

MTHEL 490 - Interdisciplinary Capstone

Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Rationale for New Course

The Global Futures Networks Steering Committee adjudicated the funding call and provided recommendations to Deans' Council Plus who finalized the first cohort of Global Futures Initiatives (GFIs). The proposal for "Creating Canada's Largest Capstone Ecosystem" has been approved for funding over 3 years.

UW currently graduates over 2,000 students per year with a mandatory capstone degree requirement, across four faculties: Arts, Environment, Health, and Engineering. Those 2,000+ students complete 500+ capstone projects per year. Currently, perhaps ~5% of these 500+ capstone projects have meaningful connections with external partners.

UW needs to grow strategically in creating elective capstone opportunities for the ~6,000 students who currently graduate without such an opportunity. The Faculty of Mathematics has participated into the recent cross-faculties efforts to create such opportunities in many recent terms:

- (Fall 2025) 6 Math students enrolled in ARTS 450/GENE 403/ENVS 403A/ENVS 404/SFM 403/SFM 413/SCI 300/MTHEL 398/EARTH 491 ([outline](#))
- (Spring 2025) 1 Math student enrolled in GENE 403/ENVS 474/MTHEL 398 ([outline](#))
- (Winter 2025) 12 Math students enrolled in GENE 404/ENBUS 475/ENVS 474/SCI 300/MTHEL 498/ARTS 490 ([outline](#))
- (Fall 2024) 14 students enrolled in ARBUS 400/GENE 403/ENBUS 475/ENVS 474/MTHEL 398/SCI 300 ([outline](#))

The theme of multiple of these past I-capstone courses have been advertised and run as **[Interdisciplinary Capstone \(i-Capstone\): Future Cities](#)**. You can browse through past I-capstone teams and projects that presented their work at the [i-capstone symposium](#) at the end of last Winter.

Read [here](#) the story about Math/CS and Science students working together. Generating these kinds of stories is part of the boot-strapping process, so we have inspirations to direct the next generation to.

Currently, each running of i-capstone has been relatively ad hoc. The hope is that by having an interdisciplinary capstone course in the books will allow for a more visible opportunity for students, and will also leave a clearer trace of the students transcripts.

Students should be able to do i-capstone projects in two flavours:

- an 8 month flavour, working on a larger project through MTHEL 490 and MTHEL 491 over two terms;
- a 4 month flavour, working on a project through MTHEL 490 over one term.

We would allow a student to do two shorter 4-month projects by allowing a second enrolment in MTHEL 490.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations

In the preparation of this course description, the following individuals were consulted:

- Derek Rayside (Associate Dean, Co-operative Education & Professional Affairs in the Faculty of Engineering). Derek has been a leader and organizer of the i-capstone experience across campus, and one of the co-lead in the Global Futures initiative funded above. He also has been one of the instructors of the previous iterations of our participation in the i-capstone course.
- Rob Gorbet (Associate Professor, SERS, Faculty of Environment).

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Subject Code

MTHEL

Number

490

Course Level

400

Title

Interdisciplinary Capstone

Abbreviated Title

Interdisciplinary Capstone

Undergraduate Communication Requirement Identifier

No,

Description

In this capstone course students will integrate their prior learning in a substantive applied project. They will reflect on their learning, identifying gaps with respect to personal and degree learning objectives, in preparation to transition beyond their undergraduate degree. Projects will be done in interdisciplinary teams. Students are expected to demonstrate a developed understanding of the interdisciplinary intersections realized in their project. Social engagement in the course is vital to the learning experience. While this is primarily a project-based course with instructors facilitating students' self-directed learning experience, there will be some specific content delivery such as design thinking, teamwork charter, environmental scan, etc.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

Project

Primary Component

Project

Grading Information

Standard Course Grading

Yes,

Cross-Listing Information

Is this course cross-listed?

No,

Repeatable Courses

Can this course be repeated for credit?

Yes,

Total Completions Allowed

02

Allow Multiple Enrol in a Term

No,

Enrolment Rules

Consent to Add

No consent required,

Consent to Drop

No consent required,

Prerequisites

Students must be in level 3B or higher

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

There are no dependencies

MTHEL 491 - Interdisciplinary Capstone 2

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Rationale for New Course

The creation of this course accompanies the creation of the MTHEL 490 course (Interdisciplinary Capstone). Students should be able to do i-capstone projects in two flavours:

- a 4 month flavour, working on a project through MTHEL 490 over one term;
- and an 8 month flavour, working on a larger project through MTHEL 490 and MTHEL 491 over two terms.

The creation of MTHEL 491 is necessary for this second flavour to be operationalized.

Approved at UAC 20251027.

Approved at FC 20251125.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Subject Code

MTHEL

Number

491

Course Level

400

Title

Interdisciplinary Capstone 2

Abbreviated Title

Interdisciplinary Capstone 2

Undergraduate Communication Requirement Identifier

No,

Description

The continuation of MTHEL490, this course sees students complete an 8-month integrative, applied project including testing, evaluation, and presentation.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

Project

Primary Component

Project

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:

- Course Not Found

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

There are no dependencies

AMATH 473 - Quantum Theory

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Offering Number

1

Proposal Details**Proposal Type**

Change,

Academic Unit Approval

2025-10-02

Rationale for Change

We added different prerequisite pathways that provide enough knowledge to be able to take the course for students whether they are in a Mathematical Physics major or not. We allow a number of pairs of courses, each with a vector calculus course and a quantum physics course. The exception is PMATH 343 which is not a quantum physics course per se, but it provides enough basis for AMATH 473 when paired with AMATH 231 (this is already a qualifying prerequisite combination in the current calendar).

The name of the course is being changed from “Quantum Theory 2” to “Quantum Theory” to accommodate the new quantum sequence in our mathematical physics major: our students will now take PHYS 234 - Quantum Physics 1 as their first course in quantum physics, followed by AMATH 473, which we will now call “Quantum Theory”, and AMATH 474, which we will now call “Advanced Quantum Theory”. Note that AMATH 373 (Quantum Theory 1) is no longer a required course in our programs and we plan to discontinue it in a few years.

Finally, we also remove the PHYS cross-listing (Physics is de-crosslisting and extinguishing the cross-listed PHYS code).

Approved at UAC 20251027.

Approved at FC 20251125.

January 20, 2026: addition of antirequisite (PHYS454) as a result of the decoupling of the previously cross-listed courses.

Consultations

These changes are coordinated with the Physics and Astronomy department and their broad program changes. This was done in consultation with Brenda Lee (Associate Chair Undergrad of Physics) and Stefan Idziak (Chair of the Physics curriculum committee), as well as with the Chairs of both departments.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied Mathematics

Subject Code

AMATH

Number

473

Course Level

400

Proposed

Title

Quantum Theory

Existing

Title
Quantum Theory 2

Proposed

Abbreviated Title
Quantum Theory

Existing

Abbreviated Title
Quantum Theory 2

Undergraduate Communication Requirement Identifier

No,

Description

The Hilbert space of states, observables, and time evolution. Feynman path integral and Greens functions. Approximation methods. Co-ordinate transformations, angular momentum, and spin. The relation between symmetries and conservation laws. Density matrix, Ehrenfest theorem, and decoherence. Multiparticle quantum mechanics. Bell inequality and basics of quantum computing.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

Primary Component

Lecture

Grading Information

Standard Course Grading

Yes,

Cross-Listing Information

Proposed

Is this course cross-listed?

No,

Existing

Is this course cross-listed?

Yes,

Proposed

Is this course cross-listed?

No,

Existing

Is this course cross-listed?

Yes,

Repeatable Courses

Can this course be repeated for credit?

No,

Enrolment Rules

Consent to Add

Consent to Drop

No consent required,

No consent required,

Prerequisites

1. Complete 1 of the following
 - **Complete all of the following**
 - Must have completed at least 1 of the following:
 - AMATH231 - Calculus 4 (0.50)
 - **MATH227 - Calculus 3 for Honours Physics (0.50)**
 -
 - Must have completed at least 1 of the following:
 - AMATH373 - Quantum Theory 1 (0.50)
 - **PHYS234 - Quantum Physics 1 (0.50)**
 -
 - Must have completed the following:
 - AMATH231 - Calculus 4 (0.50)
 - PMATH343 - Introduction to the Mathematics of Quantum Information (0.50)
 -
 - Must have completed the following:
 - **CHEM356 - Introductory Quantum Mechanics (0.50)**
 - **MATH217 - Calculus 3 for Chemical Engineering (0.50)**
 -
 - Must have completed the following:
 - **ECE206 - Advanced Calculus 2 for Electrical Engineers (0.50)**
 - **ECE305 - Introduction to Quantum Mechanics (0.50)**
 - ~~PHYS334 - Quantum Physics 2 (0.50)~~

Corequisites

No Rules

Antirequisites

1. Not completed nor concurrently enrolled in:
PHYS454

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Prerequisites

- AMATH 474 - Quantum Theory 3: Quantum Information and Foundations [View Program](#)
- PHYS 484 - Quantum Theory 3: Quantum Information and Foundations [View Program](#)

Course Requirements (no units)

- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours) [View Program](#)
- Quantum Information Option - Quantum Information Option
- H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours) [View Program](#)
- Physics Specialization - Physics Specialization [View Program](#)
- H-Applied Mathematics - Applied Mathematics (Bachelor of Mathematics - Honours) [View Program](#)
- JH-Applied Mathematics - Applied Mathematics (Joint Honours)
- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours) [View Program](#)

AMATH 474 - Advanced Quantum Theory: Quantum Information and Foundations

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Effective Date & Career

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Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-02

Rationale for Change

Adapted the course description to current content of the course and removed unnecessary prerequisites (level at least 4A and being enrolled in specific faculties are not needed if prerequisite courses are completed).

The name of the course is being changed from “Quantum Theory 3: Quantum Information and Foundations” to “Advanced Quantum Theory: Quantum Information and Foundations” to accommodate the new quantum sequence in our mathematical physics major: our students will now take PHYS 234 - Quantum Physics 1 as their first course in quantum physics, followed by AMATH 473, which we will now call “Quantum Theory”, and AMATH 474, which we will now call “Advanced Quantum Theory: Quantum Information and Foundations”. Note that AMATH 373 (Quantum Theory 1) is no longer a required course in our programs and we plan to discontinue it in a few years.

Finally, we also remove the PHYS cross-listing (Physics is de-crosslisting and extinguishing the cross-listed PHYS code).

Approved at UAC 20251027.

Approved at FC 20251125.

January 20, 2026: addition of antirequisite (PHYS484) as a result of the decoupling of the previously cross-listed courses.

Consultations

These changes are coordinated with the Physics department and their broad program changes. This was done in consultation with Brenda Lee (Associate Chair Undergrad of Physics) and Stefan Idziak (Chair of the Physics curriculum committee) as well as with the Chairs of both departments.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied
Mathematics

Subject Code

AMATH

Number

474

Course Level

400

Proposed

Title

Advanced Quantum Theory: Quantum Information and Foundations

Existing

Title

Quantum Theory 3: Quantum Information and Foundations

Proposed

Abbreviated Title

Advanced Quantum Theory

Existing

Abbreviated Title

Quantum Theory 3

Undergraduate Communication Requirement Identifier

No,

Proposed

Description

Phase space symplectic formulation of quantum mechanics. From classical theory to quantum theory: the quantization map and its issues. The Wigner function. Gaussian quantum mechanics. Notions of quantum information in infinite dimensional quantum systems. Theory of correlations and entanglement. Entanglement measures. Exploration of current research directions in quantum information.

Existing

Description

Theory of correlations and entanglement; theory of quantum channels, detectors; the measurement problem, in quantum mechanics; phase space formulation of quantum mechanics; entanglement in infinite dimensional quantum systems; introduction to open quantum systems; and exploration of current research directions in quantum information.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

Primary Component

Lecture

Grading Information

Standard Course Grading

Yes,

Cross-Listing Information

Proposed

Is this course cross-listed?

No,

Existing

Is this course cross-listed?

Yes,

Proposed

Is this course cross-listed?

No,

Existing

Is this course cross-listed?

Yes,

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

1. Must have completed at least 1 of the following:

- AMATH473 - Quantum Theory 2 (0.50)
- PHYS454 - Quantum Theory 2 (0.50)
-
- **Students must be in level 4A or higher**
- **Enrolled in a Faculty of Mathematics or Faculty of Science program**

Corequisites

No Rules

Antirequisites

1. Not completed nor concurrently enrolled in:
PHYS484

Course Notes

Workflow Information

Workflow Path
Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Faculty of Science

Dependencies

Course Requirements (no units)

- Quantum Information Option - Quantum Information Option
- H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours) [View Program](#)
- H-Applied Mathematics - Applied Mathematics (Bachelor of Mathematics - Honours) [View Program](#)
- JH-Applied Mathematics - Applied Mathematics (Joint Honours) [View Program](#)

CO 372 - Portfolio Optimization Models

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Effective Date & Career

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Undergraduate,

Proposed

Effective Term and Year
Fall 2026

Existing

Effective Term and Year
Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-23

Rationale for Change

Add MATH 235/245 (Linear Algebra 2) as needed prerequisite. Instructors have noted that students should know the material in MATH 235/245 in order to be successful in the course. This may exclude some non-Math students from the course, but the course is typically taken only by Math majors (mainly FARM majors) who are already required to take Math 235/245. There is no planned change in the material covered in the course.

Approved at UAC 20251027.

Approved at FC 20251125.

Course Information**Faculty**

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Subject Code

CO

Number

372

Course Level

300

Title

Portfolio Optimization Models

Abbreviated Title

Portfolio Optimization Models

Undergraduate Communication Requirement Identifier

No,

Description

Computational optimization methodologies underlying portfolio problems in finance. Computational linear algebra, determining derivatives, quadratic, and nonlinear optimization. The efficient frontier problem. Applications of optimization in finance such as volatility surface determination and global minimization for value-at-risk.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LaboratoryLecture

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

1. Complete all of the following
 - Must have completed at least 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
 - Must have completed at least 1 of the following:
 - ACTSC291 - Global Capital Markets and Financial Analytics (0.50)
 - ACTSC372 - Investment Science and Corporate Finance (0.50)
 - AFM272 - Global Capital Markets and Financial Analytics (0.50)
 - ECON371 - Business Finance 1 (0.50)
 -
 - Must have completed at least 1 of the following:
 - ACTSC371, BUS393W
 -
 - Complete 1 of the following

- Earned a minimum grade of 70% in each of the following:
- CO227 - Introduction to Optimization (Non-Specialist Level) (0.50)
-
- Complete 1 of the following
- Must have completed at least 1 of the following:
- CO250 - Introduction to Optimization (0.50)
- CO255 - Introduction to Optimization (Advanced Level) (0.50)
-
- Must have completed the following: CO352

Corequisites

No Rules

Antirequisites

Not completed: CO370 prior to winter 2004

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Course Requirements (no units)

- CPA-Finance Specialization - Finance Specialization [View Program](#)
- H-Mathematical Optimization - Operations Research Specialization -
Mathematical Optimization - Operations Research Specialization
(Bachelor of Mathematics - Honours) [View Program](#)
- H-Mathematical Optimization - Business Specialization - Mathematical
Optimization - Business Specialization (Bachelor of Mathematics -
Honours) [View Program](#)
- H-Mathematical Finance - Mathematical Finance (Bachelor of
Mathematics - Honours) [View Program](#)

Course Requirements (units)

- Combinatorics & Optimization Minor - Combinatorics and Optimization
Minor [View Program](#)

Course Requirements (no units)

- H-Computational Mathematics - Computational Mathematics (Bachelor
of Mathematics - Honours) [View Program](#)
- Computational Mathematics Minor - Computational Mathematics
Minor [View Program](#)
- H-Math/FARM - Chartered Financial Analyst Spec -
Mathematics/Financial Analysis and Risk Management - Chartered
Financial Analyst Specialization (Bachelor of Mathematics - Honours)
- H-Math/FARM - Professional Risk Management Spec - [View Program](#)
Mathematics/Financial Analysis and Risk Management - Professional
Risk Management Specialization (Bachelor of Mathematics - Honours)
[View Program](#)

CO 463 - Convex Optimization and Analysis

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year
Fall 2026

Existing

Effective Term and Year
Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-23

Rationale for Change

Add new course CO 365 (Optimization Models and Algorithms for Data Science) as a prerequisite option in addition to CO 255 and CO 367.

Approved at UAC 20251027.

Approved at FC 20251125.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Subject Code

CO

Number

463

Course Level

400

Title

Convex Optimization and Analysis

Abbreviated Title

Convex Optimization & Analysis

Undergraduate Communication Requirement Identifier

No,

Description

An introduction to the modern theory of convex programming, its extensions and applications. Structure of convex sets, separation and support, subgradient calculus for convex functions, Fenchel conjugacy and duality, Lagrange multipliers. Ellipsoid method for convex optimization.

Units

0.50

Exceptions to Fees or Academic Progress Units

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

1. Complete all of the following
 - Must have completed at least 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)
 -
 - Must have completed at least 1 of the following:
 - CO255 - Introduction to Optimization (Advanced Level) (0.50)
 - **CO365 - Optimization Models and Algorithms for Data Science (0.50)**
 - CO367 - Nonlinear Optimization (0.50)
 -
 - Earned a minimum cumulative average of 80

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Course Requirements (no units)

- H-Mathematical Optimization - Operations Research Specialization - Mathematical Optimization - Operations Research Specialization (Bachelor of Mathematics - Honours) [View Program](#)

Specializations

- H-Mathematical Optimization - Operations Research Specialization - Mathematical Optimization - Operations Research Specialization (Bachelor of Mathematics - Honours) [View Program](#)

Course Requirements (no units)

- H-Mathematical Optimization - Business Specialization - Mathematical Optimization - Business Specialization (Bachelor of Mathematics - Honours) [View Program](#)
- JH-Combinatorics & Optimization - Combinatorics and Optimization (Joint Honours) [View Program](#)

- H-Combinatorics & Optimization - Combinatorics and Optimization (Bachelor of Mathematics - Honours) [View Program](#)
- Artificial Intelligence Option - Artificial Intelligence Option [View Program](#)

Course Requirements (units)

- Combinatorics & Optimization Minor - Combinatorics and Optimization Minor [View Program](#)

Course Requirements (no units)

- SE-Artificial Intelligence Specialization - Artificial Intelligence Specialization [View Program](#)
- H-Computational Mathematics - Computational Mathematics (Bachelor of Mathematics - Honours) [View Program](#)
- Computational Mathematics Minor - Computational Mathematics Minor [View Program](#)
- CS-Artificial Intelligence Specialization - Artificial Intelligence Specialization [View Program](#)

Course Lists

- H-Electrical Engineering - Electrical Engineering (Bachelor of Applied Science - Honours) [View Program](#)
- H-Computer Engineering - Computer Engineering (Bachelor of Applied Science - Honours) [View Program](#)

CO 466 - Continuous Optimization

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-23

Rationale for Change

Remove CO 250 as prerequisite as it is subsumed by the other two options (CO 255 and CO 367). Remove CO352, which has not been offered at least since 2011, as a prerequisite. Add new course CO 365 (Optimization Models and Algorithms for Data Science) as a prerequisite option in addition to CO 255 and CO 367.

Approved at UAC 20251027.

Approved at FC 20251125.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Subject Code

CO

Number

466

Course Level

400

Title

Continuous Optimization

Abbreviated Title

Continuous Optimization

Undergraduate Communication Requirement Identifier

No,

Description

Numerical algorithms for nonlinear optimization. Newton, variable-metric, quasi-Newton and conjugate gradient methods. Obtaining derivatives. Convexity. Trust region methods. Constrained optimization including optimality conditions, sequential quadratic programming, interior point, and active set strategies.

Units

0.50

Exceptions to Fees or Academic Progress Units

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

1. Complete all of the following
 - **Must have completed at least 1 of the following:**
 - CO255 - Introduction to Optimization (Advanced Level) (0.50)

- **Course Not Found**
- CO367 - Nonlinear Optimization (0.50)
-
- Earned a minimum cumulative average of 80
- ~~Complete 1 of the following~~
- ~~Must have completed the following:~~
- ~~Must have completed the following:~~
- ~~Complete 1 of the following~~
- ~~Must have completed the following:~~
- ~~CO250 - Introduction to Optimization (0.50)~~
- ~~Must have completed the following: CO352~~

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Course Requirements (no units)

- H-Mathematical Optimization - Operations Research Specialization - Mathematical Optimization - Operations Research Specialization (Bachelor of Mathematics - Honours) [View Program](#)

Specializations

- H-Mathematical Optimization - Operations Research Specialization - Mathematical Optimization - Operations Research Specialization (Bachelor of Mathematics - Honours) [View Program](#)

Course Requirements (no units)

- H-Mathematical Optimization - Business Specialization - Mathematical Optimization - Business Specialization (Bachelor of Mathematics - Honours) [View Program](#)
- JH-Combinatorics & Optimization - Combinatorics and Optimization (Joint Honours) [View Program](#)
- H-Combinatorics & Optimization - Combinatorics and Optimization (Bachelor of Mathematics - Honours) [View Program](#)
- Artificial Intelligence Option - Artificial Intelligence Option [View Program](#)

Course Requirements (units)

- Combinatorics & Optimization Minor - Combinatorics and Optimization Minor [View Program](#)

Course Requirements (no units)

- SE-Artificial Intelligence Specialization - Artificial Intelligence Specialization [View Program](#)
- H-Computational Mathematics - Computational Mathematics (Bachelor of Mathematics - Honours) [View Program](#)
- Computational Mathematics Minor - Computational Mathematics Minor [View Program](#)
- CS-Artificial Intelligence Specialization - Artificial Intelligence Specialization [View Program](#)

- H-Applied Mathematics with Scientific Computing & Scientific Machine Learning - Applied Mathematics with Scientific Computing and Scientific Machine Learning (Bachelor of Mathematics - Honours)

[View Program](#)

Course Lists

- H-Electrical Engineering - Electrical Engineering (Bachelor of Applied Science - Honours) [View Program](#)
- H-Computer Engineering - Computer Engineering (Bachelor of Applied Science - Honours) [View Program](#)

CO 471 - Semidefinite Optimization

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Effective Date & Career

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Undergraduate,

Proposed

Effective Term and Year
Fall 2026

Existing

Effective Term and Year
Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-23

Rationale for Change

Add new course CO 365 (Optimization Models and Algorithms for Data Science) as a prerequisite option in addition to CO 255 and CO 367.

Approved at UAC 20251027.

Approved at FC 20251125.

Course Information**Faculty**

Faculty of Mathematics

Academic Unit

Department of Combinatorics and Optimization

Subject Code

CO

Number

471

Course Level

400

Title

Semidefinite Optimization

Abbreviated Title

Semidefinite Optimization

Undergraduate Communication Requirement Identifier

No,

Description

Optimization over convex sets described as the intersection of the set of symmetric, positive semidefinite matrices with affine spaces. Formulations of problems from combinatorial optimization, graph theory, number theory, probability and statistics, engineering design, and control theory. Theoretical and practical consequences of these formulations. Duality theory and algorithms.

Units

0.50

Exceptions to Fees or Academic Progress Units

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

1. Complete all of the following
 - Must have completed at least 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)
 -
 - Must have completed at least 1 of the following:
 - CO255 - Introduction to Optimization (Advanced Level) (0.50)
 - **Course Not Found**
 - CO367 - Nonlinear Optimization (0.50)
 -
 - Must have completed at least 1 of the following:
 - MATH239 - Introduction to Combinatorics (0.50)
 - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)
 -
 - Earned a minimum cumulative average of 80.0

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Course Requirements (no units)

- H-Mathematical Optimization - Operations Research Specialization -
Mathematical Optimization - Operations Research Specialization
(Bachelor of Mathematics - Honours) [View Program](#)

Specializations

- H-Mathematical Optimization - Operations Research Specialization - Mathematical Optimization - Operations Research Specialization (Bachelor of Mathematics - Honours) [View Program](#)

Course Requirements (no units)

- H-Mathematical Optimization - Business Specialization - Mathematical Optimization - Business Specialization (Bachelor of Mathematics - Honours) [View Program](#)
- JH-Combinatorics & Optimization - Combinatorics and Optimization (Joint Honours) [View Program](#)
- Quantum Information Option - Quantum Information Option
- H-Combinatorics & Optimization - Combinatorics and Optimization (Bachelor of Mathematics - Honours) [View Program](#) [View Program](#)

Course Requirements (units)

- Combinatorics & Optimization Minor - Combinatorics and Optimization Minor [View Program](#)

Course Requirements (no units)

- H-Computational Mathematics - Computational Mathematics (Bachelor of Mathematics - Honours) [View Program](#)
- Computational Mathematics Minor - Computational Mathematics Minor [View Program](#)

COMM 103 - Principles of Economics

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year
Fall 2026

Existing

Effective Term and Year
Fall 2023

Offering Number

1

Proposal Details

Proposal Type

Change,

Rationale for Change

Updating effective date to accompany ECON 100 motion proposed by the Faculty of Arts.

Course Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Subject Code

COMM

Number

103

Course Level

100

Title

Principles of Economics

Abbreviated Title

Principles of Economics

Undergraduate Communication Requirement Identifier

No,

Description

This course provides an introduction to the basic concepts and tools of micro and macro economic analysis of individuals, businesses, and government in the global world. Topics may include consumers, producers, market structures, national income accounting, unemployment, and inflation.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

Lecture

Primary Component

Lecture

Grading Information**Standard Course Grading**

Yes,

Cross-Listing Information

Is this course cross-listed?

