

University of Waterloo
SENATE UNDERGRADUATE COUNCIL
Notice of Meeting

DATE: Tuesday 10 March 2020
TIME: 12:00 noon – 2:00 p.m.
PLACE: NH 3318



*Please note:
A light lunch will be served.*

Open Session

Item	Action
1. Declarations of Conflict of Interest - Excerpt from Senate Bylaw 1*.....	Information
2. Approval of the 11 February 2020 Minutes* and Business Arising.....	UGC
3. Curricular Items for Approval & Information	
a. Mathematics*.....	UGC
b. Science*.....	UGC
4. Student Success Office – Global Experience Certificate*.....	Information
5. Registrar’s Office – New Undergraduate Scholarships, Awards and Bursaries*.....	Information
6. Academic Program Reviews	
a. Academic Program Reviews - Status	Information
b. Handling of Final Assessment Reports & Two-Year Progress Reports*.....	Information
c. Two-Year Progress Report – Science and Aviation, Geography and Aviation* (Reviewer: A. Kolentis; Guest: Ian McKenzie).....	UGC
7. Other Business	
8. Next Meeting: Tuesday 14 April 2020, 12:00 to 2:00 p.m. in NH 3318	

*material attached/to be distributed**

“SEN-C” to be recommended to Senate for approval (consent agenda)

“SEN-R” to be recommended to Senate for approval (regular agenda)

“UGC” to be approved on behalf of Senate & sent to Senate for information

3 March 2020

Rebecca Wickens
Associate University Secretary

Excerpt from Senate Bylaw 1

8. Declarations of conflict of interest

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

University of Waterloo
SENATE UNDERGRADUATE COUNCIL
Minutes of the 11 February 2020 Meeting
[in agenda order]

Present: Katherine Acheson, Veronica Austen, Kofi Campbell, Benoit Charbonneau, Victoria Chu, Daniel Davison, Vivian Dayeh, David DeVidi (chair), Leeann Ferries, Brendon Larson, Amanda Morin, Cathy Newell Kelly, Gavin Orok, Marlee Spafford, Cristina Vanin, Chris Vigna, Rebecca Wickens (secretary), Richard Wikkerink, Dan Wolczuk

Resources: Blair Clarence, Danielle Jeanneault, Amanda McKenzie, Alyssa Voigt

Absent: Joe Barcellos, Carly Benson, Rachel Bruce, Matthew Casale, Martin Cooke, Matthew Gerrits, Bruce MacVicar*, Tiana Zhao *regrets

Organization of Meeting: David DeVidi took the chair, and Rebecca Wickens acted as secretary. The secretary advised that a quorum was present. The agenda was approved without formal motion.

1. DECLARATIONS OF CONFLICTS OF INTEREST

No conflicts of interest were declared.

2. APPROVAL OF THE 10 DECEMBER 2019 MINUTES AND BUSINESS ARISING

The minutes were accepted as distributed. There was no business arising.

3. CURRICULAR ITEMS FOR APPROVAL & INFORMATION

Applied Health Sciences. Ferries spoke to the new course, but indicated that it is being withdrawn and will be resubmitted following consultation with Science regarding related courses. Ferries spoke to the proposed agreement with Conestoga College, including the existence of previous agreements, rationale for and benefits of this type of arrangement. Discussion included: whether/how Waterloo advertises this arrangement to students; the benefits of streamlining admissions pathways; Waterloo communications requirements for Conestoga transfer students; the note regarding the co-op program. There was a motion to recommend that Senate approve the admission, transfer credit and progression requirements outlined in the articulation agreement with Conestoga College as presented. Ferries and Acheson. Carried.

Engineering. Davison presented the architecture course and plan changes together, noting the rationale for raising the passing grade in the studio courses from 50% to 60%. Discussion included: the impact on students transferring from architecture to programs where the passing grade is 50%; how the same concerns are addressed in other programs; how the higher passing grade is communicated; the pros and cons of withdrawing this item for further consultation. There was a motion to approve the course and minor plan changes on behalf of Senate. Davison and Wolczuk. Carried with two abstentions.

Environment. Larson presented two new courses and several course changes. Following discussion of the title of INTEG 240 and possible overlap with courses offered in arts, INTEG 240 was withdrawn pending consultation with arts. There was a motion to approve the remainder of the submission on behalf of Senate. Larson and Campbell. Carried.

Renison. Campbell took members through the report. There was a motion to approve the submission on behalf of Senate. Campbell and Ferries. Carried. It was noted that it would be beneficial to look at mature student entry in a holistic manner.

Science. Spafford withdrew the inactivation of EARTH 321 noting that it was included in error. Spafford presented the remainder of the submission. There was a motion to approve the course and plan changes on behalf of Senate. Spafford and Charbonneau. Carried.

4. Academic Program Reviews

Items a and b were received for information.

FAR – English Language Studies. Council’s reviewers noted the strong reputation of the program, recommendations and timelines, and challenges around fluctuations in enrollment and workload. Following a discussion, there was a motion to approve the report on behalf of Senate. Campbell and Vigna. Carried.

FAR – Italian Studies. Discussion included: the quality of the report; suggestions and clarifications made; receptivity to feedback; the benefits of undergoing review. There was a motion to approve the report on behalf of Senate. Acheson and Austen. Carried.

Two-year Report – Engineering. Council’s reviewer provided written feedback, which was included in the report. Discussion included: the finding regarding student morale and how it was addressed; two typographical errors on page 70. Subject to correction of the two typographical errors, there was a motion to approve the report on behalf of Senate. Wolczuk and Davison. Carried.

5. Other Business.

The chair spoke to work being done by the Quality Assurance Office to map out cyclical review processes and assess where improvement can be made. Members heard that a proposal will be circulated for feedback.

Members heard that the chair will bring topics related to the strategic plan theme, developing talent for a complex future, to future meetings for discussion.

In response to an update regarding amendments being proposed to Policy 30, the chair indicated that the chair of the policy drafting committee will be invited to a future undergraduate operations committee meeting.

6. NEXT MEETING

The next meeting is scheduled for Tuesday 10 March 2020, 12:00 noon to 2:00 p.m. in NH 3318.

3 March 2020

Rebecca Wickens
Associate University Secretary

Faculty of Mathematics Report to Senate Undergraduate Council March 2020

Contents

1. Course Changes

- 1.1 ACTSC
- 1.2 MATBUS
- 1.3 AMATH
- 1.4 MTHEL

2. Academic Plan Changes (Minor Modifications)

- 2.1 Actuarial Science
- 2.2 Actuarial Science/Finance Specialization
- 2.3 Actuarial Science Joint
- 2.4 Mathematics/Business Administration
- 2.5 Information Technology Management
- 2.6 Mathematics/Financial Analysis and Risk Management
- 2.7 Mathematics/CPA- Finance Specialization
- 2.8 Mathematical Finance
- 2.9 Math/Teaching

1. Course Changes.

1.1 ACTSC (catalog report #95)

- 1.1.1 Change the title, description and requisites for ACTSC 372. Effective September 1, 2021.
- 1.1.2 Update prerequisites for ACTSC 445. Effective September 1, 2021.
- 1.1.3 Update prerequisites for ACTSC 446. Effective September 1, 2021.
- 1.1.4 Inactivate ACTSC 371. Effective September 1, 2023.

1.2 MATBUS (catalog report #95)

- 1.2.1 New course activation for MATBUS 371. Effective September 1, 2021.

1.3 AMATH (catalog report #94)

- 1.3.1 Update prerequisites for AMATH 350. Effective September 1, 2021.

1.4 MTHEL (catalog report #94)

- 1.4.1 Remove suffix for MTHEL 206A. Effective September 1, 2021.

2. Plan Changes.

2.1 Honours Actuarial Science

Update the Actuarial Science (ACTSC) major course requirements by substituting ACTSC 371 (Introduction to Investments) with ACTSC 372 (Investment Science and Corporate Finance), and update the Notes section regarding substitution for BBA Math Double Degree accordingly.
Effective: September 1, 2021

Background and Rationale: Adding ACTSC 372 and removing ACTSC 371 from the list of course requirements in Honours ACTSC. Note 1 is to be updated to reflect this change as it refers to BBA double degree students who are able to substitute their WLU courses for UWaterloo courses. This will drop the total number of required units from 8.5 to 8 for these students. Other departments on campus that have a stake in this course have been consulted including the Department of Economics and the School of Accounting and Finance.

Plan impacted: Honours Actuarial Science:

<http://ugradcalendar.uwaterloo.ca/page/MATH-Actuarial-Science1>.

2.2 Actuarial Science/Finance Specialization

Update the Actuarial Science/Finance Specialization requirements by removing ACTSC 372 (Investment Science and Corporate Finance) in the “All of” list and updating the Notes section accordingly.
Effective: September 1, 2021

Background and Rationale: ACTSC 372 is now a mandatory course in the Honours ACTSC plan. The Finance specialization must be updated accordingly by removing the course from the “All of” list as well as removing the note pertaining to ACTSC 372. This will drop the total number of required units from 3.5 to 3.

Plan impacted: Actuarial Science/Finance Specialization:

<http://ugradcalendar.uwaterloo.ca/page/MATH-AS-Finance-Specialization>

2.3 Actuarial Science Joint

Add ACTSC 372 (Investment Science and Corporate Finance) as a required course in the “all of” section, remove the “two additional courses” section, add one more 400-level ACTSC course as a requirement, and update the Notes section to reflect ACTSC 371 (Introduction to Investments) and AFM 424 (Equity Investments) change.

Effective date: September 1, 2021

One of

MATH 237 Calculus 3 for Honours Mathematics
MATH 247 Calculus 3 (Advanced Level)

All of

AFM 101 Introduction to Financial Accounting
ACTSC 231 Introductory Financial Mathematics
ACTSC 232 Life Contingencies 1
ACTSC 331 Life Contingencies 2
ACTSC 363 Casualty and Health Insurance Mathematics 1
ACTSC 372 Investment Science and Corporate Finance
ACTSC 431 Casualty and Health Insurance Mathematics 2
ACTSC 446 Mathematics of Financial Markets
ENGL 378/MTHEL 300 Professional Communications in Statistics and Actuarial Science
MTHEL 131 Introduction to Actuarial Practice
STAT 330 Mathematical Statistics
STAT 333 Applied Probability

One 400-level ACTSC course

~~Two additional courses chosen from~~

~~Any 300 or 400 level ACTSC course~~

~~AFM 424 Equity Investments~~

Notes

1. Students currently or previously enrolled in the Business Administration and Mathematics Double Degree plan may substitute:
 - BUS 121W for MTHEL 131.
 - BUS 127W for AFM 101.
 - ~~○ BUS 283W for ACTSC 371.~~
 - BUS 362W for ENGL 378/MTHEL 300.
 - BUS 393W for ACTSC 372.
 - ~~○ BUS 473W for AFM 424.~~

Background and rationale: With the changes to ACTSC 372, the joint now includes the new course in the “all of” required courses. By adding another required course in third year, the joint ACTSC reduces the choice of additional courses down from 2 to 1 to be better aligned with other joint plans within the Faculty of Mathematics. This change will drop the number of required units from 7.5 to 7. Note 1 is to be updated to reflect those changes as it refers to BBA double degree students who are able to substitute their WLU courses for UWaterloo courses.

Plan impacted: ACTSC Joint: <http://ugradcalendar.uwaterloo.ca/page/MATH-Joint-Actuarial-Science1>

2.4 Mathematics/Business Administration

Remove ACTSC 371 (Introduction to Investments) and ACTSC 372 (Investment Science and Corporate Finance) from requirements and add MATBUS 371 (Introduction to Corporate Finance) to the “all of”, and include one additional math course as a requirement.

Effective: September 1, 2021

Background and Rationale: As a result of the inactivation of ACTSC 371, MATBUS 371 will replace both ACTSC 371 and ACTSC 372 as a required course. The additional required math course preserves the number of required units. This will allow students to learn core corporate finance content in one course and have the ability to choose what math course that is of interest to them.

Plan impacted: Mathematics/Business Administration:

<http://ugradcalendar.uwaterloo.ca/page/MATH-Mathematics-or-Bus-Admin-Degree-Requirements>

2.5 Information Technology Management

Remove required ACTSC course from plan and add MATBUS 371 (Introduction to Corporate Finance) as a degree requirement

Effective date: September 1, 2021

Background and Rationale: At one time, ITM had a finance course (ACTSC 371) but that course mutated too much and became an investments course, which is not suitable as a required course in a program such as ITM. However, basic finance and capital budgeting is still core knowledge for such students. Thus, the current version of the calendar has a requirement of "One additional ACTSC course." With the creation of MATBUS 371, it is preferable to have ITM students take MATBUS 371 instead of a random ACTSC course. "One additional ACTSC course" will no longer be required.

