses
PHYS 234 - Quantum Physics 1	View Courses
MATH 218 - Differential Equations for Engineers	View Courses
MATH 227 - Calculus 3 for Honours Physics	View Courses
MATH 237 - Calculus 3 for Honours Mathematics	View Courses
AMATH 382 - Computational Modelling of Cellular Systems	View Courses

Subject Code / Number
Introduction to Real Analysis

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Description
- participants
- Effective Term and Year
- Admin Notes

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2024

Quest Course ID
15092

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

The current course description is a bit long and disorganized. The new course description is more efficient. Taylor's theorem and term-by-term differentiation and integration are covered by some, but not all, instructors, and have been removed from the course description.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Pure Mathematics

Subject Code
PMATH

Number
333

Course Level
300

Title
Introduction to Real Analysis

Abbreviated Title
Intro Real Analysis

Proposed

Description

This course is designed to enable students who did not take the MATH147/MATH148/MATH247 sequence of advanced calculus courses to fill in the missing gaps from analysis needed to prepare them for studying further topics in analysis in PMATH351/PMATH352. Topics discussed include: completeness of the real numbers, supremum and infimum, sequences and the Bolzano-Weierstrass theorem; the topology of Euclidean space: open, closed, connected, and compact sets, the intermediate value theorem, the Heine-Borel theorem, and the extreme value theorem; continuity and uniform continuity, sequences of functions and uniform convergence; the Riemann integral over rectangles and the integrability of continuous functions.

Existing

Description

The purpose of the course is to present the familiar concepts of calculus at a rigorous level and to provide students who took the MATH137/MATH138/MATH237 sequence with the background needed to be successful in PMATH351 and PMATH352. Topics discussed include the completeness properties of the reals; the density of the rationals; the topology of real n-dimensional space: open and closed sets, connectedness, compactness (by open covers), the Heine-Borel theorem, completeness; sequences in real n-dimensional space: convergence, Cauchy sequences, subsequences, the Bolzano-Weierstrass theorem; multivariable functions: limits, point-wise and uniform continuity, the extreme value theorem, uniform convergence of sequences of functions, Taylor's theorem, term-by-term differentiation of power series; integration in real n-dimensional space: Riemann integrability, Fubini's theorem for continuous functions on rectangles, term-by-term integration of power series.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
Lecture

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Complete 1 of the following
  - Earned a minimum grade of 70% in each of the following:
    - MATH128 - Calculus 2 for the Sciences (0.50)
  - Earned a minimum grade of 60% in each of the following:
    - MATH138 - Calculus 2 for Honours Mathematics (0.50)
  - Must have completed the following:
    - MATH148 - Calculus 2 (Advanced Level) (0.50)

Corequisites

- Complete all of the following
  - Completed or concurrently enrolled in:
    - MATH237 - Calculus 3 for Honours Mathematics (0.50)
  - Completed or concurrently enrolled in at least 1 of the following:
    - MATH235 - Linear Algebra 2 for Honours Mathematics (0.50)
    - MATH245 - Linear Algebra 2 (Advanced Level) (0.50)

Antirequisites

- Not completed nor concurrently enrolled in:
  - MATH247 - Calculus 3 (Advanced Level) (0.50)
  - PMATH351 - Real Analysis (0.50)

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- AMATH 331 - Applied Real Analysis — View Courses
- PMATH 331 - Applied Real Analysis — View Courses

COURSE REQUIREMENTS (NO UNITS)

- H-Mathematical Finance - Mathematical Finance (Bachelor of Mathematics - Honours) — View Programs
- JH-Pure Mathematics - Pure Mathematics (Joint Honours) — View Programs
- H-Combinatorics & Optimization - Combinatorics and Optimization (Bachelor of Mathematics - Honours) — View Programs
- H-Mathematics/Teaching - Mathematics/Teaching (Bachelor of Mathematics - Honours) — View Programs
- H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours) — View Programs
- H-Mathematical Economics (BMath) - Mathematical Economics (Bachelor of Mathematics - Honours) — View Programs
- JH-Combinatorics & Optimization - Combinatorics and Optimization (Joint Honours) — View Programs

PREREQUISITES

- PMATH 351 - Real Analysis — View Courses
- CO 463 - Convex Optimization and Analysis — View Courses
- CO 471 - Semidefinite Optimization — View Courses
- PMATH 343 - Introduction to the Mathematics of Quantum Information — View Courses
- PMATH 352 - Complex Analysis — View Courses

SPECIALIZATIONS

- H-Math/FARM - Professional Risk Management Spec - Mathematics/Financial Analysis and Risk Mana... — View Programs

Subject Code / Number
Real Analysis

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Effective Term and Year
- Description

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2023

Quest Course ID
7669

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

The proposed course description better reflects the material that is actually being covered in the course. All instructors discuss countable and uncountable sets, the Banach fixed-point theorem and the Baire category theorem (and each of these topics is important and deserves mention), while some instructors do not prove existence theorems of differential equations.

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Pure Mathematics

Subject Code
PMATH

Number
351

Course Level
300

Title
Real Analysis

Abbreviated Title
Real Analysis

Proposed
Description
Cardinality, countable and uncountable sets, normed spaces and metric spaces, open sets, continuous mappings, finite-dimensional normed spaces, sequence and function spaces, completeness, contraction mappings and the Banach fixed-point theorem, the Baire category theorem, compactness of metric spaces, the Arzela-Ascoli theorem, and the Stone-Weierstrass theorem.

Existing
Description
Normed and metric spaces, open sets, continuous mappings, sequence and function spaces, completeness, contraction mappings, compactness of metric spaces, finite-dimensional normed spaces, Arzela-Ascoli theorem, existence of solutions of differential equations, Stone-Weierstrass theorem.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
Lecture

Primary Component
Lecture

Grading Information

Standard Course Grading
Yes

Cross-Listing Information

Is this course cross-listed?
No

Repeatable Courses

Can this course be repeated for credit?
No

Enrolment Rules

Consent to Add
No consent required

Consent to Drop
No consent required

Prerequisites

- Must have completed at least 1 of the following:
  - MATH247 - Calculus 3 (Advanced Level) (0.50)
  - PMATH333 - Introduction to Real Analysis (0.50)

Corequisites
No Rules

Antirequisites
No Rules

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- AMATH 331 - Applied Real Analysis — View Courses
- PMATH 331 - Applied Real Analysis — View Courses
- PMATH 333 - Introduction to Real Analysis — View Courses

COREQUISITES

- PMATH 367 - Topology — View Courses

COURSE REQUIREMENTS (NO UNITS)

- H-Mathematical Finance - Mathematical Finance (Bachelor of Mathematics - Honours) — View Programs
- JH-Pure Mathematics - Pure Mathematics (Joint Honours) — View Programs
- H-Pure Mathematics - Pure Mathematics (Bachelor of Mathematics - Honours) — View Programs
- H-Combinatorics & Optimization - Combinatorics and Optimization (Bachelor of Mathematics - Honours) — View Programs
- H-Mathematics/Teaching - Mathematics/Teaching (Bachelor of Mathematics - Honours) — View Programs
- H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours) — View Programs
- H-Mathematical Economics (BMath) - Mathematical Economics (Bachelor of Mathematics - Honours) — View Programs
- JH-Combinatorics & Optimization - Combinatorics and Optimization (Joint Honours) — View Programs

PREREQUISITES

- PMATH 467 - Algebraic Topology — View Courses
- PMATH 450 - Lebesgue Integration and Fourier Analysis — View Courses
- CO 463 - Convex Optimization and Analysis — View Courses
- CO 471 - Semidefinite Optimization — View Courses
- PMATH 343 - Introduction to the Mathematics of Quantum Information — View Courses
- PMATH 352 - Complex Analysis — View Courses

SPECIALIZATIONS

- H-Math/FARM - Professional Risk Management Spec - Mathematics/Financial Analysis and Risk Mana... — View Programs

Subject Code / Number
Algebraic Topology

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Effective Term and Year
- Description
- Prerequisites
- participants

Effective Date & Career

Career ?
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2023

Quest Course ID
7704

Offering Number
1

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Rationale for Change

We recently introduced the new course PMATH 367 Topology. The material in PMATH 367 overlaps with the material in the old version of PMATH 467. In the proposed new calendar description for PMATH 467, the duplicated material has been removed and some additional material has been added. Note that PMATH 367 will become the new prerequisite for PMATH 467 (the old pre-requisites will not be needed as PMATH 347 is a pre-requisite, and PMATH 351 is a co-requisite, for PMATH 367).

Consultations

Supporting Documentation

Course Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Pure Mathematics

Subject Code
PMATH

Number
467

Course Level
400

Title
Algebraic Topology

Abbreviated Title
Algebraic Topology

Proposed

Description

We study algebraic structures which can be associated to topological spaces, and which are invariant under homotopy equivalence. Such topological invariants include homotopy groups, homology groups, and cohomology groups or rings. Possible applications include the classification of Platonic solids, the Brouwer and Lefschetz fixed-point theorems, the hairy ball theorem, the Borsuk-Ulam theorem, and the ham sandwich theorem.

Existing

Description

Topological spaces and topological manifolds; quotient spaces; cut and paste constructions; classification of two-dimensional manifolds; fundamental group; homology groups. Additional topics may include: covering spaces; homotopy theory; selected applications to knots and combinatorial group theory.

Units
0.50

Undergraduate Communication Requirement Identifier
No

Components
Lecture

Primary Component
Lecture

Grading Information

Standard Course Grading

Yes

Cross-Listing Information

Is this course cross-listed?

No

Repeatable Courses

Can this course be repeated for credit?

No

Enrolment Rules

Consent to Add

No consent required

Consent to Drop

No consent required

Prerequisites

- Must have completed the following:
  - ~~PMATH347 - Groups and Rings~~ ~~(0.50)~~
  - ~~PMATH351 - Real Analysis~~ ~~(0.50)~~
  - **PMATH367 - Topology (0.50)**

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Fee Statement

Notes

Workflow Information

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Dependencies

Dependent Courses and Programs/Plans
There are no dependencies

H-Computational Mathematics
Computational Mathematics (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Requirements (no units)
- Effective Term and Year

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Quality Assurance Designation
Minor Modification

Academic Unit Approval

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
Effective, 1 September 2025, add the newly created ACTSC 447 Numerical Computation for Financial Modeling to the plan requirements as a cross-listed course with CS 476 of the same title.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Field of Study
Computational Mathematics

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Computational Mathematics (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma

Admissions

Admissions Entry Point
Declare Plan

Declaration Requirements

Requirements Information

Invalid Combinations

Yes

List of Invalid Combinations

H-Applied Mathematics with Scientific Computing
H-Data Science (BCS)H-Data Science (BMath)

Average Requirement

Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: all math courses.

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 13.0 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.

Co-operative Education Program Requirements

For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - CS230 - Introduction to Computers and Computer Systems (0.50)
    - CS234 - Data Types and Structures (0.50)
  - Complete 1 of the following:
    - AMATH242 - Introduction to Computational Mathematics (0.50)
    - CS371 - Introduction to Computational Mathematics (0.50)
  - Complete 1 of the following:
    - MATH237 - Calculus 3 for Honours Mathematics (0.50)
    - MATH247 - Calculus 3 (Advanced Level) (0.50)
  - Complete 1 of the following:
    - MATH239 - Introduction to Combinatorics (0.50)
    - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)
  - Complete 3 non-math courses, at least one of which is at the 200-, 300-, or 400-level, all from the same subject code, from the following choices: AE, BIOL, BME, CHE, CHEM, CIVE, EARTH, ECE, ECON, ENVE, GEOE, ME, MNS, MSE, MTE, NE, PHYS, SYDE
  - Complete the List 1 and List 2 requirements below
  - Complete 4 additional courses, taken from List 2 or List 3; choices must be in at least two different subject codes (AMATH, CO, CS, PMATH, STAT), and 2 courses must be at the 400-level

List 1

- Complete 2 of the following
  - Complete 1 of the following:
    - AMATH250 - Introduction to Differential Equations (0.50)
    - AMATH251 - Introduction to Differential Equations (Advanced Level) (0.50)
    - AMATH350 - Differential Equations for Business and Economics (0.50)
  - Complete 1 of the following:
    - CO250 - Introduction to Optimization (0.50)
    - CO255 - Introduction to Optimization (Advanced Level) (0.50)
  - Complete 1 of the following:
    - CS245 - Logic and Computation (0.50)
    - CS245E - Logic and Computation (Enriched) (0.50)
    - PMATH330 - Introduction to Mathematical Logic (0.50)
    - PMATH432 - Mathematical Logic (0.50)
  - Complete 1 of the following:
    - CS246 - Object-Oriented Software Development (0.50)
    - CS246E - Object-Oriented Software Development (Enriched) (0.50)

List 2

- Complete all of the following
  - Complete 2 courses from the following choices:

- Choose any of the following:
    - AMATH342 - Computational Methods for Differential Equations (0.50)
    - CS475 - Computational Linear Algebra (0.50)
    - PMATH370 - Chaos and Fractals (0.50)
- Complete no more than 1 from the following:
    - CO353 - Computational Discrete Optimization (0.50)
    - CO367 - Nonlinear Optimization (0.50)
- Complete no more than 1 from the following:
    - STAT340 - Stochastic Simulation Methods (0.50)
    - STAT341 - Computational Statistics and Data Analysis (0.50)

List 3

- Choose any of the following:
    - AMATH343 - Discrete Models in Applied Mathematics (0.50)
    - AMATH382 - Computational Modelling of Cellular Systems (0.50)
    - AMATH383 - Introduction to Mathematical Biology (0.50)
    - AMATH391 - From Fourier to Wavelets (0.50)
    - AMATH442 - Computational Methods for Partial Differential Equations (0.50)
    - AMATH455 - Control Theory (0.50)
    - AMATH477 - Stochastic Processes for Applied Mathematics (0.50)
    - BIOL382 - Computational Modelling of Cellular Systems (0.50)
    - CO351 - Network Flow Theory (0.50)
    - CO370 - Deterministic OR Models (0.50)
    - CO372 - Portfolio Optimization Models (0.50)
    - CO450 - Combinatorial Optimization (0.50)
    - CO452 - Integer Programming (0.50)
    - CO454 - Scheduling (0.50)
    - CO456 - Introduction to Game Theory (0.50)
    - CO463 - Convex Optimization and Analysis (0.50)
    - CO466 - Continuous Optimization (0.50)
    - CO471 - Semidefinite Optimization (0.50)
    - CO485 - The Mathematics of Public-Key Cryptography (0.50)
    - CO487 - Applied Cryptography (0.50)
    - CS341 - Algorithms (0.50)
    - CS431 - Data-Intensive Distributed Analytics (0.50)
    - CS451 - Data-Intensive Distributed Computing (0.50)
    - CS466 - Algorithm Design and Analysis (0.50)
    - CS476 - Numeric Computation for Financial Modeling (0.50)
    - CS479 - Neural Networks (0.50)
    - CS480 - Introduction to Machine Learning (0.50)
    - CS482 - Computational Techniques in Biological Sequence Analysis (0.50)
    - CS485 - Statistical and Computational Foundations of Machine Learning (0.50)
    - CS487 - Introduction to Symbolic Computation (0.50)
    - STAT440 - Computational Inference (0.50)
    - STAT441 - Statistical Learning - Classification (0.50)
    - STAT442 - Data Visualization (0.50)
    - STAT444 - Statistical Learning - Advanced Regression (0.50)
    - **ACTSC447 - Numerical Computation for Financial Modelling (0.50)**

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students who take CO255 may take CO450 or CO466 instead of CO353 or CO367.
2. For the non-math course requirement, other course concentrations may be eligible subject to approval by a Computational Mathematics academic advisor
3. In List 1, the two courses must be in different subject codes.
4. In List 3, only one of CS431 or CS451 may be taken.
5. In List 3, BIOL382 counts as an AMATH course for the purpose of the "at least two different subject codes" requirement.
6. Students currently or previously enrolled in Computer Science may substitute:
    1. CS240 or CS240E for CS234.
    2. CS241 or C241E for CS230.
7. Students may only complete one course from any cross-listed set.