Yes,

Cross-Listed Courses

[ECON 100](#) - Principles of Economics

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

Enrolled in H-Mathematics/Chartered Professional Accountancy

Corequisites

No Rules

Antirequisites

Not completed nor concurrently enrolled in:

- ECON101 - Introduction to Microeconomics (0.50)
- ECON102 - Introduction to Macroeconomics (0.50)

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Faculty of Arts

Dependencies

Prerequisites

- ECON 201 - Microeconomic Theory for Business and Policy
- ECON 211 - Introduction to Mathematical Economics [View Program](#)
[View Program](#)

Antirequisites

- ECON 101 - Introduction to Microeconomics [View Program](#)

Prerequisites

- ECON 231 - Introduction to International Economics [View Program](#)
- ECON 351 - Labour Economics [View Program](#)
- ECON 221 - Statistics for Economists [View Program](#)
- ECON 371 - Business Finance 1 [View Program](#)
- ECON 372 - Business Finance 2 [View Program](#)
- ECON 254 - Economics of Sport [View Program](#)
- ECON 207 - Economic Growth and Development 1 [View Program](#)
- ECON 206 - Money and Banking 1 [View Program](#)
- ECON 256 - Introduction to Health Economics [View Program](#)
- ECON 322 - Econometric Analysis 1 [View Program](#)
- ECON 262 - History of Economic Thought [View Program](#)
- ECON 366 - Gender and Economics [View Program](#)
- ECON 241 - Introduction to Public Economics [View Program](#)

Antirequisites

- SFM 102 - Sustainability Economics [View Program](#)

Prerequisites

- ECON 255 - Introduction to Environmental and Natural Resource Economics [View Program](#)
- ECON 290 - Models of Choice in Competitive Markets [View Program](#)

Course Requirements (no units)

- International Trade Minor - International Trade Minor [View Program](#)
- Indigenous Entrepreneurship Diploma - Diploma in Indigenous Entrepreneurship [View Program](#)
- Indigenous Entrepreneurship Minor - Indigenous Entrepreneurship Minor [View Program](#)
- H-Mathematics/Chartered Professional Accountancy - Mathematics/Chartered Professional Accountancy (Bachelor of Mathematics - Honours) [View Program](#)

Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Proposal Details

Proposal Type

Change,

Quality Assurance Designation

Minor Modification Qad

Is there an impact to existing students?

No,

Is the credential name changing?

No,

Co-operative System of Study and Requirements

Not Applicable,

Creating or Changing Invalid Combinations

No,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

The way the Business Specialization is currently presented in the UG calendar is confusing for both students and advisors. The plan, as currently presented in the calendar, contains the repetition of requirements from the H-Mathematical Studies plan, which makes it difficult for advisors to communicate that degree requirements have been met when students seek degree audits at the end of their studies.

In the faculty of mathematics, we have both plan 10 and plan 20 (add-on) specializations. Plan 20 specializations are additional requirements that need to be completed beyond the requirements of the associated Honours plan; the MS-Business Specialization is coded as a Plan 20 specialization in Quest. As such, the proposed changes seek to align this specialization with the calendar-wide understanding of Plan 20 specialization requirements by eliminating the duplication of H-Mathematical Studies requirements and presenting a more succinct list of required courses. Effectively, this proposal does not change the requirements of the plan, it simply changes the way we present them in the calendar.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

Associate Dean of Mathematics - April 11, 2025

Director, Mathematical Studies - April 17, 2025

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Specialization

Program/Plan Name

Business Specialization

Admissions

Specialization is available for students in the following majors

H-Mathematical Studies

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

Average Requirement

No,

Proposed

Graduation Requirements

- Complete a total of 8.5 units according to the requirements listed below.

Existing

Graduation Requirements

- Complete a total of 12.0 units of math courses, listed below.

Course Requirements (units)

Required Courses

- 0Units to Complete
- No Rules

1. 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)
- BUS121W - Critical Thinking and Communication Skills (WLU) (0.50)
- CS330 - Management Information Systems (0.50)
- ECON101 - Introduction to Microeconomics (0.50)
- ECON102 - Introduction to Macroeconomics (0.50)

-
- Complete 1 of the following:
 - ACTSC221 - Introductory Financial Mathematics (Non-Specialist Level) (0.50)
 - ACTSC231 - Introductory Financial Mathematics (0.50)
 - ACTSC291 - Global Capital Markets and Financial Analytics (0.50)
 - AFM272 - Global Capital Markets and Financial Analytics (0.50)
-
- Complete 1 of the following:
 - AFM131 - Introduction to Business in North America (0.50)
 - ARBUS101 - Introduction to Business in North America (0.50)
 - BUS111W - Understanding the Business Environment (WLU) (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:
 - CO227 - Introduction to Optimization (Non-Specialist Level) (0.50)
 - CO250 - Introduction to Optimization (0.50)
 - CO255 - Introduction to Optimization (Advanced Level) (0.50)
-
- Complete 1 of the following:
 - CO327 - Deterministic OR Models (Non-Specialist Level) (0.50)
 - CO370 - Deterministic OR Models (0.50)
-
- Complete 2 of the following:
 - CS200 - Concepts for Advanced Computer Usage (0.50)
 - CS338 - Computer Applications in Business: Databases (0.50)
 - CS430 - Applications Software Engineering (0.50)
 - STAT340 - Stochastic Simulation Methods (0.50)
-
- Complete 1 of the following:
 - STAT321 - Regression and Forecasting (Non-Specialist Level) (0.50)
 - STAT322 - Sampling and Experimental Design (Non-Specialist Level) (0.50)
 - STAT331 - Applied Linear Models (0.50)
 - STAT332 - Sampling and Experimental Design (0.50)
-
- Complete the List 1 requirement below
-
- List 1
-
- Complete all of the following
 - Complete 3 additional courses from the following options.
 - Complete no more than 1 from the following:
 - LS271 - Conflict Resolution (0.50)
 - PACS202 - Conflict Resolution (0.50)
-
- Complete no more than 1 from the following:

- LS319 - Negotiation: Theories and Strategies (0.50)
- PACS323 - Negotiation: Theories and Strategies (0.50)
-
- Choose courses from any of the following subject codes: AFM, BUS, COMM, ECON, HRM, MSE, STV
- ~~Complete 7 additional math courses from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT~~
- ~~Complete 10 math courses at the 300- or 400-level from the following subject codes (including any taken to satisfy the above requirements): 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. Students 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. Students previously enrolled in the following academic plans (Computing and Financial Management and Mathematics/Chartered Professional Accountancy) may substitute:
 1. STAT373 for STAT321.
 2. STAT374/AFM323 for STAT321.

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

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

[Top](#)

Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Proposal Details

Proposal Type

Change,

Quality Assurance Designation

Minor Modification Qad

Is there an impact to existing students?

No,

Is the credential name changing?

No,

Co-operative System of Study and Requirements

Not Applicable,

Creating or Changing Invalid Combinations

No,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

This change is intended to complement the proposal to modify the presentation of the Mathematical Studies, Business Specialization requirements. The proposal to the Business Specialization includes a change to the graduation requirements, indicating the need to only complete the additional courses of the specialization beyond the requirements of the Mathematical Studies honours plan. This, in turn, eliminates the current graduation requirement in the specialization that stipulates that Business Specialization students only need to complete 12.0 units of math courses, as opposed to the 13.0 units required for Math Studies students. Since the Business Specialization's reduction in overall math courses is an alteration of the Mathematical Studies Honour plan requirement, we propose including it in the Additional Constraints of the Mathematical Studies plan page.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

Associate Dean of Mathematics - April 11, 2025

Director, Mathematical Studies - April 17, 2025

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Major

Program Type

Honours

Degree

Bachelor of Mathematics

Program/Plan Name

Mathematical Studies (Bachelor of Mathematics - Honours)

Systems of Study

Co-operative, Regular,

Admissions

Admissions Entry Point

Declare Plan,

Declaration Requirements

- Before declaring this academic plan, see [invalid credential combinations](#).

Requirements Information

Invalid Combinations

No,

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](#).
 - Mathematical Studies students are exempt from taking the List A courses.
- 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 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 1 of the following:
 - MATH106 - Applied Linear Algebra 1 (0.50)
 - MATH136 - Linear Algebra 1 for Honours Mathematics (0.50)
 - MATH146 - Linear Algebra 1 (Advanced Level) (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:
 - MATH207 - Calculus 3 (Non-Specialist Level) (0.50)
 - MATH229 - Introduction to Combinatorics (Non-Specialist Level) (0.50)
 - MATH237 - Calculus 3 for Honours Mathematics (0.50)
 - MATH239 - Introduction to Combinatorics (0.50)
 - MATH247 - Calculus 3 (Advanced Level) (0.50)
 - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)
- Complete 1 of the following:
 - MATH225 - Applied Linear Algebra 2 (0.50)
 - MATH235 - Linear Algebra 2 for Honours Mathematics (0.50)
 - MATH245 - Linear Algebra 2 (Advanced Level) (0.50)
- Complete 1 of the following:
 - STAT220 - Probability (Non-Specialist Level) (0.50)
 - STAT230 - Probability (0.50)
 - STAT240 - Probability (Advanced Level) (0.50)
- Complete 1 of the following:
 - STAT221 - Statistics (Non-Specialist Level) (0.50)
 - STAT231 - Statistics (0.50)
 - STAT241 - Statistics (Advanced Level) (0.50)
- Complete 10 additional math courses 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?

No,

Proposed

Additional Constraints

1. Students in Mathematical Studies who complete one of the following additional plans are only required to complete 12.0 units of math courses: MS-Business Specialization, or a minor or joint honours plan in a discipline outside the Faculty of Mathematics.

Existing

Additional Constraints

1. Students in Mathematical Studies who complete a minor or joint honours plan in a discipline outside the Faculty of Mathematics are only required to complete 12.0 units of math courses.

Specializations

Specializations for this Major

Yes - Optional,

Specialization Details

Students may choose to focus their elective choices by completing the available specialization.

Specializations List

MS-Business Specialization

Undergraduate Plan Guidelines

Workflow Information

Change to Undergraduate Communication Requirement

No,

Workflow Path
Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

H-Mathematical Economics (BMath) - Mathematical Economics (Bachelor of Mathematics - Honours) [Top](#)

Effective Date and Career

Career
Undergraduate,

Proposed

Effective Term and Year
Fall 2026

Existing

Effective Term and Year
Fall 2024

Proposal Details

Proposal Type
Change,

Academic Unit Approval
2025-09-11

Quality Assurance Designation

Minor Modification Qad

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 Faculty of Arts is creating three new minors:

- Minor in Economic Policy;
- Minor in Business Economics;
- Minor in Econometrics and Data Analysis.

These minors will be listed as invalid combinations for students in the BA-Mathematical Economics programs in the Faculty of Arts.

We agree with Arts that the BMath version of Mathematical Economics should also have these minors listed as **invalid combinations**.

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

Listing these new minors as invalid combinations for students in the BMath-Mathematical Economics program ensures that overlapping credentials are avoided while maintaining consistency across both BMath- and BA-Mathematical Economics programs.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

We agreed with the Department of Economics that students in the Math Econ BMath plan should not be eligible to pursue these 3 new minors, just as they are currently ineligible for the Minor in Economics and the Minor in Economic Theory.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Faculty

Faculties of Arts and Mathematics

Undergraduate Credential Type

Major

Program Type

Honours

Degree

Bachelor of Mathematics

Program/Plan Name

Mathematical Economics (Bachelor of Mathematics - Honours)

Systems of Study

Co-operative, Regular,

Admissions

Admissions Entry Point

Declare Plan,

Declaration Requirements

- Before declaring this academic plan, see [invalid credential combinations](#).

Requirements Information

Invalid Combinations

Yes,

Proposed

List of Invalid Combinations

Arts and Business

Data Science (Bachelor of
Computer Science - Honours)

Data Science (Bachelor of
Mathematics - Honours)

Economics (Bachelor of Arts - Four-Year General)

Economics (Bachelor of Arts - Honours)

Economics Minor

Economics Specialization

Economic Theory Minor

Economic Policy Minor

Business Economics Minor

Econometrics and Data Analysis Minor

Existing

List of Invalid Combinations

Arts and Business

Data Science (Bachelor of Computer Science - Honours)

Data Science (Bachelor of Mathematics - Honours)

Economics (Bachelor of Arts - Four-Year General)

Economics (Bachelor of Arts - Honours)

Economics Minor

Economics Specialization

Economic Theory Minor

Average Requirement

Yes,

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative Mathematics average of 60.0%.
- A minimum cumulative Economics average of 70.0%.

Graduation Requirements

- See [Bachelor of Mathematics degree-level requirements](#).
- Complete all the required courses listed below.
- Complete a minimum of 11.0 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 of the following
 - Complete the following courses with a minimum cumulative Economics average of 70.0%.
 - Complete all the following:
 - ECON101 - Introduction to Microeconomics (0.50)
 - ECON102 - Introduction to Macroeconomics (0.50)

- ECON290 - Models of Choice in Competitive Markets (0.50)
- ECON306 - Macroeconomics (0.50)
- ECON391 - Equilibrium in Market Economies (0.50)
- ECON393 - Market Failures (0.50)
- ECON472 - Senior Honours Essay (0.50)
- ECON491 - Advanced Microeconomics (0.50)
- ECON496 - Advanced Macroeconomics (0.50)
- Complete 1 of the following:
 - ECON406 - Money and Banking 2 (0.50)
 - ECON407 - Economic Growth and Development 2 (0.50)
 - ECON408 - Business Cycles (0.50)
 - ECON409 - Workers, Jobs, and Wages (0.50)
- Complete 4 additional ECON courses at the 300- or 400-level.
- Complete all of the following
 - Complete the following courses with a minimum cumulative Mathematics average of 60.0%.
 - Complete all the following:
 - AMATH350 - Differential Equations for Business and Economics (0.50)
 - STAT331 - Applied Linear Models (0.50)
 - STAT443 - Forecasting (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:
 - 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 7 additional math courses from the following subject codes: ACTSC, AMATH, CO, CS, MATBUS, MATH, PMATH, STAT
 - Complete 2 additional courses

Course Lists

Required Courses

- No Rules

Are there cross-listed courses listed in requirements?

Cross-Listings Options

Yes,

All cross-listings to be displayed,

Additional Constraints

1. In their elective choices, students must choose to take ACTSC372 or ECON371, as well as STAT331 or ECON 421. If taken, ACTSC372 or STAT331 will count as a mathematics group choice. If taken, ECON371 or ECON421 will count as an economics group choice.

Notes

- Students contemplating an application to transfer faculties to complete the Honours Mathematical Economics (Bachelor of Arts) plan should consult an academic advisor regarding important effects of such a change (such applications are not automatically granted).

Specializations

Specializations for this Major

No,

Undergraduate Plan Guidelines

Workflow Information

Change to Undergraduate Communication Requirement

No,

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Senate Workflow

Senate Consent,

Dependencies

Mathematics Minor - Mathematics Minor

[Top](#)

Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Proposal Details

Proposal Type

Change,

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

The Mathematics Minor is the very few minor plans at the university to list a fail limit in the graduation requirements. We propose eliminating this clause to align the Math Minor with the vast majority of other minors across the university.

The Chemistry Minor has a limit of 2 failure in CHEM courses and the Medical Physiology Minor has a requirement that a failed second attempt of a required course will result in removal from the Minor. Otherwise all other 79 minors at UW do not have a fail limit.

Approved at UAC 20251027.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Minor

Program/Plan Name

Mathematics Minor

Admissions

Admissions Entry Point

Declare Plan,

Declaration Audience

This credential is open to students enrolled in any degree program.

Declaration Requirements

- Before declaring this academic plan, see [invalid credential combinations](#).

Requirements Information

Invalid Combinations

Yes,

List of Invalid Combinations

Applied Mathematics Minor

Bioinformatics Option

Combinatorics and Optimization
Minor

Computer Science Minor

Computing Minor

Pure Mathematics Minor

Mathematics (Joint Honours)

Computer Science (Bachelor of
Computer Science - Joint Honours)

Mathematical Economics (Bachelor
of Arts - Honours)

Mathematical Economics (Bachelor
of Mathematics - Honours)

Mathematical Physics (Bachelor of
Science - Honours)

Computing and Financial
Management (Bachelor of
Computing and Financial
Management - Honours)

Software Engineering (Bachelor of
Software Engineering - Honours)

Average Requirement

Yes,

Minimum Average(s) Required

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

Proposed

Graduation Requirements

- Complete a total of 5.0 units of required courses, listed below.

Existing

Graduation Requirements

- Complete a total of 5.0 units of required courses, listed below.
- A maximum of 1.0 units of failed math courses.

Course Requirements (units)

Required Courses

- 0 Units to Complete
- No Rules

Course Requirements (no units)

Required Courses

- Complete all of the following
- 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:
 - CS114 - Principles of Computing for Science (0.50)
 - 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 1 of the following:
 - MATH106 - Applied Linear Algebra 1 (0.50)
 - MATH114 - Linear Algebra for Science (0.50)
 - MATH115 - Linear Algebra for Engineering (0.50)
- Complete 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)
- Complete 1 of the following:
 - MATH118 - Calculus 2 for Engineering (0.50)
 - MATH119 - Calculus 2 for Engineering (0.50)
 - MATH128 - Calculus 2 for the Sciences (0.50)
- Complete 2 of the following:
 - STAT220 - Probability (Non-Specialist Level) (0.50)
 - STAT221 - Statistics (Non-Specialist Level) (0.50)

- STAT321 - Regression and Forecasting (Non-Specialist Level) (0.50)
- STAT322 - Sampling and Experimental Design (Non-Specialist Level) (0.50)
- Complete 3 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?

No,

Specializations

Undergraduate Plan Guidelines

Adherence to Academic Plan Guidelines

Yes,

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

3G-Mathematics - Mathematics (Bachelor of Mathematics, Three- Year General)

[Top](#)

Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-06-05

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

The following proposes an alternative to taking MATH235/245 in the requirements of the 3G-Mathematics degree to present a direct pathway for BCS students who need to take advantage of the Honours Fallback Provision late in their program.

MATH235 is not a course that BCS students take, so its inclusion as a required course disproportionately effects BCS students who--in the typical circumstances that lead to a student taking the 3G-Mathematics route--do not have the capacity to make up this additional, missing credit. As it stands, BCS students who are otherwise successful in their program but who need to graduate as early as possible due to extenuating circumstances, are at a disadvantage to their BMATH peers because of the MATH235 requirement.

The proposal recommends adding CS245/CS245E as an alternative to

MATH235/245. Both MATH235 and CS245 are rigorous courses, and while it would no longer guarantee that every recipient of the three-year general degree has two linear algebra courses, it proposes an adequate alternative in logic and computation.

Approved at UAC 20251027.

Approved at FC 20251125.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Dean of Mathematics Office

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Major

Program Type

Three Year General

Degree

Bachelor of Mathematics

Program/Plan Name

Mathematics (Bachelor of Mathematics, Three-Year General)

Systems of Study

Regular, Co-operative,

Admissions

Admissions Entry Point

Declare Plan,

Declaration Requirements

Known as the Honours Fallback Provision, students who have, at any time, satisfied all of the following conditions may elect to graduate with a Bachelor of Mathematics, Three-Year General degree by declaring it on their application to graduate.

Students who have also satisfied the co-operative education program requirements for an Honours degree (a minimum of 2.5 COOP course units, a minimum of 2.5 PD course units (including PD1 and PD11), and at least 8 full-term study terms), may elect to graduate with a Bachelor of Mathematics, Three-Year General degree (co-op).

Requirements Information

Invalid Combinations

No,

Average Requirement

Yes,

Minimum Average(s) Required

- A minimum cumulative average of 60.0%.

Graduation Requirements

- See [Bachelor of Mathematics \(BMath\) degree-level requirements](#); must satisfy the Undergraduate Communication Requirement.
- Complete a minimum of 8.0 units of math courses, listed below.
- Complete a minimum of 5.0 units of non-math courses.

Course Requirements (units)

Required Courses

- oUnits to Complete
- No Rules

1. Required Courses

-
- Complete all of the following
- 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 1 of the following:
 - MATH106 - Applied Linear Algebra 1 (0.50)
 - MATH136 - Linear Algebra 1 for Honours Mathematics (0.50)
 - MATH146 - Linear Algebra 1 (Advanced Level) (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:
 - MATH207 - Calculus 3 (Non-Specialist Level) (0.50)
 - MATH229 - Introduction to Combinatorics (Non-Specialist Level) (0.50)
 - MATH237 - Calculus 3 for Honours Mathematics (0.50)
 - MATH239 - Introduction to Combinatorics (0.50)
 - MATH247 - Calculus 3 (Advanced Level) (0.50)
 - MATH249 - Introduction to Combinatorics (Advanced Level) (0.50)
-
- Complete 1 of the following:
 - **CS245 - Logic and Computation (0.50)**
 - **CS245E - Logic and Computation (Enriched) (0.50)**
 - MATH225 - Applied Linear Algebra 2 (0.50)
 - MATH235 - Linear Algebra 2 for Honours Mathematics (0.50)
 - MATH245 - Linear Algebra 2 (Advanced Level) (0.50)
-

- Complete 1 of the following:
- STAT220 - Probability (Non-Specialist Level) (0.50)
- STAT230 - Probability (0.50)
- STAT240 - Probability (Advanced Level) (0.50)
-
- Complete 1 of the following:
- STAT221 - Statistics (Non-Specialist Level) (0.50)
- 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?

No,

Additional Constraints

1. Students choosing the Honours Fallback Provision may not combine this choice with any specialization, option, or minor.

Notes

- Graduates who were previously awarded a general degree may apply for readmission to upgrade to an honours degree, provided that at least three terms have passed since their last term of enrolment. These applications will be considered on a case-by-case basis. Courses and grades from the general degree would be used towards the upgraded degree if applicable, but students would otherwise need to meet current Calendar requirements. Students who opt to return to upgrade their degree from general co-op to honours cannot have the co-op designation added to the honours degree.

Specializations

Specializations for this Major

No,

Undergraduate Plan Guidelines

Workflow Information

Change to Undergraduate Communication Requirement

No,

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Applied Mathematics Minor - Applied Mathematics Minor

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Effective Date and Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-02

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

We are adding PHYS 249 as a valid Linear algebra requirement to allow Honours Physics and Physics and Astronomy students to obtain the minor.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

This change was done in response to a request from the Physics and Astronomy department. In particular this was proposed under consultations with Brenda Lee (associate chair undergraduate in Physics and also instructor of the course).

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied
Mathematics

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Minor

Program/Plan Name

Applied Mathematics Minor

Admissions**Admissions Entry Point**

Declare Plan,

Declaration Audience

This credential is open to students enrolled in any degree program.

Declaration Requirements

- Before declaring this academic plan, see [invalid credential combinations](#).

Requirements Information

Invalid Combinations

Yes,

List of Invalid Combinations

Applied Mathematics with Scientific Computing and Scientific Machine Learning (Bachelor of Mathematics - Honours)

Mathematical Physics (Bachelor of Mathematics - Honours)

Mathematical Physics (Bachelor of Science - Honours)

Mathematics (Joint Honours)

Mathematics Minor

Average Requirement

No,

Graduation Requirements

- Complete a total of 5.0 units.

Course Requirements (units)

Required Courses

- 0Units to Complete
- No Rules

1. Required Courses

-
- Complete all of the following
- Complete 1 of the following:
 - MATH103 - Introductory Algebra for Arts and Social Science (0.50)
 - MATH106 - Applied Linear Algebra 1 (0.50)
 - MATH114 - Linear Algebra for Science (0.50)
 - MATH115 - Linear Algebra for Engineering (0.50)
 - MATH136 - Linear Algebra 1 for Honours Mathematics (0.50)
 - MATH146 - Linear Algebra 1 (Advanced Level) (0.50)
 - **PHYS249 - Linear Algebra for Physics and Astronomy (0.50)**
-
- Complete 1 of the following:
 - MATH104 - Introductory Calculus for Arts and Social Science (0.50)
 - MATH116 - Calculus 1 for Engineering (0.50)
 - MATH117 - Calculus 1 for Engineering (0.50)
 - 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:
 - MATH118 - Calculus 2 for Engineering (0.50)
 - MATH119 - Calculus 2 for Engineering (0.50)
 - 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:
 - ECE206 - Advanced Calculus 2 for Electrical Engineers (0.50)
 - MATH212 - Advanced Calculus 2 for Electrical Engineers (0.50)
 - MATH217 - Calculus 3 for Chemical Engineering (0.50)
 - MATH227 - Calculus 3 for Honours Physics (0.50)
 - MATH237 - Calculus 3 for Honours Mathematics (0.50)
 - MATH247 - Calculus 3 (Advanced Level) (0.50)
-
- Complete 1 of the following:
 - AMATH250 - Introduction to Differential Equations (0.50)
 - AMATH251 - Introduction to Differential Equations (Advanced Level) (0.50)
 - ECE205 - Advanced Calculus 1 for Electrical and Computer Engineers (0.50)
 - MATH211 - Advanced Calculus 1 for Electrical and Computer Engineers (0.50)
 - MATH213 - Signals, Systems, and Differential Equations (0.50)

- MATH218 - Differential Equations for Engineers (0.50)
- MATH228 - Differential Equations for Physics and Chemistry (0.50)
-
- Complete 5 additional AMATH courses, at least 3 courses must be at the 300- or 400-level

Course Lists

Required Courses

- No Rules

Are there cross-listed courses listed in requirements?

Yes,

Cross-Listings Options

All cross-listings to be displayed,

Specializations

Undergraduate Plan Guidelines

Adherence to Academic Plan Guidelines

Yes,

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

Engineering Specialization - Engineering Specialization

[Top](#)

Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-02

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

We remove PHYS 122 from the lists of required courses for two of the three themes of the specialization because Applied Mathematics students no longer take its PHYS 121 prerequisite (since the Fall 2025 calendar, removing a major hurdle for Applied Mathematics students declaring their major in second year), and because PHYS 122 is not a prerequisite for any other course in the specialization. Also, the content of PHYS 122 has recently changed following a series of curriculum updates in the Physics and Astronomy Department removing the waves part of the course content. The impact of this change on the number of students in PHYS 122 will be minimal, as only about one to three students per year pursue this specialization, which is negligible compared to the total number of students enrolled in PHYS 122. This adjustment also increases flexibility for students in the specialization, allowing them to more comfortably complete it within the normal number of academic terms.