Plan impacted: Information Technology Management:

<http://ugradcalendar.uwaterloo.ca/page/MATH-Information-Tech-Mgt-Degree-Requirements>

2.6 Mathematics/Financial Analysis and Risk Management

Remove ACTSC 371 (Introduction to Investments) and add one more 300 or 400-level math course

Effective: September 1, 2021

Background and Rationale: As a result of the discontinuation of ACTSC 371, one additional 300 or 400-level math course is being added as a degree requirement to this plan. This plan now requires two upper-level math courses but the total number of courses taken remains the same.

Plan impacted: Mathematics/Financial Analysis and Risk Management:

<http://ugradcalendar.uwaterloo.ca/page/MATH-Math-or-Fin-Analysis-Risk-Mgt-Degree-Reqmnt>

2.7 Mathematics/Chartered Professional Accountancy- Finance Specialization

To update course requirements by removing ACTSC 371 (Introduction to Investments)

Effective: September 1, 2021

Background and Rationale: As a result of the discontinuation of ACTSC 371. Students will now have four course options instead of five in the "two of" list however the number of required units doesn't change. The curriculum committee judges that this maintains sufficient flexibility for students.

Plan impacted: Mathematics/CPA- Finance Specialization:

<http://ugradcalendar.uwaterloo.ca/page/MATH-Math-Chart-Prof-Accounting-Finance-OptionCoop>

2.8 Mathematical Finance

To remove ACTSC 371 (Introduction to Investments) and update the new course title for ACTSC 372 (Investment Science and Corporate Finance) and update the Notes section.

Effective: September 1, 2021

Background and Rationale: Update to the name of ACTSC 372 and removal of ACTSC 371 requires the program to be updated accordingly; consultations have been done with the Dept. of Statistics and Actuarial

Science and the Dept. of Pure Mathematics. Change has been agreed upon with both departments. As this is a joint plan with Pure Math and Actuarial Science, Note 4 addressing substitution rules for Double Degree students must be updated accordingly on the two existing identical web page in the calendar.

Plan impacted: Mathematical Finance:

<http://ugradcalendar.uwaterloo.ca/page/MATH-Pure-Mathematics-Mathematical-Finance1>

<http://ugradcalendar.uwaterloo.ca/page/MATH-Actuarial-Science-Mathematical-Finance1>

2.9 Math/Teaching

To add the following text to the overview page, effective September 1, 2021:

Mathematics/Teaching may be combined with many of the departmental honours plans in the Faculty of Mathematics. (See Note 1 of the Mathematics/Teaching plan for additional information).

Background and Rationale: The Final Assessment Report for Mathematics/Teaching that was approved by Senate in 2018 included a recommendation to advertise the option in the Calendar since on first glance, it currently appears to be available only through the stand-alone Mathematics/Teaching program. The hope being that more students recognize the opportunity to individualize or add extra value to their mathematics degree. In part, this recommendation was made in an effort to increase the number of students who choose Mathematics/Teaching. The feeling (from the external review team) was that it is not clear to students that they may combine Mathematics/Teaching with many of the other departmental plans. For example, students who declare Applied Math as their major may not realize that they can also apply to Math/Teaching, complete 3 courses (PSYCH 101, 212 and MTHEL 206A) and 2 teaching co-op placements, thus leading to an Honours Applied Math/Teaching plan.

Plan impacted: <http://ugradcalendar.uwaterloo.ca/page/MATH-Mathematics-Teaching-Overview>

NEW COURSES (for approval)

Dean of Mathematics

Effective 01-SEP-2021

MATBUS 371 (0.50) LEC, TST, TUT Introduction to Corporate Finance

Time value of money. Loans, debts, and mortgages. Basic stock valuation. Bonds. Cash flow analysis. Capital budgeting. CAPM. Options and corporate finance.

Requisites : Prereq: AFM 101, ECON 101, one of MATH 128 or 138 or 148; one of STAT 220 or 230 or 240.

Rationale : Antireqs: ACTSC 221, 231, 371, ECON 371, AFM 272, 273, BUS 283W
With the restructuring of ACTSC 371 and 372 from the Statistics and Actuarial Science department, a new course is needed to provide the Math/Business and Information Technology Management students with suitable core corporate finance. The Statistics and Actuarial Science department have been consulted and agree to the creation of this new course.

COURSE CHANGES (for approval)

Applied Mathematics

Current Catalog Information

AMATH 350 (0.50) LEC, TST Differential Equations for Business and Economics

First order ordinary differential equations. Applications to continuous compounding and the dynamics of supply and demand. Higher order linear ordinary differential equations. Systems of linear ordinary differential equations. Introduction to linear partial differential equations. The Fourier Transform and the diffusion equation. Discussion of the Black-Scholes partial differential equations, and solutions thereof. [Offered: F,W]

No Special Consent Required

Requisites : Prereq: MATH 136 or 146, 237 or 247, STAT 230 or 240 & (one of AFM 272/ACTSC 291, ACTSC 371, ECON 371, BUS 393W); Lev at least 3A; Not open to GenMath stdts. Antireq: AMATH 250, 251, 351, 353, CIVE 222, ENVE 223, MATH 211/ECE 205, MATH 218, 228, ME 203, PHYS 364, SYDE 211

Effective 01-SEP-2021

Requisite Change : Prereq: (One of MATH 106, 136, 146), MATH 237 or 247, STAT 230 or 240 & (one of AFM 272/ACTSC 291, ACTSC 371 or 372, ECON 371, BUS 393W); Lev at least 3A; Not open to GenMath stdts. Antireq: AMATH 250, 251, 351, 353, CIVE 222, ENVE 223, MATH 211/ECE 205, MATH 218, 228, ME 203, PHYS 364, SYDE 211

Rationale : We discuss system of linear equations in AMATH 350 and rely on linear independence, determinants, and eigenvalues/eigenvectors, which are covered

in MATH 106, 136, and 146. MATH 106 is in the list of pre-requisites for AMATH 250/251. ACTSC 372 was also included as a pre-requisite as ACTSC 371 will be discontinued in 2023.

Dean of Mathematics

Current Catalog Information

MTHEL 206A (0.50) LEC Introduction to Mathematics Education

Current trends in education, professional practices and administration, the role of the department head, lesson planning, techniques of teaching, evaluation of students, special students, extracurricular activities, the relationship between elementary and secondary school mathematics, audio-visual materials. [Offered: S]

No Special Consent Required

Effective 01-SEP-2021

Subject/Catalog Nbr Change:

MTHEL 206

Rationale :

The University is currently reviewing the use of suffixes and course numbering conventions with a view towards being consistent across units/departments. At the moment, this A is an outlier.

Statistics & Actuarial Science

Current Catalog Information

ACTSC 372 (0.50) LEC, TST, TUT Corporate Finance

Capital budgeting. Real options. Investment decision using Markowitz and utility theory. Capital asset pricing model. Arbitrage pricing theory. Market efficiency.

Capital structure and dividend policy. Advanced topics. [Offered: F,W,S]

No Special Consent Required

Requisites :

Prereq: ACTSC 371 and (MATH 207 or 237 or 247) Antireq: AFM 272/ACTSC 291, AFM 273, 274, AFM 372/ACTSC 391, BUS 393W, ECON 371

Effective 01-SEP-2021

Title Change:

Investment Science and Corporate Finance

Description Change:

Introduction to financial markets. Different return and risk measures. Investment rules and capital budgeting. Rigorous derivations of Markowitz portfolio optimization and its application in investment decisions. Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT). Weighted average cost of capital (WACC) and efficient market hypothesis (EMH). Long-term financing, capital structure (MM propositions), and dividend policies. Introduction to options, forwards, and swaps. [Offered: F,W,S]

Requisite Change :

Prereq: ACTSC 231, MATH 235/245, MATH 237/247 Antireq: AFM 272/ACTSC 291, AFM 273, 274, AFM 372/ACTSC 391, BUS 393W, ECON 371, MATBUS 371

Rationale :

ACTSC 371 and 372 used to be one course but are no longer doing what the courses were designed to do. ACTSC 372 is substantially redesigned to include the required material from ACTSC 371 and remove overlapping content. About 20% of the course has changed, therefore the course would benefit from a title change and an updated description.

Current Catalog Information

ACTSC 445 (0.50) LEC, TUT Quantitative Enterprise Risk Management

This course introduces enterprise risk management, with a focus on quantitative analysis and economic capital. Risk classification is first discussed with an emphasis on the types of risk most suited to quantitative methods. Risk measures, such as Value-at-Risk (VaR) and Conditional Tail Expectation (CTE or TVaR), are then introduced and their use by firms and regulators to determine risk capital requirements is further highlighted. Different approaches are considered for developing loss distributions, including frequency/severity analysis and extreme value theory. Copulas and economic scenario generators are used to aggregate dependent risks. Different strategies for mitigating or transferring risk are reviewed. Additional topics that may be covered include credit risk, capital allocation, and regulation of financial institutions. [Offered: F,S]

No Special Consent Required

Requisites : Prereq: (AFM 372/ACTSC 391 or (ACTSC 231, 371) or (ACTSC 231, BUS 393W)), (STAT 330, 333) or STAT 334; ACTSC, Math/FARM, Math Fin students only. Antireq: AFM 422, MATBUS 472, BUS 433W, BUS 439W

Effective 01-SEP-2021

Requisite Change : Prereq: (AFM 372/ACTSC 391 or (ACTSC 231, 371) or ACTSC 372 or BUS 393W), (STAT 330, 333) or STAT 334; ACTSC, Math/FARM, Math Fin students only. Antireq: AFM 422, MATBUS 472, BUS 433W, BUS 439W

Rationale : Updating ACTSC 372 and removing ACTSC 371 requires updates to the pre-reqs of ACTSC 445

Current Catalog Information

ACTSC 446 (0.50) LEC, TUT Mathematics of Financial Markets

This course covers mathematical techniques for no-arbitrage pricing and hedging financial derivatives. Topics to be covered can be classified into three broad areas: derivatives markets (options; forwards and futures; other derivatives; put-call parity), discrete-time financial models (binomial models; general multi-period models; Fundamental Theorems of Asset Pricing; risk-neutral probability), and continuous-time financial models (basic stochastic calculus and Itô's lemma; Black-Scholes model; interest rate models and bond pricing). [Offered: F,W]

No Special Consent Required

Requisites : Prereq: (AFM 372/ACTSC 391 or (ACTSC 231&371) or (ACTSC 231&BUS 393W)), (STAT 333 or 334); ACTSC, Math/FARM, Math Fin, STAT students only. Antireq: AFM 322, BUS 423W, ECON 372, MATBUS 470

Effective 01-SEP-2021

Requisite Change : Prereq: (AFM 372/ACTSC 391 or (ACTSC 231, 371) or ACTSC 372 or BUS 393W), (STAT 333 or 334); ACTSC, Math/FARM, Math Fin, STAT students only. Antireq: AFM 322, BUS 423W, ECON 372, MATBUS 470

Rationale : Updating ACTSC 372 and removing ACTSC 371 requires updates to the pre-reqs of ACTSC 446.

COURSE INACTIVATIONS (for approval)

Effective 01-SEP-2023
ACTSC 371 (0.50)

Rationale :

Introduction to Investments

ACTSC 371 and 372 are no longer doing what the courses were designed to do, so ACTSC 372 will be redesigned to include the required material from ACTSC 371 allowing the course to be cancelled. As ACTSC 371 will gradually be phased out, we withdraw the Fall and Spring offerings (which we may offer from time to time) until the final offering of the course which is scheduled for Winter 2023.

End of Report

SCIENCE UNDERGRADUATE STUDIES COMMITTEE REPORT
FOR SUBMISSION TO MARCH 2020 SENATE UNDERGRADUATE COUNCIL (SUC)

Content

1	NEW COURSE.....	2
1.1	Physics	2
2	CHANGES TO EXISTING COURSES	2
2.1	Physics	2
3	COURSE INACTIVATIONS	2
3.1	Physics	2
4	ACADEMIC PLANS (MINOR MODIFICATIONS)	2
4.1	First-Year Physics Lab Curriculum Changes- Structure	2
4.2	First-Year Physics Lab Curriculum Changes- Contact Hours.....	5
4.3	Astrophysics Minor	6
5	ACADEMIC PLANS (FOR INFORMATION ONLY)	6
5.1.1	Medical Physiology Minor	6
5.1.2	Doctor of Optometry Academic Regulations	7

1 NEW COURSE

1.1 Physics PHYS 160L

2 CHANGES TO EXISTING COURSES

2.1 Physics PHYS 121, 121L, 122, 122L, 232L, 396, and 490

3 COURSE INACTIVATIONS

3.1 Physics PHYS 131L and 132L

4 ACADEMIC PLANS (MINOR MODIFICATIONS)

4.1 First-Year Physics Lab Curriculum Changes- Structure

Effective Date: September 1, 2021.