Notes

Specializations

Specializations for this Major
No

Workflow Information

Change to Undergraduate Communication Requirement
No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

There are no dependencies

ACTSC-Finance Specialization
Finance Specialization

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Requirements (no units)
- Invalid Combinations
- Effective Term and Year
- Admin Notes
- List of Invalid Combinations

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Quality Assurance Designation
Minor Modification

Academic Unit Approval

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
Yes

Invalid Combinations Consultations
Actuarial Science and Pure Mathematics have agreed that (Mathematical Finance) and (Actuarial Science – Finance Specialization) have sufficient overlap to be declared an invalid combination.

Rationale and Background for Change(s)
Effective, 1 September 2025, create a new “one of” list in the finance specialization under the ACTSC major plan to reflect the fact that ACTSC 447 and CS 476 are cross-listed courses. With the addition of ACTSC 447 as a cross-listed course to the existing CS 476, the finance specialization under the ACTSC major needs to be updated to reflect that the plan requirements can be met by either completing ACTSC 447 or CS 476.

Add (Mathematical Finance) and (Actuarial Science – Finance Specialization) to the list of invalid credential combinations. In the current calendar, the Mathematical Finance major can be combined with another Actuarial Science and/or Pure Mathematics academic plan so an undergraduate student can graduate with both on their diploma. This is generally fine except in one particular case: the overlap between Mathematical Finance and the Actuarial Science – Finance Specialization is too great to warrant the additional Specialization credential (in selecting courses to complete the double major, the specialization can be completed with zero additional courses). Hence, students will continue to be able to graduate with a Mathematical finance major together with an Actuarial Science major, but not to add the finance specialization to it.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Field of Study
Actuarial Science

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Specialization

Program/Plan Name
Finance Specialization

Admissions

Specialization is available for students in the following majors

- H-Actuarial Science

Admissions Entry Point
Declare Plan

Declaration Requirements

Requirements Information

Proposed
Invalid Combinations
Yes

Proposed
List of Invalid Combinations
H-Mathematical Finance

Existing
Invalid Combinations
No

Existing
List of Invalid Combinations

Average Requirement
No

Graduation Requirements

- Complete a total 3.0 units.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - ACTSC445 - Quantitative Enterprise Risk Management (0.50)
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - ~~CS476 - Numeric Computation for Financial Modeling (0.50)~~
    - STAT340 - Stochastic Simulation Methods (0.50)
  - Complete 1 of the following:
    - ACTSC423 - Topics in Financial Econometrics (0.50)
    - ACTSC471 - Corporate Financial Decision Making (0.50)
    - AFM423 - Topics in Financial Econometrics (0.50)
    - AFM424 - Equity Investments (0.50)
    - AFM476 - Corporate Financial Decision Making (0.50)
  - **Complete 1 of the following:**
    - **ACTSC447 - Numerical Computation for Financial Modelling (0.50)**
    - **CS476 - Numeric Computation for Financial Modeling (0.50)**
  - Complete 1 of the following:
    - AMATH242 - Introduction to Computational Mathematics (0.50)
    - CS370 - Numerical Computation (0.50)
    - CS371 - Introduction to Computational Mathematics (0.50)

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students currently or previously enrolled in the Business Administration and Mathematics double degree academic plan may substitute:
   1. BUS247W for AFM102.
   2. BUS473W for AFM424.

Notes

Workflow Information

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

SPECIALIZATIONS LIST

H-Actuarial Science - Actuarial Science (Bachelor of Mathematics - Honours) View Programs

H-Math/FARM - Chartered Financial Analyst Spec Mathematics/Financial Analysis and Risk Management - Chartered Financial Analyst Specialization (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress
SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Requirements (no units)
- participants
- Specializations
- Effective Term and Year
- Admin Notes

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Academic Unit Approval

Quality Assurance Designation
Minor Modification

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
• Remove COMM 231 Commercial and Business Law for the FARM plan and move AFM 231/LS 283 Business Law into the "All of" list. The deactivation of COMM 231 requires an update to the degree requirements of the FARM plan. Change has been discussed and approved by SAF.

• Move the STAT 334 or (STAT 330 and STAT 333) requirement from the "All of" list into a new "complete one of the following" list that provides two paths depending on if students take STAT 334 or those that take the path of STAT 330 and STAT 333. This reorganization clarifies the number of 300/400 math courses remaining depending on the student's choice.

• Move the MATBUS 471 and CO 372 requirements listed under both specializations (CFA and PRM) to the core FARM plan requirements and therefore simplify the electives for each specialization. As CFA and PRM have a different number of remaining courses to achieve the minimum 40, so for the sake of clarity we have explicitly written them in the calendar. CFA student require an addition 2 (1.0 units) to complete their degree.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Field of Study
Mathematics/Financial Analysis and Risk Management

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name

Mathematics/Financial Analysis and Risk Management - Chartered Financial Analyst Specialization (Bachelor of Mathematics - Honours)

Systems of Study

Co-operative
Regular

Online Degree/Diploma

This major is also available to study online (asynchronous)

Admissions

Admissions Entry Point

Declare Plan

Declaration Requirements

This major is a restricted-enrolment academic plan. Most of the students enrolled in this academic plan are admitted at the Year One level directly into the Mathematics/Financial Analysis and Risk Management admission category. In 3A, students must select the specific specialization of their choice.

Requirements Information

Invalid Combinations

Yes

List of Invalid Combinations

H-BBA & BMath Double DegreeCS-Business Specialization
H-Data Science (BCS)H-Data Science (BMath)
H-Information Technology Management
H-Mathematics/Business Administration
H-Mathematics/Chartered Professional Accountancy
SE-Business Specialization

Average Requirement

Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: all math courses.
- A minimum cumulative special major average of 70.0%: all ACTSC, AFM, BUS, COMM, ECON, and MATBUS courses (including courses cross-listed with these subject codes).

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 11.5 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.
- Complete four academic milestones related to trading activities: Students receive $1,000,000 CAD in a virtual brokerage account and they use this cash during their study to manage a portfolio which includes stocks, bonds, options, futures, currencies, and other securities from over 55 exchanges in over 30 countries. Students will be required to trade various securities, engage in various trading strategies, and portfolio allocation strategies. Each milestone comes with explicit deliverables that students must submit electronically and meet to receive credit. Specified dates and deliverables for the four academic milestones will be communicated to students separately.

Co-operative Education Program Requirements

- For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.
- Online students must consult with the program director (or their designate) in their first study term to establish their co-op sequence and related processes. Additionally, non-Canadian co-op students studying via the online mode of delivery may be further restricted in the geographic locations in which they are able to secure employment than students studying on campus. All co-op students have a responsibility to ensure they are limiting their co-op job searches to geographic locations where they are legally eligible to work.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - ACTSC231 - Introductory Financial Mathematics (0.50)
    - ACTSC372 - Investment Science and Corporate Finance (0.50)
    - AFM101 - Introduction to Financial Accounting (0.50)
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - AFM131 - Introduction to Business in North America (0.50)
    - AMATH350 - Differential Equations for Business and Economics (0.50)
    - **CO372 - Portfolio Optimization Models (0.50)**
    - COMM101 - Introduction to Financial Markets (0.50)
    - CS330 - Management Information Systems (0.50)
    - ECON101 - Introduction to Microeconomics (0.50)
    - ECON102 - Introduction to Macroeconomics (0.50)
    - **MATBUS471 - Fixed Income Securities (0.50)**
    - STAT371 - Applied Linear Models and Process Improvement for Business (0.50)
  - Complete 1 of the following:
    - ACTSC446 - Mathematics of Financial Markets (0.50)
    - MATBUS470 - Derivatives (0.50)
  - Complete 1 of the following:
    - AFM231 - Business Law (0.50)
    - ~~COMM231 - Commercial and Business Law for Mathematics Students (0.50)~~
    - LS283 - Business Law (0.50)
  - Complete 1 of the following:
    - CO250 - Introduction to Optimization (0.50)
    - CO255 - Introduction to Optimization (Advanced Level) (0.50)
  - Complete 1 of the following:
    - CS335 - Computational Methods in Business and Finance (0.50)
    - CS476 - Numeric Computation for Financial Modeling (0.50)
  - Complete 1 of the following:
    - MATH237 - Calculus 3 for Honours Mathematics (0.50)
    - MATH247 - Calculus 3 (Advanced Level) (0.50)
  - Complete 1 of the following
    - ~~Complete all the following:~~
      - ~~STAT334 - Probability Models for Business and Accounting (0.50)~~
    - ~~Complete all the following:~~
      - ~~STAT330 - Mathematical Statistics (0.50)~~
      - ~~STAT333 - Stochastic Processes 1 (0.50)~~
    - **Complete all of the following**
      - **Complete all the following:**
        - **STAT330 - Mathematical Statistics (0.50)**
        - **STAT333 - Stochastic Processes 1 (0.50)**

        - **Complete 1 additional math courses (0.5 unit) at the 300- or 400-level from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT**

    - **Complete all of the following**
        - **Complete all the following:**
            - **STAT334 - Probability Models for Business and Accounting (0.50)**
        - **Complete 2 additional math courses (1.0 unit) at the 300- or 400-level from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT**
- ~~Complete 2 additional math courses (1.0 unit) at the 300- or 400-level from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT~~

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.

Notes

- Students must obtain the approval of the program director (or their designate) for changes to mode of delivery.

Specializations

Specializations for this Major
Yes - Required (built on this record)

Specializations

Required Courses

- Complete all of the following
  - Complete all the following:
    - ~~CO372 - Portfolio Optimization Models~~ ~~(0.50)~~
    - COMM321 - Intermediate Accounting for Finance (0.50)
    - COMM421 - Financial Statement Analysis (0.50)
    - COMM433 - Income Tax for Finance Students (0.50)
    - ~~MATBUS471 - Fixed Income Securities~~ ~~(0.50)~~
  - Complete 1 of the following:
    - ARBUS302 - Principles of Marketing (0.50)
    - MGMT244 - Principles of Marketing (0.50)
  - Complete 1 of the following:
    - ECON206 - Money and Banking 1 (0.50)
    - ECON207 - Economic Growth and Development 1 (0.50)
    - ECON290 - Models of Choice in Competitive Markets (0.50)
  - Complete 1 of the following:
    - HRM200 - Basic Human Resources Management (0.50)
    - MSE211 - Organizational Behaviour (0.50)
    - PSYCH238 - Organizational Psychology (0.50)
  - **Complete 1.0 unit of additional courses**

Workflow Information

Change to Undergraduate Communication Requirement

No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

PREREQUISITES

COMM 321 - Intermediate Accounting for Finance	View Courses
COMM 421 - Financial Statement Analysis	View Courses
MATBUS 472 - Risk Management	View Courses
MATBUS 471 - Fixed Income Securities	View Courses
ECON 290 - Models of Choice in Competitive Markets	View Courses
AFM 476 - Corporate Financial Decision Making	View Courses
ACTSC 471 - Corporate Financial Decision Making	View Courses
ACTSC 445 - Quantitative Enterprise Risk Management	View Courses
ACTSC 446 - Mathematics of Financial Markets	View Courses
STAT 371 - Applied Linear Models and Process Improvement for Business	View Courses
STAT 372 - Survey Sampling and Experimental Design Techniques for Business	View Courses

H-Math/FARM - Professional Risk Management Spec Mathematics/Financial Analysis and Risk Management - Professional Risk Management Specialization (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress
SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Requirements (no units)
- participants
- Specializations
- Effective Term and Year
- Admin Notes

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Academic Unit Approval

Quality Assurance Designation
Minor Modification

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
• Remove COMM 231 Commercial and Business Law for the FARM plan and move AFM 231/LS 283 Business Law into the "All of" list. The deactivation of COMM 231 requires an update to the degree requirements of the FARM plan. Change has been discussed and approved by SAF.

• Move the STAT 334 or (STAT 330 and STAT 333) requirement from the "All of" list into a new "complete one of the following" list that provides two paths depending on if students take STAT 334 or those that take the path of STAT 330 and STAT 333. This reorganization clarifies the number of 300/400 math courses remaining depending on the student's choice.

• Move the MATBUS 471 and CO 372 requirements listed under both specializations (CFA and PRM) to the core FARM plan requirements and therefore simplify the electives for each specialization. Originally the two additional non-math courses requirement in PRM was to achieve the minimum 10 non-math courses for a 4-year degree. As some of the required courses have changed over the years, this requirement has not been updated to reflect the appropriate counts. PRM achieves 10 non-math through the 2 communications courses, 7 core business courses (AFM, ECON, COMM) and one additional course from BUS, COMM, ECON, HRM or MSCI requirements. These leaves students needing an addition three courses (1.5 units) to complete their degree. As CFA and PRM have a different number of remaining courses to achieve the minimum 40, so for the sake of clarity we have explicitly written them in the calendar.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Field of Study
Mathematics/Financial Analysis and Risk Management

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Mathematics/Financial Analysis and Risk Management - Professional Risk Management Specialization (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma
This major is also available to study online (asynchronous)

Admissions

Admissions Entry Point
Declare Plan

Declaration Requirements
This major is a restricted-enrolment academic plan. Most of the students enrolled in this academic plan are admitted at the Year One level directly into the Mathematics/Financial Analysis and Risk Management admission category. In 3A, students must select the specific specialization of their choice.

Requirements Information

Invalid Combinations
Yes

List of Invalid Combinations
H-BBA & BMath Double DegreeCS-Business Specialization
H-Data Science (BCS)H-Data Science (BMath)
H-Information Technology Management
H-Mathematics/Business Administration
H-Mathematics/Chartered Professional Accountancy
SE-Business Specialization

Average Requirement
Yes

Minimum Average(s) Required
- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: all math courses.
- A minimum cumulative special major average of 70.0%: all ACTSC, AFM, BUS, COMM, ECON, and MATBUS courses (including courses cross-listed with these subject codes).