The removal of PHYS 122 has negligible impact on the learning outcomes. The waves content of the course is seen in more depth by all AMATH students in AMATH 353, and the basic electrostatics and magnetostatic content of the course is sufficiently introduced as well for students in Theme 2 in their ECE courses.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

This change has been part of the discussions between the two departments on the broader program changes in Physics and Applied Mathematics.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied
Mathematics

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Specialization

Program/Plan Name

Admissions

Specialization is available for students in the following majors

H-Applied Mathematics

Admissions Entry Point

Declare Plan,

Declaration Requirements

Enrolment in this Specialization is limited; a minimum cumulative average of 70% is strongly recommended.

Requirements Information

Invalid Combinations

No,

Average Requirement

No,

Proposed

Graduation Requirements

- Complete the required courses for one theme described below.
 - Theme 1: Complete a total of 5.5 units.
 - Theme 2: Complete a total of 4.5 units.
 - Theme 3: Complete a total of 4.5 units.

Existing

Graduation Requirements

- Complete the required courses for one theme described below.
 - Theme 1: Complete a total of 6.0 units.
 - Theme 2: Complete a total of 5.0 units.
 - Theme 3: Complete a total of 4.5 units.

Course Requirements (units)

Required Courses

- 0Units to Complete
- No Rules

1. Required Courses

-
- Complete 1 of the following
- Theme 1: Fluids and Heat
- Complete all of the following
- Complete all the following:
 - AMATH271 - Introduction to Theoretical Mechanics (0.50)
 - AMATH361 - Continuum Mechanics (0.50)
 - AMATH463 - Fluid Mechanics (0.50)
 - ME219 - Mechanics of Deformable Solids 1 (0.50)
 - ME250 - Thermodynamics 1 (0.50)
 - ME353 - Heat Transfer 1 (0.50)
 - ME354 - Thermodynamics 2 (0.50)
 - ME456 - Heat Transfer 2 (0.50)
-
- Complete 1 of the following:
 - CO250 - Introduction to Optimization (0.50)
 - CO255 - Introduction to Optimization (Advanced Level) (0.50)
 - STAT331 - Applied Linear Models (0.50)
 - STAT340 - Stochastic Simulation Methods (0.50)
-
- Complete 1 of the following:
 - ECE140 - Linear Circuits (0.50)
 - GENE123 - Electrical Circuits and Instrumentation (0.50)
-
- Complete 1 of the following:
 - ME557 - Combustion 1 (0.50)
 - ME564 - Aerodynamics (0.50)
 - ME571 - Clean Air Technologies (0.50)
-
- Theme 2: Communication and Control
- Complete all of the following
- Complete all the following:
 - AMATH455 - Control Theory (0.50)
 - ECE207 - Signals and Systems (0.50)
 - ECE240 - Electronic Circuits 1 (0.50)
 - ECE318 - Communication Systems (0.50)
 - ECE380 - Analog Control Systems (0.50)
-
- Complete 1 of the following:
 - CO250 - Introduction to Optimization (0.50)
 - CO255 - Introduction to Optimization (Advanced Level) (0.50)
 - CS475 - Computational Linear Algebra (0.50)
 - STAT331 - Applied Linear Models (0.50)

- STAT340 - Stochastic Simulation Methods (0.50)
-
- Complete 1 of the following:
- ECE140 - Linear Circuits (0.50)
- GENE123 - Electrical Circuits and Instrumentation (0.50)
-
- Complete 2 of the following:
- ECE313 - Digital Signal Processing (0.50)
- ECE484 - Digital Control Applications (0.50)
- ECE486 - Robot Dynamics and Control (0.50)
- SYDE544 - Biomedical Measurement and Signal Processing (0.50)
- SYDE572 - Introduction to Pattern Recognition (0.50)
-
- Theme 3: Heat and Mass Transfer
- Complete all of the following
- Complete all the following:
- AMATH361 - Continuum Mechanics (0.50)
- AMATH463 - Fluid Mechanics (0.50)
- CHE230 - Physical Chemistry 1 (0.50)
- CHE231 - Physical Chemistry 2 (0.50)
- CHE312 - Mathematics of Heat and Mass Transfer (0.50)
- CHE313 - Applications of Heat and Mass Transfer (0.50)
- CHE330 - Chemical Engineering Thermodynamics (0.50)
-
- Complete 2 of the following:
- CHE314 - Chemical Reaction Engineering (0.50)
- CHE331 - Electrochemical Engineering (0.50)
- CHE341 - Introduction to Process Control (0.50)
- CHE361 - Bioprocess Engineering (0.50)
- CHE522 - Advanced Process Dynamics and Control (0.50)
- ~~PHYS122 - Waves, Electricity and Magnetism (0.50)~~
- ~~PHYS122 - Waves, Electricity and Magnetism (0.50)~~

Course Lists

Required Courses

- No Rules

Are there cross-listed courses listed in requirements?

No,

Additional Constraints

1. Theme 1:

1. ME courses can be used to fulfil the subject concentration requirement of the Honours Applied Mathematics academic plan.
2. AMATH361 and AMATH463 can be used to satisfy the AMATH courses at the 300- or 400-level requirement of the Honours Applied Mathematics academic plan.

2. Theme 2:

1. ECE and SYDE courses can be used to fulfil the subject concentration requirement of the Honours Applied Mathematics academic plan.
2. AMATH455 can be used to satisfy the AMATH courses at the 300- or 400-level requirement of the Honours Applied Mathematics academic plan.

3. Theme 3:

1. CHE courses can be used to fulfil the subject concentration requirement of the Honours Applied Mathematics academic plan.
2. AMATH361 and AMATH463 can be used to satisfy the AMATH courses at the 300- or 400-level requirement of the Honours Applied Mathematics academic plan.

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

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Physics Specialization - Physics Specialization

Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-02

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

Removing the course codes discontinued by physics and updating the list of sample courses to include the relevant course AMATH 474. The change has no effect on the specialization requirements.

Approved at UAC 20251027.

Approved at FC 20251125.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied
Mathematics

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Specialization

Program/Plan Name

Physics Specialization

Admissions

Specialization is available for students in the following majors

H-Applied Mathematics

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

Astrophysics Minor

Biophysics Minor

Mathematical Physics (Bachelor of Science - Honours)

Physics (Bachelor of Science - Honours)

Average Requirement

No,

Graduation Requirements

- Complete a total of 4.0 units, from the list of courses below or any PHYS course.
 - At least 2.0 units must be at the 300- or 400-level.

Course Requirements (units)

Required Courses

- 0 Units to Complete
- No Rules

1. Required Courses

-
- Choose any of the following:
- AMATH271 - Introduction to Theoretical Mechanics (0.50)
- AMATH361 - Continuum Mechanics (0.50)
- AMATH373 - Quantum Theory 1 (0.50)
- AMATH463 - Fluid Mechanics (0.50)
- AMATH473 - Quantum Theory 2 (0.50)
- **AMATH474 - Quantum Theory 3: Quantum Information and Foundations (0.50)**
- AMATH475 - Introduction to General Relativity (0.50)
- PHYS476 - Introduction to General Relativity (0.50)
- ~~ECE403 - Thermal Physics (0.50)~~
- ~~PHYS358 - Thermal Physics (0.50)~~

- ~~PHYS454 - Quantum Theory 2 (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. Courses used to satisfy this Specialization cannot be used to satisfy the AMATH courses at the 300- or 400-level requirement of the Honours Applied Mathematics academic plan.
3. PHYS courses can be used to fulfil the subject concentration requirement of the Honours Applied Mathematics academic plan.

Specializations

Undergraduate Plan Guidelines

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies

H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours)

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Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-02

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

The following changes are made to align the BMath Mathematical Physics program with recent major program and course changes made by the Physics and Astronomy department.

1-PHYS 122 has been split into two courses (the new PHYS 122 and PHYS 223). Since both are prerequisites for upper-year courses, we have included them in the revised program as required courses. In consultation with Physics, AMATH 271 has been approved by Physics as a substitute for PHYS 121 in meeting later course requirements. Therefore we removed PHYS 121 to make room for the new course PHYS 223 in the course requirements.

2-We remove the course codes that Physics is de-crosslisting (PHYS 473, PHYS 484).

3-In consultation with Physics, we remove Quantum Theory 1 (AMATH 373) as a required course in favour of Quantum Physics 1 (PHYS 234). The new PHYS 223 + PHYS 234 provide coverage of the same topics as AMATH 373 and will provide students access to follow-up courses in both Physics and Applied Mathematics.

4-We update the program to include the revised Physics course that combines thermodynamics and statistical mechanics (PHYS 357), and we remove PHYS 358 and PHYS 359 that will be discontinued.

5-In consultation with Physics, we revise one of the elective course lists to add PHYS 342 and PHYS 363 as possible options since they cover foundational material in mathematical physics and they open paths to new fourth-year Physics courses like PHYS 444 - Subatomic Physics and PHYS 464 - Group theory for Physics that are of great relevance to the field of mathematical physics.

6-We also reduce the number of AMATH+PHYS elective credits to give more flexibility to the major.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

These changes have been developed as the result of many discussions with Physics between May 2025 and October 2025. In particular, Applied Math Associate Chair undergraduate Eduardo Martin-Martinez, and Applied Math Chair Hans De Sterck, met extensively with Physics Associate Chair undergraduate Brenda Lee, Curriculum Committee Chair Stefan Idziak, and Interim Chair Rob Hill and Chair David Hawthorn. This also included joint meetings with the Associate Deans Undergraduate Benoit Charbonneau (Math) and Laura Deakin (Science) on June 17, 2025 and September 8, 2025. The proposed changes are implementations of what was agreed on during those

extensive meetings. The departments agreed to continue discussing several other changes that may be implemented in subsequent years.

General Program/Plan Information

Faculty

Faculty of Mathematics

Academic Unit

Department of Applied
Mathematics

Faculty

Faculty of Mathematics

Undergraduate Credential Type

Major

Program Type

Honours

Degree

Bachelor of Mathematics

Program/Plan Name

Mathematical Physics (Bachelor of Mathematics - Honours)

Systems of Study

Co-operative, Regular,

Admissions

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

Applied Mathematics (Bachelor of Mathematics - Honours)

Applied Mathematics (Joint Honours)

Applied Mathematics with Scientific Computing and Scientific Machine Learning (Bachelor of Mathematics - Honours)

Applied Mathematics Minor

Biophysics Minor

Data Science (Bachelor of Computer Science - Honours)

Data Science (Bachelor of Mathematics - Honours)

Mathematical Physics (Bachelor of Science - Honours)

Physics (Bachelor of Science - Honours)

Physics (Joint Honours)

Physics and Astronomy (Bachelor of Science - Honours)

Physics Minor

Average Requirement

Yes,

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum cumulative major average of 65.0%: all math 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

1. Required Courses

-
- Complete all of the following
- Complete all the following:
 - AMATH231 - Calculus 4 (0.50)
 - AMATH271 - Introduction to Theoretical Mechanics (0.50)
 - AMATH353 - Partial Differential Equations 1 (0.50)
 - AMATH361 - Continuum Mechanics (0.50)
 - AMATH473 - Quantum Theory 2 (0.50)
 - PHYS122 - Waves, Electricity and Magnetism (0.50)
 - **Course Not Found**
 - PHYS234 - Quantum Physics 1 (0.50)
 - PHYS242 - Electricity and Magnetism 1 (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:
 - AMATH242 - Introduction to Computational Mathematics (0.50)
 - AMATH345 - Data-Driven Mathematical Models (0.50)
 - AMATH391 - Data Analysis with Fourier and Wavelet Methods (0.50)

- AMATH445 - Scientific Machine Learning (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)
-
- 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:
- AMATH332 - Applied Complex Analysis (0.50)
- PMATH332 - Applied Complex Analysis (0.50)
- PMATH352 - Complex Analysis (0.50)
-
- Complete 1 of the following:
- AMATH475 - Introduction to General Relativity (0.50)
- PHYS476 - Introduction to General Relativity (0.50)
-
- **Complete 4 of the following:**
- AMATH333 - Calculus on Manifolds for Applied Mathematics and Physics (0.50)
- AMATH474 - Quantum Theory 3: Quantum Information and Foundations (0.50)
- **PHYS342 - Electricity and Magnetism 2 (0.50)**
- **Course Not Found**
- **PHYS363 - Intermediate Classical Mechanics (0.50)**
-
- **Complete an additional 2.0 units of any AMATH or PHYS courses, with a minimum of 1.0 units at the 300- or 400-level**
- ~~PHYS121 - Mechanics (0.50)~~
- ~~Complete 1 of the following~~
- ~~AMATH373 - Quantum Theory 1 (0.50)~~
- ~~PHYS334 - Quantum Physics 2 (0.50)~~
- ~~PHYS454 - Quantum Theory 2 (0.50)~~
- ~~Complete 2 of the following:~~
- ~~PHYS359 - Statistical Mechanics (0.50)~~
- ~~PHYS484 - Quantum Theory 3: Quantum Information and Foundations (0.50)~~
- ~~ECE403 - Thermal Physics (0.50)~~
- ~~PHYS358 - Thermal Physics (0.50)~~
- ~~Complete an additional 3.0 units of any AMATH or PHYS courses, with a minimum of 1.5 units at the 300- or 400-level~~

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.

Specializations

Specializations for this Major

No,

Undergraduate Plan Guidelines

Workflow Information

Change to Undergraduate Communication Requirement

No,

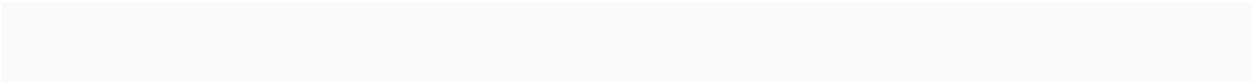
Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Mathematics

Dependencies



Date 2026/01/19

Hide Empty Fields

Meeting Information

Agenda Page Title SUC - 2026-02 - Consent Agenda - Faculties of Mathematics and Arts

Career Level
Undergraduate,

Faculty/Unit Mathematics

Date 2026-02-04

Time

Location

Summary

1. Minor Program/Plan Modifications (Motion 1)

- **H-Computing & Financial Management - *Changes to UCR and required courses.***

2. Regulations

- **CFM: Curriculum and Regulations Approval Process (For information)**

Other Business

Attachment(s)

- [CFM Curriculum and Regulations Approval Process 2025.pdf](#)

Course Proposals

Courses: Retire No proposals have been added.

Courses: New No proposals have been added.

Courses: Changes No proposals have been added.

Programs & Plans Proposals

Programs & Plans: Retire No proposals have been added.

Programs & Plans: Major Modifications No proposals have been added.

Programs & Plans: Minor Modifications

Code	Title	Type	Workflow Step
H-Computing & Financial Management	Computing and Financial Management (Bachelor of Computing and Financial Management - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee

Regulations Proposals

Regulations: Retire No proposals have been added.

Regulations: New No proposals have been added.

Regulations: Changes No proposals have been added.

H-Computing & Financial Management - Computing and Financial Management (Bachelor of Computing and Financial Management - Honours)

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Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-06-04

Quality Assurance Designation

Minor Modification Qad

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,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

There are two changes being submitted:

1. AFM 427 to replace AFM 424 - The School and Accounting and Finance will no longer be offering AFM 424, which is currently a degree requirement for CFM students. It is being replaced by AFM 427.

2. Changing undergraduate communication requirements - We want to add more course options for students to choose from to satisfy their Undergraduate Communication Requirements (UCR). Since 2018, CFM students have only been able to choose from four communication requirements whereas all other Faculty of Math programs have a selection of 25 course options.

Approved at UAC 20251027.

Approved at FC 20251125.

Consultations (Departmental)

Computing and Financial Management's curriculum is an equal combination of the School of Accounting and Finance and the Cheriton School of Computer Science. Undergraduate committees from both schools were consulted for the proposed changes and changes were presented and approved to and by each of the represented School Council meetings.

UAPC approval - June 3, 2025

SCS Council approval - June 4, 2025

Undergraduate Programs Council - May 13, 2025

SAF School Approval - May 23, 2025

Using the List 1 and List 2 options for Faculty of Mathematics, as outlined in the "degree-level requirements for all math plans" in the calendar, plus the addition of communication courses offered to Accounting and Financial Management (AFM) students, CFM would like to offer students two list options to satisfy their UCRs bringing the total of class options to 18 classes, from four.

George Lamont, Director, Undergraduate Communication Requirement Group, was consulted about the addition of communications courses and he was supportive of the additions for CFM students so long as there was rationale for the classes selected, in relation to learning outcomes.

General Program/Plan Information

Faculty

Vice-President Academic Office

Academic Unit

Interdisciplinary Studies

Faculty

Faculties of Arts and Mathematics

Undergraduate Credential Type

Major

Program Type

Honours

Degree

Bachelor of Computing and Financial Management

Program/Plan Name

Computing and Financial Management (Bachelor of Computing and Financial Management - Honours)

Systems of Study

Co-operative,

Admissions

Admissions Entry Point

Direct Entry,

Admission Requirements: Minimum Requirements

The Bachelor of Computing and Financial Management (BCFM) Steering Committee, in consultation with the faculties of Arts and Mathematics, and their admission committees, determines admission requirements for the BCFM program.

- Minimum admission requirements are those of the Faculty of Mathematics, with admissions to the BCFM program handled by the Mathematics admissions committee, following policies set by the BCFM Steering Committee.
- English language requirements are those of the Faculty of Arts. Students will be required to have a minimum of 75% in English 4U (grade 12 university level) or equivalent.

Requirements Information

Invalid Combinations

Yes,

List of Invalid Combinations

Computer Science (Bachelor of
Computer Science - Honours)

Computer Science (Bachelor of
Computer Science - Joint Honours)

Mathematics Minor

Computer Science Minor

Computing Minor

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 Faculty of Arts courses.

Graduation Requirements

- Complete a total of 20.25 units:
 - Complete all the required courses listed below.
 - Complete 2.0 units of elective courses.
 - A minimum of 13.0 units of math courses.
 - A minimum of 5.0 units of non-math courses.
- A maximum of 5.0 units of unusable course attempts.
- A maximum of 2.0 units of failed or excluded courses (excluding COOP, PD).
- A minimum of 8 full-time terms.

Co-operative Education Program Requirements

1. Complete a minimum of five credited work terms:
 1. A minimum of three must be standard work terms.
2. Complete a minimum of five Professional Development (PD) courses:
 1. PD1: Must be taken in an academic term prior to the first work term.

2. PD11: Must be taken during the first work term.
3. Three additional PD courses: To be taken during work terms.

Additional Constraints and Notes

1. Students are expected to follow the normal study/work-term sequence appropriate to their plan from admission through to graduation.

Legend for Study/Work Sequence Information Chart

Key	Description
F,W,S	Terms: F=September-December; W=January-April; S=May-August
1,2,3,4 plus A or B	Denotes academic year and term.
WT	Work term.

Study/Work Sequence Information Chart

F	W	S	F	W									
1A	1B	WT	2A	WT	2B	WT	3A	WT	3B	WT	4A	WT	4B

Course Requirements (units)

Required Courses

- 0Units to Complete
- No Rules

1. Required Courses

- Complete all of the following
- Complete all the following:
 - AFM132 - Introduction to Business Stages (0.50)
 - AFM191 - Introduction to Financial Reporting and Managerial Decision Making 1 (0.50)
 - AFM274 - Introduction to Corporate Finance (0.50)
 - AFM322 - Derivative Securities (0.50)
 - AFM425 - Fixed Income Securities (0.50)

- **AFM427 - Intermediate Portfolio Management (0.50)**
- CFM101 - Introduction to Financial Markets and Data Analytics (0.50)
- CFM301 - Financial Data Analytics (0.50)
- CS341 - Algorithms (0.50)
- ECON101 - Introduction to Microeconomics (0.50)
- ECON102 - Introduction to Macroeconomics (0.50)
- STAT373 - Regression and Forecasting Methods in Finance (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:
 - **AFM111 - Professional Pathways and Problem-Solving (0.50)**
 - **COMMST100 - Interpersonal Communication (0.50)**
 - COMMST223 - Public Speaking (0.50)
 - **COMMST225 - Interviewing (0.50)**
 - **COMMST227 - Leadership (0.50)**
 - **COMMST228 - Public Communication (0.50)**
 - **EMLS101R - Oral Communications for Academic Purposes (0.50)**
 -
 - Complete 1 of the following:
 - EMLS129R - Written Academic English (0.50)
 - **ENGL101B - Introduction to Rhetorical Studies (0.50)**
 - ENGL109 - Introduction to Academic Writing (0.50)
 - ENGL119 - Communications in Mathematics and Computer Science (0.50)
 - ENGL129R - Written Academic English (0.50)
 - **ENGL209 - Advanced Academic Writing (0.50)**
 - **ENGL210E - Genres of Technical Communication (0.50)**
 - **ENGL210F - Genres of Business Communication (0.50)**
 -
 - Complete all of the following
 - Complete 2 from this list or any additional AFM course at the 300-level or above.
 - Choose any of the following:
 - AFM291 - Intermediate Financial Accounting 1 (0.50)
 - ARBUS202 - Professional and Business Ethics (0.50)
 - ARBUS302 - Principles of Marketing (0.50)
 - CFM401 - Topics in Financial Technology (0.50)
 - ECON201 - Microeconomic Theory for Business and Policy (0.50)
 - ECON206 - Money and Banking 1 (0.50)
 - ECON207 - Economic Growth and Development 1 (0.50)
 - ECON231 - Introduction to International Economics (0.50)
 - ECON332 - International Finance (0.50)
 - MGMT244 - Principles of Marketing (0.50)
 - PHIL215 - Professional and Business Ethics (0.50)
 -
 - Complete 1 of the following
 - Complete 1.0 unit of additional AFM courses at the 300-level or above, and CFM401 if not taken to fulfil a requirement above.

- Complete 1.5 units of additional AFM courses at the 300-level or above.
-
- 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
 - Complete all the following:
 - CS136 - Elementary Algorithm Design and Data Abstraction (0.50)
 - CS136L - Tools and Techniques for Software Development (0.25)
 -
 - Complete all the following:
 - CS136L - Tools and Techniques for Software Development (0.25)
 - 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
 - Complete 1 additional course from: CS440-CS498.
 - Complete all the following:
 - CO487 - Applied Cryptography (0.50)
-
- Complete 2 additional courses from: CO487, CS251 or CS251E, CS340-CS398, CS440-CS498.
 - 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:
- 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)
- ~~AFM424 - Equity Investments (0.50)~~
- ~~Complete 2 of the following:~~

Course Lists

Required Courses

- No Rules

Are there cross-listed courses listed in requirements?

Yes,

Cross-Listings Options

All cross-listings to be displayed,

Proposed

Additional Constraints

1. Students may only complete one course from any cross-listed set.
2. Students normally start in CS135. Students with strong aptitude may take CS145 and CS146. Students who start in CS115 and earn less than 90% must take CS116 before taking CS136. Upon successful completion, CS116 may count as an elective towards the degree requirements.
3. The Undergraduate Communication Requirement is fulfilled by achieving a minimum grade of 65.0% in the two required

AFM111/COMMST/ELMS/ENGL course(s) before enrolling in 4A.

4. The Computing and Financial Management program's academic curriculum is a combination of the curricula in Computer Science and Accounting and Financial Management, and therefore, cannot be combined with any academic plan, minor, or specialization offered by the David R. Cheriton School of Computer Science or the School of Accounting and Finance. Other academic plan combinations, minors, or specializations may be possible, but may require more than 40 courses (20.0 units) and/or more than the customary eight study terms to satisfy all of the various requirements. Plan combinations, minors, or specializations should not be considered without careful consultation with a Bachelor of Computing and Financial Management (BCFM) academic advisor.

Existing

Additional Constraints

1. Students may only complete one course from any cross-listed set.
2. Students normally start in CS135. Students with strong aptitude may take CS145 and CS146. Students who start in CS115 and earn less than 90% must take CS116 before taking CS136. Upon successful completion, CS116 may count as an elective towards the degree requirements.
3. The Undergraduate Communication Requirement is fulfilled by achieving a minimum grade of 65.0% in the two required COMMST/EMLS/ENGL courses before enrolling in 4A.
4. The Computing and Financial Management program's academic curriculum is a combination of the curricula in Computer Science and Accounting and Financial Management, and therefore, cannot be combined with any academic plan, minor, or specialization offered by the David R. Cheriton School of Computer Science or the School of Accounting and Finance. Other academic plan combinations, minors, or specializations may be possible, but may require more than 40 courses (20.0 units) and/or more than the customary eight study terms to satisfy all of the various requirements. Plan combinations, minors, or specializations should not be considered without careful consultation with a Bachelor of Computing and Financial Management (BCFM) academic advisor.

Notes

- Computing and Financial Management students are considered as both Arts and Mathematics students.
 - A student's standing in the program will be determined according to policies used in the Faculty of Mathematics.
- The Computing and Financial Management program is also considered an Honours Computer Science plan for purposes of student access to math courses.

Specializations

Specializations for this Major

No,

Undergraduate Plan Guidelines

Workflow Information

Change to Undergraduate Communication Requirement

Yes,

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Arts

Faculty of Mathematics

Dependencies

Date 2026/01/19

Hide Empty Fields

Meeting Information

Agenda Page TitleSUC - 2026-02 - Consent Agenda - Faculties of Engineering and Mathematics

Career Level
Undergraduate,

Faculty/UnitEngineering

Date2026-02-04

Summary

Undergraduate Studies Submission for SUC Consent Agenda - January, 2026.

Course Proposals

Courses: Retire No proposals have been added.

Courses: New No proposals have been added.

Courses: Changes No proposals have been added.

Programs & Plans Proposals

Programs & Plans Proposal Details

Minor Modifications

H - Software Engineering - changes to PD requirements.

Programs & Plans: Retire No proposals have been added.

Programs & Plans: Major Modifications No proposals have been added.