Background and Rationale: The Department of Physics is planning to change the structure, as well as the contact hours and delivery, of the first year Physics lab courses. These changes will result in the inactivation of two lab courses, the creation of one lab course, and a re-streaming of which academic plans require which lab courses. PHYS 111L and PHYS 112L are unchanged.

Table 1: Year One PHYS Lab Courses (strikethrough = inactivation; bold = new)

Fall Courses	Winter Courses
PHYS 111L (0.25 unit)	PHYS 112L (0.25 unit)
PHYS 121L (0.25 unit)	PHYS 122L (0.25 unit)
PHYS 131L (0.25 unit)	PHYS 132L (0.50 unit)
	PHYS 160L (0.25 unit)

Currently, PHYS 121L and PHYS 131L are identical labs. The two course codes were originally created in order to group the Honours Physics, Honours Mathematical Physics, Honours Life Physics, Biophysics Specialization, and Honours Physics and Astronomy students together, with these plans taking PHYS 131L and all others taking PHYS 121L. The proposal is to inactivate PHYS 131L and have all students take PHYS 121L.

Furthermore, the Department of Physics plans to modify PHYS 132L, a 0.5 credit lab course containing 10 experiments, as follows. Currently PHYS 132L is required by students in Honours Physics, Honours Mathematical Physics, and Honours Materials and Nanosciences plans, as well as those outside of the Faculty of Science who are obtaining a joint degree with Physics. The lab shares five experiments with PHYS 122L, a 0.25 credit lab course. The proposal is to have students currently requiring PHYS 132L complete the five shared-labs through enrolment in PHYS 122L. Honours Mathematical Physics and Honours Materials and Nanoscience students would require no further labs. Therefore, the program requirements for these plans would change from PHYS 132L to PHYS 122L, reducing the overall plan units by 0.25 units. PHYS 132L would become inactive, and a new 0.25 credit lab, PHYS 160L, would be created and required only by students in the Honours Physics and Joint Honours with Physics plans. PHYS 160L will provide five more, advanced labs designed to enhance the students' enjoyment and understanding of the breadth of experimental physics ("Gee Whiz" labs). Limiting enrolment in the new lab strictly to Honours Physics students decreases the total number of students in the course and allows the department to provide a curriculum with plan-specific learning outcomes.

Table 2: Academic Plans requiring PHYS 121L, PHYS 122L and/or PHYS 160L following the proposed changes (bold = required inactivated course)

FALL COURSES	WINTER COURSES
PHYS 121L <ul style="list-style-type: none"> Hon Earth Sciences, Geophysics Spec. (Reg/Co-op) Hon Physics (Reg/Co-op) Hon Mathematical Physics (Reg/Co-op) Hon Materials & Nanosciences (Reg/Co-op) Hon Physics & Astronomy (Reg/Co-op) Hon Life Physics, Biophysics Spec. (Reg/Co-op) Hon Life Physics, Medical Physics Spec. (Reg/Co-op) Joint Hon X with Physics Plans 	PHYS 122L <ul style="list-style-type: none"> Hon Earth Sciences, Geophysics Spec. (Reg/Co-op) Hon Physics (Reg/Co-op) Hon Mathematical Physics (Reg/Co-op) Hon Materials & Nanosciences (Reg/Co-op) Hon Physics & Astronomy (Reg/Co-op) Hon Life Physics, Biophysics Spec. (Reg/Co-op) Hon Life Physics, Medical Physics Spec. (Reg/Co-op) Joint Hon X with Physics Plans
	PHYS 160L <ul style="list-style-type: none"> Honours Physics (Reg. & Co-op) Joint Hon X with Physics Plans

NOTE:

Several Science plans can substitute PHYS 121L or PHYS 131L for PHYS 111L, and substitute PHYS 122L or PHYS 132L for PHYS 112L. Therefore, a number of plan notes will change to reflect the inactivation of PHYS 131L and/or PHYS 132L (e.g., Honours Science, Honours Life Physics, Medical Physics and Biophysics Specializations, Honours Science and Aviation, General Science, and the Biophysics Minor).

The proposed changes to the first-year Physics lab curriculum will require changes to several program plans. These changes are summarized in Table 3.

Table 3: Plans Requiring Update Based on the Proposed First-Year Physics Lab Changes

Plan	Change/Update
Honours Earth Sciences, Geophysics Specialization	No change required
Honour Physics (Reg. & Co-op)	PHYS 121L replaces PHYS 131L; PHYS 132L is removed; PHYS 122L and PHYS 160L are added; no PHYS or overall unit changes
Honours Mathematical Physics (Reg. & Co-op)	PHYS 121L replaces PHYS 131L; PHYS 132L is removed; PHYS 122L is added; overall PHYS units reduced by 0.25 (7.25 to 7.0); overall units reduced by 0.25 (21.0 to 20.75)
Honours Physics and Astronomy (Reg. & Co-op)	PHYS 121L replaces PHYS 131L; no PHYS or overall unit changes
Honours Materials and Nanosciences (Reg. & Co-op)	PHYS 132L is removed; PHYS 122L is added; overall PHYS units are reduced by 0.25 (4.5 to 4.25); overall units are reduced by 0.25 (22.0 to 21.75)
Joint Honours X with Physics plans	PHYS 121L replaces PHYS 131L; PHYS 132L is removed; PHYS 122L and PHYS 160L are added; no PHYS or overall unit changes
Honours Life Physics, Biophysics Specialization (Reg. & Co-op)	PHYS 121L replaces PHYS 131L in requirements and in suggested elective lists; no PHYS or overall unit changes; update “Note” to indicated that PHYS 111L may substitute PHYS 121L vs PHYS 131L; remove “Note” which indicates PHYS 132L may substitute PHYS 122L;
Honours Life Physics, Medical Physics Specialization (Reg. & Co-op)	Remove “Note” which indicates that PHYS 132L may substitute PHYS 122L
Honours Science	Update “Notes” to indicate that only PHYS 121L and PHYS 122L may substitute PHYS 111L and PHYS 112L, not PHYS 131L and PHYS 132L
Honours Science and Aviation	Update “Notes” to indicate that only PHYS 121L and PHYS 122L may substitute PHYS 111L and PHYS 112L, not PHYS 131L and PHYS 132L
General Science	Update “Notes” to indicate that only PHYS 121L and PHYS 122L may substitute PHYS 111L and PHYS 112L, not PHYS 131L and PHYS 132L
Biophysics Minor	Remove “Note” which indicates that PHYS 132L may substitute for PHYS 122L

4.2 First-Year Physics Lab Curriculum Changes- Contact Hours

The Department of Physics plans to change the scheduling of some of its first-year Physics Lab courses. Currently, PHYS 121L and PHYS 122L contain five three-hour labs. In the future, these five experiments will be scheduled over two two-hour sessions (an increase in contact time from 15 to 20 hours). The purpose of this change is to give the students more time to collect good data, improve their experimental processes, and to reflect meaningfully on their results. The new lab schedule will be tested in PHYS 131L and five of the 10 experiments of PHYS 132L (an increase in contact time from 30 to 35 hours) in the 2020/2021 academic year. Following approval of the proposed calendar changes, the new schedule will be implemented in PHYS 121L and PHYS 122L in the 2021/2022 academic year. In order to facilitate the pilot testing of the new lab schedule in both semesters, enrolment into PHYS 121L or PHYS 131L will be adjusted for some academic plans, as outlined in the footnotes.

Table 1: Roll-Out of Changed Contact Times

Academic Year	FALL COURSES		WINTER COURSES		
	PHYS 121L	PHYS 131L	PHYS 122L	PHYS 132L	PHYS 160L
2019/2020	5x3-hr labs Final exam	5x3-hr labs Final exam	5x3-hr labs Final exam	10x3-hr labs Final exam	N.A.
2020/2021	5x3-hr labs ¹ Final exam	10x2-hr labs ²	5x3-hr labs ³ Final exam	10x2-hr labs ⁴ PLUS 5x3-hr labs	N.A.
2021/2022	10x2-hr labs	N.A.	10x2-hr labs	N.A.	5x3-hr labs ⁵

Changed Contact Time and/or Required Lab Communication Plan:

A communication plan will be created so that Honours Physics and Astronomy, Honours Materials and Nanosciences, and Honours Life Physics, Biophysics Specialization students will understand which course they are enrolled in and why. The SUO will block enroll 1A and 1B students into the appropriate Physics labs in the fall of 2020 and winter of 2021. The SUO will also help communicate the roll out plan via the First-Year Student Course Requirement web page, as one as another method of advertising and outlining the changes. The new course equivalent form can be used to update student records for those who will take Physics labs that are not indicated in their plans.

¹ Honours Life Physics, Biophysics Specialization, and Honours Physics and Astronomy majors will be moved from PHYS 131L into PHYS 121L in order to allow the pilot group to consist of the same students in both semesters.

² Taken by Honours Physics, Honours Mathematical Physics, and Honours Materials and Nanosciences majors. Honours Materials and Nanosciences majors will need to be moved from PHYS 121L into PHYS 131L.

³ Taken by Honours Physics and Astronomy and Honours Life Physics, Biophysics Specialization majors.

⁴ Taken by Honours Physics, Honours Mathematical Physics, and Honours Materials and Nanosciences majors. Because this is a 0.5 credit course the students will have two types of schedules during the year before the calendar changes come into effect. Students will perform a 2-hour lab every week, in addition to a 3-hour lab every other week. This will lead to an increase in contact hours from 30 to 35.

⁵ Taken by Honours Physics majors only.

4.3 Astrophysics Minor

Effective Date: September 1, 2021.

Background and Rationale: The Department of Physics is adding PHYS 267 to the list of PHYS electives in the Astrophysics Minor. PHYS 267 is the new probability, statistics and data analysis core course for Honours Physics and Honours Physics and Astronomy plans, which replaces the PHYS 270 requirement in Honours Physics and Astronomy plans, effective September 1, 2020. Students pursuing an Astrophysics Minor, would benefit from PHYS 267, therefore, it is added as an option.

.....

Successful completion of this minor requires:

1. 5.0 units that include:
 - 1.0 PHYS unit: PHYS 121 and PHYS 122
 - 2.0 PHYS elective units selected from: PHYS 175, PHYS 267, PHYS 275, PHYS 375, PHYS 474, PHYS 475, or PHYS 476
 - 2.0 PHYS elective units
2. A minimum cumulative average of 60% in all PHYS courses.

Notes

1. At least 1.5 PHYS lecture units must be 300-level or higher.
2. No more than 1.0 PHYS lab unit can count toward this minor.
3. An Astrophysics Minor will not be awarded with an Honours major in Physics and Astronomy.

5 ACADEMIC PLANS (FOR INFORMATION ONLY)

5.1.1 Medical Physiology Minor

Effective Date: September 1, 2020

Background and Rationale: October 2019 SUC approved harmonized text for the 50% rule where 50% of all course requirements must have numeric grades. As a result, Faculty of Science specific text allowing a maximum of 2.5 of 5.0 units for the Medical Physiology Minor to be obtained on a Letter or Permission or by transfer credit, is redundant, and is removed. The same update is made for the Faculty of Applied Health Study text on this jointly owned minor that appears separately in both Faculty Calendars.

.....

Additional Conditions:

1. A failed second attempt of a required course will result in removal from the minor. No third attempts are allowed for core required courses.
2. ~~Normally, a maximum of 2.5 units (5.0 courses) obtained on a Letter of Permission or by transfer credit from another institution may be applied toward fulfilment of this minor. The department offering a required course must first deem the replacement course equivalent (this assessment includes relevant prerequisites).~~
2. Courses obtained on a Letter of Permission or by transfer credit must be equivalent to courses listed in the course requirements.

5.1.2 Doctor of Optometry Academic Regulations

Effective Date: September 1, 2020

Background and Rationale: Harmonization of the Awards of Excellence criteria for five Faculties was approved for the 2020-2021 Calendar (Senate January 2020). The Doctor of Optometry's Academic Regulations Calendar page contains text related to awards of distinction. This page was not flagged or included with other pages set to expire with the approval of the harmonized Awards of Excellence page. Since Optometry is included in the new centralized harmonized text, reference to awards of distinction on the Academic Regulation page is removed in the 2020-2021 Calendar.