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 13.5 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.
- Complete four academic milestones related to trading activities: Students receive $1,000,000 CAD in a virtual brokerage account and they use this cash during their study to manage a portfolio which includes stocks, bonds, options, futures, currencies, and other securities from over 55 exchanges in over 30 countries. Students will be required to trade various securities, engage in various trading strategies, and portfolio allocation strategies. Each milestone comes with explicit deliverables that students must submit electronically and meet to receive credit. Specified dates and deliverables for the four academic milestones will be communicated to students separately.

Co-operative Education Program Requirements

- For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.
- Online students must consult with the program director (or their designate) in their first study term to establish their co-op sequence and related processes. Additionally, non-Canadian co-op students studying via the online mode of delivery may be further restricted in the geographic locations in which they are able to secure employment than students studying on campus. All co-op students have a responsibility to ensure they are limiting their co-op job searches to geographic locations where they are legally eligible to work.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - ACTSC231 - Introductory Financial Mathematics (0.50)
    - ACTSC372 - Investment Science and Corporate Finance (0.50)
    - AFM101 - Introduction to Financial Accounting (0.50)
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - AFM131 - Introduction to Business in North America (0.50)
    - AMATH350 - Differential Equations for Business and Economics (0.50)
    - **CO372 - Portfolio Optimization Models (0.50)**
    - COMM101 - Introduction to Financial Markets (0.50)
    - CS330 - Management Information Systems (0.50)
    - ECON101 - Introduction to Microeconomics (0.50)
    - ECON102 - Introduction to Macroeconomics (0.50)
    - **MATBUS371 - Introduction to Corporate Finance (0.50)**
    - STAT371 - Applied Linear Models and Process Improvement for Business (0.50)
  - Complete 1 of the following:
    - ACTSC446 - Mathematics of Financial Markets (0.50)
    - MATBUS470 - Derivatives (0.50)
  - Complete 1 of the following:
    - AFM231 - Business Law (0.50)
    - ~~COMM231 - Commercial and Business Law for Mathematics Students (0.50)~~
    - LS283 - Business Law (0.50)
  - Complete 1 of the following:
    - CO250 - Introduction to Optimization (0.50)
    - CO255 - Introduction to Optimization (Advanced Level) (0.50)
  - Complete 1 of the following:
    - CS335 - Computational Methods in Business and Finance (0.50)
    - CS476 - Numeric Computation for Financial Modeling (0.50)
  - Complete 1 of the following:
    - MATH237 - Calculus 3 for Honours Mathematics (0.50)
    - MATH247 - Calculus 3 (Advanced Level) (0.50)
  - Complete 1 of the following
    - ~~Complete all the following:~~
      - ~~STAT334 - Probability Models for Business and Accounting (0.50)~~
    - ~~Complete all the following:~~
      - ~~STAT330 - Mathematical Statistics (0.50)~~
      - ~~STAT333 - Stochastic Processes 1 (0.50)~~
    - **Complete all of the following**
      - **Complete all the following:**
        - **STAT330 - Mathematical Statistics (0.50)**
        - **STAT333 - Stochastic Processes 1 (0.50)**

        - **Complete 1 additional math course (0.5 unit) at the 300- or 400-level from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT**

    - **Complete all of the following**
        - **Complete all the following:**
            - **STAT334 - Probability Models for Business and Accounting (0.50)**
        - **Complete 2 additional math courses (1.0 unit) at the 300- or 400-level from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT**
- ~~Complete 2 additional math courses (1.0 unit) at the 300- or 400-level from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT~~

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.

Notes

- Students must obtain the approval of the program director (or their designate) for changes to mode of delivery.

Specializations

Specializations for this Major
Yes - Required (built on this record)

Specializations

Required Courses

- Complete all of the following
  - Complete all the following:
    - ~~CO372 - Portfolio Optimization Models~~ ~~(0.50)~~
    - CS338 - Computer Applications in Business: Databases (0.50)
    - ~~MATBUS471 - Fixed Income Securities~~ ~~(0.50)~~
  - Complete 1 of the following:
    - ACTSC445 - Quantitative Enterprise Risk Management (0.50)
    - MATBUS472 - Risk Management (0.50)
  - Complete 1 of the following:
    - AMATH331 - Applied Real Analysis (0.50)
    - PMATH331 - Applied Real Analysis (0.50)
    - PMATH333 - Introduction to Real Analysis (0.50)
    - PMATH351 - Real Analysis (0.50)
  - Complete 1 of the following:
    - STAT340 - Stochastic Simulation Methods (0.50)
    - STAT341 - Computational Statistics and Data Analysis (0.50)
  - Complete 0.5 additional unit from the following subject codes: BUS, COMM, ECON, HRM, MSE
  - Complete 1.~~0~~**5** ~~unit~~**units** of additional ~~non-math~~ courses

Workflow Information

Change to Undergraduate Communication Requirement
No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

PREREQUISITES

COMM 321 - Intermediate Accounting for Finance	View Courses
COMM 421 - Financial Statement Analysis	View Courses
MATBUS 472 - Risk Management	View Courses
MATBUS 471 - Fixed Income Securities	View Courses
ECON 290 - Models of Choice in Competitive Markets	View Courses
ACTSC 445 - Quantitative Enterprise Risk Management	View Courses
ACTSC 446 - Mathematics of Financial Markets	View Courses
STAT 371 - Applied Linear Models and Process Improvement for Business	View Courses
STAT 372 - Survey Sampling and Experimental Design Techniques for Business	View Courses

H-Mathematics/Chartered Professional Accountancy Mathematics/Chartered Professional Accountancy (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Effective Term and Year
- Co-operative Education Program Requirements
- Course Requirements (no units)

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2023

Proposal Details

Proposal Type
Change

Quality Assurance Designation
Minor Modification

Academic Unit Approval

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
Effective, 1 September 2025, remove COMM 231 Commercial and Business Law for the Mathematics/Chartered Professional Accountancy plan and add AFM 335 Business Law for Financial Managers to the “All of” list. The deactivation of COMM 231 requires an update to the degree requirements of the Math/CPA plan. Change has been discussed and approved by SAF.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Field of Study
Mathematics/Chartered Professional Accountancy

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Mathematics/Chartered Professional Accountancy (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative

Online Degree/Diploma

Admissions

Admissions Entry Point
Direct Entry

Admission Requirements: Minimum Requirements
Students normally apply for direct admission from high school into the first year of the Mathematics/Chartered Professional Accountancy academic plan. Upon successful completion of a provisional first year, students will formally proceed into the Mathematics/Chartered Professional Accountancy academic plan in second year. Successful completion of the provisional year requires all of the following:

- Successful completion of the following courses, within 12 months of admission into the provisional year:
  - AFM111, AFM182, AFM191;
  - COMM103/ECON100 or (one of ECON101, ECON102);
  - COMMST111;
  - One of CS115, CS135, CS145;
  - One of MATH135, MATH145;
  - One of MATH136, MATH146;
  - One of MATH127, MATH137, MATH147;
  - One of MATH128, MATH138, MATH148.
- A minimum cumulative average of 60% in all math courses taken to date.
- A minimum cumulative average of 70% in all AFM, COMM, and ECON courses taken to date.
- Be in Good or Excellent academic standing in the Faculty of Mathematics.

Mathematics/CPA is a restricted-enrolment academic plan, and admission into the academic plan for students not currently enrolled in the provisional year is not normally granted.

Requirements Information

Invalid Combinations
Yes

List of Invalid Combinations
H-BBA & BMath Double Degree
H-Information Technology ManagementH-Data Science (BCS)
H-Data Science (BMath)
H-Mathematics/Business Administration
H-Math/FARM - Chartered Financial Analyst Spec
H-Math/FARM - Professional Risk Management Spec

Average Requirement
Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: all math courses.
- A minimum cumulative special major average of 70.0%: all AFM, COMM, ECON, MSCI courses and any courses cross-listed with these subject codes.

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
    - Mathematical/Chartered Professional Accountancy students are exempt from taking the List A courses.
- Complete all the required courses listed below.
- Complete a minimum of 9.5 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.

Proposed

Co-operative Education Program Requirements

See Bachelor of Mathematics co-operative education program requirements. This academic plan involves four co-op work terms, the first of which occurs in the winter term immediately following the fall 2A academic term. Students are exempted from paying co-op fees for their 1A and 1B terms.

Existing

Co-operative Education Program Requirements

See Bachelor of Mathematics co-operative education program requirements. This academic plan involves four co-op work terms, the first of which occurs in the winter term immediately following the fall 2A academic term. Students are exempted from paying co-op fees for their 1A and 1B terms.

Course Requirements (units)

Required Courses

0

Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - AFM111 - Professional Pathways and Problem-Solving (0.50)
    - AFM182 - Foundations for Management Accounting (0.50)
    - AFM191 - Foundations for Financial Reporting (0.50)
    - AFM206 - Introduction to Tax (0.25)
    - AFM208 - Introduction to Assurance (0.25)
    - AFM212 - Financial Analysis and Planning (0.50)
    - AFM274 - Introduction to Corporate Finance (0.50)
    - AFM291 - Intermediate Financial Accounting 1 (0.50)
    - AFM311 - Connections to Ethical Context (0.50)
    - AFM321 - Personal Financial Planning and Taxation (0.50)
    - **AFM335 - Business Law for Financial Managers (0.50)**
    - AFM341 - Accounting Information Systems (0.50)
    - AFM362 - Corporate Taxation (0.50)
    - AFM373 - Cases and Applications in Corporate Finance (0.50)
    - AFM382 - Cost Management Systems (0.50)
    - AFM391 - Intermediate Financial Accounting 2 (0.50)
    - AFM433 - Business Strategy (0.50)
    - AFM451 - Audit Strategy (0.50)
    - AFM462 - Specialized Topics in Taxation (0.50)
    - AFM482 - Performance Measurement and Organization Control (0.50)
    - AFM491 - Advanced Financial Accounting (0.50)
    - COMMST111 - Leadership, Communication, and Collaboration (0.50)
  - Complete 1 of the following:
    - ACTSC127 - Introduction to Global Capital Markets and Financial Analytics (0.50)
    - AFM127 - Introduction to Global Capital Markets and Financial Analytics (0.50)
  - Complete 1 of the following:
    - ACTSC291 - Global Capital Markets and Financial Analytics (0.50)
    - AFM272 - Global Capital Markets and Financial Analytics (0.50)
  - Complete 1 of the following:
    - ACTSC423 - Topics in Financial Econometrics (0.50)
    - AFM423 - Topics in Financial Econometrics (0.50)
  - Complete 1 of the following:
    - AFM323 - Quantitative Foundations for Finance (0.50)
    - STAT371 - Applied Linear Models and Process Improvement for Business (0.50)
    - STAT374 - Quantitative Foundations for Finance (0.50)
  - ~~Complete 1 of the following:~~
    - ~~AFM335 - Business Law for Financial Managers (0.50)~~
    - ~~COMM231 - Commercial and Business Law for Mathematics Students (0.50)~~
  - Complete 1 of the following
    - Complete 1 of the following:
      - COMM103 - Principles of Economics (0.50)

        - ECON100 - Principles of Economics (0.50)
    - Complete all the following:
        - ECON101 - Introduction to Microeconomics (0.50)
        - ECON102 - Introduction to Macroeconomics (0.50)
- Complete 1 of the following:
    - CS115 - Introduction to Computer Science 1 (0.50)
    - CS135 - Designing Functional Programs (0.50)
    - CS145 - Designing Functional Programs (Advanced Level) (0.50)
- Complete 1 of the following:
    - CS116 - Introduction to Computer Science 2 (0.50)
    - CS136 - Elementary Algorithm Design and Data Abstraction (0.50)
    - CS146 - Elementary Algorithm Design and Data Abstraction (Advanced Level) (0.50)
- Complete all the following:
    - MATH127 - Calculus 1 for the Sciences (0.50)
    - MATH137 - Calculus 1 for Honours Mathematics (0.50)
    - MATH147 - Calculus 1 (Advanced Level) (0.50)
- Complete 1 of the following:
    - MATH128 - Calculus 2 for the Sciences (0.50)
    - MATH138 - Calculus 2 for Honours Mathematics (0.50)
    - MATH148 - Calculus 2 (Advanced Level) (0.50)
- Complete 1 of the following:
    - MATH135 - Algebra for Honours Mathematics (0.50)
    - MATH145 - Algebra (Advanced Level) (0.50)
- Complete 1 of the following:
    - MATH136 - Linear Algebra 1 for Honours Mathematics (0.50)
    - MATH146 - Linear Algebra 1 (Advanced Level) (0.50)
- Complete 1 of the following:
    - MATH237 - Calculus 3 for Honours Mathematics (0.50)
    - MATH247 - Calculus 3 (Advanced Level) (0.50)
- Complete 1 of the following:
    - STAT230 - Probability (0.50)
    - STAT240 - Probability (Advanced Level) (0.50)
- Complete 1 of the following:
    - STAT231 - Statistics (0.50)
    - STAT241 - Statistics (Advanced Level) (0.50)
- Complete 6 additional math courses from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.
2. AFM462, AFM482, and AFM491 may be substituted with an acceptable 300-/400-level AFM elective, with the understanding that any such substitution would forfeit Master of Accounting (MAcc) admission eligibility and will impact the path to a Chartered Professional Accountancy (CPA) designation pursued through CPA Ontario.
3. Students may not repeat an AFM course in which they have obtained a grade of 60% or higher. AFM courses completed with a grade in the range 50-59% may be repeated, but only once, and then only with approval from the School of Accounting and Finance.

Notes

Specializations

Specializations for this Major
Yes - Optional

Specialization Details
Students may choose to focus their elective choices by completing one of two available specializations.