Programs & Plans: Minor Modifications

Code	Title	Type	Workflow Step
H-Software Engineering	Software Engineering (Bachelor of Software Engineering - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee

Regulations Proposals

Regulations: Retire No proposals have been added.

Regulations: New No proposals have been added.

Regulations: Changes No proposals have been added.

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

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Effective Date and Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-24

Quality Assurance Designation

Minor Modification Qad

Is there an impact to existing students?

Yes,

Impact on Existing Students

Required PD courses dropping from five to four effective immediately; current students can still elect to complete five if they wish.

Is the credential name changing?

No,

Co-operative System of Study and Requirements

Yes,

Co-operative Education Consultation

The Faculty of Engineering currently requires all students to take 5 PD courses (PD19, PD20 and 3 electives). We are proposing a reduction to 4 (PD19, PD20 and 2 electives). Some programs specify additional required courses (e.g., PD10, PD11, PD22) which reduce the number of electives.

The Faculty of Math has 6 work term opportunities and requires 5 PD courses (including PD1 taken during the first recruiting

term). Instead of PD1, Engineering students take [Co-op Fundamentals for Engineering](#) in their 1A term. This proposal will align with the Faculty of Math (5 required work terms with 1 coop prep course, and 4 PD courses taken during work terms).

Reducing the number of PD courses is an effort to reduce workload for Engineering students, ensuring they still meet their CEAB and Co-op (CEWIL) graduation requirements.

This change will be made for all active students, effective immediately. Current students will be told that they only require 4 PD courses (in addition to CFE) to meet graduation requirements. If students choose to take a 5th PD course, that will be permitted.

This change has been approved by the Provost, Centre for WIL, IAP and the AVP Co-operative & Experiential Education. This change has been approved by Engineering Department Chairs, and once approved at Faculty Council, all BASc and BSE plans will be updated accordingly.

Approved at UAC 20251027.

Creating or Changing Invalid Combinations

No,

Change to Learning Outcomes

No,

Rationale and Background for Change(s)

The Faculty of Engineering currently requires all students to take 5 PD courses (PD19, PD20 and 3 electives). We are proposing a reduction to 4 (PD19, PD20 and 2 electives). Some programs specify additional required courses (e.g., PD10, PD11, PD22) which reduce the number of electives.

The Faculty of Math has 6 work term opportunities and requires 5 PD courses (including PD1 taken during the first recruiting term). Instead of PD1, Engineering students take [Co-op Fundamentals for Engineering](#) in their 1A term. This proposal will align with the Faculty of Math (5 required work terms with 1 coop prep course, and 4 PD courses taken during work terms).

Reducing the number of PD courses is an effort to reduce workload for Engineering students, ensuring they still meet their CEAB and Co-op (CEWIL) graduation requirements.

This change will be made for all active students, effective immediately. Current students will be told that they only require 4 PD courses (in addition to CFE) to meet graduation requirements. If students choose to take a 5th PD course, that will be permitted.

This change has been approved by the Provost, Centre for WIL, IAP and the AVP Co-operative & Experiential Education. This change has been approved by Engineering Department Chairs, and once approved at Faculty Council, all BAsC and BSE plans will be updated accordingly.

Approved at UAC 20251027.

Approved at FC 20251125.

General Program/Plan Information

Faculty

Vice-President Academic Office

Academic Unit

Interdisciplinary Studies

Faculty

Faculties of Engineering and Mathematics

Undergraduate Credential Type

Major

Program Type

Honours

Degree

Bachelor of Software Engineering

Program/Plan Name

Software Engineering (Bachelor of Software Engineering - Honours)

Systems of Study

Co-operative,

Admissions

Admissions Entry Point

Direct Entry,

Requirements Information

Invalid Combinations

Yes,

List of Invalid Combinations

Computer Science (Bachelor of Computer Science - Honours)

Computer Science (Bachelor of Mathematics - Honours)

Computer Science (Bachelor of Computer Science - Joint Honours)

Computer Science (Bachelor of Mathematics - Joint Honours)

Computing Minor Computing Option

Software Engineering Specialization

Data Science (Bachelor of Computer Science - Honours)

Data Science (Bachelor of Mathematics - Honours)

Mathematics Minor

Average Requirement

Yes,

Minimum Average(s) Required

- A minimum cumulative overall average of 60.0%.
- A minimum term average of 60.0%. See Faculty of Engineering [promotion rules](#).

Graduation Requirements

- Complete a total of 21.50 units (excluding COOP, PD):
 - Complete all the required courses listed below.
 - Complete 12 approved electives:
 - Complete two Complementary Studies Electives (CSEs) from the [Complementary Studies Course Lists for Engineering](#):
 - One course from List A.
 - One course from List C.
 - Complete three courses from the Natural Science list.
 - Complete four courses from the Technical Electives (TEs) lists.
 - Complete the Undergraduate Communication Requirement.
 - Complete two electives chosen from any 0.5-unit courses.
- Complete all co-operative education program requirements listed below.

Undergraduate Communication Requirement

See below for the list of courses that can be used towards this requirement. The course must be completed with a minimum grade of 60.0% prior to enrolling in the 3A term.

Proposed

Co-operative Education Program Requirements

- Complete a total of four PD courses: PD10, PD11, PD19, PD20.
- Complete a total of five credited work terms.

Legend for Study/Work Sequences Chart

Key	Description
F,W,S	Terms: F=September-December; W=January-April; S=May-August
1,2,3,4 plus A or B	Denotes academic year and term.
WT	Work term.

Study/Work Sequences Chart

Sequence	F	W	S	F	W	S	F	W	S	F	W	S	F	W
Stream 8X	1A	1B	WT	2A	WT	2B	WT	3A	WT	3B	WT	WT	4A	4B
Stream 8Y	1A	1B	WT	2A	WT	2B	WT	3A	WT	3B	4A	WT	WT	4B

Additional Constraints and Notes

1. Stream 8X is the primary stream. Students may choose to switch to stream 8Y after the 3B term, with advisor approval.

Existing

Co-operative Education Program Requirements

- Complete a total of five PD courses: PD10, PD11, PD19, PD20, and one additional PD course.
- Complete a total of five credited work terms.

Legend for Study/Work Sequences Chart

Key	Description
F,W,S	Terms: F=September-December; W=January-April; S=May-August
1,2,3,4 plus A or B	Denotes academic year and term.
WT	Work term.

Study/Work Sequences Chart

Sequence	F	W	S	F	W	S	F	W	S	F	W	S	F	W
Stream 8X	1A	1B	WT	2A	WT	2B	WT	3A	WT	3B	WT	WT	4A	4B
Stream 8Y	1A	1B	WT	2A	WT	2B	WT	3A	WT	3B	4A	WT	WT	4B

Additional Constraints and Notes

1. Stream 8X is the primary stream. Students may choose to switch to stream 8Y after the 3B term, with advisor approval.

Required Courses (Term by Term)

1A Term

- Complete all the following:
 - CS137 - Programming Principles (0.50)
 - CHE102 - Chemistry for Engineers (0.50)
 - MATH115 - Linear Algebra for Engineering (0.50)
 - MATH117 - Calculus 1 for Engineering (0.50)
 - MATH135 - Algebra for Honours Mathematics (0.50)
 - SE101 - Introduction to Methods of Software Engineering (0.25)
- 1B Term
- Complete all of the following
- Complete all the following:
 - CS138 - Introduction to Data Abstraction and Implementation (0.50)
 - ECE124 - Digital Circuits and Systems (0.50)
 - ECE140 - Linear Circuits (0.50)
 - ECE192 - Engineering Economics and Impact on Society (0.25)
 - MATH119 - Calculus 2 for Engineering (0.50)
 - SE102 - Seminar (0.00)
- Complete 1 approved elective
- 2A Term
- Complete all of the following
- Complete all the following:
 - CS241 - Foundations of Sequential Programs (0.50)
 - ECE222 - Digital Computers (0.50)
 - SE201 - Seminar (0.00)
 - SE212 - Logic and Computation (0.50)
 - STAT206 - Statistics for Software Engineering (0.50)
- Complete 1 of the following:
 - ECE105 - Classical Mechanics (0.50)
 - PHYS115 - Mechanics (0.50)
 - PHYS121 - Mechanics (0.50)
- 2B Term
- Complete all of the following
- Complete all the following:
 - CS240 - Data Structures and Data Management (0.50)
 - CS247 - Software Engineering Principles (0.50)
 - CS348 - Introduction to Database Management (0.50)
 - MATH239 - Introduction to Combinatorics (0.50)
 - SE202 - Seminar (0.00)
- Complete 1 approved elective
- 3A Term
- Complete all of the following
- Complete all the following:
 - CS341 - Algorithms (0.50)
 - MATH213 - Signals, Systems, and Differential Equations (0.50)
 - SE301 - Seminar (0.00)
 - SE350 - Operating Systems (0.50)
 - SE464 - Software Design and Architectures (0.50)

- SE465 - Software Testing and Quality Assurance (0.50)
- Complete 1 approved elective
- 3B Term
- Complete all of the following
- Complete all the following:
 - CS343 - Concurrent and Parallel Programming (0.50)
 - ECE358 - Computer Networks (0.50)
 - SE302 - Seminar (0.00)
 - SE380 - Introduction to Feedback Control (0.50)
 - SE463 - Software Project Management, Requirements, and Analysis (0.50)
- Complete 1 of the following:
 - CS349 - User Interfaces (0.50)
 - CS449 - Human-Computer Interaction (0.50)
 - MSE343 - Human-Computer Interaction (0.50)
- Complete 1 approved elective
- 4A Term
- Complete all of the following
- Complete all the following:
 - SE401 - Seminar (0.00)
- Complete 1 of the following:
 - GENE403 - Interdisciplinary Design Project 1 (0.50)
 - SE490 - Design Project 1 (0.50)
- Complete 4 approved electives
- 4B Term
- Complete all of the following
- Complete all the following:
 - SE402 - Seminar (0.00)
- Complete 1 of the following:
 - GENE404 - Interdisciplinary Design Project 2 (0.50)
 - SE491 - Design Project 2 (0.50)
- Complete 4 approved electives

Course Lists

Undergraduate Communication Requirement

- Complete 1 of the following:
 - COMMST100 - Interpersonal Communication (0.50)
 - COMMST223 - Public Speaking (0.50)
 - EMLS101R - Oral Communications for Academic Purposes (0.50)
 - EMLS102R - Clear Communication in English Writing (0.50)
 - EMLS129R - Written Academic English (0.50)
 - ENGL109 - Introduction to Academic Writing (0.50)
 - ENGL119 - Communications in Mathematics and Computer Science (0.50)
 - ENGL129R - Written Academic English (0.50)
 - ENGL209 - Advanced Academic Writing (0.50)
 - ENGL210E - Genres of Technical Communication (0.50)
- Natural Science List
- Complete all of the following
- Complete a total of 3 lecture courses (see Additional Constraints).
- Choose any of the following:
 - AMATH382 - Computational Modelling of Cellular Systems (0.50)
 - BIOL110 - Biodiversity, Biomes, and Evolution (0.50)
 - BIOL130 - Introductory Cell Biology (0.50)
 - BIOL130L - Cell Biology Laboratory (0.25)
 - BIOL150 - Organismal and Evolutionary Ecology (0.50)
 - BIOL165 - Diversity of Life (0.50)

- BIOL211 - Introductory Vertebrate Zoology (0.50)
- BIOL220 - Introduction to Plant Structure and Function (0.50)
- BIOL239 - Genetics (0.50)
- BIOL240 - Fundamentals of Microbiology (0.50)
- BIOL240L - Microbiology Laboratory (0.25)
- BIOL241 - Introduction to Applied Microbiology (0.50)
- BIOL273 - Principles of Human Physiology 1 (0.50)
- BIOL280 - Introduction to Biophysics (0.50)
- BIOL365 - Methods in Bioinformatics (0.50)
- BIOL373 - Principles of Human Physiology 2 (0.50)
- BIOL373L - Human Physiology Laboratory (0.25)
- BIOL376 - Cellular Neurophysiology (0.50)
- BIOL382 - Computational Modelling of Cellular Systems (0.50)
- BIOL469 - Genomics (0.50)
- BIOL476 - Systems Neuroscience: From Neurons to Behaviour (0.50)
- BIOL489 - Arctic Ecology (0.50)
- CHE161 - Engineering Biology (0.50)
- CHEM123 - General Chemistry 2 (0.50)
- CHEM123L - General Chemistry Laboratory 2 (0.25)
- CHEM209 - Introductory Spectroscopy and Structure (0.50)
- CHEM237 - Introductory Biochemistry (0.50)
- CHEM237L - Introductory Biochemistry Laboratory (0.25)
- CHEM254 - Introductory Chemical Thermodynamics (0.50)
- CHEM262 - Organic Chemistry for Engineering (0.50)
- CHEM262L - Organic Chemistry Laboratory for Engineering Students (0.25)
- CHEM266 - Basic Organic Chemistry 1 (0.50)
- CHEM356 - Introductory Quantum Mechanics (0.50)
- CS482 - Computational Techniques in Biological Sequence Analysis (0.50)
- EARTH121 - Introductory Earth Sciences (0.50)
- EARTH122 - Introductory Environmental Sciences (0.50)
- EARTH123 - Introductory Hydrology (0.50)
- EARTH221 - Introductory Geochemistry (0.50)
- EARTH270 - Disasters and Natural Hazards (0.50)
- EARTH281 - Geological Impacts on Human Health (0.50)
- ECE106 - Electricity and Magnetism (0.50)
- ECE231 - Semiconductor Physics and Devices (0.50)
- ECE305 - Introduction to Quantum Mechanics (0.50)
- ECE403 - Thermal Physics (0.50)
- ECE404 - Geometrical and Physical Optics (0.50)
- ENVE275 - Aquatic Chemistry (0.50)
- ENVS200 - Field Ecology (0.50)
- NE222 - Organic Chemistry for Nanotechnology Engineers (0.50)
- PHYS122 - Waves, Electricity and Magnetism (0.50)
- PHYS124 - Modern Physics (0.50)
- PHYS175 - Introduction to the Universe (0.50)
- PHYS233 - Introduction to Quantum Mechanics (0.50)
- PHYS234 - Quantum Physics 1 (0.50)
- PHYS263 - Classical Mechanics and Special Relativity (0.50)
- PHYS275 - Planets (0.50)
- PHYS280 - Introduction to Biophysics (0.50)
- PHYS334 - Quantum Physics 2 (0.50)
- PHYS335 - Condensed Matter Physics (0.50)
- PHYS375 - Stars (0.50)
- PHYS380 - Molecular and Cellular Biophysics (0.50)
- PHYS468 - Introduction to the Implementation of Quantum Information Processing (0.50)
- PSYCH207 - Cognitive Processes (0.50)
- PSYCH261 - Physiological Psychology (0.50)
- PSYCH306 - Perception (0.50)
- PSYCH307 - Human Neuropsychology (0.50)

- SCI200 - Energy - Its Development, Use, and Issues (0.50)
- SCI201 - Global Warming and Climate Change (0.50)
- SCI238 - Introductory Astronomy (0.50)
- SCI250 - Environmental Geology (0.50)
- Technical Electives List
- Complete a minimum of 4 Technical Electives.
- List 1
- Complete 1 of the following:
- AMATH242 - Introduction to Computational Mathematics (0.50)
- AMATH449 - Neural Networks (0.50)
- CS360 - Introduction to the Theory of Computing (0.50)
- CS365 - Models of Computation (0.50)
- CS370 - Numerical Computation (0.50)
- CS371 - Introduction to Computational Mathematics (0.50)
- CS442 - Principles of Programming Languages (0.50)
- CS444 - Compiler Construction (0.50)
- CS448 - Database Systems Implementation (0.50)
- CS450 - Computer Architecture (0.50)
- CS451 - Data-Intensive Distributed Computing (0.50)
- CS452 - Real-Time Programming (0.50)
- CS453 - Software and Systems Security (0.50)
- CS454 - Distributed Systems (0.50)
- CS457 - System Performance Evaluation (0.50)
- CS459 - Privacy, Cryptography, Network and Data Security (0.50)
- CS462 - Formal Languages and Parsing (0.50)
- CS466 - Algorithm Design and Analysis (0.50)
- CS479 - Neural Networks (0.50)
- 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)
- CS487 - Introduction to Symbolic Computation (0.50)
- CS488 - Introduction to Computer Graphics (0.50)
- CS489 - Advanced Topics in Computer Science (0.50)
- List 2
- Complete 1 of the following:
- ECE313 - Digital Signal Processing (0.50)
- ECE320 - Computer Architecture (0.50)
- ECE327 - Digital Hardware Systems (0.50)
- ECE340 - Electronic Circuits 2 (0.50)
- ECE405A - Quantum Information Processing Devices (0.50)
- ECE405B - Fundamentals of Experimental Quantum Information (0.50)
- ECE405C - Programming of Quantum Computing Algorithms (0.50)
- ECE405D - Superconducting Quantum Circuits (0.50)
- ECE409 - Cryptography and System Security (0.50)
- ECE416 - Advanced Topics in Networking (0.50)
- ECE417 - Image Processing (0.50)
- ECE423 - Embedded Computer Systems (0.50)
- ECE454 - Distributed Computing (0.50)
- ECE455 - Embedded Software (0.50)
- ECE457A - Co-operative and Adaptive Algorithms (0.50)
- ECE457B - Fundamentals of Computational Intelligence (0.50)
- ECE457C - Reinforcement Learning (0.50)
- ECE458 - Computer Security (0.50)
- ECE459 - Programming for Performance (0.50)
- ECE481 - Digital Control Systems (0.50)
- ECE486 - Robot Dynamics and Control (0.50)
- ECE488 - Multivariable Control Systems (0.50)
- ECE493 - Special Topics in Electrical and Computer Engineering (0.50)
- ECE495 - Autonomous Vehicles (0.50)

- List 3
- Complete all of the following
- Complete 2 additional course from List 1, List 2, or List 3.
- Choose any of the following:
 - BIOL487 - Computational Neuroscience (0.50)
 - CO331 - Coding Theory (0.50)
 - CO342 - Introduction to Graph Theory (0.50)
 - CO351 - Network Flow Theory (0.50)
 - CO353 - Computational Discrete Optimization (0.50)
 - CO367 - Nonlinear Optimization (0.50)
 - CO456 - Introduction to Game Theory (0.50)
 - CO481 - Introduction to Quantum Information Processing (0.50)
 - CO485 - The Mathematics of Public-Key Cryptography (0.50)
 - CO487 - Applied Cryptography (0.50)
 - CS467 - Introduction to Quantum Information Processing (0.50)
 - MSE343 - Human-Computer Interaction (0.50)
 - MSE446 - Introduction to Machine Learning (0.50)
 - MSE543 - Analytics and User Experience (0.50)
 - MTE544 - Autonomous Mobile Robots (0.50)
 - MTE546 - Multi-Sensor Data Fusion (0.50)
 - PHYS467 - Introduction to Quantum Information Processing (0.50)
 - SE498 - Advanced Topics in Software Engineering (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)
 - SYDE533 - Conflict Resolution (0.50)
 - SYDE543 - Cognitive Ergonomics (0.50)
 - SYDE548 - User Centred Design Methods (0.50)
 - SYDE552 - Computational Neuroscience (0.50)
 - SYDE556 - Simulating Neurobiological Systems (0.50)
 - SYDE575 - Image Processing (0.50)
- Additional Requirements
- Complete all of the following
- Complete 1 sustainability-related course, from the following list. This course may also be counted towards another elective requirement (e.g., Natural Science elective, Complementary Studies elective) if part of that list.
- Complete 1 of the following:
 - BIOL489 - Arctic Ecology (0.50)
 - EARTH270 - Disasters and Natural Hazards (0.50)
 - ENBUS102 - Introduction to Environment and Business (0.50)
 - ENBUS211 - Principles of Marketing for Sustainability Professionals (0.50)
 - ENGL248 - Literature for an Ailing Planet (0.50)
 - ENVS105 - Environmental Sustainability and Ethics (0.50)
 - ENVS200 - Field Ecology (0.50)
 - ENVS205 - Sustainability: The Future We Want (0.50)
 - ENVS220 - Ecological Economics (0.50)
 - ERS215 - Environmental and Sustainability Assessment 1 (0.50)
 - ERS225 - Gendering Environmental Politics (0.50)
 - ERS253 - Communities and Sustainability (0.50)
 - ERS270 - Introduction to Sustainable Agroecosystems (0.50)
 - ERS294 - Spirituality, Religion, and Ecology (0.50)
 - ERS310 - Peace and the Environment (0.50)
 - ERS316 - Urban Water and Wastewater Systems: Integrated Planning and Management (0.50)
 - ERS320 - Economics and Sustainability (0.50)
 - ERS328 - Environmental Politics and System Change (0.50)
 - ERS361 - Food Systems and Sustainability (0.50)
 - ERS370 - Corporate Sustainability: Issues and Prospects (0.50)
 - ERS372 - First Nations and the Environment (0.50)

- ERS404 - Global Environmental Governance (0.50)
- GEOG203 - Environment and Development in a Global Perspective (0.50)
- GEOG207 - Climate Change Fundamentals (0.50)
- GEOG225 - Global Environment and Health (0.50)
- GEOG361 - Food Systems and Sustainability (0.50)
- GEOG459 - Energy and Sustainability (1.00)
- PACS310 - Peace and the Environment (0.50)
- PHIL224 - Environmental Ethics (0.50)
- PLAN451 - Environmental Planning in Rural and Regional Systems (0.50)
- PSCI432 - Global Environmental Governance (0.50)
- RCS285 - Spirituality, Religion, and Ecology (0.50)
- SCI200 - Energy - Its Development, Use, and Issues (0.50)
- SCI201 - Global Warming and Climate Change (0.50)
- THPERF374 - Sustainability in Design (0.50)

Are there cross-listed courses listed in requirements?

Yes,

Cross-Listings Options

All cross-listings to be displayed,

Additional Constraints

1. For the Natural Science requirement, if a 0.25-laboratory course accompanies a lecture course, the laboratory course must also be taken and the pair together count as one course towards the three-course requirement (e.g., BIOL130 with BIOL130L).
2. To accommodate an elective reduced load, CHE102, CS343, CS348, CS349, CS449, ECE140, ECE192, ECE358, MSE343, and SE380 may be taken out of sequence.
3. Courses in the Technical Electives Lists may not be taken before the 3A term.
4. Students will only be permitted to use the WD and WF provisions used in the Faculty of Mathematics to withdraw from extra courses taken above the degree requirements.
5. Exceptions to the requirements and electives listed above require prior approval of the Software Engineering Director.

Notes

- Software Engineering students are considered as both Engineering and Mathematics students:
 - Students can take advantage of degree enhancements available to students from either faculty. These enhancements take the form of additional plans such as options, specializations, minors, and joint honours. Before declaring any academic plan, see [invalid credential combinations](#).
 - Students are eligible for Awards of Excellence in the Faculty of Engineering as well as for Awards of Excellence in the Faculty of Mathematics.
 - The Software Engineering plan is also considered an Honours Mathematics plan for purposes of student access to Mathematics courses.

Specializations

Specializations for this Major

Yes - Optional,

Specialization Details

Students may choose to focus their elective choices by completing one (or more) of four available specializations.

Specializations List

SE-Artificial Intelligence Specialization, SE-Business Specialization, SE-Computational Fine Art Specialization, or SE-Human-Computer Interaction Specialization

Undergraduate Plan Guidelines

Workflow Information

Change to Undergraduate Communication Requirement

No,

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Engineering

Faculty of Mathematics

Dependencies

Date 2026/02/02

Meeting Information

Agenda Page TitleSUC - 2026-02 - Consent Agenda - Faculty of Science

Career Level
Undergraduate,

Faculty/UnitFaculty of Science

Date2026-02-04

Time10:00 am

Location

Summary

Faculty of Science submission to SUC -Consent Agenda - For 2026-2027 UG Calendar

Motion 1: To approve Department of Biology curriculum changes to include a new BIOL 212 course and changes to BIOL 225, 251, 444, 462 courses, as detailed in the Quali proposals within this agenda.

Motion 2: To approve Department of Chemistry curriculum changes to include a new CHEM 212 and CHEM 257 course, course changes to CHEM 335L, 340, 350, 356, 370, 404, and MNS 322, in addition to the following minor chemistry plan modifications, as detailed in the Quali proposals within this agenda:

- H- Chemistry
- H- Chemistry, Computational Specialization
- H- Medicinal Chemistry
- H- Biochemistry
- H- Biochemistry, Biotechnology Specialization
- H- Materials and Nanosciences

Motion 3: To approved Department of Earth and Environmental Sciences curriculum changes to include a new EARTH 343 course, changes to EARTH 440, a subject and number change from SCI 201 to EARTH 305, in addition to the following minor plan modification, for as detailed in the Quali proposals within this agenda:

- Earth Sciences Minor

Motion 4: To approve Department of Physics and Astronomy curriculum changes to include

the retirement of five courses, introduction of nine new courses, eleven course changes, in addition to the following minor physics plan modifications, as detailed in the Kuali proposals within this agenda:

- H- Physics
- H- Physics and Astronomy
- H- Mathematical Physics
- H- Biological and Medical Physics
- H- Materials and Nanosciences
- Astrophysics Minor
- Biophysics Minors
- Physics Minor
- Joint H- Physics

Motion 5: To approve the Schools of Pharmacy and Optometry & Vision Science curriculum changes to include a new PHARM 381 course and the addition of drop consent to 50 OPTOM courses, two of which additionally include title changes, as detailed in the Kuali proposals within this agenda.