.....

Academic Decisions on Standing

.....

Recommended for Doctor of Optometry Degree

A student qualifies for this decision if the student has successfully completed all requirements of the Optometry program.

Recommended for Doctor of Optometry Degree entitles the student to graduate with the Doctor of Optometry (OD) degree.

~~Recommended for Doctor of Optometry Degree with Distinction~~

~~A student qualifies for this decision if the student has demonstrated superior academic performance (a final cumulative overall average of 80.0% or better in the Optometry program) while successfully completing all requirements of the Optometry program.~~

~~Recommended for Doctor of Optometry Degree with Distinction entitles the student to graduate with the OD degree and be placed on the Dean's Honours List.~~

NEW COURSES (for approval)

Physics & Astronomy

Effective 01-SEP-2021

PHYS 160L (0.25) LAB Introductory Measurement Laboratory

A lab for students following the Honours Physics Plan. [Note: Lab alternates weeks.

Offered: W]

Requisites :

Prereq: Honours Physics students only. Coreq: PHYS 122L. Antireq: PHYS 132L

Rationale :

As part of a restructure of first year PHYS labs, this new course will initially house five labs from a course that is being inactivated -- PHYS 132L. The other five labs from PHYS 132L will be offered in PHYS 122L (these labs have been common to PHYS 122L and PHYS 132L). With time, PHYS 160L labs will become more advanced to allow a better understanding of the breadth of experimental Physics. PHYS 160L is intended for Honours Physics students only and will require PHYS 122L as a corequisite while PHYS 132L will be listed as an antirequisite. The lab will involve 3-hour lab sessions running alternating weeks.

COURSE CHANGES (for approval)

Current Catalog Information

PHYS 121 (0.50) LEC, TST, TUT Mechanics

An introductory course in physics for students intending to concentrate their future studies in the physical sciences, optometry or mathematics; includes particle kinematics and dynamics, forces in nature, work and energy, conservation of energy and linear momentum, rotational kinematics and dynamics, and conservation of angular momentum. [Note: Successful completion of 4 U Calculus and Vectors , 4U Advanced Functions and 4U Physics is required. Science students must also take PHYS 121L (or PHYS 131L if they intend to follow any Physics or Mathematical Physics Plan).

Students in Honours Life Physics, Biophysics Specialization, are encouraged to take PHYS 111L. Offered: F, also offered online: W]

No Special Consent Required

Requisites :

Coreq: One of MATH 104, 127, 137, 147. Antireq: PHYS 111, 115, ECE 105

Effective 01-SEP-2021

Description Change:

An introductory course in physics for students intending to concentrate their future studies in the physical sciences, optometry or mathematics; includes particle kinematics and dynamics, forces in nature, work and energy, conservation of energy and linear momentum, rotational kinematics and dynamics, and conservation of angular momentum. [Note: Successful completion of 4U Calculus and Vectors , 4U Advanced Functions and 4U

University of Waterloo
Undergraduate Catalog Report
Faculty of SCI: for April 2020 SUC

Page No. 2
Run Date 03-MAR-2020
Meeting Number(s) 3

Rationale :

Physics is required. Offered: F, also offered online: W]
As part of a restructuring of first year Physics labs, there will no longer be both PHYS 121L and 131L labs associated with PHYS 121, therefore, the notes regarding which lab is required for which plan, have been removed. The recommended note that students in Life Physics take the PHYS 111L is also removed as PHYS 111L has a corequisite of PHYS 111 only. While note changes do not require SUC approval, this change is being brought forward because it is part of a restructuring plan that does require approval.

Current Catalog Information

PHYS 121L (0.25) LAB Mechanics Laboratory

For students who have taken or are taking PHYS 121. Students intending to follow a Physics or Mathematical Physics plan must take PHYS 131L. [Note: Lab alternates weeks. Offered: F]

No Special Consent Required

Requisites :

Coreq: PHYS 121 Antireq: PHYS 111L or 131L

Effective 01-SEP-2021

Description Change:

Rationale :

For students who have taken or are taking PHYS 121. [Offered: F]
The structure of first year physics labs is changing. PHYS 121L and 131L are currently identical, and can substitute each other as a result. The two different lab numbers were used to group students into program cohorts. As part of the structure change, PHYS 131L will be eliminated (inactivated) and students who normally take it, will instead take PHYS 121L. PHYS 121L will run weekly in 2-hour sessions versus bi-weekly in 3-hour sessions to allow an interactive approach to data collection and analysis. Students will perform five experiments over two 2-hour sessions, decreasing weekly contact hours from 3.0 to 2.0, while increasing total contact hours from 15.0 to 20.0. The description is updated to remove reference to PHYS 131L and the note referencing lab alternates weeks is removed.

Current Catalog Information

PHYS 122 (0.50) LEC, TST, TUT Waves, Electricity and Magnetism

Simple harmonic motion, resonance, damped harmonic motion, wave motion and sound, electrostatic force and potential, electric current and power, capacitors, DC circuits, LRC circuits, introduction to magnetic fields Lorentz Force. [Note:

Science students must also take PHYS 122L (or PHYS 132L if they intend to follow any Physics or Mathematical Physics plan). Offered: W,S; also offered online: S]

No Special Consent Required

Requisites :

Prereq: PHYS 111 (minimum grade 70%) or PHYS 115 or 121 or ECE 105. Coreq: One of MATH 127, 137, 147. Antireq: PHYS 112, 125

Effective 01-SEP-2021

Description Change:

Simple harmonic motion, resonance, damped harmonic motion, wave motion and sound, electrostatic force and potential, electric current and power, capacitors, DC circuits, LRC circuits, introduction to magnetic fields Lorentz Force. [Offered: W,S; also offered online: S]

Rationale :

As part of a restructuring of first year Physics labs, there will no longer

be both PHYS 122L and 132L labs associated with PHYS 122, therefore, the notes regarding which lab is required for which plan, have been removed. While note changes do not required SUC approval, this change is being brought forward because it is part of a restructure plan that does require approval.

Current Catalog Information

PHYS 122L (0.25) LAB Waves, Electricity and Magnetism Laboratory

For students who have taken or are taking PHYS 122. Students intending to follow a Physics or Mathematical Physics plan must take PHYS 132L. [Note: Lab alternate weeks. Offered: W]
No Special Consent Required
Requisites : Coreq: PHYS 122. Antireq: PHYS 112L or 132L

Effective 01-SEP-2021

Description Change:

Rationale :

For students who have taken or are taking PHYS 122. [Offered: W]
The structure of first year physics labs is changing. PHYS 122L and 132L currently share five experiments. As part of the structure change, students in Honours Mathematical Physics and Honours Materials and Nanosciences plans, who normally take PHYS 132L, will complete the first five experiments of PHYS 132L as part of PHYS 122L, and will only require PHYS 122L for their plan. Students in Honours Physics plans, who normally take PHYS 132L, will now take both PHYS 122L and PHYS 160L, the latter being a new lab, which will contain the five non-shared experiments currently in PHYS 132L. The description for PHYS 122L no longer requires reference to PHYS 132L so it is removed from the description. PHYS 122L will run weekly in 2-hour sessions versus bi-weekly in 3-hour sessions to allow an interactive approach to data collection and analysis. Students will perform five experiments over two 2-hour sessions, decreasing weekly contact hours from 3.0 to 2.0 while increasing total contact hours from 15.0 to 20.0. The note referencing lab alternates weeks, is removed.

Current Catalog Information

PHYS 232L (0.25) LAB Measurement Laboratory

A laboratory that teaches programming (e.g. LabVIEW) for the computer interfacing of physics experiments and automatic data collection. [Note: Lab alternate weeks. Offered: Fall].
No Special Consent Required
Requisites :

Prereq: PHYS 132L and restricted to students in Physics, Chemical Physics, Science and Business (Physics Option), Materials and Nanosciences

Effective 01-SEP-2021

Description Change:

A laboratory that teaches programming for the computer interfacing of physics experiments and automatic data collection. [Note: Lab alternate weeks. Offered: F].

Requisite Change :

Prereq: PHYS 122L; Honours Materials and Nanosciences and Honours Physics students only

Rationale :

As part of the first year lab structure changes in Physics, PHYS 132L will

become inactive. PHYS 122L is deemed an appropriate prerequisite for PHYS 232L. Requisites are updated to replace PHYS 132L with PHYS 122L and to remove inactive programs from the requisite list. The description note is updated to replace the term of offering with a letter versus full word. In addition, reference to specific software is removed from the description should it become obsolete or change in the future.

Current Catalog Information

PHYS 396 (0.50) LEC, TUT Biophysics of Imaging
Introduction to imaging concepts in biophysics with emphasis on the interrelationship between the physics principles of an imaging modality and the associated image reconstruction; methods for imaging at macroscopic to microscopic scales; computed tomography, magnetic resonance imaging, ultrasound, PET, optical imaging, optical and fluorescence microscopy, scanning probe microscopy (AFM, STM), optical tweezers, electron microscopy. [Note: PHYS 380 recommended. Offered: W odd years]
No Special Consent Required
Requisites : Prereq: One of PHYS 112, 122, 125, ECE 106; One of MATH 128, 138, 148, (SYDE 111, 112); One of PHYS 224, 233, 234, 242, 256, 280, 380, ECE 209, 370, 375, NE 232, 241, SYDE 283, AMATH 231, 373, CS 473, CHEM 209, 356; Level at least 3A SCI, MATH or ENG stdnts

Effective 01-SEP-2021

Component Change: LEC, SEM
Rationale : Some instructors use a conference style presentation for project evaluation that must be scheduled outside the former lecture period. Therefore a SEM component is added to this course for such evaluations to be scheduled for students.

Current Catalog Information

PHYS 490 (0.50) LEC Special topics in Physics
A lecture course offered in a particular branch of physics, subject to availability of instructor.
No Special Consent Required
Requisites : Prereq: Honours Physics or Chemical Physics students only

Effective 01-SEP-2021

Requisite Change : Prereq: Mathematical Physics, Physics, and Physics and Astronomy students only.
Rationale : Special topic courses in Physics are generally open to all students in programs offered solely or jointly by the Department of Physics. There is a separate special topics course for students in Honours Life Physics programs. Requisites for this course are updated to include Honours Physics and Astronomy and Honours Mathematical Physics plans, and to remove the Honours Chemical Physics plan which becomes inactive September 1, 2020.

COURSE INACTIVATIONS (for approval)

University of Waterloo
Undergraduate Catalog Report
Faculty of SCI: for April 2020 SUC

Page No. 5
Run Date 03-MAR-2020
Meeting Number(s) 3

Effective 01-SEP-2021
PHYS 131L (0.25)
Rationale :

Mechanics Laboratory

The structure of first year physics labs is changing. PHYS 121L and 131L are currently identical, and can substitute each other as a result. The two different lab numbers were used to group students into program cohorts. As part of the structure change, only PHYS 121L will be used. PHYS 131L will become inactive and students normally requiring it as part of their program, will require PHYS 121L instead.

Effective 01-SEP-2021
PHYS 132L (0.25)
Rationale :

Waves, Electricity, Magnetism and Measurement Laboratory

The structure of first year physics labs is changing. Currently PHYS 122L and 132L share five experiments. As part of the structure change PHYS 122L will retain the five shared experiments and a new 0.25 unit lab will be introduced to house the five labs that were unique to PHYS 132L with enhanced redesign (PHYS 160L). Therefore, PHYS 132L will become inactive.

End of Report

Memorandum

To: Rebecca Wickens, Associate University Secretary
CC: Chris Read, Associate Provost, Students
From: Heather Westmorland, Acting Director, Student Success Office (SSO)
Sacha Geer, Manager, International Mobility and Intercultural Learning, SSO
Sandra López-Rocha, Intercultural Learning Specialist, SSO

Date: 11 February, 2020

RE: Editorial changes to the Global Experience Certificate's course list

A review of the Global Experience Certificate's previously-approved courses, ahead of publication in the 2020-2021 Calendar, required updating some course codes and numbers, which have already been fixed in ACMS. The following have been corrected:

- Arabic-language courses were changed from SI to ARABIC (all of them)
- RS 218 (cross-listed with SOC 260) was renumbered to RS 262

The above is reported to SUC for information.