Specializations List

- CPA-Data Analytics Specialization, or CPA-Finance Specialization

Workflow Information

Change to Undergraduate Communication Requirement
No

Workflow Path
Committee approvals

Faculty/AFIW Path(s) for Workflow
Faculty of Mathematics

Senate Workflow
--

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

AFM 101 - Introduction to Financial Accounting	View Courses
LS 283 - Business Law	View Courses
AFM 231 - Business Law	View Courses
COMM 433 - Income Tax for Finance Students	View Courses

PREREQUISITES

AFM 433 - Business Strategy	View Courses
AFM 491 - Advanced Financial Accounting	View Courses
AFM 274 - Introduction to Corporate Finance	View Courses
AFM 291 - Intermediate Financial Accounting 1	View Courses
AFM 391 - Intermediate Financial Accounting 2	View Courses
AFM 341 - Accounting Information Systems	View Courses
AFM 401 - Accounting Theory	View Courses
AFM 241 - Impact of Technology on Business	View Courses
AFM 443 - E-business: Introduction to Electronic Commerce	View Courses
AFM 373 - Cases and Applications in Corporate Finance	View Courses
AFM 442 - E-business: Enterprise Systems	View Courses
AFM 482 - Performance Measurement and Organization Control	View Courses
AFM 434 - Corporate Governance and Risk Management	View Courses
AFM 362 - Corporate Taxation	View Courses
MATBUS 472 - Risk Management	View Courses
AFM 483 - Applications of Analytics to Business	View Courses
AFM 462 - Specialized Topics in Taxation	View Courses
MATBUS 471 - Fixed Income Securities	View Courses
AFM 429 - Investment Management - Senior Portfolio Manager	View Courses
AFM 329 - Investment Management - Senior Analyst	View Courses
AFM 328 - Investment Management - Junior Analyst	View Courses
AFM 479 - Cases and Applications in Finance 2	View Courses
AFM 444 - Business Analytics Project Management	View Courses
AFM 200 - Continuation of Experiential Learning	View Courses
AFM 100 - Introduction to Experiential Learning	View Courses
AFM 207 - Introduction to Performance Analytics	View Courses
AFM 324 - Wealth Management	View Courses
AFM 182 - Foundations for Management Accounting	View Courses
AFM 111 - Professional Pathways and Problem-Solving	View Courses
AFM 345 - Business Applications of Social Media Analytics	View Courses
AFM 347 - Cybersecurity	View Courses
AFM 244 - Analytic Methods for Business 3	View Courses
AFM 205 - Introduction to Financial Services	View Courses
AFM 132 - Introduction to Business Stages	View Courses
AFM 212 - Financial Analysis and Planning	View Courses
AFM 470 - Financial Management of High Growth Companies	View Courses
AFM 446 - Performance Management and Tax Analytics	View Courses
AFM 447 - Governance and Ethical Issues with Data and Emerging Technologies	View Courses
AFM 485 - Approaches to Measuring Value	View Courses
AFM 346 - Applications of Predictive Analytics in Accounting and Finance	View Courses
AFM 427 - Intermediate Portfolio Management	View Courses
AFM 445 - Information Technology Assurance and Audit Analytics	View Courses
AFM 335 - Business Law for Financial Managers	View Courses
AFM 191 - Foundations for Financial Reporting	View Courses
AFM 476 - Corporate Financial Decision Making	View Courses
AFM 275 - Corporate Finance	View Courses

- ACTSC 471 - Corporate Financial Decision Making — View Courses
- ACTSC 391 - Corporate Finance — View Courses
- STAT 374 - Quantitative Foundations for Finance — View Courses
- ECON 100 - Principles of Economics — View Courses
- AFM 323 - Quantitative Foundations for Finance — View Courses
- COMM 103 - Principles of Economics — View Courses
- AFM 206 - Introduction to Tax — View Courses
- AFM 334 - International Study Experience — View Courses
- AFM 208 - Introduction to Assurance — View Courses
- AFM 276 - Financial Statement Analysis — View Courses
- AFM 326 - Student Venture Fund - Analyst — View Courses
- AFM 382 - Cost Management Systems — View Courses
- AFM 418 - Special Topics in Finance or Accounting — View Courses
- AFM 426 - Student Venture Fund-Associate — View Courses
- AFM 428 - Investment Management - Junior Portfolio Manager — View Courses
- AFM 448 - Data Analytics and Emerging Technologies Consulting Group — View Courses
- AFM 451 - Audit Strategy — View Courses
- COMMST 111 - Leadership, Communication, and Collaboration — View Courses
- AFM 363 - Taxation 2 - Integration — View Courses
- STAT 334 - Probability Models for Business and Accounting — View Courses
- AFM 127 - Introduction to Global Capital Markets and Financial Analytics — View Courses
- ACTSC 127 - Introduction to Global Capital Markets and Financial Analytics — View Courses
- AFM 272 - Global Capital Markets and Financial Analytics — View Courses
- ACTSC 291 - Global Capital Markets and Financial Analytics — View Courses
- AFM 280 - Introduction to Organizational Behaviour — View Courses
- AFM 480 - Introduction to Organizational Behaviour — View Courses
- STAT 373 - Regression and Forecasting Methods in Finance — View Courses
- AFM 484 - Advanced Management Control Systems — View Courses
- AFM 473 - Advanced Topics in Corporate Finance — View Courses

SPECIALIZATION IS AVAILABLE FOR STUDENTS IN THE FOLLOWING MAJORS

- CPA-Data Analytics Specialization - Data Analytics Specialization — View Programs
- CPA-Finance Specialization - Finance Specialization — View Programs

H-Mathematical Finance
Mathematical Finance (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress
SUC Subcommittee, SUC Curricular Subcommittee expand ▲
Waiting for Approval | Approval Delegate(s)

Tim Weber-Kraljevski
Mike Grivicic
Melanie Figueiredo
Diana Goncalves
Kuali - Arts

Changes

- Effective Term and Year
- Course Requirements (no units)
- Minimum Average(s) Required
- participants
- List of Invalid Combinations

Effective Date and Career

Career
Undergraduate

Important! ?

Proposed
Effective Term and Year ?
Fall 2025

Existing
Effective Term and Year ?
Fall 2023

Proposal Details

Proposal Type ?
Change

Academic Unit Approval

Quality Assurance Designation
Minor Modification

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
Yes

Invalid Combinations Consultations
Actuarial Science and Pure Mathematics have agreed that (Mathematical Finance) and (Actuarial Science – Finance Specialization) have sufficient overlap to be declared an invalid combination.

Rationale and Background for Change(s)
Effective, 1 September 2025, add ACTSC 447 to the same list of “One of” courses that CS 476 belongs to. With the addition of ACTSC 447 as a cross-listed course to the existing CS 476, the Mathematical Finance plan needs to be updated to allow students to take the course under either course code.

Add (Mathematical Finance) and (Actuarial Science – Finance Specialization) to the list of invalid credential combinations. In the current calendar, the Mathematical Finance major can be combined with another Actuarial Science and/or Pure Mathematics academic plan so an undergraduate student can graduate with both on their diploma. This is generally fine except in one particular case: the overlap between Mathematical Finance and the Actuarial Science – Finance Specialization is too great to warrant the additional Specialization credential (in selecting courses to complete the double major, the specialization can be completed with zero additional courses). Hence, students will continue to be able to graduate with a Mathematical finance major together with an Actuarial Science major, but not to add the finance specialization to it.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Field of Study
Mathematical Finance

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Mathematical Finance (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma

Admissions

Admissions Entry Point
Declare Plan

Declaration Requirements

Requirements Information

Invalid Combinations
Yes

Proposed
List of Invalid Combinations
H-Data Science (BCS)H-Data Science (BMath)
ACTSC-Finance Specialization

Existing
List of Invalid Combinations
H-Data Science (BCS)H-Data Science (BMath)

Average Requirement
Yes

Proposed
Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 70.0%: all math courses.

Existing
Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 70.0%: all math courses.

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 13.0 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.

Co-operative Education Program Requirements

For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - ACTSC231 - Introductory Financial Mathematics (0.50)
    - ACTSC372 - Investment Science and Corporate Finance (0.50)
    - ACTSC445 - Quantitative Enterprise Risk Management (0.50)
    - ACTSC446 - Mathematics of Financial Markets (0.50)
    - PMATH351 - Real Analysis (0.50)
    - PMATH450 - Lebesgue Integration and Fourier Analysis (0.50)
    - PMATH451 - Measure and Integration (0.50)
    - STAT330 - Mathematical Statistics (0.50)
    - STAT331 - Applied Linear Models (0.50)
    - STAT333 - Stochastic Processes 1 (0.50)
    - STAT443 - Forecasting (0.50)
  - Complete 1 of the following
    - Complete all the following:
      - AFM101 - Introduction to Financial Accounting (0.50)
    - Complete all the following: BUS127W
  - Complete 1 of the following
    - Complete all the following:
      - AFM102 - Introduction to Managerial Accounting (0.50)
    - Complete all the following: BUS247W
  - Complete 1 of the following
    - Complete 1 of the following:
      - AFM131 - Introduction to Business in North America (0.50)
      - ARBUS101 - Introduction to Business in North America (0.50)
    - Complete all the following: BUS111W
  - Complete 1 of the following:
    - AMATH242 - Introduction to Computational Mathematics (0.50)
    - CS335 - Computational Methods in Business and Finance (0.50)
    - CS371 - Introduction to Computational Mathematics (0.50)
  - Complete 1 of the following:
    - AMATH250 - Introduction to Differential Equations (0.50)
    - AMATH251 - Introduction to Differential Equations (Advanced Level) (0.50)
    - AMATH350 - Differential Equations for Business and Economics (0.50)
  - Complete 1 of the following:
    - AMATH351 - Ordinary Differential Equations (0.50)
    - CO250 - Introduction to Optimization (0.50)
    - CO255 - Introduction to Optimization (Advanced Level) (0.50)
    - PMATH352 - Complex Analysis (0.50)
  - Complete 1 of the following:

        - **ACTSC447 - Numerical Computation for Financial Modelling (0.50)**
        - AMATH353 - Partial Differential Equations 1 (0.50)
        - CO372 - Portfolio Optimization Models (0.50)
        - CS476 - Numeric Computation for Financial Modeling (0.50)
        - PMATH453 - Functional Analysis (0.50)

    - Complete 1 of the following
        - Complete all the following:
            - ECON101 - Introduction to Microeconomics (0.50)
        - Complete all the following: ECON120W

    - Complete 1 of the following
        - Complete all the following:
            - ECON102 - Introduction to Macroeconomics (0.50)
        - Complete all the following: ECON140W

    - Complete 1 of the following
        - Complete all the following:
            - ECON201 - Microeconomic Theory for Business and Policy (0.50)
        - Complete all the following: ECON260W

    - Complete 1 of the following
        - Complete all the following:
            - MATH247 - Calculus 3 (Advanced Level) (0.50)
        - Complete all the following:
            - MATH237 - Calculus 3 for Honours Mathematics (0.50)
            - PMATH333 - Introduction to Real Analysis (0.50)

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.
2. Students enrolled in the Business Administration and Mathematics double degree academic plan:
    1. May substitute BUS393W for ACTSC372.
    2. Are exempt from taking STAT443, but can count it under the "Complete 1 of AMATH353, CO372, CS476, PMATH453" requirement if they choose to take it.
3. Students currently or previously enrolled in the following academic plans (Business Administration and Mathematics double degree, Mathematics/Business Administration, Mathematics/Financial Analysis and Risk Management, Information Technology Management, and Mathematical Optimization – Business Specialization) may substitute:
    1. STAT 371 for STAT 331.

Notes

Specializations

Specializations for this Major

No

Workflow Information

Change to Undergraduate Communication Requirement

No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

PREREQUISITES

- ACTSC 453 - Basic Pension Mathematics — View Courses
- ACTSC 455 - Life Contingencies 3 — View Courses
- ACTSC 468 - Readings in Actuarial Science 1 — View Courses
- ACTSC 469 - Readings in Actuarial Science 2 — View Courses
- ACTSC 489 - Advanced Topics in Actuarial Science — View Courses
- AFM 476 - Corporate Financial Decision Making — View Courses
- ACTSC 471 - Corporate Financial Decision Making — View Courses
- ACTSC 363 - Casualty and Health Insurance Mathematics 1 — View Courses
- ACTSC 362 - Introduction to Property and Casualty Practice — View Courses
- ACTSC 431 - Casualty and Health Insurance Mathematics 2 — View Courses
- ACTSC 432 - Credibility and Risk Theory — View Courses
- ACTSC 445 - Quantitative Enterprise Risk Management — View Courses
- ACTSC 446 - Mathematics of Financial Markets — View Courses
- ACTSC 454 - Longevity and Mortality Using Predictive Analytics — View Courses

H-Mathematics/Business Administration Mathematics/Business Administration (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Requirements (no units)
- Effective Term and Year
- Admin Notes

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Quality Assurance Designation
Minor Modification

Academic Unit Approval

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
• Remove BUS 227W Introduction to Financial Accounting from the “One of” list with AFM 101 Introduction to Financial Accounting and move AFM 101 into the “All of” list. This change is necessary as WLU has made a change to BUS 227W making the course only available to Double Degree students.
• Remove COMM 231 Commercial and Business Law from the “One of” list with AFM 231/LS 283 Business Law and move AFM 231/LS 283 into the “All of” list. This change is necessary due to the deactivation of COMM 231.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Field of Study
Mathematics and Business

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Mathematics/Business Administration (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma

Admissions

Admissions Entry Point
Both

Admission Requirements: Minimum Requirements
Honours Mathematics/Business Administration is a restricted-enrolment academic plan. Most of the students enrolled in this academic plan are admitted at the Year One level directly into the Mathematics/Business Administration admission category.

Declaration Requirements
Students admitted to the Faculty of Mathematics in other admission categories may subsequently apply for transfer to Mathematics/Business Administration at a later date. However, to be admitted, such applicants will normally be required to have:

- a Good or Excellent academic standing
- a minimum cumulative overall average of 70.0% based on at least 5.0 units of non-excluded courses.

Applicants in good standing with less than a 70.0% cumulative overall average will also be considered on an individual basis if resources available at the time of their application should permit enrolling additional students in the academic plan.

Requirements Information

Invalid Combinations
Yes

List of Invalid Combinations
H-BBA & BMath Double DegreeH-Data Science (BCS)
H-Data Science (BMath)
H-Information Technology Management
Management Studies Minor
H-Mathematics/Chartered Professional Accountancy
H-Math/FARM - Chartered Financial Analyst Spec
H-Math/FARM - Professional Risk Management Spec

Average Requirement
Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: all math courses.
- A minimum cumulative special major average of 60.0%: all AFM, BUS, COMM, ECON, HRM, MSE, MTHEL courses.

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 10.5 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.