Motion 6: To approve the following Dean of Science minor plan modifications as detailed in the Kuali proposals within this agenda:

- H- Science and Aviation

Motion 7: To approve Dean of Science curriculum changes for course changes to SCI 211, 252, 267, 300, and 301, in addition to the follow minor plan modifications, as detailed in the Kuali proposals within this agenda:

- H- Science and Financial Management
- Biotechnology Specialization
- Physics of Systems & Energy Specialization
- H- Medical Sciences

Motion 8: To approve regulation changes to the following science and university regulations:

- Science: Averages and Academic Standings
- Science: Courses and Classes
- Science: Transfer Information
- Academic Regulations: Determination of Level of Study
- Admissions: Transferring to Waterloo
- Tuition, Fees, and Financing: Tuition and Other Fees

Other Business

Related Faculty of Environment and Science Submission

- Retire GEOG 416 cross-listing with AVIA courses
- New AVIA 310 and 470 courses included in new Aviation minor and GEM's AVIA specialization
- New GEOG 402 cross-listing to existing EARTH 444, and BIOL 462
- New SCI 205 cross-listing existing GEOG 207
- AVIA 310 renumbered as AVIA 210
- AVIA 417 renumbered as AVIA 317
- AVIA 416- credit weight change
- GEOG 207- gets a new cross-listing of SCI 205
- GEOG 270/AVIA 270- GEOG subject changes to GDS

Related Faculty of Environment Submission

- Retired GEOG 405
- Retired GEOG 309

Related Faculty of Arts Submissions

- Updated PHIL 252 (SCI 252 cross-listing)
- Updated PHIL 258 (SCI 267 cross-listing)

Related Faculty of Engineering Submissions

- H-Geological Engineering - invalid combination with Earth Sciences Minor

Related Faculty of Mathematics Submissions

- AMATH 473- retiring PHYS 454 cross-link
- AMATH 474- retiring PHYS 484 cross-link

Attachment(s)

Course Proposals

Course Proposal Details

RETIRE COURSES

Note: Physics will have a phased approach for retiring courses as part of their curriculum changes (2026 through to 2030); the following will retire 2026-2027 Calendar.

PHYS 124- retiring from core to make space for new PHYS 223 course

PHYS 335- content being moved to 400-level series, new PHYS 436

PHYS 435- content merged with PHYS 335 content into new PHYS 436

PHYS 454- retiring PHYS label from cross-listing

PHYS 484- retiring PHYS label from cross-listing

NEW COURES

BIOL 212, Dinosaurs- A survey of the major dinosaur groups from the beginning of the Triassic through the end of the Cretaceous including aspects of evolution, behaviour and general biology.

CHEM 214, Biological Inorganic Chemistry- A new course that will provide a more basic introduction to inorganic chemistry, structure and bonding. In the second half of the course, emphasis shifts to special examples in bioinorganic chemistry. The course is designed for Biochemistry plans, to address the challenges created by CHEM 212, however, this new courses is accessible to other students with an interest in chemistry.

CHEM 257, Physical Chemistry for Life Sciences- A new course created primarily for the Biochemistry and Medicinal Chemistry plans, replacing CHEM 254 (Introductory Chemical Thermodynamics) covering more topics but with less depth and mathematical detail. It will also cover the chemical kinetics component, currently taught in CHEM 350 (Chemical Kinetics and Statistical Mechanics) for the Medicinal Chemistry plan, and in CHEM 357 (Physical Biochemistry) for Biochemistry plans. It will be open for other students with an interest in chemistry.

EARTH 343, Coastal Geomorphology- designed to provide a broad introduction to coastal geomorphology.

PHARM 381, Advanced Hypertension Management in Primary Care- A new elective and online option in an advanced area of clinical practice, for students in the Doctor of Pharmacy program who require four electives throughout their program.

PHYS 223, Waves - PHYS 122 split into Electricity and Magnetism (remains PHYS 122) and Waves.

PHYS 356, Optics 1- New Optics course to replace second year PHYS 256.

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PHYS 357, Statistical Mechanics and Thermodynamics- Sequence revise for thermodynamics and statistical mechanics from PHYS 358/359 to PHYS 357/457.

PHYS 376, Relativistic Physics - New standalone course preparing students for advanced general relativity courses.

PHYS 436, Condensed Matter- New course in this topic replacing third year PHYS 335.

PHYS 456, Optics 2- New course to follow PHYS 356, capturing content from retiring PHYS 393 and 394.

PHYS 457, Advanced Statistical Mechanics- Sequence revise for thermodynamics and statistical mechanics from PHYS 358/359 to PHYS 357/457.

PHYS 464, Group Theory for Physicists- new course to provide a physics-focused treatment of symmetries and their applications, with minimal mathematical overhead.

PHYS 480, Advanced Topics in Biophysics- New course in advanced biophysics to replace alternating year offerings of PHYS 395 and 396.

COURSE CHANGES

Note: Physics will have a phased approach for course changes as part of their curriculum changes (2026 through to 2030); the ones include in this list will have changes for 2026-2027 Calendar.

BIOL 225- title change and added discussion (DIS) component

BIOL 251- new antirequisite, ENVS 200, Field Ecology

BIOL 444- description update, removal of BIOL 341 in addition to redundant prerequisites

CHEM 355L- remove CHEM 357 corequisite

CHEM 340L- description update, number change (L) and added program prerequisites

CHEM 350- prerequisite changed to corequisite; CHEM 257 added as optional corequisite

CHEM 356- "level at least 2A MNS" added as optional prerequisite

CHEM 370- prerequisite changed to corequisite; CHEM 257 added as optional corequisite

CHEM 404- CHEM 257 added as optional prerequisite

EARTH 305- renumbered, formerly SCI 201, with updated title, description and requisites

EARTH 440- description change

MNS 322- prerequisites become co-requisites and CHEM 257 is added as an alternative option

OPTOM courses (all 50)- drop consent added

- **OPTOM 342A- title and short title change; prerequisite update, as well as the addition of drop consent**
- **OPTOM 342B- title and short title change as well as the addition to drop consent**

PHYS 121- description and requisite updates.

PHYS 122- title and description update to remove waves, and requisites updates

PHYS 234- description and requisite updates.

PHYS 242- description and requisite updates.

PHYS 267- requisite updates.

PHYS 334- requisite updates

PHYS 444- title and description updates

PHYS 449- title, description updates, LAB component added, and removal of an old prerequisite

PHYS 468- title, description and requisite update

PHYS 483- remove program prerequisite and add PHYS 383 requisite

PHYS 490- tutorial (TUT) component and program prerequisites added

SCI 211- "Additional fees may apply" statements is added for transparency

SCI 252- description updates

SCI 267- description updates

SCI 300- "Additional fees may apply" statements is added for transparency

SCI 301- "Additional fees may apply" statements is added for transparency

Courses: Retire

Code	Title	Type	Workflow Step
PHYS 124	Modern Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 335	Condensed Matter Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 435	Current Topics in Condensed Matter Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 454	Quantum Theory 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 484	Quantum Theory 3: Quantum Information and Foundations	Courses	SUC Subcommittee, SUC Curricular Subcommittee

Courses: New

Code	Title	Type	Workflow Step
BIOL 212	Dinosaurs	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 214	Biological Inorganic Chemistry	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 257	Physical Chemistry for the Life Sciences	Courses	SUC Subcommittee, SUC Curricular Subcommittee
EARTH 343	Coastal Geomorphology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHARM 381	Advanced Hypertension Management in Primary Care	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 223	Waves	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 356	Optics 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 357	Statistical Mechanics and Thermodynamics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 376	Relativistic Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 436	Condensed Matter	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 456	Optics 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 457	Advanced Statistical Mechanics	Courses	SUC Subcommittee, SUC Curricular Subcommittee

PHYS 464	Group Theory for Physicists	Courses	SUC Subcommittee, SUC Curricular Subcommittee
PHYS 480	Advanced Topics in Biophysics	Courses	SUC Subcommittee, SUC Curricular Subcommittee

Courses: Changes

Code	Title	Type	Workflow Step
BIOL 225	Plant Knowledge and Practices: Indigenous and Western Science Perspectives	Courses	SUC Subcommittee, SUC Curricular Subcommittee
BIOL 251	Fundamentals of Ecology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
BIOL 444	Bacterial Pathogenesis	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 335L	Advanced Biochemistry Laboratory	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 340L	Introductory Computational Chemistry	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 350	Chemical Kinetics and Statistical Mechanics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 356	Introductory Quantum Mechanics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 370	Introduction to Polymer Science	Courses	SUC Subcommittee, SUC Curricular Subcommittee
CHEM 404	Physicochemical Aspects of Natural Waters	Courses	SUC Subcommittee, SUC Curricular Subcommittee
EARTH 305	Physical Science of Climate Change	Courses	SUC Subcommittee, SUC Curricular Subcommittee
EARTH 440	Quaternary Geology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
MNS 322	Polymer Materials	Courses	SUC Subcommittee, SUC Curricular Subcommittee
OPTOM 103	Pathophysiology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
OPTOM 104	Neuroanatomy	Courses	SUC Subcommittee, SUC Curricular Subcommittee
OPTOM 105	Medical Microbiology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
OPTOM 106	Geometrical, Physical and Visual Optics	Courses	SUC Subcommittee, SUC Curricular Subcommittee

<u>OPTOM 108</u>	Histology of Tissues and Organs	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 109</u>	Visual Perception 1: Perception of Light	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 114</u>	Ocular Anatomy and Physiology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 124</u>	Human Gross Anatomy	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 126</u>	Fundamentals of Visual Optics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 134</u>	Immunology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 148</u>	Clinical Experience 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 150</u>	Optometric Jurisprudence	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 152</u>	Fundamental Clinical Techniques	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 158</u>	Clinical Experience 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 170</u>	Public Health Optometry	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 215</u>	Systemic Disease	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 216</u>	Ophthalmic Optics 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 219</u>	Visual Perception 2: Monocular and Binocular Visual Processes	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 231</u>	Introductory Clinical Pharmacology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 243</u>	Neurophysiology of Vision	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 245</u>	Diseases of the Eye 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 246</u>	Ophthalmic Optics 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 248</u>	Clinical Experience 3	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 252</u>	Binocular Vision 1: Non-Strabismic Conditions	Courses	SUC Subcommittee, SUC Curricular Subcommittee

<u>OPTOM 255</u>	Diseases of the Eye 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 258</u>	Clinical Experience 4	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 261</u>	Clinical Ocular Pharmacology	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 262</u>	Preparation for Primary Clinical Care	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 272</u>	Strabismus and Aniseikonia	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 342A</u>	Evidence-Based Case Analysis 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 342B</u>	Evidence-Based Case Analysis 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 346</u>	Ophthalmic Optics 3	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 347</u>	Contact Lenses 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 347L</u>	Contact Lenses 1 Laboratory	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 348A</u>	Optometry Clinics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 348B</u>	Optometry Clinics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 360</u>	Professional Ethics and Optometric Communication	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 365</u>	Ophthalmic Lasers and Refractive Surgery	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 367</u>	Contact Lenses 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 375</u>	Diseases of the Eye 3	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 375L</u>	Diseases of the Eye 3 Laboratory	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 377</u>	Pediatric Optometry and Learning Disabilities	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 380</u>	Practice Management	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 385</u>	Clinical Medicine for Optometric Practice	Courses	SUC Subcommittee, SUC Curricular Subcommittee

<u>OPTOM 387</u>	Low Vision and Geriatrics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 412</u>	Case Analysis and Communication 3	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 458</u>	Clinical Clerkship 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 468</u>	Clinical Clerkship 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 478</u>	Clinical Clerkship 3	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>OPTOM 477</u>	Clinical Techniques 4	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 121</u>	Mechanics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 122</u>	Electricity and Magnetism	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 234</u>	Quantum Physics 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 242</u>	Electricity and Magnetism 1	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 267</u>	Probability, Statistics, and Data Analysis for Physics and Astronomy	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 334</u>	Quantum Physics 2	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 444</u>	Subatomic Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 449</u>	Special Topics in Computational Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 468</u>	Physics of Quantum Computing	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 483</u>	Advanced Therapeutic Concepts in Oncology and Medical Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>PHYS 490</u>	Special Topics in Physics	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>SCI 211</u>	Traditional Medicines Land-Based Field Course	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>SCI 252</u>	Quantum Mechanics for Everyone	Courses	SUC Subcommittee, SUC Curricular Subcommittee
<u>SCI 267</u>	Introduction to the Philosophy of Science	Courses	SUC Subcommittee, SUC Curricular Subcommittee

SCI 300	Special Topics in Science	Courses	SUC Subcommittee, SUC Curricular Subcommittee
SCI 301	Special Topics in Science	Courses	SUC Subcommittee, SUC Curricular Subcommittee

Programs & Plans Proposals

Programs & Plans Proposal Details

Minor Modifications

- **H- Science and Aviation**
 - incompatible with new Aviation Minor
 - replace retired GEOG 309 with AVIA 370

- **H- Chemistry & H- Chemistry, Computational Specialization**
 - 2.0 total program unit reduction (now 20.0 units)
 - overall 400-level course requirement minimum is 2.0 units, includes CHEM 494A/B
 - additional options added to 300-level CHEM requirement
 - CHEM 340 becomes CHEM 340L

- **H- Medicinal Chemistry**
 - 1.75 total program unit reduction (now 20.25 units)
 - new CHEM 257 replaces CHEM 254 requirement
 - overall 400-level course requirement minimum is 2.0 units, including required CHEM 400-level courses
 - combined average for CHEM 264 and 265 reduced to 65% versus 70%
 - 70% required in CHEM 360L and 382L, and 70% average required across CHEM 360, 360L, 381, 382L, and 383 versus 70% minimum in each.

- **H- Biochemistry & H- Biochemistry, Biotechnology Specialization**
 - 1.75 total program unit reduction (now 20.25 units)
 - STAT 202 required; MATH 228 removed as option
 - new CHEM 257 replaces CHEM 254 requirement
 - new CHEM 214 replaces CHEM 212 requirement
 - Approved course lists merged and additional courses added

- **Earth Sciences Minor**
 - Invalid combination with H- Geological Engineering

- **H- Physics & H- Physics and Astronomy**
 - Reduce the number of required units to 21.0
 - Ensure strong introductory foundations in first three terms (sprit PHYS 122, adding new Waves course, PHYS 223)
 - Provide flexibility in selecting core courses in third year (introduce pick four from a list of six, rather than require all six)

- **H- Mathematical Physics**
 - Units remain at 20.75; increase electives by 2.0 units, reducing core units by 2.0

- Ensure strong introductory foundations in first three terms (sprit PHYS 122, adding new Waves course, PHYS 223)
 - remove upper year AMATH/PHYS breadth requirement providing options
 - Provide flexibility in selecting core courses in third year, adjusting PHYS elective pool and requiring 3 of 8 electives
- **H-Biological and Medical Physics**
 - Reduce the number of required units to 21.0
 - Ensure strong introductory foundations in first three terms (sprit PHYS 122, adding new Waves course, PHYS 223)
 - Removing courses and replacing others for flexibility and more biophysics focus
 - Revise elective structure for more flexibility
- **H- Materials and Nanosciences**
 - reduced total degree units, 20.0 total
 - remove CHEM 209 and PHYS 342 from core into program elective
 - reduced program elective requirement by 0.5 unit
 - replace PHYS 234 with CHEM 356
- **Astrophysics Minor, Biophysics Minor, Physics Minor, Joint H-Physics**
 - curriculum changes reflected are minors and joint program
- **H-Science and Financial Management**
 - Reduce total plan units to 20.0
 - Biotechnology Specialization- reduced total plan units from 8.0 to 6.0
 - Physics of Systems & Energy Specialization- provide option 1.5 core set of courses and update list of approved course electives
- **H-Medical Sciences**
 - Update Academic Admission requirements to note that only MD-6 track, versus MD-5 students have an opportunity for a BMSci degree
 - Update notes to include links and reference to SGU technical requirements, policies, regulations and procedures, alerting students these can be different from Waterloo.

Programs & Plans: Retire No proposals have been added.

Programs & Plans: Major Modifications No proposals have been added.

Programs & Plans: Minor Modifications

Code	Title	Type	Workflow Step
H-Chemistry	Chemistry (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee

<u>H-Chemistry - Computational Specialization</u>	Chemistry - Computational Specialization (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Medicinal Chemistry</u>	Medicinal Chemistry (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Biochemistry</u>	Biochemistry (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Biochemistry - Biotechnology Specialization</u>	Biochemistry - Biotechnology Specialization (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>Earth Sciences Minor</u>	Earth Sciences Minor	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Physics</u>	Physics (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Physics & Astronomy</u>	Physics and Astronomy (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Mathematical Physics (BSc)</u>	Mathematical Physics (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Biological & Medical Physics</u>	Biological and Medical Physics (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>Astrophysics Minor</u>	Astrophysics Minor	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>Biophysics Minor</u>	Biophysics Minor	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>Physics Minor</u>	Physics Minor	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>JH-Physics</u>	Physics (Joint Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Materials & Nanosciences</u>	Materials and Nanosciences (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
<u>H-Science & Aviation</u>	Science and Aviation (Bachelor of Science - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee

H-Science & Financial Management	Science and Financial Management (Bachelor of Science and Financial Management - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee
Biotechnology Specialization	Biotechnology Specialization	Programs	SUC Subcommittee, SUC Curricular Subcommittee
Physics of Systems & Energy Specialization	Physics of Systems and Energy Specialization	Programs	SUC Subcommittee, SUC Curricular Subcommittee
H-Medical Sciences	Medical Sciences (Bachelor of Medical Sciences - Honours)	Programs	SUC Subcommittee, SUC Curricular Subcommittee

Regulations Proposals

Regulations Proposal Details

Regulation Changes

- **Science: Averages and Academic Standings**
 - Removal of regulations section related to academic standings, progression and repeating courses specific to Bachelor of Medical Sciences (BMSci) from this page as all the information will instead be on the new regulation page for Medical Sciences.
- **Science: Courses and Classes**
 - **Course Load Regulation**
 - Inclusion of maximum units per term for General Science plan.
 - Inclusion of two new plans, Science and Financial Management (BScFM) and Medical Sciences.
 - **Grading Regulation**
 - Noting two examining bodies for courses in the Medical Sciences plan.
 - **Enrolment in Graduate Courses**
 - Exclusion of Medical Sciences plan from this regulation.
 - **Repeating Courses**
 - Indicating the regulation applies to both BSc and BScFM.
 - Noting that only one grade is included for repeated antirequisite and cross-listed courses.
 - Adding links to Regulation pages for Optometry, Pharmacy and Medical Sciences plans.
- **Science: Transfer Information**
 - **Letter of Permission Regulation**
 - Excluding Medical Sciences plan from eligibility.
 - **External Transfer Students Regulations**
 - Excluding Medical Sciences plan from advance standing via transfer credits.
- **Academic Regulations: Determination of Level of Study**
 - Inclusion of Medical Sciences plan in list of plans where progression and level is based on completion of previous level.
- **Admissions: Transferring to Waterloo**
 - **Advanced Standing Regulation**

- Inclusion of Medical Sciences plan in list of plans that do not follow course-credit system
 - Inclusion of link to regulations for advanced standing in Medical Sciences plan.
- Tuition, Fees, and Financing: Tuition and Other Fees
 - Fee Assessment Regulation
 - Inclusion of fee details for Medical Sciences plan under "Regular Programs"

Regulations: Retire No proposals have been added.

Regulations: New No proposals have been added.

Regulations: Changes

Code	Title	Type	Workflow Step
UG-SCI-Averages and Academic Standings	Science: Averages and Academic Standings	Policies	SUC Subcommittee, SUC Curricular Subcommittee
UG-SCI-Courses and Classes	Science: Courses and Classes	Policies	SUC Subcommittee, SUC Curricular Subcommittee
UG-SCI-Transfer Information	Science: Transfer Information	Policies	SUC Subcommittee, SUC Curricular Subcommittee
UG-AR-Level/Term of Study	Determination of Level and Term of Study	Policies	SUC Subcommittee, SUC Curricular Subcommittee
UG-ADM-Transferring to Waterloo	Transferring to Waterloo	Policies	SUC Subcommittee, SUC Curricular Subcommittee
UG-TFS-Tuition & Other Fees	Tuition and Other Fees	Policies	SUC Subcommittee, SUC Curricular Subcommittee

PHYS 124 - Modern Physics

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2025

Offering Number

1

Proposal Details

Proposal Type

Retire,

Academic Unit Approval

2025-06-11

Last Offering of Course

Winter 2026

Retired Impact

Yes,

Retired Impact Details

This is being removed from all physics plans. Students who do not have this course and need it to graduate can substitute any other physics course. For other plans, this course is generally in a long list of electives and there are many possible alternatives.

Rationale for Change

PHYS 124 is a required course for physics programs but not a pre-requisite to higher level courses. This course will retire, allowing space for the newly created PHYS 223, Waves, as a core for physics programs. PHYS 223 will be a pre-requisite to higher level courses.

Consultations**Consultation Paragraph:**

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- email consultations attached

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

124

Course Level

100

Title

Modern Physics

Abbreviated Title

Modern Physics

Undergraduate Communication Requirement Identifier

No,

Description

An introductory course in modern physics; includes relativity, quantum physics, atomic physics, nuclear physics, particle physics, and gravitation.

Units

0.50

Proposed

Exceptions to Fees or Academic Progress Units

Existing

Exceptions to Fees or Academic Progress Units

Components

LectureTest Slot Tutorial

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:
 - PHYS111 - Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - ECE105 - Classical Mechanics (0.50)
 - PHYS115 - Mechanics (0.50)
 - PHYS121 - Mechanics (0.50)

Corequisites

Complete all of the following

- Completed or concurrently enrolled in at least 1 of the following:
 - ECE106 - Electricity and Magnetism (0.50)
 - PHYS112 - Physics 2 (0.50)
 - PHYS122 - Waves, Electricity and Magnetism (0.50)
- Completed or concurrently enrolled in: PHYS125

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (no units)

- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours)
- JH-Physics - Physics (Joint Honours) [View Program](#) [View Program](#)

Course Requirements (units)

- Physics Minor - Physics Minor [View Program](#)

Course Requirements (no units)

- H-Biological & Medical Physics - Biological and Medical Physics (Bachelor of Science - Honours) [View Program](#)

Course Lists

- H-Electrical Engineering - Electrical Engineering (Bachelor of Applied Science - Honours)
- H-Computer Engineering - Computer Engineering (Bachelor of Applied Science - Honours) [View Program](#) [View Program](#)
- H-Management Engineering - Management Engineering (Bachelor of Applied Science - Honours)

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

[View Program](#)
[View Program](#)

Course Requirements (no units)

- H-Physics & Astronomy - Physics and Astronomy (Bachelor of Science - Honours)
- H-Physics - Physics (Bachelor of Science - Honours) [View Program](#) [View Program](#)
- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours) [View Program](#)

PHYS 335 - Condensed Matter Physics Top

Effective Date & Career

Career Undergraduate,	<table border="1" style="margin: auto;"> <tr><td style="background-color: #FFD700;">Proposed</td></tr> <tr><td style="background-color: #FFD700;">Effective Term and Year Fall 2026</td></tr> <tr><td style="background-color: #ADD8E6;">Existing</td></tr> <tr><td style="background-color: #ADD8E6;">Effective Term and Year Fall 2025</td></tr> </table>	Proposed	Effective Term and Year Fall 2026	Existing	Effective Term and Year Fall 2025	Offering Number 1
Proposed						
Effective Term and Year Fall 2026						
Existing						
Effective Term and Year Fall 2025						

Proposal Details

Proposal Type Retire,	Academic Unit Approval 2025-06-11		
Last Offering of Course Winter 2026	<table border="0"> <tr> <td style="vertical-align: top;">Retired Impact Yes,</td> <td style="vertical-align: top;">Retired Impact Details Course is part of a long list of electives that can be replaced by another course. Students can also take the new version of this course effective Winter 2027 (PHYS 436) since the course is being moved to 400-series.</td> </tr> </table>	Retired Impact Yes,	Retired Impact Details Course is part of a long list of electives that can be replaced by another course. Students can also take the new version of this course effective Winter 2027 (PHYS 436) since the course is being moved to 400-series.
Retired Impact Yes,	Retired Impact Details Course is part of a long list of electives that can be replaced by another course. Students can also take the new version of this course effective Winter 2027 (PHYS 436) since the course is being moved to 400-series.		

Rationale for Change

The content of PHYS 335 has been moved to a new fourth year course, PHYS 436, which will also cover some of the material in a bit more depth. Fourth year is the traditional time to teach this material in most physics programs.

Consultations

Consultation Paragraph:

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Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

Number

Course Level

PHYS

335

300

Title

Condensed Matter Physics

Abbreviated Title

Condensed Matter Physics

Undergraduate Communication Requirement Identifier

No,

Description

An introduction to condensed matter physics, including their lattice, electronic and thermodynamic properties. Crystalline lattices in solids. Reciprocal lattices. Diffraction from crystals. Lattice vibrations and phonons. Properties of a free electron gas. Electrons in a periodic potential and band-structure. Metals, insulators and semiconductors. Electrical transport in materials. Introduction to semiconductor physics.

Units

0.50

Exceptions to Fees or Academic Progress Units

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 all of the following

- Must have completed the following:
 - PHYS358 - Thermal Physics (0.50)
- Must have completed at least 1 of the following:
 - AMATH231 - Calculus 4 (0.50)
 - PHYS364 - Mathematical Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - CHEM356 - Introductory Quantum Mechanics (0.50)
 - PHYS234 - Quantum Physics 1 (0.50)
- Students must be in level 3A
- Enrolled in a program offered by the Faculties of Engineering, Mathematics, or Science

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Prerequisites

- PHYS 435 - Current Topics in Condensed Matter Physics [View Program](#)
- PHYS 461 - Nanophysics [View Program](#)

Course Lists

- H-Materials & Nanosciences - Materials and Nanosciences (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- H-Biological & Medical Physics - Biological and Medical Physics (Bachelor of Science - Honours) [View Program](#)

Course Lists

- H-Electrical Engineering - Electrical Engineering (Bachelor of Applied Science - Honours)
- H-Computer Engineering - Computer Engineering (Bachelor of Applied Science - Honours) [View Program](#)
- H-Software Engineering - Software Engineering (Bachelor of Software Engineering - Honours) [View Program](#)

Course Requirements (no units)

- Physical Sciences Option - Physical Sciences Option [View Program](#)

PHYS 435 - Current Topics in Condensed Matter Physics

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year
Fall 2026

Existing

Effective Term and Year
Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Retire,

Academic Unit Approval

2025-06-11

Last Offering of Course

Winter 2025

Retired Impact

Yes,

Retired Impact Details

Course is part of a long list of electives that can be replaced by another course. Students can also take the new version of this course effective Winter 2027 (PHYS 436) since the course is being moved to 400-series.