NEW UNDERGRADUATE SCHOLARSHIPS, AWARDS, and BURSARIES

to be added to the Undergraduate Awards Database

- submitted for the March 10, 2020 meeting of Senate Undergraduate Council -

ENTRANCE AWARDS

Hedy and Graham Burton Arts Entrance Scholarship

A scholarship, valued at up to \$5,000, will be awarded annually to a full-time undergraduate student entering Year One of any program in the Faculty of Arts. Selection will be based on academic excellence (minimum 80% admission average) combined with extracurricular and leadership involvement in their community as assessed through the Admission Information Form. Preference will be given to students interested in studying a humanities program. This fund is made possible by a generous donation from Jolyon Burton, BA'00, and is named after his parents, Hedy and Graham Burton.

Method of financing: annual donation + progressive endowment

Jones Family Scholarship

A scholarship, valued at \$4,000, will be awarded annually to an outstanding full-time undergraduate student entering Year One of any program in the Faculty of Engineering. Selection is based on academic excellence (minimum 80% admission average) combined with extracurricular achievements and leadership involvement as assessed through the Admission Information Form. This fund is made possible by a donation from Howard and Sandra Jones.

Method of Financing: annual donation (two-year pledge)

Foo-man Li and Shang-jen Wong Bursary for Women

Two bursaries, valued at up to \$9,500 each, will be awarded to full-time female undergraduate students enrolling in Year One of an eligible program in the Faculty of Mathematics (excluding Computer Science) or the Department of Physics & Astronomy in which women are underrepresented. Selection will be based on academic achievement (minimum admission average of 80%) combined with demonstrated financial need as determined by Waterloo. To be considered, students must compete the University of Waterloo Entrance Bursary application by April 15. Recipients will receive \$2,000 in Year One, and an additional \$2,500 in each of Year Two, Three, and Four. Payments beyond first year are dependent on continued full-time enrolment in an eligible Mathematics or Physics program, as well as maintaining a 70% cumulative average each year. The donors are making this gift in honour of their late parents. Their mother was a strong believer in women studying Mathematics and Physics.

Method of Financing: one-time donation

Mofizur Rahman Memorial Scholarship

A scholarship, valued at \$2,500, will be awarded annually to an outstanding female undergraduate student enrolled in Year One of any program in the Faculty of Engineering wherein women are underrepresented. Selection is based on academic achievement combined with extracurricular and leadership involvement as assessed through the Admission Information Form. This fund is made possible by a donation from Akbar Rahman in memory of his dear father, Mofizur Rahman.

Method of Financing: annual donation (four-year pledge)

Kenneth Gordon Savery Memorial Scholarship

A scholarship, valued at approximately \$1,500, will be awarded annually to a full-time undergraduate student enrolled in Year One of any program in the Faculty of Applied Health Science, Engineering, Mathematics, or Science on the basis of academic excellence. This fund is made possible by a donation from Michael Yeo in memory of his grandfather, Kenneth Gordon Savery.

Method of Financing: endowment

NEW UNDERGRADUATE SCHOLARSHIPS, AWARDS, and BURSARIES

to be added to the Undergraduate Awards Database

- submitted for the March 10, 2020 meeting of Senate Undergraduate Council -

Sprickerhoff Family Bursary for Women in Mathematics

One bursary, valued at \$5,000, will be awarded annually to a full-time female undergraduate student entering Year One of any program in the Faculty of Mathematics, wherein women are underrepresented (excluding Software Engineering). Preference will be given to students enrolling in Computer Science. Preference will also be given to candidates from Milton, Caledon, Acton, Halton Hills, Georgetown, or Brampton. Selection will be based on academic excellence and demonstrated financial need, as determined by Waterloo. To be considered, students must complete the University of Waterloo Entrance Bursary application by April 15. This fund is made possible by a donation from the Sprickerhoff family to encourage young women to pursue studies in STEM disciplines.

Method of Financing: annual donation (four-year pledge)

Jason Thean Engineering Entrance Bursary

A bursary, valued at \$2,000, will be awarded annually to a full-time undergraduate student enrolled in Year One of any program in the Faculty of Engineering who has demonstrated financial need as determined by Waterloo. To be considered, students must complete the University of Waterloo Entrance Bursary application. This fund is made possible by a donation from alumnus Jason Thean (BASc '07, Software Engineering).

Method of Financing: annual donation (five-year pledge)

Traquair Family Award in Arts

Two awards, valued at up to \$20,000 over eight academic terms, will be awarded annually to deserving undergraduate students entering Year One of full-time degree studies in any program in the Faculty of Arts (excluding Accounting and Financial Management). Selection will be based on a combination of academic excellence and financial need as determined by Waterloo. To be considered, students must complete the University of Waterloo Entrance Bursary application by April 15. Recipients will receive \$2,500 per academic term for up to eight terms (1A-4B). Payments beyond Year One are dependent on maintaining a minimum overall average of 75% and full-time enrolment in the Faculty of Arts. This award is made possible by a donation from Janis Traquair (BA '79) and Brian Traquair (BMath '79).

Method of financing: annual donation + progressive endowment

Traquair Family Award in Mathematics

One award, valued at up to \$40,000 over eight academic terms, will be awarded to a deserving undergraduate student entering Year One of full-time degree studies in any program in the Faculty of Mathematics. Selection will be based on a combination of academic excellence, Admission Information Form, contest scores as assessed through the Centre for Education in Mathematics and Computing (CEMC), and on financial need as determined by Waterloo. To be considered, students must complete the University of Waterloo Entrance Bursary application by April 15. Recipients will receive \$5,000 per academic term for up to eight terms (1A-4B). Payments beyond Year One are dependent on maintaining a minimum overall average of 75% and full-time enrolment in the Faculty of Mathematics. This award is made possible by a donation from Brian Traquair (BMath '79) and Janis Traquair (BA '79).

Method of financing: annual donation + progressive endowment

NEW UNDERGRADUATE SCHOLARSHIPS, AWARDS, and BURSARIES

to be added to the Undergraduate Awards Database

- submitted for the March 10, 2020 meeting of Senate Undergraduate Council -

UPPER-YEAR AWARDS

Carey Bissonnette Memorial Scholarship

A scholarship, valued at up to \$1,200, will be awarded annually to a graduating undergraduate student in the Department of Chemistry in the Faculty of Science. Selection is based on academic achievement (minimum 80% cumulative average) combined with a commitment to undergraduate research or teaching assistantships. An application is not required. This fund has been made possible by family and friends of Carey Bissonnette, a dedicated colleague, lecturer, academic advisor and teaching fellow at the University of Waterloo where he devoted himself for over 24 years.

Method of Financing: endowment

Janet Law-Yip Memorial Award

An award, valued at up to \$1,000, will be provided annually to a full-time undergraduate student enrolled in Year Three or Four of any program in the Faculty of Engineering. Selection is based on academic achievement (minimum 75% cumulative average) combined with extracurricular involvement and/or volunteer activities. Preference will be given to students who have participated in student government. Interested students should submit an application by October 1. This fund is made possible by a donation from Janet Law-Yip's family and friends in her memory.

Method of Financing: endowment

Shamim Mapara Philosophy Scholarship

One or more scholarships, valued at \$2,000 each, will be awarded annually to one or more full-time undergraduate students enrolled in Year Three or Four in the Department of Philosophy in the Faculty of Arts. Selection is based on academic excellence (minimum 80% cumulative average) combined with coursework in multidisciplinary studies which demonstrates the student's holistic approach to learning. Interested students should submit an on-line application by October 15. This scholarship has been established by a donation from Nina Mapara (BSc '94, BA '96) in honour of her mother.

Method of Financing: annual donation (five-year pledge)

Jack and Annie Scott History Scholarship

A scholarship, valued at up to \$1,200, will be awarded annually to a full-time undergraduate student entering Year Two in the Faculty of Arts who has declared History as their major. Selection will be based on academic excellence (minimum 80% cumulative average). No application is necessary. This fund is made possible by a donation from the estate of Eileen Wiegand in honour of her parents, Jack (a member of the founding University of Waterloo Board of Governors) and Annie Scott, who, by their example, instilled in Eileen a strong commitment to community and an understanding of the importance of education.

Method of Financing: endowment

NEW UNDERGRADUATE SCHOLARSHIPS, AWARDS, and BURSARIES

to be added to the Undergraduate Awards Database

- submitted for the March 10, 2020 meeting of Senate Undergraduate Council -

John Tattersall Memorial Award

An award, valued at up to \$1,200, will be provided annually to a full-time undergraduate Canadian Indigenous student enrolled in Year Two, Three, or Four in any program in the Faculty of Engineering. Selection is based on academic excellence (minimum 75% cumulative average). An application is not required. To be considered, students must have self-identified as a Canadian Indigenous person on their University application through OUAC. Nominated students will be asked to provide a copy of their status card to confirm eligibility. This fund is made possible by a donation from The Tattersall Family.

Method of Financing: endowment

Lynne and Peter Woolstencroft Experiential Learning Award

Awards of varying value are available to full-time undergraduate students enrolled in the Faculty of Arts who wish to participate in an extracurricular activity that will enhance their education in their program of study or an experiential activity tied to a course where the cost is not covered by their tuition. Selection is based on academic achievement (minimum 70% cumulative average) and a demonstration of how the activity will benefit the student's knowledge acquisition, professional development, or enrich their in-class learning. Interested students must apply by completing an application form and submit it to the Administrative Co-ordinator, Arts Undergraduate Office. This fund is made possible by a donation from Professor Emeritus Peter Woolstencroft, a revered educator and passionate advocate for experiential student learning.

Method of financing: annual donation + progressive endowment

ATHLETIC AWARDS

Gary Boug Memorial Football Excellence Award

One or more awards, valued at up to \$4,500 each, are given to members of the varsity football team. This award recognizes "ACE": attitude, character and enthusiasm. This fund is supported by friends and family of former Warriors Football Coach Gary Boug, in memory of the positive impact that Gary had on so many lives.

Method of Financing: one-time collection of pooled donations (possibly more in future)

INTERNATIONAL EXPERIENCE AWARDS

Ella Dinoi International Experience Award

An award, valued at up to \$1,200, will be provided annually to a full-time undergraduate student enrolled in Year Three or Four in the School of Architecture who is pursuing an international study or co-op opportunity. Candidates must have a minimum cumulative average of 75%. Preference will be given to students who have a demonstrated passion for design excellence. To be considered, students must submit the general University of Waterloo International Experience Award application by July 15th. This fund has been established by friends and family in memory of Ella Dinoi (BArch '98, Waterloo). Ella's incomparable creative spirit and passion for design was respected by colleagues, professors, classmates and clients in Canada, Italy, and internationally.

Method of Financing: endowment

Handling of Final Assessment Reports & Two-Year Progress Reports related to academic program reviews

Introduction

Waterloo's Senate Undergraduate Council (SUC) and Senate Graduate and Research Council (SGRC) have a duty to consider all aspects relating to the academic quality of undergraduate studies and graduate studies within the University. As described in Waterloo's Institutional Quality Assurance Process ([IQAP](#)), documentation emerging from the [cyclical program review](#) process includes:

- [Final Assessment Report](#), which summarizes the self-study, external reviewers' report, program response, and implementation plan, and
- [Two-Year Progress Report](#), which reports on progress related to the implementation plan.

Final Assessment Reports (FARs), require two SUC or SGRC members to review the report, whereas, Two-Year Progress Reports only require one SUC or SGRC member, although at the SUC/SGRC Chair's discretion, a second reviewer may be sought. In order to ensure that student representatives have the opportunity to review each report, the WUSA VP, Education and GSA President receive these documents in advance for information. Any questions or concerns they might have can be raised and addressed, if needed, prior to the report being approved at SUC/SGRC. This review process is coordinated by the Quality Assurance (QA) Office.

To promote transparency and foster integrity in the review process, reviewers should not be members of the Faculty or Affiliated and Federated Institutions of Waterloo (AFIW) from which the report originates.

Assessment

Reviewers will consider a series of **guiding questions** (see below) in arriving at their recommendation for revision or approval to SUC or SGRC. Before reporting to SUC or SGRC, reviewers will ask questions and share their observations, as well as any concerns they have identified with the report, to the Quality Assurance Office, who will then connect with the Chair or Director of the program. The FEDS and GSA representative will also receive these reports for information prior to submission to SUC/SGRC.

The Quality Assurance Office will ensure that any revisions to the reports are completed by the Chair or Director of the program, prior to the QA Office submitting the report for approval at a SUC or SGRC.

Does the Final Assessment Report:

- 1) Include a credible implementation plan that not only addresses the substantive issues identified from the program review process but also identifies clearly:
 - What actions will follow from specific recommendations?
 - Who will be responsible for acting on those recommendations?
 - Who will be responsible for providing resources?
 - Priorities for implementation and realistic timelines for initiating and monitoring actions?
- 2) Provide a rationale as to why a recommendation(s) will not be pursued?