Co-operative Education Program Requirements
For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Return to Agenda

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - **AFM101 - Introduction to Financial Accounting (0.50)**
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - BUS111W - Introduction to Business Organization (WLU) (0.50)
    - BUS121W - Functional Areas of the Organization (WLU) (0.50)
    - BUS381W - Business Policy 1 (WLU) (0.50)
    - CO370 - Deterministic OR Models (0.50)
    - CS330 - Management Information Systems (0.50)
    - CS338 - Computer Applications in Business: Databases (0.50)
    - ECON101 - Introduction to Microeconomics (0.50)
    - ECON102 - Introduction to Macroeconomics (0.50)
    - HRM200 - Basic Human Resources Management (0.50)
    - MATBUS371 - Introduction to Corporate Finance (0.50)
    - STAT371 - Applied Linear Models and Process Improvement for Business (0.50)
    - STAT372 - Survey Sampling and Experimental Design Techniques for Business (0.50)
  - Complete 1 of the following:
    - ACTSC221 - Introductory Financial Mathematics (Non-Specialist Level) (0.50)
    - ACTSC231 - Introductory Financial Mathematics (0.50)
  - ~~Complete 1 of the following:~~
    - ~~AFM101 - Introduction to Financial Accounting (0.50)~~
    - ~~BUS127W - Introduction to Financial Accounting (WLU) (0.50)~~
  - Complete 1 of the following:
    - AFM231 - Business Law (0.50)
    - ~~COMM231 - Commercial and Business Law for Mathematics Students (0.50)~~
    - LS283 - Business Law (0.50)
  - Complete 1 of the following:
    - ARBUS302 - Principles of Marketing (0.50)
    - BUS252W - Introduction to Marketing Management (WLU) (0.50)
    - MGMT244 - Principles of Marketing (0.50)
  - Complete 1 of the following:
    - CO250 - Introduction to Optimization (0.50)
    - CO255 - Introduction to Optimization (Advanced Level) (0.50)
  - Complete 1 of the following:
    - MATH237 - Calculus 3 for Honours Mathematics (0.50)
    - MATH247 - Calculus 3 (Advanced Level) (0.50)
  - Complete 1 of the following:
    - MSE211 - Organizational Behaviour (0.50)
    - PSYCH238 - Organizational Psychology (0.50)
  - Complete 1 of the following
    - Complete 1 of the following:
      - ARBUS202 - Professional and Business Ethics (0.50)

        - COMM400 - Entrepreneurship, Technology and the Emerging Information Economy (0.50)
        - LS271 - Conflict Resolution (0.50)
        - LS319 - Negotiation: Theories and Strategies (0.50)
        - PACS202 - Conflict Resolution (0.50)
        - PACS323 - Negotiation: Theories and Strategies (0.50)
        - PHIL215 - Professional and Business Ethics (0.50)
        - PSYCH339 - Personnel Psychology (0.50)
    - Complete 1 additional 0.5-unit course from the following subject codes: AFM, BUS, COMM, ECON, HRM, MSE, PSCI, STV
- Complete 3 additional 0.5-unit math courses from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT
- Complete 1 additional 0.5-unit COMM course at the 300- or 400-level
- Complete 1 additional 0.5-unit BUS or COMM course at the 300- or 400-level
- Complete 1.5 units of additional courses

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.

Notes

Specializations

Specializations for this Major
No

Workflow Information

Change to Undergraduate Communication Requirement
No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

BUS 311W - Entrepreneurship and New Ventures (WLU) View Courses

PREREQUISITES

STAT 334 - Probability Models for Business and Accounting View Courses

STAT 371 - Applied Linear Models and Process Improvement for Business View Courses

STAT 372 - Survey Sampling and Experimental Design Techniques for Business View Courses

H-Information Technology Management Information Technology Management (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Requirements (no units)
- participants
- Effective Term and Year
- Admin Notes

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Academic Unit Approval

Quality Assurance Designation
Minor Modification

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
Effective, 1 September 2025, remove COMM 231 Commercial and Business Law from the “One of” list with AFM 231/LS 283 Business Law. This change is necessary due to the deactivation of COMM 231. The effect is that students will be required to take one of AFM 231/LS 283.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Dean of Mathematics Office

Field of Study
Information Technology Management

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Information Technology Management (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma

Admissions

Admissions Entry Point

Declare Plan

Declaration Requirements

- Information Technology Management is a restricted-enrolment plan.
- Students are normally admitted at the Year One level into the Mathematics/Business Administration admission category. In Year Two, provided they remain eligible for an honours program, such students may declare the Information Technology Management major.
- Students admitted to the Faculty of Mathematics in other admission categories may subsequently apply for transfer into Information Technology Management at a later date. These students are required to have a Good or Excellent academic standing with a minimum cumulative overall average (CAV) of 70% based on at least 5.0 units of non-excluded courses.

Requirements Information

Invalid Combinations

Yes

List of Invalid Combinations

H-BBA & BMath Double DegreeComputing Minor
H-Data Science (BCS)H-Data Science (BMath)
H-Mathematics/Business Administration
H-Mathematics/Chartered Professional Accountancy
H-Math/FARM - Chartered Financial Analyst Spec
H-Math/FARM - Professional Risk Management Spec

Average Requirement

Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: all math courses.
- A minimum cumulative special major average of 60.0%: all BUS, COMM, MSCI, and STV courses.

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 10.0 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.

Co-operative Education Program Requirements

For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - AFM101 - Introduction to Financial Accounting (0.50)
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - BUS111W - Introduction to Business Organization (WLU) (0.50)
    - BUS121W - Functional Areas of the Organization (WLU) (0.50)
    - BUS381W - Business Policy 1 (WLU) (0.50)
    - COMM431 - Project Management (0.50)
    - COMM432 - Electronic Business (0.50)
    - CS230 - Introduction to Computers and Computer Systems (0.50)
    - CS330 - Management Information Systems (0.50)
    - CS338 - Computer Applications in Business: Databases (0.50)
    - CS430 - Applications Software Engineering (0.50)
    - CS436 - Networks and Distributed Computer Systems (0.50)
    - ECON101 - Introduction to Microeconomics (0.50)
    - ECON102 - Introduction to Macroeconomics (0.50)
    - MSE211 - Organizational Behaviour (0.50)
    - MSE311 - Organizational Design and Technology (0.50)
    - STAT371 - Applied Linear Models and Process Improvement for Business (0.50)
    - STAT372 - Survey Sampling and Experimental Design Techniques for Business (0.50)
    - STV202 - Design and Society (0.50)
  - Complete 1 of the following:
    - ACTSC221 - Introductory Financial Mathematics (Non-Specialist Level) (0.50)
    - ACTSC231 - Introductory Financial Mathematics (0.50)
  - Complete 1 of the following:
    - AFM231 - Business Law (0.50)
    - ~~COMM231 - Commercial and Business Law for Mathematics Students~~ ~~(0.50)~~
    - LS283 - Business Law (0.50)
  - Complete 1 of the following:
    - ARBUS302 - Principles of Marketing (0.50)
    - BUS252W - Introduction to Marketing Management (WLU) (0.50)
    - MGMT244 - Principles of Marketing (0.50)
  - Complete 1 of the following:
    - CO250 - Introduction to Optimization (0.50)
    - CO255 - Introduction to Optimization (Advanced Level) (0.50)
  - Complete 1 of the following:
    - MATH239 - Introduction to Combinatorics (0.50)
    - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)
  - Complete 1 of the following:
    - STV302 - Information Technology and Society (0.50)
    - STV304 - Technology in Canadian Society (0.50)
    - STV305 - Technology, Society and the Modern City (0.50)
    - STV306 - Biotechnology and Society (0.50)
    - STV400 - Society, Technology and Values: Senior Project (0.50)

        - STV401 - Society, Technology and Values: Advanced Topics (0.50)
    - Complete 1 additional course at the 300- or 400-level from: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT
    - Complete 3 additional courses

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

Notes

Specializations

Specializations for this Major
No

Workflow Information

Change to Undergraduate Communication Requirement
No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans
PREREQUISITES

- STAT 371 - Applied Linear Models and Process Improvement for Business — View Courses
- STAT 372 - Survey Sampling and Experimental Design Techniques for Business — View Courses

CS-Business Specialization
Business Specialization

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Lists
- Course Requirements (no units)
- Graduation Requirements
- Effective Term and Year
- Admin Notes

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Quality Assurance Designation
Minor Modification

Academic Unit Approval

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
• Add ACTSCI 447/CS 476 to the “Two of” list. This course is relevant to Business and there is a desire to make it an option for students in the Business Specialization.
• Remove CS 454 from the “Two of” list. This course is less relevant to Business and thus is should be removed from the Business Specialization.
• Change the “Six of” list to a “Five of” list. Reducing the number of required courses by one aligns the specialization more closely with other specializations.
• Add a requirement that at least two of the courses taken from the “Five of” list must be at 200-level or higher. This is to ensure students complete some more advanced business related courses.
• Update title of ACTSC 372 correcting a previous oversight.
• Remove AFM 123/ARBUS 102 from the now “Five of” list. This course is not open to Computer Science students and therefore not a true option for students in this specialization.
• Remove ARBUS 302/MGMT 244 from the now “Five of” list. This course is not open to Computer Science students and therefore not a true option for students in this specialization.
• Remove MSCI 452 from the now “Five of” list. This course is less relevant to Business and thus is should be removed from the Business Specialization.
Add COMM 101 and COMM 432 to the now “Five of” list. Both courses are relevant to Business and should be added to the specialization to allow students the option to take these courses.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Field of Study
Computer Science

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Specialization

Program/Plan Name
Business Specialization

Admissions

Specialization is available for students in the following majors

- H-Computer Science (BCS), or H-Computer Science (BMath)

Admissions Entry Point
Declare Plan

Declaration Requirements

- Before declaring this academic plan, see invalid credential combinations.

Requirements Information

Invalid Combinations
Yes

List of Invalid Combinations
Economics MinorHuman Resources Management Minor
Human Resources Management Diploma
Management Studies Minor
H-Math/FARM - Chartered Financial Analyst Spec
H-Math/FARM - Professional Risk Management Spec

Average Requirement
No

Proposed
Graduation Requirements

- Complete a total of 3.5 units.

Existing
Graduation Requirements

- Complete a total of 4.0 units.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - ~~Complete 2 of the following:~~
    - ~~CS348 - Introduction to Database Management (0.50)~~
    - ~~CS454 - Distributed Systems (0.50)~~
    - ~~CS490 - Information Systems Management (0.50)~~
  - ~~Complete 3.0 units from the list of approved courses.~~
  - **Complete 2 of the following:**
    - **ACTSC447 - Numerical Computation for Financial Modelling (0.50)**
    - **CS348 - Introduction to Database Management (0.50)**
    - **CS476 - Numeric Computation for Financial Modeling (0.50)**
    - **CS490 - Information Systems Management (0.50)**
  - **Complete 2.5 units from the list of approved courses, where at least two courses must be at the 200-, 300-, or 400-level**

Course Lists

Approved Courses List

- Complete all of the following
  - Choose any of the following:
    - ACTSC231 - Introductory Financial Mathematics (0.50)
    - ACTSC372 - Investment Science and Corporate Finance (0.50)
    - **AFM101 - Introduction to Financial Accounting (0.50)**
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - BUS121W - Functional Areas of the Organization (WLU) (0.50)
    - BUS362W - Applied Marketing (WLU) (0.50)
    - BUS381W - Business Policy 1 (WLU) (0.50)
    - BUS491W - Business Policy 2 (WLU) (0.50)
    - **COMM101 - Introduction to Financial Markets (0.50)**
    - COMM400 - Entrepreneurship, Technology and the Emerging Information Economy (0.50)
    - **COMM432 - Electronic Business (0.50)**
    - ECON101 - Introduction to Microeconomics (0.50)
    - ECON102 - Introduction to Macroeconomics (0.50)
    - HRM200 - Basic Human Resources Management (0.50)
    - MGMT220 - Entrepreneurship and the Creative Workplace (0.50)
    - MSE311 - Organizational Design and Technology (0.50)
    - ~~MSE452 - Decision Making Under Uncertainty (0.50)~~
  - ~~Complete no more than 1 from the following:~~
    - ~~AFM101 - Introduction to Financial Accounting (0.50)~~
    - ~~AFM123 - Accounting Information for Managers (0.50)~~
    - ~~ARBUS102 - Accounting Information for Managers (0.50)~~
  - Complete no more than 1 from the following:
    - AFM131 - Introduction to Business in North America (0.50)
    - ARBUS101 - Introduction to Business in North America (0.50)
    - BUS111W - Introduction to Business Organization (WLU) (0.50)
  - ~~Complete no more than 1 from the following:~~
    - ~~ARBUS302 - Principles of Marketing (0.50)~~
    - ~~MGMT244 - Principles of Marketing (0.50)~~
  - Complete no more than 1 from the following:
    - MSE211 - Organizational Behaviour (0.50)
    - PSYCH238 - Organizational Psychology (0.50)

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.

Notes

Workflow Information

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

SPECIALIZATIONS LIST

- H-Computer Science (BMath) - Computer Science (Bachelor of Mathematics - Honours) View Programs
- H-Computer Science (BCS) - Computer Science (Bachelor of Computer Science - Honours) View Programs

SE-Business Specialization
Business Specialization

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Melanie Figueiredo
Diana Goncalves

Changes

- Course Lists
- Course Requirements (no units)
- Graduation Requirements
- participants
- Effective Term and Year

Show All ▼

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Academic Unit Approval

Quality Assurance Designation
Minor Modification

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
No

Rationale and Background for Change(s)
The changes to this specialization are identical to the changes to the CS-Business Specialization.

• Add ACTSCI 447/CS 476 to the “Two of” list. This course is relevant to Business and there is a desire to make it an option for students in the Business Specialization.
• Remove CS 454 from the “Two of” list. This course is less relevant to Business and thus is should be removed from the Business Specialization.
• Change the “Six of” list to a “Five of” list. Reducing the number of required courses by one aligns the specialization more closely with other specializations.
• Add a requirement that at least two of the courses taken from the “Five of” list must be at 200-level or higher. This is to ensure students complete some more advanced business related courses.
• Update title of ACTSC 372 correcting a previous oversight.
• Remove AFM 123/ARBUS 102 from the now “Five of” list. This course is not open to Computer Science students and therefore not a true option for students in this specialization.
• Remove ARBUS 302/MGMT 244 from the now “Five of” list. This course is not open to Computer Science students and therefore not a true option for students in this specialization.
• Remove MSCI 452 from the now “Five of” list. This course is less relevant to Business and thus is should be removed from the Business Specialization.
Add COMM 101 and COMM 432 to the now “Five of” list. Both courses are relevant to Business and should be added to the specialization to allow students the option to take these courses.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Field of Study
Software Engineering

Faculty
Faculties of Engineering and Mathematics

Undergraduate Credential Type
Specialization

Program/Plan Name
Business Specialization

Admissions

Specialization is available for students in the following majors

- H-Software Engineering

Admissions Entry Point
Declare Plan

Declaration Requirements

- Before declaring this academic plan, see invalid credential combinations.

Requirements Information

Invalid Combinations
Yes

List of Invalid Combinations
Economics MinorHuman Resources Management Minor
Human Resources Management Diploma
Management Studies Minor
H-Math/FARM - Chartered Financial Analyst Spec
H-Math/FARM - Professional Risk Management Spec

Average Requirement
No

Proposed
Graduation Requirements

- Complete a total of 3.5 units.