Rationale for Change

Due to low enrolment in PHYS 335, Condensed Matter Physics, as well as planned curriculum changes within the physics plans, content from PHYS 335, together with content from PHYS 435, Current Topics in Condensed Matter Physics, will make up the content for a new fourth year course, PHYS 436, Condensed Matter. Therefore both PHYS 335 and PHYS 435 will retire.

Consultations**Consultation Paragraph:**

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Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

435

Course Level

400

Title

Current Topics in Condensed Matter Physics

Abbreviated Title

Topics: Condensed Matter

Undergraduate Communication Requirement Identifier

No,

Description

Physics pertaining to collective and emergent phenomena in condensed matter systems. Examples of topics to be covered include magnetism, superconductivity, heavy Fermion systems, quantum hall effect, protein folding, membranes, DNA physics, polymer physics, modern experimental and theoretical techniques.

Units

0.50

Exceptions to Fees or Academic Progress Units

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 all of the following

- Must have completed the following:
 - PHYS335 - Condensed Matter Physics (0.50)
 - PHYS359 - Statistical Mechanics (0.50)
- Must have completed at least 1 of the following:
 - AMATH373 - Quantum Theory 1 (0.50)
 - PHYS334 - Quantum Physics 2 (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Lists

- H-Materials & Nanosciences - Materials and Nanosciences (Bachelor of Science - Honours)

[View Program](#)

Course Requirements (no units)

- Physical Sciences Option - Physical Sciences Option

[View Program](#)

PHYS 454 - Quantum Theory 2

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and
Year

Fall 2026

Existing

Offering Number

2

Proposal Details

Proposal Type

Retire,

Academic Unit Approval

2025-06-11

Last Offering of Course

Fall 2025

Retired Impact

Yes,

Retired Impact Details

Students can still take AMATH 473 as they are crosslisted with PHYS 454.

Rationale for Change

The department of Physics and Astronomy will retire the PHYS label on three quantum-related cross-listed courses so that these courses do not count towards the three 400-level PHYS breadth electives in the updated physics plans effective 2026. The department already offers PHYS 434, Quantum Physics 3, and needs to ensure that physics students do not graduate with only quantum-related courses as their breadth electives.

Therefore, the PHYS cross-link label is being retired for PHYS 454, Quantum theory (2026), PHYS 467 (2029), Introduction to Quantum Information and Processing, and PHYS 484, Quantum Theory 3: Quantum Information and Processing (2026), but the courses will continue to be offered by other departments.

These courses will still be promoted to students in physics plans and can be used to meet their elective requirements.

These courses are not currently listed as explicit electives in physics programs.

Consultations

Consultation Paragraph:

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Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

454

Course Level

400

Title

Quantum Theory 2

Abbreviated Title

Quantum Theory 2

Undergraduate Communication Requirement Identifier

No,

Description

The Hilbert space of states, observables, and time evolution. Feynman path integral and Greens functions. Approximation methods. Co-ordinate transformations, angular momentum, and spin. The relation

between symmetries and conservation laws. Density matrix, Ehrenfest theorem, and decoherence. Multipartle quantum mechanics. Bell inequality and basics of quantum computing.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

Primary Component

Lecture

Grading Information

Standard Course Grading

Yes,

Cross-Listing Information

Is this course cross-listed?

Yes,

Cross-Listed Courses

[AMATH473](#) - Quantum Theory 2

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:
 - AMATH231 - Calculus 4 (0.50)
 - PMATH343 - Introduction to the Mathematics of Quantum Information (0.50)
- Must have completed at least 1 of the following:
 - AMATH373 - Quantum Theory 1 (0.50)
 - PHYS334 - Quantum Physics 2 (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Prerequisites

- AMATH 474 - Quantum Theory 3: Quantum Information and Foundations [View Program](#)
- PHYS 484 - Quantum Theory 3: Quantum Information and Foundations [View Program](#)

Course Requirements (no units)

- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours)
- Quantum Information Option - Quantum Information Option [View Program](#) [View Program](#)

- H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours)
- Physics Specialization - Physics Specialization [View Program](#) [View Program](#)
- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours)
- Physical Sciences Option - Physical Sciences Option [View Program](#) [View Program](#)

PHYS 484 - Quantum Theory 3: Quantum Information and Foundations

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Effective Date & Career

Career

Undergraduate,

Proposed
Effective Term and Year Fall 2026
Existing
Effective Term and Year Fall 2024

Offering Number

2

Proposal Details

Proposal Type

Retire,

Academic Unit Approval

2025-06-11

Last Offering of Course

Winter 2026

Retired Impact

Yes,

Retired Impact Details

Students in other plans can still take the currently cross-listed course, AMATH 474

Rationale for Change

The department of Physics and Astronomy will retire the PHYS label on three quantum-related cross-listed courses so that these courses do not count towards the three 400-level PHYS breadth electives in the updated physics plans effective 2026. The department already offers PHYS 434, Quantum Physics 3, and

needs to ensure that physics students do not graduate with only quantum-related courses as their breadth electives.

Therefore, the PHYS cross-link label is being retired for PHYS 454, Quantum theory (2026), PHYS 467, Introduction to Quantum Information and Processing (2029), and PHYS 484, Quantum Theory 3: Quantum Information and Processing (2026), but the courses will continue to be offered by other departments.

These courses will still be promoted to students in physics plans and can be used to meet their elective requirements.

These courses are not currently listed as explicit electives in physics programs.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

484

Course Level

400

Title

Quantum Theory 3: Quantum Information and Foundations

Abbreviated Title

Quantum Theory 3

Undergraduate Communication Requirement Identifier

No,

Description

Theory of correlations and entanglement; theory of quantum channels, detectors; the measurement problem, in quantum mechanics; phase space formulation of quantum mechanics; entanglement in infinite dimensional quantum systems; introduction to open quantum systems; and exploration of current research directions in quantum information.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

Primary Component

Lecture

Grading Information

Standard Course Grading

Yes,

Cross-Listing Information

Is this course cross-listed?

Yes,

Cross-Listed Courses

[AMATH 474](#) - Quantum Theory 3: Quantum Information and Foundations

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:
 - AMATH473 - Quantum Theory 2 (0.50)
 - PHYS454 - Quantum Theory 2 (0.50)
- Students must be in level 4A or higher
- Enrolled in a program offered by the Faculties of Mathematics or Science

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (no units)

- Quantum Information Option - Quantum Information Option [View Program](#)
- H-Mathematical Physics (BMath) - Mathematical Physics (Bachelor of Mathematics - Honours) [View Program](#)

BIOL 212 - Dinosaurs

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-04-29

Rationale for New Course

This new Biology course will offer a BIOL elective option for students across the entire university, which is currently not available. It is anticipated that BIOL 212 will develop over time into a high enrolment course,

with initial enrolment capacities of 150 and 355 anticipated for spring and winter terms, respectively. The first offering is planned for W2028.

Consultations

Draft outline for BIOL 212 attached.

Supporting Documentation

- [Biol 212 Dinosaurs Preliminary Content Outline.pdf](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Biology

Subject Code

BIOL

Number

212

Course Level

200

Title

Dinosaurs

Abbreviated Title

Dinosaurs

Undergraduate Communication Requirement Identifier

No,

Description

A survey of the major dinosaur groups from the beginning of the Triassic through the end of the Cretaceous including aspects of evolution, behaviour, and general biology. The course will emphasize factors that resulted in mass extinction events, and impacts of continental drift and climate change on dinosaurs over time.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

Primary Component

Lecture

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

Students must be in level 2A or higher

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

CHEM 214 - Biological Inorganic Chemistry

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-10-06

Rationale for New Course

Historically, CHEM 212 has been a challenge for many students in Biochemistry plans, as it has a strong emphasis on molecular orbitals and elements of symmetry. CHEM 214, Biological Inorganic Chemistry, is a new course that will provide a more basic introduction to inorganic chemistry, structure and bonding. In the second half of the course, emphasis shifts to special examples in bioinorganic chemistry. The course is designed for Biochemistry plans, to address the challenges created by CHEM 212, however, this new course is accessible to other students with an interest in chemistry.

Consultations

Draft outline for CHEM 214 attached.

Supporting Documentation

- [CHEM214_Calendar.doc](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

CHEM

Number

214

Course Level

200

Title

Biological Inorganic Chemistry

Abbreviated Title

Biological Inorganic Chemistry

Undergraduate Communication Requirement Identifier

No,

Description

An introduction to inorganic chemistry that focuses on biological systems. Topics include basic concepts of structure and bonding, metal and ligand types, and physical properties and chemical reactivity. Bioinorganic applications are illustrated through examples such as dioxygen-binding proteins, oxygenases, metalloproteases, and bioorganometallic chemistry.

Units

Exceptions to Fees or Academic Progress Units

0.50

No,

Components

LectureTutorial

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:
 - CHEM233 - Fundamentals of Biochemistry (0.50)
 - CHEM237 - Introductory Biochemistry (0.50)
- Enrolled in an Honours program

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

CHEM 257 - Physical Chemistry for the Life Sciences

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-10-06

Rationale for New Course

CHEM 257, Physical Chemistry for the Life Sciences, is a new course created primarily for the Biochemistry and Medicinal Chemistry plans, replacing CHEM 254 (Introductory Chemical Thermodynamics) currently required in these plans. It will also be open for other students with an interest in chemistry (e.g., those doing a Chemistry Minor).

CHEM 257 will also cover the chemical kinetics component, currently taught in CHEM 350 (Chemical Kinetics and Statistical Mechanics) for the Medicinal Chemistry plan, and in CHEM 357 (Physical Biochemistry) for Biochemistry plans. As such, CHEM 350 and CHEM 357 will become program electives for these plans.

CHEM 257 covers more topics than CHEM 254, but with less depth and mathematical detail. Topics include introductory thermodynamics, electrochemistry, transport properties and chemical/biological kinetics.

Consultations

The Biology Department has been consulted regarding the changes to the Biochemistry and Biochemistry - Biotechnology Specialization programs.

A draft outline for CHEM 257 is attached.

Supporting Documentation

- [CHEM 257_Calendar.docx](#)

Course Information

Faculty**Academic Unit**

Subject Code	Number	Course Level
CHEM	257	200

Title

Physical Chemistry for the Life Sciences

Abbreviated Title

Physical Chemistry Life Sci

Undergraduate Communication Requirement Identifier

No,

Description

The principles and application of thermodynamics to systems in the life sciences, from small molecules to macromolecules. Principles of electrochemistry, transport properties, diffusion and collisions. Chemical and enzyme kinetics and their use in understanding chemical and biological transformations.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

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:
 - MATH119 - Calculus 2 for Engineering (0.50)
 - MATH128 - Calculus 2 for the Sciences (0.50)
- Must have completed at least 1 of the following:
 - CHEM123 - General Chemistry 2 (0.50)
 - CHEM125 - Chemical Reactions, Equilibria and Kinetics (0.50)
 - NE121 - Chemical Principles (0.50)
- Enrolled in an Honours program

Corequisites

Completed or concurrently enrolled in at least 1 of the following:

- CHEM233 - Fundamentals of Biochemistry (0.50)
- CHEM237 - Introductory Biochemistry (0.50)
- NE281 - Biology for Nanotechnology Engineers (0.50)

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

EARTH 343 - Coastal Geomorphology

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-09-08

Rationale for New Course

There is new departmental expertise in this area, as well as an identified need for further courses in this field. This course has run as a special topics course under EARTH 491, winter 2025, and received positive student feedback.

Consultations

Geography Department approval/acknowledgement (email: C. Vong Oct 27, 2025)

Draft course outline for EARTH 343, based on EARTH 491 offering, is attached.

Supporting Documentation

- [Course Outline - Coastal Geomorphology \(EARTH 491\).pdf](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Earth and Environmental Sciences

Subject Code

EARTH

Number

343

Course Level

300

Title

Coastal Geomorphology

Abbreviated Title

Coastal Geomorphology

Undergraduate Communication Requirement Identifier

No,

Description

This course is designed to provide a broad introduction to coastal geomorphology by covering significant processes and landforms that are characteristic of sandy coastlines in both marine and lacustrine environments. In addition, this course will focus on the major threats to important coastal resources globally including climate change and anthropogenic impacts. Lectures, weekly readings, and assignments will introduce the basic theoretical background and direct application of modern research methodologies using opensource datasets and software.

Units

0.50

Exceptions to Fees or Academic Progress Units

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:

- EARTH121 - Introductory Earth Sciences (0.50)
- EARTH123 - Introductory Hydrology (0.50)
- GEOG102 - Global Environmental Systems: Processes and Change (0.50)

Corequisites

No Rules

Antirequisites

Not completed or currently enrolled in: EARTH491 (Topic 10: Process Geomorphology)

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHARM 381 - Advanced Hypertension Management in Primary Care

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-05-29

Rationale for New Course

Students registered in the Doctor or Pharmacy program must take 4 elective courses throughout the program. This new course provides students an opportunity for training in an advanced clinical area of practice, while also providing an additional online elective option. PHARM 381 will be entirely online and asynchronous to provide more student flexibility. It will be offered to students in Pharmacy in level 3A or higher.

Consultations

Draft course outline attached for PHARM 381.

Supporting Documentation

- [PHARM 381 - Hypertension elective.docx](#)
- [PHARM 381 - Proposed Course Schedule.docx](#)
- [PHARM 381 - Outline Draft \(v2\).pdf](#)

Course Information**Faculty**

Faculty of Science

Academic Unit

School of Pharmacy

Subject Code

PHARM

Number

381

Course Level

300

Title

Advanced Hypertension Management in Primary Care

Abbreviated Title

Advanced Hypertension Mgmt

Undergraduate Communication Requirement Identifier

No,

Description

This course focuses on developing clinical skills to manage hypertension in primary care settings. Students will learn to critically appraise evidence, individualize treatment plans, and implement hypertension management services. Cardiovascular risk assessment, blood pressure management strategies, and clinical documentation are examples of topics that may be covered.

Units

0.25

Exceptions to Fees or Academic Progress Units

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

Department consent required,

Consent to Drop

Department consent required,

Prerequisites

Complete all of the following

- Students must be in level 3A or higher
- Enrolled in Pharmacy

Corequisites

No Rules

Antirequisites

No Rules

Course Notes**Workflow Information****Workflow Path**

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

The content of PHYS 122 is being split into two courses: electricity and magnetism in PHYS 122 and waves in PHYS 223. This is for student workload and student success in higher terms.

The calculus prerequisite for PHYS 223, includes equivalent calculus pre-requisites from Engineering. Students with an AMATH 271 pre-requisite in addition to the required calculus prerequisite, have direct access to the waves course.

An antirequisite of PHYS 122 taken 2026 or earlier, is necessary for students who completed PHYS 122 when the course covered waves.

Consultations**Consultation Paragraph:**

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Kuali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- Email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

week 1: introduction, motivating examples, review of complex numbers

week 2: simple harmonic motion, different physical manifestations

week 3: damped harmonic oscillator

week 4: forced oscillations, applications to electric circuits

week 5: waves on a string, travelling waves, reflection at boundary

week 6: standing waves, string musical instruments

week 7: fourier analysis, midterm

week 8: the wave and electromagnetic nature of light, optical resonators

week 9: interference of light, interferometers

week 10: Huygen's principle, diffraction of light

week 11: introduction to wave approach to quantum mechanics

week 12: particle in a well, review

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

223

Course Level

200

Title

Waves

Abbreviated Title

Waves

**Undergraduate Communication
Requirement Identifier**

No,

Description

An introductory course in oscillations and waves and their importance to a wide variety of modern physics topics. Concepts include simple harmonic motion, resonance, damped harmonic motion, wave motion and interference, wave optics and diffraction, quantum mechanics.

Units

0.50

**Exceptions to Fees or Academic Progress
Units**

No,

Components

Lecture
Test Slot
Tutorial

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:
 - AMATH271 - Introduction to Theoretical Mechanics (0.50)
 - ECE105 - Classical Mechanics (0.50)
 - PHYS115 - Mechanics (0.50)
 - PHYS121 - Mechanics (0.50)
 - Earned a minimum grade of 80% in each of the following:
 - PHYS111 - Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - ECE205 - Advanced Calculus 1 for Electrical and Computer Engineers (0.50)
 - MATH116 - Calculus 1 for Engineering (0.50)
 - MATH117 - Calculus 1 for Engineering (0.50)
 - MATH127 - Calculus 1 for the Sciences (0.50)
 - MATH137 - Calculus 1 for Honours Mathematics (0.50)
 - MATH147 - Calculus 1 (Advanced Level) (0.50)

Corequisites

No Rules

Antirequisites

Must not have completed: PHYS 122 (taken 2026 or earlier).

Course Notes**Workflow Information****Workflow Path**

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHYS 356 - Optics 1

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-10

Rationale for New Course

PHYS 356 is a new Optics course that replaces the former second-year PHYS 256, Geometrical and Physical Optics, that will be sequenced in third year due to introduction of the new PHYS 223, Waves, that will be a required prerequisite for PHYS 356.

Equivalent Engineering calculus courses are also added as prerequisites.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to

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- Email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

PHYS 356: Recommended textbook is Optics, 5th Edition, by Eugene Hecht

1. Introduction to Optics, Reflection & Refraction, Fermat's Principle
2. Total Internal Reflection (TIR), Fiber Optics, Dispersion Through Prism
3. Mirrors and Lenses, Thick and Thin Lens
4. Combining Lenses, Ray Tracing, Introduction to Aberration
5. Paraxial Approximation, Optical Systems
6. Introduction to the Physical Properties of Light
7. Scattering and Adsorption
8. Coherence and Superposition of Waves
9. Interference and Interferometers
10. Diffraction
11. Applications of Diffraction, Diffraction Gratings
12. Polarization

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Academic Unit

Subject Code

PHYS

Number

356

Course Level

300

Title

Optics 1

Abbreviated Title

Optics 1

Undergraduate Communication Requirement Identifier

No,

Description

Geometrical optics: image formation, ray tracing through multiple optical components, dispersion by prisms, optical fibers, optical instruments - eyes, telescopes, microscopes, and cameras, introduction to aberrations; physical optics: interference and interferometers, diffraction, imaging resolution, diffraction gratings and their use in spectroscopy; coherence; wave-particle duality; introduction to the electromagnetic nature of light and polarization.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

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:
 - AMATH250 - Introduction to Differential Equations (0.50)
 - AMATH251 - Introduction to Differential Equations (Advanced Level) (0.50)
 - MATH228 - Differential Equations for Physics and Chemistry (0.50)
- Must have completed at least 1 of the following:
 - MATH118 - Calculus 2 for Engineering (0.50)
 - MATH119 - Calculus 2 for Engineering (0.50)
 - 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
 - Must have completed at least 1 of the following:
 - ECE106 - Electricity and Magnetism (0.50)
 - PHYS122 - Waves, Electricity and Magnetism (0.50)
 - Earned a minimum grade of 80% in each of the following:
 - PHYS112 - Physics 2 (0.50)
- Complete 1 of the following
 - Must have completed the following:
 - Course Not Found
 - PHYS122 (taken prior to winter 2027)

Corequisites

No Rules

Antirequisites

Not completed nor concurrently enrolled in:

- ECE404 - Geometrical and Physical Optics (0.50)

- PHYS256 - Geometrical and Physical Optics (0.50)

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHYS 357 - Statistical Mechanics and Thermodynamics

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

The thermodynamics and statistical mechanics sequence (PHYS 358/359) is being revised so that thermodynamics is developed from a modern statistical mechanics approach. PHYS 358, Thermal Physics, and PHYS 359, Statistical Mechanics, will retire, replaced by the new PHYS 357, which reads similar to PHYS 358, but with a new title, and updated description to reflect increased statistical mechanics content, while reducing emphasis on heat engines.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- Email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

Week 1

Temperature and thermodynamic equilibrium.

Heat and work in thermodynamics.

Week 2

The first law of thermodynamics. Application to the Ideal gas: discussion of heat, work, energy.

Equipartition of energy based on empirical observations. The Maxwell Boltzmann distribution.

Week 3

Kinetic theory of gases, transport phenomena.

Microstates and macrostates. Multiplicity. The Einstein model.

Week 4

Multiplicity for two coupled systems, exemplified by the Einstein solid.
The second law. Temperature in connection to entropy maximization.

Week 5

Entropy of the ideal gas.

Mechanical and chemical equilibrium.

Week 6

The thermodynamic identity.

Reversible and irreversible processes. Examples based on the ideal gas (mixing, Gibbs paradox). Entropy production.

Week 7

Review meeting.

Heat engines: fundamentals and examples.

Week 8

Refrigerators: fundamentals and examples.

Thermodynamic potentials: introduction, reservoir models, connection with work and heat. Application to chemical reactions.

Week 9

Thermodynamic identities and Maxwell relations. The Legendre transform framework for thermodynamic potentials.

Equilibrium conditions analyzed using thermodynamic potentials.

The third law.

Week 10

Phases of matter. Properties. Analysis based on Gibbs free energy.

The van der Waals model.

Week 11

Introduction of the microcanonical and canonical ensemble. The Helmholtz free energy and the partition function. Brief introduction to the grandcanonical ensemble.

Equipartition of energy derived using statistical mechanics.

Week 12

The ideal gas and the paramagnet analyzed using the canonical ensemble.

Review meeting.

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

357

Course Level

300

Title

Statistical Mechanics and Thermodynamics

Abbreviated Title

Undergraduate Communication
Requirement Identifier

Stat Mech & Thermodynamics

No,

Description

Temperature and thermodynamic equilibrium. Work, internal energy, heat. First law. Kinetic theory of gases and the Maxwell-Boltzmann distribution. Absolute temperature, reversibility, entropy and the second law. Thermodynamic potentials and Maxwell's relations. Phase transitions. Third Law. Fundamental principles of statistical mechanics including the microcanonical and canonical ensembles.

Units

0.50

Exceptions to Fees or Academic Progress Units

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

Consent to Drop

No consent required,

No consent required,

Prerequisites

Complete all of the following

- Must have completed at least 1 of the following:
 - AMATH250 - Introduction to Differential Equations (0.50)
 - AMATH251 - Introduction to Differential Equations (Advanced Level) (0.50)
 - MATH228 - Differential Equations for Physics and Chemistry (0.50)
- Must have completed at least 1 of the following:
 - ECE206 - Advanced Calculus 2 for Electrical Engineers (0.50)
 - MATH212 - Advanced Calculus 2 for Electrical Engineers (0.50)
 - MATH217 - Calculus 3 for Chemical Engineering (0.50)
 - MATH227 - Calculus 3 for Honours Physics (0.50)
 - MATH237 - Calculus 3 for Honours Mathematics (0.50)
 - MATH247 - Calculus 3 (Advanced Level) (0.50)
 - NE217 - Advanced Calculus and Numerical Methods 2 (0.50)
- Must have completed at least 1 of the following:
 - PHYS267 - Probability, Statistics, and Data Analysis for Physics and Astronomy (0.50)
 - STAT220 - Probability (Non-Specialist Level) (0.50)
 - STAT230 - Probability (0.50)
 - STAT240 - Probability (Advanced Level) (0.50)
- Complete 1 of the following
 - Must have completed at least 1 of the following:
 - AMATH271 - Introduction to Theoretical Mechanics (0.50)
 - PHYS121 - Mechanics (0.50)
 - Earned a minimum grade of 80% in each of the following:
 - PHYS111 - Physics 1 (0.50)

Corequisites

No Rules

Antirequisites

Not completed nor concurrently enrolled in:

- CHEM254 - Introductory Chemical Thermodynamics (0.50)
- ECE403 - Thermal Physics (0.50)
- PHYS358 - Thermal Physics (0.50)
- PHYS359 - Statistical Mechanics (0.50)

Course Notes

Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHYS 376 - Relativistic Physics

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

PHYS 376 is a new 300-level elective core course in relativity that is being introduced to cover special and general relativity, including a small portion of content move from PHYS 263 to PHYS 376. This standalone course provides a smoother introduction and prepares students for the advanced 400-level general relativity course.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

Week 1: Logical development of Special Relativity: Einstein's two principles, proper role of the ether

Week 2: Minkowski geometry and k-calculus: Doppler shift, velocity composition, universal speed limit

Week 3: Lorentz transformations—algebraic & group theoretical; constant proper acceleration

Week 4: Relativistic mechanics: spacetime trajectories, proper time, 4-velocity, light cone

Week 5: 4-momentum, conservation of 4-momentum, equivalence of mass and energy, collisions

Week 6: 4-tensor angular momentum, conservation, centroid motion, Pauli-Lubanski spin vector

Week 7: 4-acceleration, 3- and 4-force and dynamics; electrodynamics, conserved energy tensor

Week 8: Relativistic waves: 4-frequency and 4-rays; relativistic root of quantum mechanics, de Broglie

Week 9: Relativistic gravity: gravity not as force in 2nd Law, but spacetime curvature in 1st Law; geodesics

Week 10: Schwarzschild geometry, timelike and null geodesics, conserved quantities, black holes

Week 11: slowly rotating spacetimes, introduction to gravitational waves

Week 12: introduction to Einstein's field equation, impact on foundations of physics

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

376

Course Level

300

Title

Relativistic Physics

Abbreviated Title

Relativistic Physics

Undergraduate Communication Requirement Identifier

No,

Description

Special relativity: spacetime diagrams and Lorentz transformations; relativistic kinematics and dynamics in flat spacetime; four-vector/tensor notation. Relativistic physics in curved spacetimes: gravity as geometry; description of curved spacetimes; geodesics; physics in spherically symmetric and rotating spacetimes; introduction to gravitational waves.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

Lecture Test Slot Tutorial

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:
 - PHYS242 - Electricity and Magnetism 1 (0.50)
- Must have completed at least 1 of the following:
 - AMATH231 - Calculus 4 (0.50)
 - ECE206 - Advanced Calculus 2 for Electrical Engineers (0.50)
 - MATH212 - Advanced Calculus 2 for Electrical Engineers (0.50)
 - MATH217 - Calculus 3 for Chemical Engineering (0.50)
 - MATH227 - Calculus 3 for Honours Physics (0.50)
 - NE217 - Advanced Calculus and Numerical Methods 2 (0.50)
- Must have completed at least 1 of the following:
 - AMATH271 - Introduction to Theoretical Mechanics (0.50)
 - PHYS263 - Classical Mechanics and Special Relativity (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHYS 436 - Condensed Matter

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

Due to low enrolment in PHYS 335, Condensed Matter Physics, as well as planned curriculum changes within the physics plans, content from PHYS 335, together with content from PHYS 435, Current Topics in Condensed Matter Physics, will make up the content for a new fourth year course, PHYS 436, Condensed Matter.