Does the Two-Year Progress Report:

- 1) Clearly describe progress achieved on the various action items in the implementation plan?
- 2) Explain convincingly any circumstances that would have altered the original implementation plan?
- 3) For items that are behind schedule, propose an amended implementation schedule that is reasonable and credible?
- 4) Address significant developments or initiatives that have arisen since the program review process, or that were not contemplated by the program review process?

The program Chair or Director (or their chosen delegate) will attend the SUC or SGRC meeting to address any questions or concerns that might arise during SUC/SGRC.

SUC's and SGRC's responsibility will be to focus on the overall credibility and feasibility of the report and the proposed plan of action – seeking to uncover, for example, unexplained disjunctions between the reviewers' recommendations and the program's response – as opposed to the minutiae of course content and curriculum structure.

A Final Assessment Report or Two-Year Progress Report that is approved by a majority vote of SUC/SGRC will be submitted to Senate for information. Should the discussion at SUC or SGRC reveal issues of concern that require revision, the Quality Assurance Office will work with the program Chair or Director to address the concern(s). If minor revisions are needed, the report will be edited and then it will proceed to Senate for information without re-approval from SUC/SGRC; however, any major revisions will require SUC/SGRC review and approval.

Status of Reports under Review

A summary of the status of all reports under review, including reports for which the QA Office is seeking reviewers, can be found at the following link:

<https://uwaterloo.ca/academic-program-reviews/status-reports-under-review>

Two-Year Progress Report

Science and Aviation (BSc), Geography and Aviation (BES)

June 2019; revised January 2020

Background

In accordance with the University of Waterloo's Institutional Quality Assurance Process (IQAP), an external review of the aviation programs (Science and Aviation, Geography and Aviation) was conducted November 6-7, 2014. The resulting report from the examiners was returned on November 20, 2014. A written response to the reviewers' recommendations was submitted to the University on June 18th, 2015, by the Director, Ian McKenzie and received endorsements from the Dean of Environment on June 19, 2015 and the Dean of Science September 5, 2015. This was the first review conducted for the aviation programs.

This report presents progress updates on the recommendations made by the reviewers. Each recommendation/comment (*italicized*, 2014) is followed by the initial response (2015) and an updated progress update (2018). This information is summarized within the implementation table, attached to the end of this document.

Responses to the Reviewers' Recommendations

1. Reviewer Comments: *Is the degree nomenclature appropriate? The degree name could be misleading. "Bachelor of Science and Aviation" or "Bachelor of Geography and Aviation" could lead a recruiter to the mistaken opinion that the graduate has more theoretical background in Aviation. In fact, the graduates have no more background in Aviation than a graduate of an airport-based flight school. Something like "Bachelor of Science (Professional Pilot)" may be more appropriate unless the academic curriculum is enhanced with core aviation courses.*

Initial Response: We disagree. The degree names stated by the reviewer are incorrect. The actual name of the degrees are Bachelor of Science (Science and Aviation) and Bachelor of Environmental Studies (Geography and Aviation). We believe that the current degree nomenclature is appropriate for distinguishing Aviation as a separate/individual degree program at Waterloo. It is in line with the intention of identifying Aviation as an academic discipline in its own right, rather than solely as an add-on/option to existing traditional degree programs. This also encourages more growth, expansion, and resources.

Progress Update: No further actions taken regarding the degree name. In response to reviewer comment 'unless the academic curriculum is enhanced with core aviation courses', additional AVIA courses have been added to expand the scope of academic aviation offerings (more details in response #4).

2. Reviewer Comments: *Car Share or Bus Service - Transportation and parking seem to be a major ongoing problem for flight students. It was recognized that both the Director of Aviation and the General Manager of [Waterloo Wellington Flight Centre \(WWFC\)](#) have invested time and energy into finding a resolution.*

Initial Response: The reviewers are correct that since the program began, we have conducted an extensive search for transportation options. Students have developed creative ways to manage their transportation needs such as carpooling with students with flights at the same time; sharing rides with other students across various years; and, most recently, using the Student Care Share program. Recently the Airport, leading to an additional expense, has enforced parking fees.

Progress Update: All Waterloo Undergraduates have Grand River Transit passes. Currently a bus comes within 4 km of airport and some students will use a bicycle to cover the rest or if a few are travelling together for a flight, take an Uber from the nearest stop. We anticipate that with operation of the ION, residential growth in Breslau, and the new Grand River Bridge crossing on Fairway Road to Fountain St., new bus routes will cover the airport. Currently many students with similar academic schedules are sharing rides and book flights at similar times with their various instructors. We will continue to advocate for public transportation to access the Airport, not just for aviation flight training but for all students, who might want to travel from the Region of Waterloo International Airport.

Work plan: The most practical solution for students without a car is public transportation because they can obtain student-rate bus passes. We anticipate that transportation options to the airport will improve with the operation of the ION in 2019

Responsibility: The Director in conjunction with AVIA Faculty members and WWFC.

January 2020 Update: Breslau area continues to grow and a bus link is expected within the next year as routes are adjusted with the arrival of the ION. Students continue to find transportation to the airport through ride sharing networks with other students. Discussions are ongoing with the Region to deliver bus service to the Region of Waterloo International Airport.

3. Reviewer Comments: *Internship Opportunities - The program is encouraged to continue identifying relationships with industry and leveraging the co-op and internship resources on the University of Waterloo campus for 3rd and/or 4th year aviation students.*

Initial Response: We agree. There are no traditional co-op opportunities in aviation because flight training occurs in all terms until 4th year. An opportunity for experiential learning in the spirit of Waterloo is welcomed. We continue to investigate 3 to 6 week opportunities for paid internships with airlines, flight operations, and aviation related companies. We envisage this as a 4th year elective course for students.

Progress Update: After exploring this possibility, we decided the impact would be limited as most flight students choose to pursue additional flying during this phase. Instead, we chose to focus on incorporating enhanced industry cooperation within their academic coursework. This includes working with the Co-operative and Experiential Education (CEE) to improve aviation job-readiness skills (4 CEE sessions by a career advisor, are now embedded within academic courses throughout their degree plans). In addition, experiential learning assignments where students collaborate with industry partners provide opportunities for real-world problem solving and industry networking, have

been incorporated within AVIA 100, 310, 315, and 320. Since the review, several direct job pathway programs have been established (with Sunwing, Jazz, and Porter Airlines) which allow our graduates an expedited pathway to an airline pilot position.

Work plan: Continue to enhance experiential learning opportunities for aviation students. In the Fall of 2018, AVIA 310 will incorporate an assignment using the [Riipen](#) platform. Airline industry partners will submit assignments, collaborate with students, rate performance, and invite the highest-scoring group to a dinner with airline executives. Following an assessment of Riipen within AVIA 310 an assessment will determine whether this software will be incorporated in other AVIA courses.

Responsibility: The Director in conjunction with AVIA Faculty members.

4. Reviewer Comments: *Creating 2 new 0.5 courses on aviation topics (1.0 credits). Suggestions include: A 1st year class to introduce students to aviation - a survey course exploring aspects of the 'aviation core' topics suggested by Aviation Accreditation Board International (AABI). A 4th year course run by a course manager but with lectures presented by different professors each week from across Waterloo campus (whose work relate to aviation such as robotics, systems design engineering, computer science, etc.).*

Initial Response: We agree. Adding more aviation focused academic courses to the plan would be popular with students; however, more staffing resources are required.

Progress Update: Since the report, [AVIA 310](#) has been completely redeveloped and three new aviation academic courses have been added to the curriculum ([AVIA 100](#), [AVIA 315](#) and [AVIA 320](#)). [AVIA 320 \(formerly AVIA 374\)](#) on Unmanned Aerial Systems has been taught three times.

Work plan: Monitor student evaluations of new course offerings, and liaise with aviation industry colleagues to ensure course content is aligned with professional competencies.

Responsibility: The Director in conjunction with AVIA Faculty members.

January 2020 Update: Effective Sept. 2020 a new specialization begins in the Geography and Environmental Management (GEM) Plan. The Aviation Specialization (5.5 units) is focused on growing Waterloo's presence in the aviation industry with career opportunities such as airline dispatch, air traffic control support, airport management and planning, tourism and sustainable aviation. The Aviation Specialization is supported by a suite of courses from AVIA, GEOG and cross lists with PLAN. The Aviation Specialization joins GEM's existing specializations in: Climate Change and Environment, Earth Systems Science, Economy and Society and Geomatics.

5. Reviewer Comments: *Add a significant culminating upper year experience in aviation. For example, a capstone course, internship, or special project related to aviation that is a required part of the degree.*

Initial Response: We are considering this suggestion. The opportunity for an internship is being considered for 2017 as an elective. A special research project course is already available ([AVIA 475: Independent Studies of Selected Topics](#)). Flexibility is required in year 4 to meet various degree requirements. A capstone course for all Aviation students in Science and Geography would be difficult to add into the program. Students are working to complete academic specializations or minors in year

four. These credentials, among others, can include Physics, Earth Sciences, Biology, Chemistry and Geomatics.

Progress Update: A new upper-year aviation course ([AVIA 320](#)) was added to the curriculum in the winter of 2018. [AVIA 320](#) incorporates a 'safety challenge' which is completed by students throughout the semester. Student solutions, which require references to elements learned in earlier years of the program, are presented to a panel of industry judges at the end of the term.

Work plan: Explore methods to enhance a senior culminating experience. The Riipen platform that facilitates experiential learning and industry partners will be explored for this purpose beginning in the winter of 2019. Continue to develop the aviation plans to include industry experience for aviation students.

Responsibility: Director of Aviation & Instructor of [AVIA 320](#)

January 2020 Update: In Sept 2020, GEOG/AVIA 416, Sustainable Aviation 1.0 unit elective will be considered a capstone course. Currently GEOG 490 A, B (1.5 units) are available to students to do research.

As part of the new Integrated Aviation Flight Program, approved by Transport Canada, students graduating in 2021 will have completed four years of integrated flight training experience. This culminates in year 4, with multi-crew resource and simulator training to manage a multi crew environment. The writing of 2 pre-graduation professional exams, the SAMRA and SARON, gives students credit towards the Airline Transport Pilot Licence (ATPL). The ATPL (frozen) allows graduates to get their ATP Licence when they have completed 1,500 flight hours.

6. Reviewer Comments: *We also recommend incorporating some mandatory flight training in 4th year to avoid flight skills becoming 'rusty' during that time (not necessarily more flight hours, but a redistribution of training so that it extends into 4th year).*

Initial Response: We understand this suggestion; however, raise the following points. Some students already obtain flight training in fourth year because they complete extra credentials in aviation (e.g. 30% of students pursue an Instructor Rating or Float Rating). The Waterloo Aviation program already has flight training in 8 terms (1B to 3C; including 3 spring terms). Students on campus during a spring term may work part time (80% of year 3 students), or take extra courses in order to graduate early or reduce their load in other terms (20% of year 3, 40% of year 2, and 30% of year 1 students).

We have already discussed the incorporation of the new two-person crew ALSIM flight simulator as an additional training option.

Progress Update: The aviation industry has evolved significantly since the time of the original report and our program has adapted. Fourth year students now have the option of seeking employment through one of our airline partnership programs (Sunwing, Jazz, or Porter Airlines). WWFC has responded and been approved by Transport Canada to initiate a new training program, including multi crew coordination training, to help students gain the skills they require to fly large, complex aircraft. The [Integrated Airline Transport Pilot](#) program, leading to the 'Airline Transport Pilot Licence (ATPL) frozen', prepares our students to write the Transport Canada ATPL professional exams while still in school. These exams are typically completed after graduates have accumulated 750 total flight hours

and several years of experience (our program is 205 hours). The additional training is optional (as it does carry additional costs). Before a pilot can be a Captain of a multi-crew flight, the pilot in command must hold an ATPL. This gives our program an advantage over other flight training programs in Ontario. Students entering our program in 2017 are on the pathway to take this flight training option in 4A. The University of Waterloo Aviation Programs and Seneca College, School of Aviation are the only two Ontario, Post- Secondary institutions with the ATPL integrated programs.

Work plan: Beginning in the fall of 2017, incoming first year students have the option of choosing a different pathway for their flight education. This pathway would lead them to earn an Integrated Airline Transport Pilot Licence (ATPL), which would support their progression more directly into an airline pilot position. This is an optional pathway but is an indication that flight training within the program is evolving to meet industry needs.