Existing
Graduation Requirements

- Complete a total of 4.0 units.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete 2 of the following:
    - **ACTSC447 - Numerical Computation for Financial Modelling (0.50)**
    - CS348 - Introduction to Database Management (0.50)
    - ~~CS454 - Distributed Systems (0.50)~~
    - **CS476 - Numeric Computation for Financial Modeling (0.50)**
    - CS490 - Information Systems Management (0.50)
  - Complete ~~3~~**2**.~~0~~**5** units from the list of approved courses**, where at least two courses must be at the 200-, 300-, or 400-level**

Course Lists

Approved Courses List

- Complete all of the following
  - Choose any of the following:
    - ACTSC231 - Introductory Financial Mathematics (0.50)
    - ACTSC372 - Investment Science and Corporate Finance (0.50)
    - **AFM101 - Introduction to Financial Accounting (0.50)**
    - AFM102 - Introduction to Managerial Accounting (0.50)
    - BUS121W - Functional Areas of the Organization (WLU) (0.50)
    - BUS362W - Applied Marketing (WLU) (0.50)
    - BUS381W - Business Policy 1 (WLU) (0.50)
    - BUS491W - Business Policy 2 (WLU) (0.50)
    - **COMM101 - Introduction to Financial Markets (0.50)**
    - COMM400 - Entrepreneurship, Technology and the Emerging Information Economy (0.50)
    - **COMM432 - Electronic Business (0.50)**
    - ECON101 - Introduction to Microeconomics (0.50)
    - ECON102 - Introduction to Macroeconomics (0.50)
    - HRM200 - Basic Human Resources Management (0.50)
    - MGMT220 - Entrepreneurship and the Creative Workplace (0.50)
    - MSE311 - Organizational Design and Technology (0.50)
    - ~~MSE452 - Decision Making Under Uncertainty (0.50)~~
  - ~~Complete no more than 1 from the following:~~
    - ~~AFM101 - Introduction to Financial Accounting (0.50)~~
    - ~~AFM123 - Accounting Information for Managers (0.50)~~
    - ~~ARBUS102 - Accounting Information for Managers (0.50)~~
  - Complete no more than 1 from the following:
    - AFM131 - Introduction to Business in North America (0.50)
    - ARBUS101 - Introduction to Business in North America (0.50)
    - BUS111W - Introduction to Business Organization (WLU) (0.50)
  - ~~Complete no more than 1 from the following:~~
    - ~~ARBUS302 - Principles of Marketing (0.50)~~
    - ~~MGMT244 - Principles of Marketing (0.50)~~
  - Complete no more than 1 from the following:
    - MSE211 - Organizational Behaviour (0.50)
    - PSYCH238 - Organizational Psychology (0.50)

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. Students may only complete one course from any cross-listed set.

Notes

Workflow Information

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

SPECIALIZATIONS LIST

H-Software Engineering - Software Engineering (Bachelor of Software Engineering - Honours) View Programs

H-Data Science (BMath)
Data Science (Bachelor of Mathematics - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Diana Goncalves
Melanie Figueiredo

Changes

- Invalid Combinations
- List of Invalid Combinations
- Effective Term and Year
- Admin Notes

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Academic Unit Approval

Quality Assurance Designation
Minor Modification

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
Yes

Invalid Combinations Consultations
Consulted department chairs of the Faculty of Math.

Rationale and Background for Change(s)
Effective, 1 September 2025, add the following additional combinations to the list of invalid credential combinations: BMath Data Science combined with Computing minor; BMath Data Science combined with Computer Science minor; BCS Data Science combined with Statistics minor.

These combinations are currently treated as invalid with the understanding that the BMath Data Science and the BCS Data Science plans are jointly offered by the School of Computer Science and the Department of Statistics and Actuarial Science, and the invalid credential combinations page (https://ugradcalendar.uwaterloo.ca/page/Acad-Regs-Invalid-Credential-Combinations) prohibits students from enrolling in two plans from the same group (where Computer Science and Statistics are two of the groups). Adding these pairs makes the exclusion explicit while clarifying existing practices.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
Department of Statistics and Actuarial Science

Field of Study
Data Science

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Mathematics

Program/Plan Name
Data Science (Bachelor of Mathematics - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma

Admissions

Admissions Entry Point
Declare Plan

Declaration Requirements
Admission to the Data Science (Bachelor of Mathematics) academic plan, which is a Computer Science major academic plan, normally happens in second year. Students from within the Faculty of Mathematics with advanced standing may apply for admission to the Data Science major if they:

- Have completed at least one term in the Faculty of Mathematics with a typical course load for a Computer Science major.
    - For students taking a first-year CS course: one CS course, two math courses, and two non-math electives.
    - For students taking second-year CS courses: two CS courses, two math courses, and one non-math elective.
- Have credit for CS136 or CS146.
- Have a minimum cumulative math major average of 65% (calculated over all math and computer science courses) and a minimum cumulative CS major average of 70%.

Notes

- The Data Science major is a limited-enrolment academic plan and successful completion of the above conditions will not guarantee admission; applicants without some of these conditions will be considered on an individual basis. Students are normally not considered for admission beyond the 2B level.
- Transfer into the BMath (Data Science) academic plan from other academic plans in the Faculty of Mathematics outside of Computer Science is subject to enrolment limits. Transfer into BMath (Data Science) does not allow a student to then transfer automatically into Computer Science academic plans.
- Before declaring this academic plan, see invalid credential combinations.

Requirements Information

Proposed
Invalid Combinations
Yes

Proposed
List of Invalid Combinations
Computing MinorComputer Science Minor

Existing
Invalid Combinations
No

Existing
List of Invalid Combinations

Average Requirement

Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0%: CS136, CS138, CS146, all subsequent CS major courses, as well as CS courses numbered 600 and higher, CO487, ECE222, ECE429, SE212, SE240, SE382, SE463, SE464, SE465, and STAT 440.
- A minimum cumulative special major average of 65%: all math courses.

Graduation Requirements

- See Bachelor of Mathematics degree-level requirements.
- Complete all the required courses listed below.
- Complete a minimum of 14.25 units of math courses.
- Complete a minimum of 5.0 units of non-math courses.

Co-operative Education Program Requirements

For students in the co-operative system of study, see Bachelor of Mathematics co-operative education program requirements.

Course Requirements (units)

Required Courses

0

Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - CS136L - Tools and Techniques for Software Development (0.25)
    - CS341 - Algorithms (0.50)
    - CS348 - Introduction to Database Management (0.50)
    - CS431 - Data-Intensive Distributed Analytics (0.50)
    - STAT330 - Mathematical Statistics (0.50)
    - STAT331 - Applied Linear Models (0.50)
    - STAT332 - Sampling and Experimental Design (0.50)
    - STAT333 - Stochastic Processes 1 (0.50)
    - STAT341 - Computational Statistics and Data Analysis (0.50)
  - Complete 1 of the following:
    - CS136 - Elementary Algorithm Design and Data Abstraction (0.50)
    - CS146 - Elementary Algorithm Design and Data Abstraction (Advanced Level) (0.50)
  - Complete 1 of the following:
    - CS240 - Data Structures and Data Management (0.50)
    - CS240E - Data Structures and Data Management (Enriched) (0.50)
  - Complete 1 of the following:
    - CS241 - Foundations of Sequential Programs (0.50)
    - CS241E - Foundations of Sequential Programs (Enriched) (0.50)
  - Complete 1 of the following:
    - CS245 - Logic and Computation (0.50)
    - CS245E - Logic and Computation (Enriched) (0.50)
  - Complete 1 of the following:
    - CS246 - Object-Oriented Software Development (0.50)
    - CS246E - Object-Oriented Software Development (Enriched) (0.50)
  - Complete 1 of the following:
    - CS251 - Computer Organization and Design (0.50)
    - CS251E - Computer Organization and Design (Enriched) (0.50)
  - Complete 1 of the following:
    - CS480 - Introduction to Machine Learning (0.50)
    - CS484 - Computational Vision (0.50)
    - CS485 - Statistical and Computational Foundations of Machine Learning (0.50)
    - CS486 - Introduction to Artificial Intelligence (0.50)
    - STAT441 - Statistical Learning - Classification (0.50)
  - Complete 2 of the following:
    - STAT431 - Generalized Linear Models and their Applications (0.50)
    - STAT440 - Computational Inference (0.50)
    - STAT441 - Statistical Learning - Classification (0.50)
    - STAT442 - Data Visualization (0.50)
    - STAT443 - Forecasting (0.50)
    - STAT444 - Statistical Learning - Advanced Regression (0.50)
  - Complete 1 of the following:

        - ENGL378 - Professional Communications in Statistics and Actuarial Science (0.50)
        - MTHEL300 - Professional Communications in Statistics and Actuarial Science (0.50)
    - Complete 1 of the following:
        - MATH237 - Calculus 3 for Honours Mathematics (0.50)
        - MATH247 - Calculus 3 (Advanced Level) (0.50)
    - Complete 1 of the following:
        - MATH239 - Introduction to Combinatorics (0.50)
        - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)
    - Complete 1 additional course at the 300- or 400-level from: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT

Course Lists

Required Courses

No Rules

Are there cross-listed courses listed in requirements?
Yes

Cross-Listings Options
All cross-listings to be displayed

Additional Constraints

1. No one course may fulfil more than one requirement within the major.
2. Students currently or previously enrolled in the following academic plans (Business Administration and Mathematics double degree, Mathematics/Business Administration, Mathematics/Financial Analysis and Risk Management, Information Technology Management, and Mathematical Optimization – Business Specialization) may substitute:
    1. STAT371 for STAT331.
    2. STAT372 for STAT332.
3. List of not acceptable substitutions:
    1. STAT334 is not an acceptable substitute for STAT330 or STAT333.
    2. STAT373 is not an acceptable substitute for STAT331.
4. Business Administration and Mathematics double degree students may substitute BUS362W for ENGL378/MTHEL300.

Notes

Specializations

Specializations for this Major
No

Workflow Information

Change to Undergraduate Communication Requirement

No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

- MATH 106 - Applied Linear Algebra 1 — View Courses

PREREQUISITES

- CS 480 - Introduction to Machine Learning — View Courses
- CS 486 - Introduction to Artificial Intelligence — View Courses
- ENGL 378 - Professional Communications in Statistics and Actuarial Science — View Courses
- MTHEL 300 - Professional Communications in Statistics and Actuarial Science — View Courses
- CS 240 - Data Structures and Data Management — View Courses
- CS 240E - Data Structures and Data Management (Enriched) — View Courses
- CS 451 - Data-Intensive Distributed Computing — View Courses
- CS 485 - Statistical and Computational Foundations of Machine Learning — View Courses
- CS 484 - Computational Vision — View Courses
- CS 348 - Introduction to Database Management — View Courses
- CS 341 - Algorithms — View Courses
- CS 251E - Computer Organization and Design (Enriched) — View Courses
- CS 251 - Computer Organization and Design — View Courses
- CS 241 - Foundations of Sequential Programs — View Courses
- CS 241E - Foundations of Sequential Programs (Enriched) — View Courses
- CS 458 - Computer Security and Privacy — View Courses

H-Data Science (BCS)
Data Science (Bachelor of Computer Science - Honours)

Under Review | Fall 2025

Proposal Information

Status
Active

Workflow Status
In Progress

SUC, Senate Undergraduate Council (SUC) expand ▲
Waiting for Approval | Approval Delegate(s)

Mike Grivicic
Tim Weber-Kraljevski
Diana Goncalves
Melanie Figueiredo

Changes

- participants
- List of Invalid Combinations
- Effective Term and Year

Effective Date and Career

Career
Undergraduate

Important!

Proposed
Effective Term and Year
Fall 2025

Existing
Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change

Quality Assurance Designation
Minor Modification

Academic Unit Approval

Is there an impact to existing students?
No

Is the credential name changing?
No

Co-operative System of Study and Requirements
No

Creating or Changing Invalid Combinations
Yes

Invalid Combinations Consultations
The department of Statistics and Actuarial Science and School of Computer Science agree that BCS Data Science is not to be combined with a Statistics minor (this is the current practice and is being formalized here).

Rationale and Background for Change(s)
Effective, 1 September 2025, add the following additional combinations to the list of invalid credential combinations: BMath Data Science combined with Computing minor; BMath Data Science combined with Computer Science minor; BCS Data Science combined with Statistics minor.

These combinations are currently treated as invalid with the understanding that the BMath Data Science and the BCS Data Science plans are jointly offered by the School of Computer Science and the Department of Statistics and Actuarial Science, and the invalid credential combinations page (https://ugradcalendar.uwaterloo.ca/page/Acad-Regs-Invalid-Credential-Combinations) prohibits students from enrolling in two plans from the same group (where Computer Science and Statistics are two of the groups). Adding these pairs makes the exclusion explicit while clarifying existing practices.

Consultations (Departmental)

Supporting Documentation

General Program/Plan Information

Faculty
Faculty of Mathematics

Academic Unit
David R. Cheriton School of Computer Science

Field of Study
Data Science

Faculty
Faculty of Mathematics

Undergraduate Credential Type
Major

Program Type
Honours

Degree
Bachelor of Computer Science

Program/Plan Name
Data Science (Bachelor of Computer Science - Honours)

Systems of Study
Co-operative
Regular

Online Degree/Diploma

Admissions

Admissions Entry Point
Declare Plan

Declaration Requirements
Admission to the Bachelor of Computer Science (Data Science) academic plan, which is a Computer Science major academic plan, normally happens in second year. Students from within the Faculty of Mathematics with advanced standing may apply for admission to the Data Science major if they:

- Have completed at least one term in the Faculty of Mathematics with a typical course load for a Computer Science major.
    - For students taking a first-year CS course: one CS course, two math courses, and two non-math electives.
    - For students taking second-year CS courses: two CS courses, two math courses, and one non-math elective.
- Have credit for CS136 or CS146; and CS136L.
- Have a minimum cumulative math major average of 65% (calculated over all math and computer science courses) and a minimum cumulative CS major average of 70%.

Notes

- The Data Science major is a limited-enrolment academic plan and successful completion of the above conditions will not guarantee admission; applicants without some of these conditions will be considered on an individual basis. Students are normally not considered for admission beyond the 2B level.
- Transfer into the BMath (Data Science) academic plan from other academic plans in the Faculty of Mathematics outside of Computer Science is subject to enrolment limits. Transfer into BMath (Data Science) does not allow a student to then transfer automatically into Computer Science academic plans.
- Before declaring this academic plan, see invalid credential combinations.

Requirements Information

Invalid Combinations
Yes

Proposed
List of Invalid Combinations
CS-Artificial Intelligence SpecializationStatistics Minor

Existing
List of Invalid Combinations
CS-Artificial Intelligence Specialization

Average Requirement

Yes

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 60.0% in two or more of the following courses: CS136, CS138, CS146, all subsequent CS major courses, as well as CS courses numbered 600 and higher, CO487, ECE222, ECE429, SE212, SE240, SE382, SE463, SE464, SE465, and STAT 440.
- A minimum cumulative special major average of 65%: all math courses.

Graduation Requirements

- See Bachelor of Computer Science degree-level requirements.
- Complete the Breadth and Depth Requirements
- Complete a minimum of 14.75 units of math courses.
- Complete all the required courses listed below.