Only PHYS 335 is added as an antirequisite course for PHYS 436. Any student that has previously taken PHYS 435, would also have taken PHYS 335, so both are not required as antirequisites.

As a result, both PHYS 335 and PHYS 435 courses will retire.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- Email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

PHYS 436: Recommended textbook is Introduction to Solid State Physics by Charles Kittel

1. Introduction to Condensed Matter, Crystal structure: translational symmetry, lattice vectors, primitive cell
2. Crystal structure: types of lattices, lattice planes, simple structures, Na Cl, FCC vs. BCC, Zn S
Reciprocal lattices: reciprocal lattice definition, Brillouin zones, fourier transforms, lattice planes, Miller indices
3. Diffraction by a lattice: Laue and Bragg's laws
Diffraction by a lattice: Scattering amplitude and examples
4. Crystal bonding
Compressibility, sound velocity and thermal expansion
5. Crystal vibrations: monotonic and diatomic chains, normal modes and phonons
Crystal vibrations: lattice vibrations in real materials, measurement
6. Crystal vibrations: thermal properties, Heat capacity (Debye and Einstein models)
7. Free electron gas: $T = 0$ properties
Free electron gas: Fermi Dirac distribution function
8. Free electron gas: Heat capacity of electrons
Free electron gas: Electrical conductivity, Drude model
9. Free electron gas: Thermal conductivity, Hall effect
Electrons in a periodic potential: Nearly free electrons, Bloch Waves
10. Band structure: Metals, Insulators and optical properties
Band structure: Tight binding model
11. Semi conductor physics: electrons, holes and electrical transport revisited
Semi conductor physics: intrinsic carrier concentration,
12. Semi conductor physics: Impurity doping of semiconductors, pn junction diodes

Supporting Documentation

- [PhysicsCurriculumChanges ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

436

Course Level

400

Title

Condensed Matter

Abbreviated Title

Condensed Matter

Undergraduate Communication Requirement Identifier

No,

Description

Overview of condensed matter ordered and disordered systems. Thermodynamic origin of order and phase transitions. Waves. Properties of the solid state. Crystals and fractals. Overview of Fourier Series. Reciprocal lattice. Diffraction. Classical elastic theory of the crystalline state. Electrons in a periodic potential, Band structure, and Fermi surface.

Units

0.50

Exceptions to Fees or Academic Progress Units

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 all of the following

- Must have completed at least 1 of the following:
 - AMATH231 - Calculus 4 (0.50)
 - PHYS364 - Mathematical Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - CHEM356 - Introductory Quantum Mechanics (0.50)
 - PHYS234 - Quantum Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - Course Not Found
 - PHYS358 - Thermal Physics (0.50)

Corequisites

No Rules

Antirequisites

Not completed nor concurrently enrolled in:

- PHYS335 - Condensed Matter Physics (0.50)

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

PHYS 456, Optics 2, is a new fourth year course to follow the new PHYS 356, Optics 1, course which will be taught in third year. PHYS 456 captures content from both PHYS 393, Physical Optics and PHYS 394, Light-Matter Interactions which were taught in alternating years, into one 400-level course offered that is offered each year.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Kuali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

PHYS 456: Special topics in advanced optics; may not cover all material but these are samples of what could be offered; with the first half being advanced physical optics and latter half being nonlinear optics (will depend on instructor expertise).

1. Foundations of Physical Optics and EM Waves (review, light as EM wave)
2. Light Matter Interaction and Dispersion (refractive index origins, phase and group velocities, microscopic models of polarization, introduction to absorption and emission)
3. Fresnel Equations and Optics at Interfaces (boundary conditions, Fresnel coefficients, Brewster angle and TIR, thin film interference and coatings)
4. Polarization of Light (linear/circular/elliptical, birefringence and waveplates, Jones vectors/matrices, Stokes parameters / Mueller matrices)
5. Coherence Theory (temporal and spatial coherence, coherence time/length, spectral bandwidth, applications in interference/imaging)
6. Diffraction Theory (Fraunhofer and Fresnel diffraction, aperture functions and diffraction patterns/limits)
7. Fourier Optics (Fourier transform formalism, lens, spatial frequency and optical information, spatial filtering and image processing)
8. Principles of Lasers (stimulated emission and Einstein coefficients, rate equations, 3- and 4-level laser systems)
9. Laser Cavities and Modes (optical resonators, cavity stability)
10. Gaussian Beams and Propagation (introduction, Rayleigh range, beam transformation through lenses, etc.)
11. Spectral Line Shapes and Transient Laser Behaviour (homogeneous vs. inhomogeneous broadening, Q-switching, transient laser dynamics)
12. Mode Locking and Nonlinear Optics (mode locking principles, ultra-short pulse generation, nonlinear polarization response, overview of second harmonic generation and Kerr effects)

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Academic Unit

Subject Code	Number	Course Level
PHYS	456	400

Title
Optics 2

Abbreviated Title
Optics 2

Undergraduate Communication Requirement Identifier
No,

Description

Fourier Optics: diffraction, dispersion, coherence, imaging. Polarization: birefringence, Jones vectors, Mueller Matrices. Fresnel Equations: optics at an interface, thin films. Light-matter interactions. Propagation of Gaussian beams, introduction to non-linear optics.

Units
0.50

Exceptions to Fees or Academic Progress Units
No,

Components
LectureTutorial

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:
 - AMATH353 - Partial Differential Equations 1 (0.50)
 - PHYS364 - Mathematical Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - ECE404 - Geometrical and Physical Optics (0.50)
 - PHYS256 - Geometrical and Physical Optics (0.50)
 - Course Not Found

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Faculty/AFIW Path(s) for Workflow

Committee approvals,

Faculty of Science

Dependencies

There are no dependencies

PHYS 457 - Advanced Statistical Mechanics

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Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

Some statistical mechanics content is moved from PHYS 359, Statistical Mechanics, to a new 300-level course, PHYS 357, Statistical Mechanics and Thermodynamics, while the remaining content will be moved into this new 400-level course, PHYS 457, Advanced Statistical Mechanics. PHYS 359 will retire.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership,

Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Kuali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

Week 1

State distributions for systems of distinguishable and indistinguishable particles,

Week 2

Entropy, second law and thermodynamic state distributions; Boltzmann, Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac and Maxwell-Boltzmann statistics

Week 3

Partition function and thermodynamic potentials

Week 4

Applications of Boltzmann and Maxwell-Boltzmann statistics

Week 5

Applications of Boltzmann and Maxwell-Boltzmann statistics; Gibbs paradox

Week 6

Applications of Fermi-Dirac statistics

Week 7

Applications of Bose-Einstein statistics

Week 8

Ensemble perspective on statistical mechanics (microcanonical, canonical and grand canonical)

Week 9

Density matrix and ensembles perspective on formulation of statistical mechanics

Week 10

Interacting systems: van der Waals equation of state, critical phenomena

Week 11

Interacting systems: (variational) mean-field theory, Ising model, critical phenomena,

Week 12

Example of quantum interacting systems and quantum phase transition: transverse field Ising model, quantum rotor model

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

457

Course Level

400

Title

Advanced Statistical Mechanics

Abbreviated Title

Advanced Statistical Mechanics

Undergraduate Communication Requirement Identifier

No,

Description

Statistical methods for many-particle systems. Statistical ensembles, mixed states, density matrices, and entropy; quantum gases including Bose–Einstein and Fermi–Dirac statistics; the partition function and thermodynamic potentials; interacting systems; phase transitions; critical phenomena, other topics as time permits.

Units

0.50

Exceptions to Fees or Academic Progress Units

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 all of the following

- Must have completed the following:
 - Course Not Found
- Must have completed at least 1 of the following:
 - AMATH373 - Quantum Theory 1 (0.50)
 - CHEM356 - Introductory Quantum Mechanics (0.50)
 - PHYS233 - Introduction to Quantum Mechanics (0.50)
 - PHYS234 - Quantum Physics 1 (0.50)
- Must have completed at least 1 of the following:
 - CS114 - Principles of Computing for Science (0.50)
 - 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)

Corequisites

No Rules

Antirequisites

Not completed nor concurrently enrolled in:

- PHYS359 - Statistical Mechanics (0.50)

Course Notes

Workflow Information

Workflow Path
Committee approvals,

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

Dependencies

There are no dependencies

PHYS 464 - Group Theory for Physicists

[Top](#)

Effective Date & Career

Career
Undergraduate,

Effective Term and Year
Fall 2026

Proposal Details

Proposal Type
New,

Academic Unit Approval
2025-06-11

Rationale for New Course

PHYS 464 is a new course being introduced to provide a physics-focused treatment of symmetries and their applications, with minimal mathematical overhead.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

- June 2, 2025: Consulted with the Materials & Nanosciences (MNS) Steering Committee regarding proposed curriculum changes affecting MNS course offerings
- June 16, 2025: Curriculum strategy meeting with Chairs of Applied Math and Physics to discuss directions for the Math Phys program
- June 17, 2025: Consultation for Math Phys program changes (ACUGs, Chairs and ADUs) to refine program revisions and confirm cross-faculty alignment
- August 13, 2025: Follow-up consultation with Applied Mathematics to confirm remaining issues requiring resolution for both Math Phys plans
- August 26, 2025: Consulted with all Associate Chairs and ADUs of affected departments/faculties via a formal email notice, providing a general consultation template and a summarized Word document outlining proposed program and course changes. See attachment.
- August 29, 2025: Released proposed curriculum changes on Quali for broader visibility and feedback from stakeholders.
- September 3, 2025: Consulted with the Chairs of Physics and Applied Mathematics regarding proposed program revisions and alignment across departments.
- September 4, 2025: Met with the Applied Mathematics Undergraduate Committee (AMATH ACUG) to discuss the Math Phys plan revisions and gather feedback.
- September 8, 2025: Meeting with Physics and Math ADUs and Chairs and ACUGs and Curriculum Chairs to finalize Math Phys program changes
- email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

Week 1: Symmetry in Physics; Noether's Theorems

Week 2: Lie Groups and Lie Algebras: Physics-First Introduction

Week 3: Representations and Actions on Vector Spaces

Week 4: Rotations, Spin, and Quantum Angular Momentum

Week 5: Symmetry in Classical Mechanics & Phase Space

Week 6: Lorentz Group, Poincaré Group, and Relativistic Wave Equations

Week 7: Wigner's Classification: Particles as Representations

Week 8: Internal Symmetries and Early Gauge Theory

Week 9: Yang-Mills Theory and Geometric Gauge Fields

Week 10: Topological Effects: Aharonov-Bohm, Berry Phase, Homotopy

Week 11: Spontaneous Symmetry Breaking and Coset Geometry

Week 12: Modern Applications: Topological Phases, Chern-Simons, Beyond Lie Groups

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

464

Course Level

400

Title

Group Theory for Physicists

Abbreviated Title

Group Theory for Physicists

Undergraduate Communication Requirement Identifier

No,

Description

Symmetries: Introduction to Lie groups, Lie algebras, and representation theory, Gauge theory. Extensive applications in physics. Other topics depending on time.

Units

0.50

Exceptions to Fees or Academic Progress Units

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 all of the following

- Must have completed the following:
 - PHYS334 - Quantum Physics 2 (0.50)
 - PHYS342 - Electricity and Magnetism 2 (0.50)
 - PHYS363 - Intermediate Classical Mechanics (0.50)
- Must have completed at least 1 of the following:
 - AMATH332 - Applied Complex Analysis (0.50)
 - PHYS365 - Mathematical Physics 2 (0.50)
 - PMATH332 - Applied Complex Analysis (0.50)
- Must have completed at least 1 of the following:
 - AMATH353 - Partial Differential Equations 1 (0.50)
 - PHYS364 - Mathematical Physics 1 (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

PHYS 480 - Advanced Topics in Biophysics

[Top](#)

Effective Date & Career

Career

Undergraduate,

Effective Term and Year

Fall 2026

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-06-11

Rationale for New Course

PHYS 480, Advanced Topics in Biophysics, is created to replace the alternating year offerings of PHYS 395, Biophysics of Therapeutic Methods, and PHYS 396, Biophysics of Imaging courses, which have caused

scheduling and academic progression issues.

PHYS 480 is an advanced biophysics course will expose students to various popular topics in biophysics with foundational knowledge obtained from prior biophysics, math and physics courses.

PHYS 395 and PHYS 396 will retire, but are not added as an antirequisite for PHYS 480. Even though there is some topic overlaps, it is not enough to considered them antirequisite courses.

Consultations

Consultation Paragraph:

As part of the curriculum change process for the affected physics programs and courses, the Department of Physics & Astronomy engaged in a series of structured consultations with departmental leadership, Associate Chairs Undergraduate Studies, Associate Deans Undergraduate, and relevant Directors and steering committees across many faculties and departments throughout UWaterloo. These consultations ensured transparency, alignment across units, and opportunities for everyone to provide feedback prior to formal submission in Quali. A chronological order of consultations in Spring 2025 and Fall 2025 are provided below:

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- September 8, 2025: Meeting with Physics and Math ADUs and Chairs and ACUGs and Curriculum Chairs to finalize Math Phys program changes
- email consultations attached

Temporary idea of content:

Broader discussions with colleagues are required to narrow down exactly what topics will be offered each week, and these will be scheduled for next year.

PHYS 480: Special topics in advanced biophysics. Topics will depend on instructor expertise and can be focused on biophysics of disease, therapeutics and imaging techniques.

1. Introduction to Fields of Biophysics (modern directions, experimental vs. theoretical, relevance in medicine and technology)
2. Scales of Life and Multiscale Biophysical Modeling (molecules, cells, tissues, systems and emergent phenomena)

3. Advanced Biophysical Measurement Techniques (imaging and structural methods, single-molecule techniques, force spectroscopy)
4. Advanced Biophysical Measurement Techniques (surface, interface biophysics, emerging techniques)
5. Biophysics of Disease Mechanisms (protein folding, misfolding, energy landscapes, aggregation)
6. Diseases and Infection (Alzheimer's Disease, Parkinsons, Pneumonia, Infectious Diseases, etc.)
7. Special Topics on Disease Pathways such as Antimicrobial Peptides and Membrane Disruption (via Guest Lecture if Suitable)
8. Special Topics on Quantum Biology and Nanotechnology Research (via Guest Lecture is Suitable)
9. Special Topics on Biophysics of Radiobiology and Cancer Research (via Guest Lecture if Suitable)
10. Special Topics on Biophysics of Radiotherapy (via Guest Lecture if Suitable)
11. Special Topics on Imaging Techniques (image formation, contrast, resolution, noise, etc.)
12. Special Topics on Medical Imaging (MRI, CT scan, ultrasound, etc.)

Supporting Documentation

- [PhysicsCurriculumChanges_ACUGEmails20250826.docx](#)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Physics and Astronomy

Subject Code

PHYS

Number

480

Course Level

400

Title

Advanced Topics in Biophysics

Abbreviated Title

Advanced Topics in Biophysics

Undergraduate Communication Requirement Identifier

No,

Description

Advanced topics in biophysics will be presented, with content changing depending on instructor expertise and current topics of interest. Topics may include radiation biophysics (the effect of radiation on various kinds of cells and tissues, mechanisms of radiation-induced DNA damage and cell death, tumour radiobiology and therapies, etc.); the physics behind imaging techniques (computed tomography, optical imaging, microscopy, etc.); recent research topics and emerging techniques in biophysics and medical biophysics.

Units

0.50

Exceptions to Fees or Academic Progress**Units**

No,

Components

LectureProject

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:
 - MATH228 - Differential Equations for Physics and Chemistry (0.50)
 - PHYS267 - Probability, Statistics, and Data Analysis for Physics and Astronomy (0.50)
 - PHYS380 - Molecular and Cellular Biophysics (0.50)

- Must have completed at least 1 of the following:
 - BIOL280 - Introduction to Biophysics (0.50)
 - PHYS280 - Introduction to Biophysics (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

There are no dependencies

BIOL 225 - Plant Knowledge and Practices: Indigenous and Western Science Perspectives

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Effective Date & Career

Career

Undergraduate,

Proposed

Offering Number

1

Effective Term and Year Fall 2026
Existing
Effective Term and Year Fall 2024

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-05-27

Rationale for Change

The title change for BIOL 225 was preempted when this course was significantly redesigned in 2024 to incorporate Indigenous perspectives in the course design. The title was discussed with the first-class cohort in the updated version of the course and now reflects the experience more accurately. A discussion (DIS) component is added to facilitate scheduling with the increased course size.

Consultations

Faculty of Environment made aware of title change and added component for BIOL 225 for their Urban Studies minor which lists the course in a program elective list.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Biology

Subject Code

BIOL

Number

225

Course Level

200

Proposed

Title

Plant Knowledge and Practices: Indigenous and Western Science Perspectives

Existing

Title

Plants and Civilization

Proposed

Abbreviated Title

Plant Knowledge and Practices

Existing

Abbreviated Title

Plants & Civilization

Undergraduate Communication Requirement Identifier

No,

Description

This course welcomes students and knowledge keepers together to explore the long-lasting relationships between plants and humans, how our histories entwine, and the importance of botanical familiarity in our lives. Both historical and contemporary connections to plants will be discussed including with an Indigenous context. Plant structures and life histories will be discussed as well as medicinal, textile, food, and other usages in modern contexts. Knowledge of plants will be shared from multiple sources to construct a fuller understanding of, and relation to, plants and their fundamental importance to human civilization.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Proposed

Components

Discussion

Existing

Components

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

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (units)

- Urban Studies Minor - Urban Studies Minor [View Program](#)
- H-Environmental Sciences - Ecology Specialization - Environmental Sciences - Ecology Specialization (Bachelor of Science - Honours) [View Program](#)

BIOL 251 - Fundamentals of Ecology

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Academic Unit Approval

Rationale for Change

BIOL 251 (Fundamentals of Ecology) has significant overlap in content coverage with ENVS 200 (Field Ecology) and includes development of similar laboratory skills. Courses requiring BIOL 251 also include optional pre-requisite pathway of ENVS 200. Addition of the ENVS anti-requisite prevents students from receiving multiple credits for completing these two similar courses.

In addition, effective 2026, all Environment plans will required ENVS 200, therefore the prerequisite to allowing 2A Faculty of Environment students, is removed.

Consultations

Consultation with Environment (Derek Armitage: Oct 1, 2025)

Consultation with C. Knipe (Nov 6, 2025)- confirmed all Environment plans will require ENVS 200 for 2026, supporting removal that prerequisite.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Biology

Subject Code

BIOL

Number

251

Course Level

200

Title

Fundamentals of Ecology

Abbreviated Title

Fundamentals of Ecology

Undergraduate Communication Requirement Identifier

No,

Description

This course provides students with an introduction to the breadth of the ecology discipline, including laboratory and field components. It covers hypothesis testing and the nature of scientific inquiry, organismal, population, community, and ecosystem levels of ecology.

Units

0.50

**Exceptions to Fees or Academic Progress
Units**

No,

Components

LaboratoryLecture

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

1. Complete all of the following
 - Must have completed the following:
 - BIOL110 - Biodiversity, Biomes, and Evolution

Corequisites

No Rules

Antirequisites

1. Not completed nor concurrently enrolled in:
 - BIOL150 - Organismal and Evolutionary Ecology (0.50)
 - **ENVS200 - Field Ecology (0.50)**

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Prerequisites

- ERS 346 - Wildlife Ecology [View Program](#)
- BIOL 383 - Tropical Ecosystems [View Program](#)
- BIOL 312 - The Natural History of Aquatic Organisms [View Program](#)
- BIOL 489 - Arctic Ecology [View Program](#)
- ENVS 444 - Ecosystem and Resource Management in Parks/Natural Areas [View Program](#)
- ERS 382 - Ecological Monitoring [View Program](#)
- ERS 443 - Ecosystem Field Research [View Program](#)
- ERS 446 - Wildlife Management [View Program](#)

Antirequisites

- BIOL 150 - Organismal and Evolutionary Ecology [View Program](#)

Prerequisites

- BIOL 485 - Conservation Biology [View Program](#)
- PLAN 340 - Canadian Environmental Policy and Politics [View Program](#)
- BIOL 350 - Ecosystem Ecology [View Program](#)
- BIOL 351 - Aquatic Ecology [View Program](#)
- BIOL 451 - Advanced Ecology and Evolution [View Program](#)
- BIOL 455 - Ecological Risk Assessment and Management [View Program](#)
- BIOL 457 - Analysis of Communities [View Program](#)
- BIOL 458 - Quantitative Ecology [View Program](#)
- PLAN 240 - Environmental Planning and Policy [View Program](#)
- ERS 335 - Restoration Ecology [View Program](#)
- ERS 337 - ReWilding and Ecological Restoration [View Program](#)
- BIOL 450 - Marine Biology [View Program](#)
- BIOL 352 - Populations and Communities [View Program](#)
- ERS 340 - Ecosystem Assessment [View Program](#)
- ERS 341 - Professional Conservation and Restoration Practice 1 [View Program](#)
- ERS 342 - Professional Conservation and Restoration Practice 2 [View Program](#)
- BIOL 490A - Biology Field Course 1 [View Program](#)
- BIOL 490B - Biology Field Course 2 [View Program](#)
- BIOL 490C - Biology Field Course 3 [View Program](#)
- BIOL 490D - Biology Field Course 4 [View Program](#)
- BIOL 498A - Short Biology Field Course 1 [View Program](#)
- BIOL 498B - Short Biology Field Course 2 [View Program](#)
- BIOL 452 - Quantitative Fisheries Biology [View Program](#)

Course Requirements (no units)

- JH-Science with Arts Major - Science (Joint Honours with Arts Major) [View Program](#)

Course Requirements (units)

- H-Environmental Sciences - Water Science Specialization - Environmental Sciences - Water Science Specialization (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- H-Science & Aviation - Science and Aviation (Bachelor of Science - Honours) [View Program](#)
- 3G-Science - Science (Bachelor of Science - Three-Year General) [View Program](#)
- H-Science - Science (Bachelor of Science - Honours) [View Program](#)
- H-Physics & Astronomy - Physics and Astronomy (Bachelor of Science - Honours) [View Program](#)
- H-Physics - Physics (Bachelor of Science - Honours) [View Program](#) [View Program](#)
- H-Mathematical Physics (BSc) - Mathematical Physics (Bachelor of Science - Honours) [View Program](#)

Course Requirements (units)

- H-Climate & Environmental Change - Climate and Environmental Change (Bachelor of Sciences - Honours) [View Program](#)

Course Requirements (no units)

- H-Science & Business - Science and Business (Bachelor of Science - Honours) [View Program](#)

Course Requirements (units)

- Ecology & Environmental Biology Option - Ecology and Environmental Biology Option
- H-Environmental Sciences - Ecology Specialization - Environmental Sciences - [View Program](#)
Ecology Specialization (Bachelor of Science - Honours) [View Program](#)

BIOL 444 - Bacterial Pathogenesis

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-04-29

Rationale for Change

The description for BIOL 444 is updated to better represent how the course will be taught from the perspective of a new instructor. The content is modified as such to no longer required the BIOL 341 as a pre-requisite. Other redundant pre-requisite are removed at the same time (BIOL 240/240L is a pre-requisite for BIOL 241).

Consultations

Faculty of Health made aware of requisite change for Pre-Clinic specialization.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Biology

Subject Code

BIOL

Number

444

Course Level

400

Title

Bacterial Pathogenesis

Abbreviated Title

Bacterial Pathogenesis

Undergraduate Communication Requirement Identifier

No,

Proposed**Description**

A medical microbiology course with an emphasis on the study of the bacteria involved in pathogenesis, their mode of infection, symptoms, and prevention of diseases. The laboratory will focus on identification of bacterial isolates and processes contributing to pathogenesis, such as antibiotic resistance.

Existing**Description**

A study of the bacteria involved in pathogenesis, their mode of infection, symptoms, and prevention of diseases. The laboratory will focus on identification of bacterial isolates.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LaboratoryLecture

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

1. Complete all of the following
 - Must have completed the following:
 - BIOL241 - Introduction to Applied Microbiology

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Lists

- H-Biochemistry - Biochemistry (Bachelor of Science - Honours)

[View Program](#)

Course Requirements (units)

- Microbiology Option - Microbiology Option

[View Program](#)

Course Lists

- H-Biochemistry - Biotechnology Specialization - Biochemistry - Biotechnology Specialization (Bachelor of Science - Honours)

[View Program](#)

Course Requirements (no units)

- Pre-Clinical Specialization - Pre-Clinical Specialization

[View Program](#)

Course Requirements (units)

- Medical Physiology Minor - Medical Physiology Minor
- H-Science & Business - Biotechnology Specialization - Science and Business - Biotechnology Specialization (Bachelor of Science - Honours)

[View Program](#)

[View Program](#)

Course Requirements (no units)

- H-Biomedical Sciences - Biomedical Sciences (Bachelor of Science - Honours)

[View Program](#)

Course Requirements (units)

- H-Biotechnology/Chartered Professional Accountancy - Biotechnology/Chartered Professional Accountancy (Bachelor of Science - Honours) [View Program](#)

CHEM 335L - Advanced Biochemistry Laboratory

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-06

Rationale for Change

CHEM 257, Physical Chemistry for the Life Sciences, is a new course created primarily for the Biochemistry and Medicinal Chemistry plans, replacing CHEM 254 (Introductory Chemical Thermodynamics) currently required in these plans. It will also cover the chemical kinetics component, currently taught in CHEM 350 (Chemical Kinetics and Statistical Mechanics) for the Medicinal Chemistry plan, and in CHEM 357 (Physical Biochemistry) for Biochemistry plans. As such, CHEM 350 and CHEM 357 will become program electives for these plans.