Responsibility: Director of Aviation & WWFC

7. Reviewer Comments: *Incorporate crew-coordination training into flight curriculum. Not necessarily additional hours of training, but a restructuring of a few existing flight lessons to target crew-coordination skills through Line-Oriented Flight Training (LOFT) and/or scenario-based simulator flights.*

Initial Response: We agree. This idea is already being considered with WWFC, using the new ALSIM simulator in year 4. This is further discussed under item 16 below (the writing portion of the Airline Transport Pilot Licence).

Progress Update: Please see progress update for response to item #6.

8. Reviewer Comments: *Incorporate more student involvement in flight training. Consider training students in elementary maintenance. Involve students in regular safety meetings.*

Initial Response: We believe there is limited potential for this suggestion. Basic maintenance information is possible, but WWFC considers that, only the Aircraft Maintenance Engineer has responsibility to work on any aircraft.

WWFC has an active Safety Management Systems (SMS) and a flight officer responsible for WWFC activities. SMS help companies identify safety risks before they become bigger problems. Transport Canada regulations require the aviation industry to put safety management systems in place as an extra layer of protection to help save lives.

Progress Update: Students are encouraged to participate in the safety management process at WWFC, through submitting safety reports and safety meetings. Through the new course [AVIA 320](#) 'Aviation Safety' students are educated on the process and limitations of safety management systems (SMSs), enhancing their ability to engage with the WWFC safety program as well as that of future employers.

Work plan: Continuing with current student involvement in safety program.

Responsibility: WWFC and Director of Aviation

9. Reviewer Comments: *Explore a specialization in Unmanned Aerial Vehicles/Systems (UAVs/UASs). With the aviation program located within Geography and Science it seems logical for aviation program to explore opportunities within the UAV/UAS sector. This is a segment of the aviation industry that is growing rapidly yet there is little academic guidance to support best practice. With an academic specialization in UAV/UASs Waterloo graduates would be likely to have a more direct link between the academic courses they complete at the University and how that knowledge can help them contribute to industry (and find employment).*

Initial Response: We agree and have been exploring the UAV/UAS opportunity. As indicated in item #4 above, we will offer a new UAS course as [AVIA 374](#) in Winter 2016. The WWFC has launched a [new flight course in UAV](#). We are reviewing training courses (in Canada and in the USA).

Progress Update: [AVIA 270 / GEOG 270 \(formerly GEOG 374\)](#) a special topics course exploring the use of drones, is now running annually and attracts both Aviation students and those from other programs.

Work plan: We have developed an RPAS (Remotely Piloted Aircraft System, aka “Drone”) option, which would be available to students not currently enrolled in an aviation program. This option is under review and may be re-introduced as a non flight option. Program growth and flight training demand on WWFC facilities does not permit a separate Private Pilot Licence for this option.

Responsibility: Director of Aviation & AVIA, GEM and Geomatics faculty members

10. Reviewer Comments: *Collaboration with Western and Windsor University’s aviation program. With a similar structure and the close geographic proximity, it seems logical for Waterloo, Western, and Windsor to collaborate. Possibilities include notifying each other of guest speakers, tours, shared student chapters (99’s, Women in Aviation, IAAE, etc.), student social events (such as ski trips), etc. Also, sharing faculty resources by allowing Waterloo students to complete other University aviation courses and vice versa is an opportunity worth exploring.*

Initial Response: We agree but as a lower priority goal. Collaboration between university programs would be appropriate, especially Western because of its proximity. Opportunities could include invitations to lectures with guest speakers and collaborative research opportunities related to the aviation industry. Social events can be organized by students such as ‘fly-ins’. Meetings could be arranged at the home airport of one institution, with student pilots from the other flight programs, arriving by plane.

It should be noted that students already can take courses elsewhere on a Letter of Permission. Developing additional Waterloo AVIA courses with Waterloo faculty will be a higher priority than arranging inter-institutional collaborations.

Progress Update: Conestoga College and Western’s aviation students have been invited to campus annually, to attend Chris Hadfield’s guest lecture. To support our outreach to the international aviation community, Waterloo’s aviation program has partnered with the [International Civil Aviation Organization \(ICAO\)](#) to launch a free online course called ‘[Fundamentals of the Air Transport System](#)’ (FATS). This course provides accessible, online learning to an international audience. Launched in Dec. 2017, more than 2000 people have taken this course from every global region. Dr. Suzanne Kearns’

text book 'Fundamentals of International Aviation', 2018 has recently been translated into Turkish and ICAO is negotiating with the publisher for translation rights in other languages.

Another annual event, hosted and co-ordinated by the Aviation Society is a [Career Day](#). Conestoga College Aviation students are also invited. This year industry representatives include: Porter Airline, Jazz Aviation, Sunwing, Great Lakes Helicopter, Air Canada- Rouge, WestJet Encore, Chartright Air, WestJet and Air Canada.

Work plan: We remain open to collaborative opportunities. We will monitor and report on the impacts of the FATS course annually.

Responsibility: Director of Aviation

11. Reviewer Comments: *Join the University Aviation Association (UAA), Aviation Accreditation Board International (AABI), and Women in Aviation.*

Initial Response: We agree. Resources for membership fees and travel resources are required. We would need to work toward an AABI accreditation with curriculum revision and additional staff/ faculty resources. Only two Canadian institutions are accredited: Mount Royal University and Seneca College Flight Training Program.

Progress Update: We are now active members of the [University Aviation Association \(UAA\)](#), a North American organization with 120 universities and colleges with aviation programs (an AVIA professor serves on the Board of the UAA). We also host a student chapter of [Women in Aviation](#) (2018).

Work plan: We are exploring the possibilities of joining the [Air Transport Association of Canada \(ATAC\)](#), with plans to become members in 2019-20. Pursuing accreditation from the [Aviation Accreditation Board International \(AABI\)](#) is currently not planned. Faculty staff and simulator resources are not at a level to go for accreditation at this time. Also, cost is approximately \$18,000 US to prepare the accreditation proposal and site visits.

Responsibility: Director of Aviation

12. Reviewer Comments: *Create a University of Waterloo Flight Standards Committee for Quality Assurance Purposes and hire or contract a qualified flight standards pilot.*

Initial Response: We disagree. At the present time oversight of flight training is with WWFC. Students are prepared for the various flight credentials. Examinations and licensing of credentials is the responsibility of the Department of Transport, Civil Aviation. Although appropriate for accreditation by AABI, university resources are more appropriately directed to Waterloo Aviation faculty. Currently the Aviation Director and Associate Director sit on the Conestoga College Program Advisory Committee with members from the Aviation Industry and Airlines. We both utilize WWFC as the flight training school (Conestoga College for 18 years). In the spirit of regional co-operation, this committee serves the needs of both institutions.

Progress Update: Waterloo currently has members on the Conestoga College Program Advisory Committee (PAC).

Work plan: As the Waterloo aviation program has grown, our perspective has shifted on this issue. We are planning to put together a small advisory group of industry representatives, to provide oversight and feedback on both the academic and flight-related aspects of the program. Seek to have this in place by the winter/spring of 2020.

Responsibility: Director of Aviation, Aviation faculty, staff and students with representation from WWFC

13. Reviewer Comments: *Create a tenure-track faculty position (that includes a research component) with an aviation focus.*

Initial Response: We agree. This is one of the key components going forward with the Aviation programs in Science and Environment. The University of Waterloo program is unique and the first in Canada to offer a BES or a BSc degree in Aviation. Graduates from the program have the recognized Waterloo branding. In Geography and Aviation, a Geomatics Specialization with a Commercial Pilot Licence, Multi-Engine Rating and Instrument Flight Rating is possible. In Science and Aviation, a BSc academic credential is possible with an Earth Sciences Specialization, a Physics Specialization, or no specialization plan that is often associated with a Biology or Chemistry Minor. Additional options include Commercial Pilot Licence, Multi-Engine Rating, and Multi- Instrument Flight Rating. Graduates are ready for placement in many areas in the Aviation Industry, but most importantly, as pilots. In the first four graduating classes (2011 to 2014), Waterloo graduates are working across Canada from Newfoundland Labrador to British Columbia to Inuvik. Our graduates are also working as pilots with:

- the Canadian Military (search and rescue and training for fighter squadrons);
- international airlines such as Cathay Pacific (2nd officers);
- cargo and passenger operation in Canada's north for resource industries and isolated communities;
- Medivac work from Europe; and
- Corporate aircraft within North America.

Graduates also train some of our new pilots as flight instructors.

At this time, there are no full-time aviation faculty members at Waterloo. The first seven years of the program and the review, acknowledge success of this new program, as a small but important part of Canadian Aviation. The Aviation flight and ground school instruction components have been delivered by the Waterloo Wellington Flight Centre (WWFC), which has been in operation for over 80 years. The Waterloo Aviation academic component has been given by a sessional who is a Waterloo Alumni and an Air Canada captain. The sessional is respected by students as an experienced frontline pilot. We also have as an adjunct Aviation Professor and former astronaut. We have the nucleus for innovation and research but the program needs to grow with faculty who hold regular appointments to achieve this.

Progress Update: Dr. Suzanne Kearns was hired as a tenured Associate Professor of aviation on July 1, 2016. She conducts research, teaches four AVIA courses (100, 310, 315, and 320), supervises graduate students, and serves as a liaison for the program to industry partners.

Work plan: To support the ongoing growth of the program, an additional faculty position is required. The focus of the hire will be in the Faculty of Science. We have also suggested a hybrid 'aviation manager', a staff or lecture position role, with expertise in both aviation teaching, research, administration, aviation/aerospace expertise required (piloting experience desirable).

Responsibility: Director of Aviation in conjunction with Deans of Science, Environment and University administration.

14. Reviewer Comments: *Add 1.0-2.0 university credits (in addition to the 1.0 courses suggested in short-term opportunities, above) in aviation-related academic topics to target all of the Aviation Accreditation Board International (AABI) 'aviation core' subject areas over 3 to 5 years.*

Initial Response: We agree but note resource limitations. To add 1.0 to 2.0 additional Aviation units will require curriculum adjustment to potential core course requirements. The 'Science and Aviation' and 'Geography and Aviation' degrees meet the discipline focus of the degrees. With additional faculty and resources, the aviation focus of the degree can be further emphasized and still meet the rigor of the BSc and BES degrees. Some of the existing core courses can be replaced by some of the AABI recommended courses. It is important to build an academic aviation component.

Progress Update: Please see note under item #4. 2.0 aviation courses have been added to the course calendar. For *Aviation Accreditation Board International (AABI)* see Work Plan in #11

Work plan: Additional aviation offerings would be of benefit to students, yet this would require an additional faculty position.

Responsibility: Director of Aviation in conjunction with Deans and University administration.

15. Reviewer Comments: *Create a non-flight stream allowing students to complete academic courses (with the added aviation credits) to earn an aviation degree without the flying component.*

Initial Response: We disagree. At this stage of the program, Waterloo Aviation is currently known for its strength as a BSc or BES degree with flight training program. We are not considering a non-flight option degree. We are considering new UAV/UAS, AVIA courses that would include some non-flying components and flying components that could lead to an Aviation UAS Option. It is expected that within a few years Transport Canada will have regulations in place for 'Beyond Line of Sight operations'. This will likely require an Instrument Flight Rating (IFR) capable, remote pilot. There will be an emerging role for UAV specialists in a wide range of applications that can include extracting resources and monitoring pipelines, sea and lake ice, whales, hydro installations, environmental issues/ pollution and disasters. UAV specialists -- pilot/crews will be required to manage UAV use and data collection.

Progress Update: Although there is not currently a non-flying degree options, students from the variety of degree programs across campus can complete aviation course offerings that are available as electives to the campus community. These include AVIA 100, 315, and 374.

Work plan: In the future, we would like to expand the aviation offerings that are available to Waterloo students not currently in one of the aviation programs. We are also exploring the possibility of a non-flying aviation plan (this is in the early discussion/information-gathering stage).

Responsibility: Director of Aviation

16. Reviewer Comments: *Consider adding a 'Frozen' ATPL option for flight students.*

Initial Response: We agree. An integrated Airline Transportation Licence (ATPL) allows the captain or pilot to be in command of a multi-crew airplane. The ATPL for aviation students would include a Commercial Pilot Licence (CPL) Instrument Rating (IR) and the ATPL theory subjects complete. The written portion of the licence requirement is considered complete or 'frozen'. However, the Licence requirements are not complete until the pilot accumulates 1,500 total hours with a minimum of 250 hours as pilot in command. A pilot has 5 years to complete the flight requirements of the ATPL. Upon graduation from our program students will have about 200-205 total hours. Students will finish their in-airplane training as usual in spring of third year. In year 4, the simulation training would continue, culminating in the written ATPL.