Breadth and Depth Requirement

Breadth Requirement

Requirement	Units Required	Subject Codes
Humanities	1.0 unit	CHINA, CLAS, CMW, COMMST, CROAT, DAC, DUTCH, EASIA, ENGL, FINE, FR, GER, GRK, HIST, HUMSC, ITAL, ITALST, JAPAN, JS, KOREA, LAT, MEDVL, MUSIC, PHIL, PORT, REES, RS, RUSS, SI, SPAN, THPERF, VCULT
Pure Sciences	0.5 unit	BIOL, CHEM, EARTH, PHYS, SCI
Pure and Applied Sciences	0.5 unit	BIOL, CHEM, EARTH, ENVS, ERS, HEALTH, KIN, MNS, PHYS, PLAN, SCI
Social Sciences	1.0 unit	AFM, ANTH, APPLS, ARBUS, BET, BUS, COMM, ECON, ENBUS, GEOG, GSJ, HRM, INDEV, INDG, INTST, LS, MSCI, PACS, PSCI, PSYCH, REC, SDS, SMF, SOC, SOCWK, STV

Depth Requirement

- Complete 1 of the following:
  - 1.5 units with the same subject, including at least 0.5 unit at 300-level or higher
  - 1.5 units with the same subject forming a prerequisite chain of length three

Additional Constraints

1. No course can satisfy more than one of the breadth requirements.
2. Courses with substantial math or computer science content, regardless of subject, do not satisfy the elective breadth or depth requirement. Students may wish to consult with the CS academic advisors about specific courses.
3. Courses from the "List 1: First Course" for the Undergraduate Communication Requirement do not satisfy the humanities breadth requirement. Courses found only in the "List 2: Second Course" list can satisfy both the humanities breadth requirement and the Undergraduate Communication Requirement.

Co-operative Education Program Requirements

For students in the co-operative system of study, see Bachelor of Computer Science co-operative education program requirements.

Course Requirements (units)

Required Courses

0
Units to Complete

No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
  - Complete all the following:
    - CS136L - Tools and Techniques for Software Development (0.25)
    - CS341 - Algorithms (0.50)
    - CS348 - Introduction to Database Management (0.50)
    - CS350 - Operating Systems (0.50)
    - CS451 - Data-Intensive Distributed Computing (0.50)
    - STAT330 - Mathematical Statistics (0.50)
    - STAT331 - Applied Linear Models (0.50)
    - STAT341 - Computational Statistics and Data Analysis (0.50)
  - Complete 1 of the following:
    - CS115 - Introduction to Computer Science 1 (0.50)
    - CS135 - Designing Functional Programs (0.50)
    - CS145 - Designing Functional Programs (Advanced Level) (0.50)
  - Complete 1 of the following:
    - CS136 - Elementary Algorithm Design and Data Abstraction (0.50)
    - CS146 - Elementary Algorithm Design and Data Abstraction (Advanced Level) (0.50)
  - Complete 1 of the following:
    - CS240 - Data Structures and Data Management (0.50)
    - CS240E - Data Structures and Data Management (Enriched) (0.50)
  - Complete 1 of the following:
    - CS241 - Foundations of Sequential Programs (0.50)
    - CS241E - Foundations of Sequential Programs (Enriched) (0.50)
  - Complete 1 of the following:
    - CS245 - Logic and Computation (0.50)
    - CS245E - Logic and Computation (Enriched) (0.50)
  - Complete 1 of the following:
    - CS246 - Object-Oriented Software Development (0.50)
    - CS246E - Object-Oriented Software Development (Enriched) (0.50)
  - Complete 1 of the following:
    - CS251 - Computer Organization and Design (0.50)
    - CS251E - Computer Organization and Design (Enriched) (0.50)
  - Complete 1 of the following
    - Complete all of the following
      - Complete all the following:
        - CS480 - Introduction to Machine Learning (0.50)
      - Complete 1 of the following:
        - CS448 - Database Systems Implementation (0.50)
        - CS454 - Distributed Systems (0.50)
        - CS484 - Computational Vision (0.50)

- CS485 - Statistical and Computational Foundations of Machine Learning (0.50)
- CS486 - Introduction to Artificial Intelligence (0.50)

- Complete all of the following
  - Complete all the following:
    - CS485 - Statistical and Computational Foundations of Machine Learning (0.50)
  - Complete 1 of the following:
    - CS448 - Database Systems Implementation (0.50)
    - CS454 - Distributed Systems (0.50)
    - CS480 - Introduction to Machine Learning (0.50)
    - CS484 - Computational Vision (0.50)
    - CS486 - Introduction to Artificial Intelligence (0.50)

- Complete all of the following
  - Complete all the following:
    - CS486 - Introduction to Artificial Intelligence (0.50)
  - Complete 1 of the following:
    - CS448 - Database Systems Implementation (0.50)
    - CS454 - Distributed Systems (0.50)
    - CS480 - Introduction to Machine Learning (0.50)
    - CS484 - Computational Vision (0.50)
    - CS485 - Statistical and Computational Foundations of Machine Learning (0.50)

- Complete 1 of the following:
  - MATH127 - Calculus 1 for the Sciences (0.50)
  - MATH137 - Calculus 1 for Honours Mathematics (0.50)
  - MATH147 - Calculus 1 (Advanced Level) (0.50)
- Complete 1 of the following:
  - MATH128 - Calculus 2 for the Sciences (0.50)
  - MATH138 - Calculus 2 for Honours Mathematics (0.50)
  - MATH148 - Calculus 2 (Advanced Level) (0.50)
- Complete 1 of the following:
  - MATH135 - Algebra for Honours Mathematics (0.50)
  - MATH145 - Algebra (Advanced Level) (0.50)
- Complete 1 of the following:
  - MATH136 - Linear Algebra 1 for Honours Mathematics (0.50)
  - MATH146 - Linear Algebra 1 (Advanced Level) (0.50)
- Complete 1 of the following:
  - MATH235 - Linear Algebra 2 for Honours Mathematics (0.50)
  - MATH245 - Linear Algebra 2 (Advanced Level) (0.50)
- Complete 1 of the following:
  - MATH237 - Calculus 3 for Honours Mathematics (0.50)
  - MATH247 - Calculus 3 (Advanced Level) (0.50)
- Complete 1 of the following:
  - MATH239 - Introduction to Combinatorics (0.50)
  - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)

- Complete 1 of the following:
  - STAT230 - Probability (0.50)
  - STAT240 - Probability (Advanced Level) (0.50)
- Complete 1 of the following:
  - STAT231 - Statistics (0.50)
  - STAT241 - Statistics (Advanced Level) (0.50)
- Complete 2 of the following:
  - STAT431 - Generalized Linear Models and their Applications (0.50)
  - STAT440 - Computational Inference (0.50)
  - STAT441 - Statistical Learning - Classification (0.50)
  - STAT442 - Data Visualization (0.50)
  - STAT443 - Forecasting (0.50)
  - STAT444 - Statistical Learning - Advanced Regression (0.50)
- Complete 1 additional CS courses chosen from CS340-CS398, CS440-CS489.

- Complete 1 of the following
  - Choose any course from the following: CS440-CS498, any CS course at the 600- or 700-level (see Additional Constraints)
  - Choose any of the following:
    - CO487 - Applied Cryptography (0.50)
    - CS499T - Honours Thesis (0.50)
    - STAT440 - Computational Inference (0.50)
- Complete a total of 5.0 units of non-math courses satisfying the Breadth and Depth Requirement listed under Graduation Requirements

Course Lists

Approved Courses List

No Rules

Are there cross-listed courses listed in requirements?
No

Additional Constraints

1. No one course may fulfil more than one requirement within the major.
2. Undergraduates are not allowed to enrol in 600-level courses when an equivalent 400-level exists. CS courses at the 700-levels may be taken only when special permission is obtained from the instructor and a CS academic advisor.

Notes

Specializations

Specializations for this Major
No

Workflow Information

Change to Undergraduate Communication Requirement
No

Workflow Path	Faculty/AFIW Path(s) for Workflow	Senate Workflow
Committee approvals	Faculty of Mathematics	--

Dependencies

Dependent Courses and Programs/Plans

ANTIREQUISITES

CS 436 - Networks and Distributed Computer Systems	View Courses
PMATH 330 - Introduction to Mathematical Logic	View Courses
MATH 106 - Applied Linear Algebra 1	View Courses
CS 330 - Management Information Systems	View Courses
CS 230 - Introduction to Computers and Computer Systems	View Courses
CS 231 - Algorithmic Problem Solving	View Courses
CS 234 - Data Types and Structures	View Courses
CS 200 - Concepts for Advanced Computer Usage	View Courses
CS 430 - Applications Software Engineering	View Courses
CS 335 - Computational Methods in Business and Finance	View Courses
CS 431 - Data-Intensive Distributed Analytics	View Courses
CS 338 - Computer Applications in Business: Databases	View Courses

PREREQUISITES

CS 456 - Computer Networks	View Courses
CS 442 - Principles of Programming Languages	View Courses
CS 480 - Introduction to Machine Learning	View Courses
CS 486 - Introduction to Artificial Intelligence	View Courses
ENGL 378 - Professional Communications in Statistics and Actuarial Science	View Courses
MTHEL 300 - Professional Communications in Statistics and Actuarial Science	View Courses
CS 240 - Data Structures and Data Management	View Courses
CS 240E - Data Structures and Data Management (Enriched)	View Courses
CS 499R - Readings in Computer Science	View Courses
CS 497 - Multidisciplinary Studies in Computer Science	View Courses
CS 494 - Team Project 2	View Courses
CS 493 - Team Project 1	View Courses
CS 492 - The Social Implications of Computing	View Courses
CS 490 - Information Systems Management	View Courses
CS 489 - Advanced Topics in Computer Science	View Courses
CS 462 - Formal Languages and Parsing	View Courses
CS 466 - Algorithm Design and Analysis	View Courses
CS 454 - Distributed Systems	View Courses
CS 453 - Software and Systems Security	View Courses
CS 459 - Privacy, Cryptography, Network and Data Security	View Courses
CS 451 - Data-Intensive Distributed Computing	View Courses
CS 398 - Topics in Computer Science	View Courses
CS 399 - Readings in Computer Science	View Courses
CS 346 - Application Development	View Courses
CS 360 - Introduction to the Theory of Computing	View Courses
CS 499T - Honours Thesis	View Courses
CS 488 - Introduction to Computer Graphics	View Courses
CS 485 - Statistical and Computational Foundations of Machine Learning	View Courses
CS 484 - Computational Vision	View Courses
CS 457 - System Performance Evaluation	View Courses
CS 452 - Real-Time Programming	View Courses
CS 450 - Computer Architecture	View Courses
CS 449 - Human-Computer Interaction	View Courses
CS 448 - Database Systems Implementation	View Courses
CS 447 - Software Testing, Quality Assurance, and Maintenance	View Courses
CS 446 - Software Design and Architectures	View Courses
CS 445 - Software Requirements Specification and Analysis	View Courses
CS 444 - Compiler Construction	View Courses

CS 365 - Models of Computation	View Courses
CS 350 - Operating Systems	View Courses
CS 349 - User Interfaces	View Courses
CS 348 - Introduction to Database Management	View Courses
CS 343 - Concurrent and Parallel Programming	View Courses
CS 341 - Algorithms	View Courses
CS 251E - Computer Organization and Design (Enriched)	View Courses
CS 251 - Computer Organization and Design	View Courses
CS 241 - Foundations of Sequential Programs	View Courses
CS 241E - Foundations of Sequential Programs (Enriched)	View Courses
CS 458 - Computer Security and Privacy	View Courses

Final Assessment Report
Computing and Financial Management (BCFM)
February 2024

Executive Summary

External reviewers found that the Computing and Financial Management program (BCFM) delivered jointly by the David R Cheriton School of Computer Science and School of Accounting and Finance was in good standing.

"We were impressed by the academic quality and practical relevance of the program. In our opinion the program is rigorous and covers both breadth (Finance and CS) and depth."

A total of four recommendations were provided by the reviewers, regarding advising, course offerings, faculty appointment, and building relationships. In response, the program created a plan outlining the specific actions proposed to address each recommendation as well as a timeline for implementation. The next cyclical review for this program is scheduled for 2027-2028.

Enrollment over the past three years

	BCFM
2023-2024 (CURRENT YR)	204
2022-2023 (LAST YR)	187
2021-2022 (THREE YRS)	206

*Based on Active Student Extract from Quest on February 1, 2024.

Background

In accordance with the University of Waterloo's Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response of the Computing and Financial Management program (BCFM) delivered jointly by the David R Cheriton School of Computer Science and School of Accounting and Finance. A self-study (Volume I, II, III) was submitted to the Associate Vice-President, Academic on April 4, 2023. The self-study (Volume I) presented the program descriptions and learning outcomes, an analytical assessment of the programs, including the data collected from a student survey, along with the standard data package prepared by the Office of Institutional Analysis & Planning (IAP). The CVs for each faculty member with a key role in the delivery of the program(s) were included in Volume II of the self-study.

From Volume III, two arm's-length external reviewers were selected by the Associate Vice-President, Academic: Dr. Tony Ware, Professor of Applied Mathematics, University of Calgary; and Dr. Matt Davison, Professor of Statistical and Actuarial Science, Western University.

Reviewers appraised the self-study documentation and conducted a site visit to the University on October 16-20, 2023. An internal reviewer from the University of Waterloo, Dr. Mike Stone, Professor of Geography, was selected to accompany the external reviewers. The visit included interviews with the Vice-President, Academic & Provost; Associate Vice-President, Academic; Deans of the Faculties of Mathematics and Arts; Faculty Associate Deans of Undergraduate Studies for the Faculties of Mathematics and Arts; Co-Directors of the Department, as well as faculty members, staff, and current undergraduate students. The Review Team also had an opportunity to meet with representatives from the library, and Co-operative Education.

Following the site visit, the external reviewers submitted a report on their findings, with recommendations. Subsequently, the program responded to each recommendation and outlined a plan for implementation of the recommendations. Finally, the Dean responded to the external reviewers' recommendations, and endorsed the plans outlined by the program.

This final assessment report is based on information extracted, in many cases verbatim, from the self-study, the external reviewers' report, the program response and the Dean's response.

Program Characteristics

The CFM program offers a unique study experience for students as it is the only program in Canada to combine two majors in finance and computer science into one degree. It is also the only program to combine these two studies with a mandatory co-op program, requiring at least five four-month work terms.

CFM is a co-op only program, which provides students with the opportunity to gain up to two years of professional experience over five to six four-month work terms. The program was designed with co-op education as part of its degree requirements and students must complete their co-op work terms in order to graduate.

Students may choose after graduation to pursue designations including a Chartered Financial Analyst (CFA), Information Systems Professional (ISP), and/or Information Technology Certified Professional (ITCP) designation because of the accreditations that the CFM program has received from Canada's Association of I.T. Professionals and the CFA Institute. Graduates may also pursue graduate studies in the fields of computer science, finance or both.