The CHEM 357 corequisite for CHEM 335L is no longer required, based on consultation with the instructor for CHEM 335L, and based on the fact that the relevant material need from CHEM 357, will now be taught in the new CHEM 257 course, which biochemistry students will take ahead of CHEM 233L.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

CHEM

Number

335L

Course Level

300

Title

Advanced Biochemistry Laboratory

Abbreviated Title

Advanced Biochemistry Lab

Undergraduate Communication Requirement Identifier

No,

Description

Selected experiments for students having completed or concurrently taking CHEM331. Topics to be covered include NMR, allostery, enzymology, electrophoresis, carbohydrates, lipids, photosynthesis, and respiration.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LaboratoryTutorial

Primary Component

Laboratory

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:

- CHEM233L - Fundamentals of Biochemistry Laboratory (0.25)

Corequisites

1. Completed or concurrently enrolled in at least 1 of the following:
 - CHEM331 - Fundamentals of Metabolism 1 (0.50)
 - CHEM333 - Metabolism 1 (0.50)
 - ~~Completed or concurrently enrolled in:~~
 - ~~CHEM357 - Physical Biochemistry (0.50)~~
 -

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (no units)

- H-Biochemistry - Biochemistry (Bachelor of Science - Honours) [View Program](#)
- H-Chemistry - Computational Specialization - Chemistry - Computational Specialization (Bachelor of Science - Honours) [View Program](#)

Course Requirements (units)

- H-Biochemistry - Biotechnology Specialization - Biochemistry - Biotechnology Specialization (Bachelor of Science - Honours) [View Program](#)

CHEM 340L - Introductory Computational Chemistry

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Offering Number

1

Proposal Details

Proposal Type

New,

Academic Unit Approval

2025-05-28

Rationale for Change

CHEM 340 will become CHEM 340L, as it is a better fit for the material in this course, which is the equivalent of a weekly 6-hour lab (0.5 units). Starting fall 2026, students can take CHEM 340L as one of their advanced labs, having both a lecture and lab component, and significant work done outside of the physical lab to run calculations. The description is updated to highlight the quantum chemistry aspect of CHEM 340, distinguishing it from CHEM 481, which builds off CHEM 340, covering bimolecular modelling. The prerequisite is updated to restrict this lab to students in chemistry plans, based on limited enrolment restrictions.

Consultations

2025-10-21 - Engineering plans offering the Physical Science Option, where CHEM 340 exists as a choice in a "pick X number of courses" list, have been made aware of the requisite changes, which would exclude students outside of chemistry plans, access to this course, however, if the course remains part of the specialization, override to the program prerequisite would be considered, as uptake for this particular course for this option is extremely low.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

CHEM

Proposed

Number
340L

Existing

Number
340**Course Level**

300

Title

Introductory Computational Chemistry

Abbreviated Title

Intro Computational Chemistry

Undergraduate Communication Requirement Identifier

No,

Proposed

Description

Introduction to molecular modelling and quantum chemistry using commercially available software. This course incorporates weekly lectures and hands-on computational sessions (labs). Examples are drawn from various areas of chemistry, highlighting the applications of quantum chemistry.

Existing

Description

This course introduces students to molecular modelling theories and commercially available molecular modelling software packages. This course incorporates weekly lectures and hands-on computational sessions (labs). Examples are drawn from many areas of chemistry to illustrate the power and utility of molecular modelling.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LaboratoryLecture

Primary Component

Laboratory

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

1. Complete all of the following
 - Must have completed the following:
 - CHEM140 - Introduction to Scientific Calculations
 - Enrolled in:

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (units)

- H-Medicinal Chemistry - Medicinal Chemistry (Bachelor of Science - Honours) [View Program](#)

Course Lists

- H-Materials & Nanosciences - Materials and Nanosciences (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- H-Chemistry - Computational Specialization - Chemistry - Computational Specialization (Bachelor of Science - Honours) [View Program](#)
- H-Chemistry - Chemistry (Bachelor of Science - Honours) [View Program](#)
- Physical Sciences Option - Physical Sciences Option [View Program](#)

CHEM 350 - Chemical Kinetics and Statistical Mechanics

[Top](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and
Year

Fall 2026

Offering Number

1

Existing

**Effective Term and
Year**
Fall 2024

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-06

Rationale for Change

CHEM 257, Physical Chemistry for the Life Sciences, is a new course created primarily for the Biochemistry and Medicinal Chemistry plans, replacing CHEM 254 (Introductory Chemical Thermodynamics) currently required in these plans. It will also cover the chemical kinetics component, currently taught in CHEM 350 (Chemical Kinetics and Statistical Mechanics) for the Medicinal Chemistry plan, and in CHEM 357 (Physical Biochemistry) for Biochemistry plans. As such, CHEM 350 and CHEM 357 will become program electives for these plans.

For CHEM 350, the CHEM 254 prerequisite is removed and becomes one of two corequisite options, together with CHEM 257, allowing access to this course as a program elective option for students in Biochemistry and Medicinal Chemistry plans.

Consultations

Consultation for these changes for the Materials and Nanosciences plans, jointly owned with the Department of Physics and Astronomy, have been made.

2025-10-21 - Engineering plans offering the Physical Science Option, where CHEM 350 exists as a choice in a "pick X number of courses" list, have been made aware of the requisite changes.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

CHEM

Number

350

Course Level

300

Title

Chemical Kinetics and Statistical Mechanics

Abbreviated Title

Chem Kinetics & Stat Mechanics

Undergraduate Communication Requirement Identifier

No,

Description

Basic chemical kinetics; treatment of kinetic data; complex reaction mechanisms; fast reactions; the canonical ensemble and the canonical partition function; statistical mechanics applied to chemistry; statistical theory of reaction rates.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

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

1. Complete all of the following
 - Must have completed at least 1 of the following:
 - ~~CHEM254 - Introductory Chemical Thermodynamics~~
 - Enrolled in an Honours program
 - Enrolled in an Honours program

Corequisites

1. Completed or concurrently enrolled in at least 1 of the following:
 - **CHEM254 - Introductory Chemical Thermodynamics (0.50)**
 - **Course Not Found**

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Faculty/AFIW Path(s) for Workflow

Dependencies

Course Requirements (no units)

- JH-Chemistry - Chemistry (Joint Honours) [View Program](#)

Course Requirements (units)

- H-Medicinal Chemistry - Medicinal Chemistry (Bachelor of Science - Honours) [View Program](#)
- H-Materials & Nanosciences - Materials and Nanosciences (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- H-Chemistry - Computational Specialization - Chemistry - Computational Specialization (Bachelor of Science - Honours) [View Program](#)
- H-Chemistry - Chemistry (Bachelor of Science - Honours) [View Program](#)
- Physical Sciences Option - Physical Sciences Option [View Program](#)

CHEM 356 - Introductory Quantum Mechanics

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year
 Fall 2026

Existing

Effective Term and Year
 Fall 2024

Offering Number

1

Proposal Details

Proposal Type
Academic Unit Approval

Rationale for Change

Students in Materials and Nanoscience (MNS) plans take their first quantum course, PHYS 234, Quantum Physics 1, in their 3A winter term. Changes to Physics curriculum planned for 2026-2027, will include a new waves prerequisite course, PHYS 223, for PHYS 234, which will not be included in the MNS plans. As such, CHEM 356, Introductory Quantum Mechanics, will replace PHYS 234, in MNS plans, and will be sequenced into their 2A fall term, ahead of MATH 228, taken third year.

It is felt that 2nd year MNS students have sufficient math skills for success in CHEM 356, taken concurrent with MATH 227, Calculus 3 for Honours Physics. Prerequisites for CHEM 356 are updated to include the optional prerequisite of "level at least 2A, MNS".

Since the proposed changes is an alternative prerequisite to the existing prerequisites, none of the other plans dependant on this course will be impacted.

Consultations

Consultations with the department of Physics and Astronomy, who jointly own the MNS plans, has taken place.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

CHEM

Number

356

Course Level

300

Title

Introductory Quantum Mechanics

Abbreviated Title

Intro Quantum Mechanics

Undergraduate Communication Requirement Identifier

No,

Description

Historical background; the differential equation approach to quantum mechanics; treatments of solvable problems such as the particle-in-a-box, harmonic oscillator, rigid rotator and the hydrogen atom; introduction to approximation methods for more complicated systems.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

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

1. Complete all of the following
 - Must have completed at least 1 of the following:
 - ~~AMATH250 - Introduction to Differential Equations~~
 - ~~AMATH251 - Introduction to Differential Equations (Advanced Level)~~
 - ~~CHEM240 - Mathematical Methods for Chemistry~~
 - ~~MATH228 - Differential Equations for Physics and Chemistry~~
 - Students must be in at least level 2A

Corequisites

No Rules

Antirequisites

Not completed nor concurrently enrolled in:

- PHYS234 - Quantum Physics 1 (0.50)

Course Notes**Workflow Information****Workflow Path**

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies**Prerequisites**

- PHYS 334 - Quantum Physics 2

[View Program](#)

- ECE 405A - Quantum Information Processing Devices [View Program](#)

Antirequisites

- NE 332 - Quantum Mechanics [View Program](#)
- ECE 305 - Introduction to Quantum Mechanics [View Program](#)

Prerequisites

- PHYS 359 - Statistical Mechanics [View Program](#)
- PHYS 335 - Condensed Matter Physics [View Program](#)

Antirequisites

- PHYS 234 - Quantum Physics 1 [View Program](#)

Prerequisites

- PHYS 396 - Biophysics of Imaging [View Program](#)

Antirequisites

- PHYS 233 - Introduction to Quantum Mechanics [View Program](#)

Prerequisites

- ECE 405B - Fundamentals of Experimental Quantum Information [View Program](#)
- ECE 405C - Programming of Quantum Computing Algorithms [View Program](#)
- ECE 405D - Superconducting Quantum Circuits [View Program](#)

Antirequisites

- ECE 405 - Introduction to Quantum Mechanics [View Program](#)

Course Requirements (no units)

- JH-Chemistry - Chemistry (Joint Honours) [View Program](#)
- Quantum Information Option - Quantum Information Option [View Program](#)

Course Lists

- H-Medicinal Chemistry - Medicinal Chemistry (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- Quantum Engineering Option - Quantum Engineering Option [View Program](#)
- H-Chemistry - Computational Specialization - Chemistry - Computational Specialization (Bachelor of Science - Honours) [View Program](#)

Course Lists

- H-Electrical Engineering - Electrical Engineering (Bachelor of Applied Science - Honours)
- H-Computer Engineering - Computer Engineering (Bachelor of Applied Science - Honours) [View Program](#)
- H-Software Engineering - Software Engineering (Bachelor of Software Engineering - Honours) [View Program](#)

Course Requirements (no units)

- H-Chemistry - Chemistry (Bachelor of Science - Honours) [View Program](#)
- Physical Sciences Option - Physical Sciences Option [View Program](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-06

Rationale for Change

CHEM 257, Physical Chemistry for the Life Sciences, is a new course created primarily for the Biochemistry and Medicinal Chemistry plans, replacing CHEM 254 (Introductory Chemical Thermodynamics) currently required in these plans. It will also cover the chemical kinetics component, currently taught in CHEM 350 (Chemical Kinetics and Statistical Mechanics) for the Medicinal Chemistry plan, and in CHEM 357 (Physical Biochemistry) for Biochemistry plans. As such, CHEM 350 and CHEM 357 will become program electives for these plans.

For CHEM 370, the CHEM 254 prerequisite is removed and becomes one of two corequisite options, together with CHEM 257, allowing access to this course as a program elective option for students in Biochemistry and Medicinal Chemistry plans.

Consultations

2025-10-21 - Engineering plans offering the Physical Science Option, where CHEM 370 exists as a choice in a "pick X number of courses" list, have been made aware of the requisite changes.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

CHEM

Number

370

Course Level

300

Title

Introduction to Polymer Science

Abbreviated Title

Intro Polymer Science

Undergraduate Communication Requirement Identifier

No,

Description

Basic definitions and polymer nomenclature, molecular weight distributions and averages, molecular weight measurements, step-growth and free radical chain-growth polymerization reactions, chain conformations, glass transition, crystallization, and mechanical properties of polymers.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

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

1. Complete all of the following
 - Must have completed at least 1 of the following:
 - ~~CHEM254 - Introductory Chemical Thermodynamics~~

Corequisites

1. Completed or concurrently enrolled in at least 1 of the following:
 - **CHEM254 - Introductory Chemical Thermodynamics (0.50)**
 - **Course Not Found**

Antirequisites

Not completed nor concurrently enrolled in:

- CHE541 - Introduction to Polymer Science and Properties (0.50)
- MNS322 - Polymer Materials (0.50)
- NE333 - Macromolecular Science (0.50)

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Antirequisites

- MNS 322 - Polymer Materials
- NE 333 - Macromolecular Science

[View Program](#)

[View Program](#)

Course Lists

- H-Medicinal Chemistry - Medicinal Chemistry (Bachelor of Science - Honours)

[View Program](#)

Course Requirements (no units)

- H-Chemistry - Chemistry (Bachelor of Science - Honours)
- Physical Sciences Option - Physical Sciences Option

[View Program](#)

[View Program](#)

CHEM 404 - Physicochemical Aspects of Natural Waters

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and
Year

Offering Number

1

Title

Physicochemical Aspects of Natural Waters

Abbreviated Title

Physicochem Aspects Nat Waters

Undergraduate Communication Requirement Identifier

No,

Description

Properties of water; chemicals in the environment; environmental fate of inorganic and organic pollutants; basic phenomena affecting the fate of water pollutants (vapor pressure; activity, solubility, partitioning, diffusion, sorption); acids and bases in water; dissolved carbon dioxide; trace metals in water.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

LectureTutorial

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

1. Complete all of the following
 - Must have completed at least 1 of the following:
 - ~~CHEM254 - Introductory Chemical Thermodynamics~~
 - Must have completed at least 1 of the following:
 - ~~CHEM262 - Organic Chemistry for Engineering~~
 - ~~CHEM264 - Organic Chemistry 1~~
 - ~~CHEM266 - Basic Organic Chemistry 1~~
 - Must have completed at least 1 of the following:
 - ~~CHEM123 - General Chemistry 2~~
 - ~~CHEM125 - Chemical Reactions, Equilibria and Kinetics~~

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Lists

- H-Medicinal Chemistry - Medicinal Chemistry (Bachelor of Science - Honours) [View Program](#)
- H-Biochemistry - Biochemistry (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- H-Chemistry - Computational Specialization - Chemistry - Computational Specialization (Bachelor of Science - Honours) [View Program](#)

Course Lists

- H-Biochemistry - Biotechnology Specialization - Biochemistry - Biotechnology Specialization (Bachelor of Science - Honours) [View Program](#)

Course Requirements (no units)

- H-Chemistry - Chemistry (Bachelor of Science - Honours) [View Program](#)

EARTH 305 - Physical Science of Climate Change

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Rationale for Change

The current SCI 201, Global Warming and Climate Change, exists as an elective in Science, with good uptake, but high withdrawal rates. The current description sounds like the current GEOG 207, but a substantial quantitative content is delivered, which may contribute to the high attrition, as students are not expecting it based on the course description.

There is relatively little overlap between these two courses and students who struggle in SCI 201, have much higher likelihood of success in GEOG 207. Since there is a known issue with student success in SCI 201, moving it to a third year, 300-level course (EARTH 305) and cross-listing a new SCI course, SCI 205, with the existing GEOG 207, will allow the new cross-listing to count toward science units, while providing students the content that the current SCI 201 course description promises. At the same time, the content of what is currently taught as SCI 201, will provide students in both faculties a dedicated climate change course, that builds on the SCI 205 cross-listing with GEOG 207, hopefully increasing the intake and addressing attrition.

The renumbered EARTH 305 will require either the SCI 205/GEOG 207 or "level at least 2A Science" as a prerequisite, preparing non-science students for the quantitative content of EARTH 305.

The intention is to cross-list EARTH 305 with a new 300-level course in the Faculty of Environment, but the best choice for this cross-listing will be determined and brought forward for 2027 effective dating.

Note: Since the label is changed from SCI to EARTH, the subject code is changed from SCI to EARTH, the academic unit is changed to the Department of Earth & Environmental Sciences, as this department owns all the EARTH courses.

Related proposals:

- Science agenda: SCI205 cross-listing for GEOG 207
- Science and ENV agenda: GEOG207

Consultations

Consultations have occurred and a new SCI cross-listing for GEOG 207 (SCI 205) plus the level and number change for existing SCI 201 (SCI 305) was agreed to by both faculties. A summary of this collaboration was detailed in an April 16, 2025 email (J. Wandel, GEM chair, D. Scott, L. Deakin).

A notification of pending changes was sent to Math, Engineering and Environment (email from M. Sertic dated Aug 5, 2025) as SCI 201 is listed as one choice in a list of options in Software Engineering elective lists and in two diplomas offered through the Faculty of Environment. Notification updated Oct 27th, as SCI 305 will now be EARTH 305, and the prerequisite plan for this course, also changed Prereq for EARTH 305: SCI 205/GEOG 205 or level at least 2B Science (*versus* "or MATH 127").

Course Information

Faculty

Faculty of Science

Proposed

Academic Unit

Existing

Academic Unit

Proposed

Subject Code
EARTH

Existing

Subject Code
SCI

Proposed

Number
305

Existing

Number
201

Proposed

Course Level
300

Existing

Course Level
200

Proposed

Title
Physical Science of Climate Change

Existing

Title
Global Warming and Climate Change

Proposed

Abbreviated Title
Physical Sci of Climate Change

Existing

Abbreviated Title
Global Warm & Climate Change

Undergraduate Communication Requirement Identifier

No,

Proposed

Description

This course examines changes in the global climate system, including planetary energy balance, radiative forcing, role of greenhouse gases, and system response and feedback; carbon cycles; paleoclimate, natural and anthropogenic causes; observed and future climate change, implications for earth systems, climate tipping points; strategies including greenhouse gases emission reductions, carbon capture and storage, and geo-engineering options.

Existing

Description

This course will survey a broad spectrum of topics relating to global climate change, with an emphasis on the scientific approaches to address this issue. Topics covered will include natural and anthropogenic causes of climate change, monitoring methods, current and low emission alternatives of energy production. The scientific, economic, public and political aspects of implementation of carbon capture and storage technology and other geo-engineering options to mitigate climate change will also be discussed.

Units

0.50

Exceptions to Fees or Academic Progress Units

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

1. Complete all of the following
 - Must have completed at least 1 of the following:

Corequisites

No Rules

Antirequisites

1. Complete all of the following
 - Not completed nor concurrently enrolled in:
 - EARTH358 - Earth System Science (0.50)
 -
 - **Not completed SCI201**

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (units)

- Sustainability Diploma - Diploma in Sustainability
- Future Cities Diploma - Diploma in Future Cities

[View Program](#)

[View Program](#)

Course Requirements (no units)

- Physics of Systems & Energy Specialization - Physics of Systems and Energy Specialization

[View Program](#)

Course Lists

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

[View Program](#)

EARTH 440 - Quaternary Geology

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Effective Date & Career

Career

Undergraduate,

Proposed
Effective Term and Year Fall 2026
Existing
Effective Term and Year Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2023-09-29

Rationale for Change

An updated description for EARTH 440, better reflects the content of the course.

Consultations

Awareness email sent to Civil and Environmental Engineering (from L. Balch to S. Springall and L. Schneider, Oct. 27, 2025)

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Earth and Environmental Sciences

Subject Code

EARTH

Number

440

Course Level

400

Title

Quaternary Geology

Abbreviated Title

Quaternary Geology

Undergraduate Communication Requirement Identifier

No,

Proposed

Description

An introduction to the major topics of Quaternary geology with an emphasis on 1) the framework of the Quaternary Period, 2) the regional glacial geology and the geologic processes pertaining to glacial environments, 3) the methods to study the past 2.6 million years (e.g., isotope stratigraphy, geochronology), 4) Glacial-interglacial cycles, 5) applications of Quaternary geology (e.g., mineral exploration, geohazards, climate change, and water resources).

Existing

Description

Glacial-interglacial cycles and sub-Milankovitch oscillations from ocean sediments and ice cores. Quaternary geochronology. Glacial sediment-land systems. Mineral exploration techniques pertaining to glaciated terrains and hydrostratigraphic analyses of Quaternary basins. Local field trips. Laboratory studies on glacial sediments.

Units

0.50

**Exceptions to Fees or Academic Progress
Units**

No,

Components

LaboratoryLecture

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:

- EARTH333 - Introductory Sedimentology (0.50)
- EARTH342 - Geomorphology and GIS Applications (0.50)

Corequisites

No Rules

Antirequisites

No Rules

Course Notes

Workflow Information

Workflow Path

Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Course Requirements (no units)

- H-Environmental Sciences - Geoscience Specialization - Environmental Sciences - Geoscience Specialization (Bachelor of Science - Honours) [View Program](#)
- H-Earth Sciences - Hydrogeology - Earth Sciences - Hydrogeology Specialization (Bachelor of Science - Honours) [View Program](#)

Course Lists

- H-Geological Engineering - Geological Engineering (Bachelor of Applied Science - Honours) [View Program](#)

Course Requirements (no units)

- Hydrogeology Specialization - Hydrogeology Specialization [View Program](#)
- Physical Sciences Option - Physical Sciences Option [View Program](#)

Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2024

Offering Number

1

Proposal Details

Proposal Type

Change,

Academic Unit Approval

2025-10-06

Rationale for Change

CHEM 257, Physical Chemistry for the Life Sciences, is a new course created primarily for the Biochemistry and Medicinal Chemistry plans, replacing CHEM 254 (Introductory Chemical Thermodynamics) currently required in these plans. It will also cover the chemical kinetics component, currently taught in CHEM 350 (Chemical Kinetics and Statistical Mechanics) for the Medicinal Chemistry plan, and in CHEM 357 (Physical Biochemistry).

For MNS 322, all the prerequisite options, become corequisites and CHEM 257 is added as an alternative corequisite for CHEM 254 allowing access to this course. As corequisites students can consider concurrent enrolment to aid with course sequencing, and still be prepared for MNS 322.

Course Information

Faculty

Faculty of Science

Academic Unit

Department of Chemistry

Subject Code

MNS

Number

322

Course Level

300

Title

Polymer Materials

Abbreviated Title

Polymer Materials

Undergraduate Communication Requirement Identifier

No,

Description

Basic definitions and polymer nomenclature, molecular weight distributions and averages, molecular weight measurements, step-growth and radical chain polymerization reactions, chain conformations, glass transition, crystallization, mechanical properties of polymers, phase behaviour and morphologies, and self-assembly.

Units

0.50

Exceptions to Fees or Academic Progress Units

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**Corequisites**

1. Completed or concurrently enrolled in at least 1 of the following:
 - **CHEM254 - Introductory Chemical Thermodynamics (0.50)**
 - **Course Not Found**
 - **ECE403 - Thermal Physics (0.50)**
 - **PHYS358 - Thermal Physics (0.50)**

Antirequisites

Not completed nor concurrently enrolled in:

- CHEM370 - Introduction to Polymer Science (0.50)
- NE333 - Macromolecular Science (0.50)

Course Notes**Workflow Information**

Workflow Path
Committee approvals,

Faculty/AFIW Path(s) for Workflow

Faculty of Science

Dependencies

Antirequisites

- CHEM 370 - Introduction to Polymer Science
- NE 333 - Macromolecular Science

[View Program](#)

[View Program](#)

Course Requirements (units)

- H-Materials & Nanosciences - Materials and Nanosciences (Bachelor of Science - Honours)

[View Program](#)

OPTOM 103 - Pathophysiology

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Effective Date & Career

Career

Undergraduate,

Proposed

Effective Term and Year

Fall 2026

Existing

Effective Term and Year

Fall 2023

Offering Number

1

Proposal Details

Proposal Type

Change,

Rationale for Change

We are adding "Drop consent" to all OPTOM courses. Previously "Drop consent" was added on a term-by-term basis, but this is unnecessary if it can exist at the calendar level. OPTOM students should not be able to drop courses without consulting with an advisor and/or the undergrad committee, as it affects their ability to remain with their cohort. Enrolment is managed for them already, so students are unlikely to try to drop courses on their own, and there have been no issues so far. However, we are adding "Drop Consent" as a precaution to correct an oversight and to ensure the existing practice is enforced by the system.

Course Information

Faculty

Faculty of Science

Academic Unit

School of Optometry and Vision Science

Subject Code

OPTOM

Number

103

Course Level

100

Title

Pathophysiology

Abbreviated Title

Pathophysiology

Undergraduate Communication Requirement Identifier

No,

Description

Pathogenesis of human disease based on a molecular and cellular framework. Fundamental concepts such as homeostasis, cell injury, protective responses (inflammation, fever, immune response) and the healing process. Systemic pathophysiology: abnormal functions of the cardiovascular system, endocrine system, nervous system, urinary system, muscular system, respiratory system and digestive system.

Units

0.50

Exceptions to Fees or Academic Progress Units

No,

Components

Primary Component