Progress Update: A significant amount of work has been invested in adding the ATPL flight option (ATPL (frozen)) to our program offerings. This option became available as of fall 2017. An increase in admissions to 85 students in 2018, 125 in 2019 for the integrated program, signals an opportunity for growth (65 in 2017). The University Waterloo Aviation program is now the largest university aviation program in Canada. Aviation globally by 2036 will see a projected shortage of 240,000 pilots. In Canada, within the next 7 years we will see a shortage of approximately 6,000 pilots. Transport Canada indicates 1,200 commercial pilot licences earned each year in Canada, from all training sources. Fifty percent of these are to international flight training students, training in Canada and returning to Asia. In 2018, we had almost 600 applicants to our programs, and over 800 in 2019. Our objective over the next 3 years is an incremental growth to 125 incoming aviation students per year, by 2022. Our aviation flight-training partner, WWFC has agreed to support this growth. In order for our students to take advantage of the ATPL training, additional simulators will be required to increase the demand for training.

Work plan: Monitor integration of ATPL training path. Initiate funding opportunities from industry to meet the new training demand for simulator equipment.

Responsibility: Director of Aviation, WWFC and Office of Advancement.

17. Reviewer Comments: *Build an alumni network*

Initial Response: We agree. This work is ongoing, at both Waterloo and WWFC, to link graduates to social media for networking and career advancement.

Progress Update: This work is ongoing, in cooperation with WWFC. We have started to develop an alumni, mentorship program with are graduates to be available to students who are looking for pathways to various industry careers that our graduate now hold. Since our first graduating class in 2011, we now have pilots (First Officers and Captains) with all major airlines in Canada, the military, air cargo, UAV pilots, flight instructors, airborne survey and mapping, corporate pilots and air medivac.

As well, international companies such as Cathay Pacific. Waterloo Aviation graduates now fly to all continents, including Antarctica.

Work plan: Establish robust alumni network, invite key alumni to standards committee.

Responsibility: Director of Aviation & Instructor of AVIA 320 and Alumni Relations in the Faculties of Science and Environment.

Other Updates

The Science and Aviation Plans (Honours Science and Aviation; Honours Science and Aviation, Earth Science Specialization; and Honours Science and Aviation, Physics Specialization), have gone through two significant changes. First in fall 2017, the Science and Aviation Plans moved from 21 units to 20 units. This is in line with the Geography and Aviation Plan of 20 units.

In September 2019, the Science and Aviation Plans will remove the specialization plans, Earth Sciences Specialization and Physics Specialization. Science and Aviation will have one entry point. It will simplify the Ontario Universities Application Centre (OUAC) entry point to Honours Science and Aviation. Science and Aviation students can add a minor currently in Biology, Chemistry, Earth Science and Physics. The specializations are available in the 2018-19 calendar.

Updated Implementation Plan

	Recommendations	Initial Response and Proposed Actions	Progress to Date	Future Goals	Responsibility for Leading Actions
1.	Revise degree nomenclature	Disagreed	No actions	N/A	N/A
2.	Car share for students to airport	Agreed – action was to wait for the public transportation expansion expected 2017-2018	<p>The public transportation expansion was not implemented. This remains an issue for students.</p> <p>Groups of 3 or 4 students continue to book instructors at the same time and share a ride. Also using Facebook to organize rides from other students at all levels.</p>	<p>Bus currently comes within 4 km of airport and some students will use a bicycle to cover the rest or take an Uber. Anticipate that with operation of the ION, and residential growth in Breslau, new bus routes will be aligned to cover the airport.</p> <p>Will continue to advocate for public transportation to access.</p>	Director of Aviation, AVIA Faculty and WWFC
3.	Internship opportunities for students were suggested.	We agreed on the benefits of this experience, but there are difficulties incorporating this into the program (considering the timelines of flight training)	<p>After exploring this possibility, we decided the impact would be limited as most flight students choose to pursue additional flying during this phase. Instead, we chose to focus on incorporating enhanced industry cooperation within their academic work. This includes working with CEE to improve their job-readiness skills (4 CECA sessions are now embedded within academic courses throughout their degree plans). In addition, experiential learning assignments where students collaborate with industry partners provide opportunities for real-world problem solving and industry networking, have been incorporated within AVIA 100, 310, 315, and 320.</p> <p>Since the review, several direct job pathway programs have been established (with Sunwing, Jazz, and Porter Airlines)</p>	<p>Continue to enhance experiential learning opportunities for aviation students.</p> <p>In the Fall of 2018, AVIA 310 will incorporate an assignment using the Riipen platform. Airline industry partners will submit assignments, collaborate with students, and rate performance.</p> <p>Following an assessment of Riipen within AVIA 310 an assessment will determine whether this software will be used in other AVIA courses as well.</p>	Director of Aviation & Instructor of AVIA courses

			which allow our graduates an expedited pathway to an airline pilot position.		
4.	Create 2 new 0.5 courses on aviation topics	Agreed – new academic aviation (AVIA) offerings have been added to the course calendar	Since the report, AVIA 310 has been completely redeveloped and three new aviation academic courses have been added to the curriculum (AVIA 100, AVIA 315, and AVIA 320). AVIA 374 on Unmanned Aerial Systems has been taught three times.	Monitor student evaluations of new course offerings, and liaise with aviation industry colleagues to ensure course content is aligned with professional competencies.	Director of Aviation & Instructor of AVIA Courses
5.	Add a significant culminating upper year experience in aviation	Agreed – we planned to explore possibilities for a 4 th year AVIA course with a culminating experience.	A new upper-year aviation course (AVIA 320) was added to the curriculum in the Winter of 2018. AVIA 320 incorporates a ‘safety challenge’ for students, which they work on throughout the semester. Their solutions are presented to a panel of industry judges at the end of the term.	Explore methods to enhance this culminating experience. The Riipen platform that facilitates experiential learning and industry partners will be explored for this purpose beginning in the Winter of 2019.	Director of Aviation & Instructor of AVIA 320
6.	Mandatory flight training in 4 th year to avoid flight skills becoming ‘rusty’.	Agreed – yet it was pointed out that most students pursue a flight instructor or a float rating during this time.	The aviation industry has evolved significantly since the time of the original report and our program has adapted. 4 th year students now have the option of seeking employment through one of our airline partnership programs (Sunwing, Jazz, or Porter Airlines). WWFC has responded by creating a new training program, including multi crew coordination training, to help students gain the skills they require to fly large complex aircraft. This additional training is optional (as it does carry additional costs).	Beginning in the fall of 2017, incoming first year students have the option of choosing a different pathway for their flight education. This pathway would lead them to earn an Integrated Airline Transport Pilot Licence (IATPL), which would support their path more directly into an airline pilot position. This is an optional pathway, but is an indication that flight training within the program is evolving to meet industry needs.	Director of Aviation & WWFC
7.	Incorporate crew coordination training.	Agreed	Please see response to item #6.	N/A	N/A
8.	Incorporate more student involvement in flight training, such as with elementary	Limited potential	Students are encouraged to participate in the safety management process at WWFC, through submitting safety reports and safety meetings.	Ongoing	WWFC

	maintenance and in safety briefings.				
9.	Explore a specialization in UAV/UASs	Agreed – we have pursued the possibility of incorporating additional coursework in Remotely Piloted Aircraft Systems (RPASs)	GEOG 374, a special topics course exploring the use of drones, is now running annually and attracts both Aviation students and those from other programs.	We are exploring the possibility of an RPAS option, which would be available to students not currently enrolled in an aviation program.	Director of Aviation & AVIA faculty members
10.	Collaboration with Western and Windsor's aviation programs	Agreed, but a lower priority goal.	Conestoga College and Western's aviation students have been invited to campus annually, to attend Chris Hadfield's guest lecture. To support our outreach to the international aviation community, Waterloo's aviation program has partnered with the International Civil Aviation Organization (ICAO) to launch a free online course called 'Fundamentals of the Air Transport System'. This course provides free, accessible, online learning to an international audience (www.icao.int/fats).	We remain open to collaborative opportunities. We monitor and report on the impacts of the FATS course annually.	Director of Aviation
11.	Join aviation industry associations	Agreed.	We are now active members of the University Aviation Association (UAA) and host a student chapter of Women in Aviation.	We are exploring the possibilities of joining the Air Transport Association of Canada (ATAC), with plans to become members in 2018-19 Pursuing accreditation from the Aviation Accreditation Board International (AABI) is not currently planned.	Director of Aviation
12.	Create a University of Waterloo Flight Standards Committee for Quality Assurance purposes	Disagreed	Waterloo currently has members on the Conestoga College Program Advisory Committee (PAC).	As the Waterloo aviation program has grown, our perspective has shifted on this issue. We are exploring possibilities of putting together a small advisory group of industry representatives, to provide oversight and feedback on both	Director of Aviation

				the academic and flight-related aspects of the program. Seek to have this in place by the Winter of 2019.	
13.	Create a tenure-track faculty position that includes a research component with an aviation focus	Agreed – plan was a first academic hire in 2016 and a second in 2017.	Dr. Suzanne Kearns was hired as a tenured Associate Professor of aviation on July 1, 2016. She conducts research, teaches four AVIA courses (100, 310, 315, and 320), supervises graduate students, and serves as a liaison for the program to industry partners.	To support the ongoing growth of the program, an additional faculty position is required. We have suggested a hybrid-role, with expertise in both aviation teaching, administration, and flight training would significantly enrich the program offerings.	Director of Aviation in conjunction with Deans and University administration.
14.	Add 1.0-2.0 university credits (in addition to those mentioned in item #4) in aviation related topics	Agreed – but resource limitations are noted	Please see note under item #4. 2.0 aviation courses have been added to the course calendar.	Additional aviation offerings would be of benefit to students, yet this would require an additional faculty position.	Director of Aviation in conjunction with Deans and University administration.
15.	Create a non-flight stream allowing students to complete academic courses without the flying component	Disagreed - as Waterloo is not known as a non-flying program.	Although there is not currently a non-flying degree options, students from the variety of degree programs across campus can complete aviation course offerings that are available as electives to the campus community. These include AVIA 100, 315, and 374.	In the future, we would like to expand the aviation offerings that are available to Waterloo students not currently in the aviation program.	Director of Aviation
16.	Consider adding a 'Frozen' ATPL option for flight students	Agreed	A significant amount of work has been invested in adding this flight option to our program offerings. This option is available as of fall 2017. An increase in admissions to 85 students in 2018 for the integrated program, signals an opportunity for growth (65 students in 2017). In 2018, we had almost 600 applicants to our programs. Our objective over the next 4 years is an incremental growth to 125 incoming aviation students per year, by 2022. Our aviation flight-training partner, WWFC has agreed to support this growth. In order for our students to take	Monitor integration of ATPL training path. Initiate funding opportunities from industry to meet the new training demand for simulator equipment.	Director of Aviation, WWFC and Alumni Relations

			advantage of the ATPL training, additional simulators will be required to meet the demand.		
17.	Build an alumni network	Agreed	This work is ongoing, in cooperation with WWFC.	Establish robust alumni network, invite key alumni to standards committee.	Director of Aviation & WWFC Staff, Alumni Relations

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

Date of next program review: _____ 2021-2022 _____
Date

Signatures of Approval:

Chair/Director 12 September 2018
Date

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

Faculty Dean Environment 2 October 2018
Date

Faculty Dean Science 2-10-18
Date

Associate Vice-President, Academic March 26, 2019
(For undergraduate and augmented programs) Date

Associate Vice-President, Graduate Studies and Postdoctoral Affairs Date
(For graduate and augmented programs)

Checklist for SUC/SGRC Reviewer Feedback

Quality Assurance Office

Two-Year Progress Report: Science and Aviation / Geography and Aviation

Name of Reviewer: Alysia Kolentsis

Date: 2/3/2020

Does the Two-Year Progress Report:

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------|
| 1. Clearly describe progress achieved on the various action items in the implementation plan? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Explain convincingly any circumstances that would have altered the original implementation plan? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. For items that are behind schedule, propose an amended implementation schedule that is reasonable and credible? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Address significant developments or initiatives that have arisen since the program review process, or that were not contemplated by the program review process? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

General Comments

The responses to the reviewers' comments and suggestions were consistently thorough and convincing. The few instances for improvement that I noted in my evaluation – namely, concerning the transportation links to the airport and the recommendation for a capstone course – were thoughtfully considered, and I am satisfied with the updated action plans.