Summary of Strengths, Challenges and Weaknesses based on Self-Study

Strengths

- Growing number of applicants.
- Growing number of alumni with relevant career outcomes.
- Program prepares job-ready students for financial technology (fintech) roles.
- Unique program and degree (BCFM).
- Career growth in the FinTech industry.
- Mentorship program to support students.
- Tight-knit community.
- Dedicated support of a Program Manager.

Challenges

- The population of Ontario Secondary School (OSS) applicants is declining.
- New program competitors may arise.
- A decline in applicants will result in the loss of funding for the program.
- High admissions average for a niche program.
- Limited degree recognition by employers.
- The David R. Cheriton School of Computer Science, the School of Accounting and Finance, the Faculty of Mathematics, and the Faculty of Arts, do not keep sophisticated or easy-to-interpret records of retention to compare with CFM's attrition numbers.

Weaknesses

- Limited course flexibility.
- Program demands strong time management.
- High tuition costs.
- High attrition rate.
- Limited engagement with alumni.
- Employers are not familiar with CFM.
- Limited scholarships for future and current students.

Summary of Key Findings from the External Reviewers

"We thought the new CFM courses, two of which (CFM101 and 301) have already been offered, are really good. It would be great to consider replacing one of the "deep computer science" courses on the CS side with a custom-made CFM course devised and taught by School of CS faculty. It is possible that a slight decrease in the number of required courses might be considered, to free space for more electives (even within program relevant 'pick lists'), available to program students.

We were impressed by the students we met and their positive commentary on their program. We were also impressed by the strong quantitative and qualitative metrics shared with us by the co-op office in terms of how well the students were doing on their placements and where those placements were."

Program Response to External Reviewers' Recommendations

1. Adjust details around the program advisor role to improve links with other counselling staff and to, if possible, improve the position salary grade to increase long term retention of staff in this role and to better support the program advisor in all aspects of the role**.**

Program Response

This has been our greatest concern in the program, and so having it as the first recommendation fits very well with what we also view as a major shortcoming in the program. The co-Directors have reached out to Breean Belton (SAF staff member and supervisor of the CFM manager position) and Tracey Williams (Administrative Officer of SAF) to express our desire to address this recommendation fully and completely. We are pleased that the initial response has been positive, which we detail below from Breean Belton.

"In the coming months we are hoping to build more cross training among the group of advisors in AFM, SFM, and CFM. This team is currently made up of 3-4 AFM advisors, the SFM Program Manager, and the CFM Program Manager.

Some of the strategy behind moving the SFM and CFM Program Managers into this team was so that we could leverage all SAF advisors to support all programs. The plan would be to build in cross training so that advisors can help each other during peak times or when someone is away. The intention is to provide more support to our students and to the advisors.

In addition to building cross training into the team, other ideas we'd like to explore are:

- Review the CFM Program Manager position (workload and responsibilities).

- Consider hiring a permanent staff advisor or coordinator position that would work directly with the CFM Program Manager. This would likely be instead of a temporary co-op position each term. This would provide additional support to students, knowledge sharing, cross training, and capacity for the Program Manager to be more involved in other areas (strategy, planning, director support, alumni relations).
- Consider having the CFM and SFM Program Managers collaborate closely to share best practices, share common resources and investigate cross-training.

Also of note, we recently added a new position in SAF for events. The Events Manager helps support the logistics of event planning. The CFM Manager can seek support for events from this position."

Dean's Response – Arts
The Dean supports most of the responses to this recommendation, particularly cross-training for advisors and the review of the Program Manager and enhancing collaboration between the CFM and SFM Program Managers. Like Math, I do not think that an additional permanent dedicated CFM advisor/coordinator is warranted.

Dean's Response – Math
Increasing integration and collaboration between the CFM Program Manager and advisors in SAF, CS and Math more generally is an important step in providing good guidance and a strong student experience. I am supportive of an increase in grade, consistent with similar positions, especially in other VPA programs. It is unlikely at the current scale of the programme that an additional permanent CFM-focused staff advisor is appropriate, and we'd be better served by more capacity and integration in the constituent units (CS, Math and SAF).

2. Continue path to offering one or more additional CFM coded courses, including one which replaces a more detailed CS program course in the curriculum with a financially relevant computer science course. Consider reducing the number of required courses in order to allow for more electives, even if from pick lists, so as to allow students to develop their own interests. We feel it is important for each CFM graduate to be able to do graduate school in one of CS or Finance if they wish and plan toward it, but that it might not be reasonable to ensure that every graduate be prepared to do graduate work in both disciplines.

Program Response
The CFM Program is pleased that the external reviewers acknowledged the importance and quality of the newly created CFM courses (CFM 101, 301 and 401). This initiative was originated from SAF, and the intention was to teach the CFM students right from the beginning what this program is about and how computing and finance work together. The

recommendation of offering addition CFM courses and in particular, a financially relevant computer science course, aligns with the general direction of the initiative. Ideally, we would like a course that is of general interest to CS majors and in the meantime of direct relevance to CFM. One potential candidate is CS 476: Numerical Computation for Financial Modeling. It was designed and taught by faculty in the Scientific Computing group in CS. The course is offered for CS majors and it is currently listed as an elective for CFM. In consultation with the Scientific Computing group, we will review and investigate the suitability of revising CS 476 as a required course for CFM with a CFM label. We will also investigate the possibility of creating a brand-new course in other finance-related areas.

The recommendation of reducing the number of required courses is an interesting idea. It provides more flexibility to CFM students and it may help address the issue of retention. However, we also recognize the importance of a well-balanced program with sufficient foundational and advanced knowledge in both fields of computer science and finance. In view of this, we are keen on a gradual plan that slowly reduces the number of required courses. We will investigate the viability of allowing a difference of one to two required courses in either field, and then review in the next couple of years whether to proceed further.

Dean's Response – Arts
The Dean endorses the thoughtful response to this recommendation provided by the program leadership. The Dean of Arts respects the views of the Dean of Math on these questions as well.

Dean's Response – Math
As noted in the Program Response, CFM is already creating a number of CFM-labeled courses which we hope will serve the program well. Expansion beyond this comes at the danger of boutique courses to small numbers for which there is little capacity to deliver or maintain. The proposed revision of the more broadly accessible CS476 (also to CS, SAS and Math students at least) is a good path forward, but too few CFM students currently take the prerequisite CS370/371/AM241 (which is itself problematic). A revision of CS335 (Computational Methods in Business and Finance) would be another option. It is not clear that a relabeling of these courses as CFM courses is necessary or desirable.

3. Ensure continuity of intellectual leadership in the program in the face of faculty retirements in SAF and CS, by appropriate recruitment. This might include joint appointment of faculty across relevant units including but not necessarily limited to SAF and CS.

Program Response
The CFM Program agrees with the external reviewers the importance of ensuring continuity of intellectual leadership. Three of the faculty members who have been heavily involved

with the creation, administration, and teaching of the CFM program, have been and will be retired. New faculty appointments are crucial to maintain a healthy offering of the program. That being said, we recognize the challenges of hiring faculty with background in computing and finance. These candidates are highly sought in the financial industry with much higher pay than in academia.

We will consider two directions of recruitment. One is to hire a regular faculty, possibly in the rank of lecturer, for teaching finance-related courses. In particular, we will investigate such a position based in SAF which tends to offer a higher and more competitive salary. In addition, they often possess industrial experience that is of great value to our students.

The other direction is to hire a regular faculty in CS. As the computational finance faculty members in the Scientific Computing group are retiring over the years, there are interests in hiring replacements. A note of interest is that the Faculty of Mathematics is undergoing a new change in organizational structure for managing business related programs. There may be interest within Math to hire a CS faculty to support broadly the developments of business/finance programs.

Dean's Response – Arts

The Dean of Arts endorses the response to this recommendation by the Dean of Math, and encourages collaboration and realistic assessment of the needs of the program. I add that if a new "lecturer" position is intended to be permanent, then we would be looking at hiring a teaching stream professor (under the new Policy 76) rather than a lecturer.

Dean's Response – Math

A Lecturer in CS with ability to teach computational finance (perhaps along with Scientific Computing) would be an asset, and one was recently recruited but unfortunately departed soon afterwards. It is not clear this is the best long-term strategy as there needs to be considerable development of senior courses, which is best done by faculty with a research interest in the area. As noted, there is considerable depth in computational and mathematical finance in the Department of Statistics and Actuarial Science. The related and much larger Financial Analysis and Risk Management, Actuarial Science, and Mathematics of Business programs are now all under SAS. We should explore better collaboration in the CFM program development and course development (as well as research).

4. Better leveraging of UW or Faculty-level Alumni Relations teams to keep in touch with students post-graduation. This will be beneficial for CO-OP and post-graduation job placement and for better understanding industry trends and needs for continuous program improvement.

Program Response

With the first graduating class in 2011, we agree that our program is now in a position where we must do more to facilitate connections with our alumni. The Co-Directors will pursue this from both the University and Faculty of Math level. In addition, on the SAF side, we are working to get the SAF Associate Director of Advancement to have CFM alumni relations within that job description as well.

Dean's Response – Arts
The Dean of Arts endorses the program's response to this recommendation.

Dean's Response – Math
Advancement is done at a faculty level in Math, including tracking CFM alumni. There could be stronger collaboration with SAF in this regard, much as there is on other VPA programs (e.g. Software Engineering between Math and Engineering).

Recommendations Not Selected for Implementation
Not Applicable

Implementation Plan

	Recommendations	Proposed Actions	Responsibility for Leading and Resourcing (if applicable) the Actions	Timeline for addressing Recommendations
1.	Adjust details around the program advisor role to improve links with other counselling staff and to, if possible, improve the position salary grade to increase long term retention of staff in this role and to better support the program advisor in all aspects of the role.	Co-Directors to work directly with relevant staff to restructure role and salary of CFM program manager.	This will be a joint effort between the co-Directors, Breean Belton (Supervisor, CFM Manager), and Tracy Williams (Administrative Officer, SAF). There will be resources required to implement changes, these resources will need to come from both the Faculty of Math and the Faculty of Arts.	1-2 years.
2.	Continue path to offering one or more additional CFM coded courses, including one which replaces a more detailed CS program course in the curriculum with a financially relevant computer science course. Consider reducing the number of required courses in order to allow for more electives, even if from pick lists, so as to allow students to develop their own interests. We feel	In consultation with the Scientific Computing group in CS, review and study the feasibility of revising the contents of CS 476 to make it a required course for CFM. New course topics will also be considered. Review the current curriculum of the CFM program. Investigate the feasibility of reducing the list of required courses while maintaining a healthy balance of computer science and finance.	It will be led by the CFM Program Manager and the co-Directors. It will involve faculty in the Scientific Computing group in CS. No immediate resources will be needed.	1 year.

	it is important for each CFM graduate to be able to do graduate school in one of CS or Finance if they wish and plan toward it, but that it might not be reasonable to ensure that every graduate be prepared to do graduate work in both disciplines.			
3.	Ensure continuity of intellectual leadership in the program in the face of faculty retirements in SAF and CS, by appropriate recruitment. This might include joint appointment of faculty across relevant units including but not necessarily limited to SAF and CS.	Investigate the possibility of a lecturer position in SAF that is able to teach CFM related courses. Also investigate the possibility of a faculty position in CS or Math Faculty that has a background in computer science and finance.	It will be led by the CFM co-Directors. It will involve discussion with administrators at the departmental and Faculty level. The outcome may require resources for faculty positions.	1-2 years.
4.	Better leveraging of UW or Faculty-level Alumni Relations teams to keep in touch with students post graduation. This will be beneficial for CO-OP and post graduation job placement and for better understanding industry trends and needs for continuous program improvement.	Co-Directors to work with alumni relations at the University level, the Faculty of Math, and the School of Accounting and Finance.	This will be lead by the CFM manager and co-Directors. We do not anticipate additional resources required.	1-2 years.

The Department Chair/Director, in consultation with the Dean of the Faculty shall be responsible for the Implementation Plan.

Date of next program review ~~2027-2028~~

Date

Signatures of Approval

James R. Thompson George Labahn April 17, 2024

Chair/Director Date

AFIW Administrative Dean/Head (*For AFIW programs only*) Date

Mark Giesbecht
Dean of Mathematics 19 April 2024

Faculty Dean Date

Note: AFIW programs fall under the Faculty of ARTS; however, the Dean does not have fiscal control nor authority over staffing and administration of the program.

Dan DeVidi

April 10, 2024

Associate Vice-President, Academic Date
(For undergraduate and augmented programs)

Senate Undergraduate Council - Effective Dates Chart

Meetings: 2024 - 2025

				EARLIEST EFFECTIVE DATE (see Notes)			
SUC Subcommittee submission timelines	**SUC meeting dates**	**Proposals for Courses** *(don't go to Senate)*	**Proposals for Programs/Plans, Regulations**	**New entry programs (enrol in 1A) [marketing deadline]**	**SENATE meeting dates**
April 2024	May 2024	Sept 2025	Sept 2025	**Sept 2026**	June 2024
May 2024	June 2024	Sept 2025	Sept 2025	Sept 2026	September 2024
June 2024	September 2024	Sept 2025	Sept 2025	Sept 2026	October 2024
October 2024	November 2024	Sept 2025	Sept 2025	Sept 2026	January 2025
December 2024	January 2025	Sept 2025	Sept 2025	Sept 2026	March 2025
March 2025	April 2025	**Sept 2026**	**Sept 2026**	Sept 2026	May 2025
April 2025	May 2025	Sept 2026	Sept 2026	**Sept 2027**	June 2025

Notes:

1. Proposals submitted up to January 2024 SUC are eligible for inclusion in the 2025-2026 UG Calendar.
2. Dates listed above are the earlist effective dates ***possible*** for any given proposal. Proposals wanting to use later effective dates (e.g., course changes for 2026 or 2027), should wait until the appropriate set of meetings.
3. If an ***earlier*** effective date is desired, impacting the current Calendar, a request to the Office of the Registrar, with an appropriate rationale, is ***required*** , to ensure it is feasible. The request should be made as early as possible in the drafting process.
4. For course proposals, exceptions can be made to allow changes to become effective in January (winter term) or May (spring term). A request to the Office of the Registrar, with an appropriate rationale, is required, to ensure it is feasible and to understand the impact to the rest of the published Calendar. The request should be made as early as possible in the drafting process.

Last opportunity to	SUC meeting	Goes to Senate
Make changes to 2025-2026 Calendar (plans/regulations)	January 2025	March 2025
Make changes to 2025-2026 Calendar (courses)	January 2025	N/A
Create new entry program for fall 2026	April 2025	May 2025
Make changes to 2026-2027 Calendar (plans/regulations)	January/February 2026	March 2026
Make changes to 2026-2027 Calendar (courses)	January/February 2026	N/A

Prepared by the Office of the Registrar, April 2024

Return to Agenda