### OPEN SESSION

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:30</td>
<td><strong>Consent Agenda</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Motion:</strong> To approve or receive for information by consent items 1-5 below.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Minutes of the 15 October 2012 Meeting</td>
<td>Decision</td>
</tr>
<tr>
<td></td>
<td>2. Reports from Councils</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Graduate &amp; Research</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>b. Undergraduate</td>
<td>Decision/Information</td>
</tr>
<tr>
<td></td>
<td>3. Report of the President</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>a. Recognition and Commendation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Reports from the Faculties</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>5. Other Business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. COU Report</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>b. Undergraduate Council Appointment</td>
<td>Decision</td>
</tr>
<tr>
<td>3:35</td>
<td><strong>Regular Agenda</strong></td>
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<tr>
<td></td>
<td>6. Business Arising from the Minutes</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>7. Reports from Committees and Councils</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Executive Committee</td>
<td>Information/Second Reading</td>
</tr>
<tr>
<td></td>
<td>b. Graduate &amp; Research Council</td>
<td>Decision/First Reading</td>
</tr>
<tr>
<td></td>
<td>c. Long Range Planning Committee</td>
<td>Second Reading</td>
</tr>
<tr>
<td>4:10</td>
<td>8. Research Presentation: Professor Jennifer Clapp, Environment &amp; Resource Studies</td>
<td>Information</td>
</tr>
<tr>
<td>4:20</td>
<td>9. Report of the President</td>
<td>Information</td>
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<tr>
<td>4:30</td>
<td>10. Q &amp; A Period with the President</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>a. Inventory of Campus-wide Planning</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>b. Undergraduate Enrolment Update</td>
<td>Information</td>
</tr>
<tr>
<td>4:55</td>
<td>12. Report of the Vice-President, Advancement</td>
<td>Information</td>
</tr>
<tr>
<td>5:05</td>
<td>13. Report of the Vice-President, University Relations</td>
<td>Information</td>
</tr>
<tr>
<td>5:15</td>
<td>14. Report of the Vice-President, University Research</td>
<td>Information</td>
</tr>
<tr>
<td>5:25</td>
<td>15. Other Business</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>CONFIDENTIAL SESSION</strong></td>
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</tr>
<tr>
<td>5:30</td>
<td>16. Report of the Vice-President, Advancement</td>
<td>Information</td>
</tr>
<tr>
<td>5:40</td>
<td>17. Report from the Nominating Committee for Honorary Degrees</td>
<td>Decision</td>
</tr>
<tr>
<td>5:50</td>
<td>18. Other Business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Northwest Campus Street Naming</td>
<td>Information</td>
</tr>
</tbody>
</table>

LA:tad/7 November 2012

Logan Atkinson, Secretary of the University
Senate Graduate & Research Council met on 15 October 2012 and agreed to forward the following items to Senate for information. These items are recommended for inclusion in the consent agenda.

Further details are available at: www.adm.uwaterloo.ca/infosec/Committees/senate/sgrc.htm

FOR INFORMATION

CURRICULAR MODIFICATIONS
On behalf of Senate, council reviewed and approved curricular modifications and minor program revisions for the Faculties of Environment (environment and resource studies; geography; environmental management; and planning) and Engineering (chemical engineering; and electrical and computer engineering).

SCHOLARSHIPS AND AWARDS
On behalf of Senate, Council approved the creation of the Dr. Erlane F. Soares Scholarship in Civil and Environmental Engineering (trust).

NEW AND CONTINUING MEMBERSHIPS
Council approved the membership recommendation for the Human Research Ethics Committee and the Clinical Research Ethics Committee and the Animal Care Committee on behalf of Senate.

/md      Sue Horton          George Dixon
Associate Provost, Graduate Studies       Vice President, University Research
Senate Undergraduate Council met on October 9, 2012 and on behalf of Senate, approved changes to academic plans, new courses, course changes and course inactivations. Council agreed to forward the following items to Senate for approval and information. Council recommends that these items be included in the consent agenda.

Further details are available at: www.secretariat.uwaterloo.ca/Committees/senate/ugc.htm.

FOR APPROVAL  [effective September 1, 2013]

CALENDAR DATES

1. Motion: To approve the 2013-14 calendar dates as provided in attachment #1.

UNDERGRADUATE ADMISSION REQUIREMENTS

2. Motion: Council recommends approval of the undergraduate admission requirements for 2014 as detailed in attachment #2.

ACADEMIC PROGRAM CHANGES

Faculty of Environment

Environment and Resource Studies

Minor

3. Motion: To approve the following changes to the plan (Note: new text = bold; deleted text = strikethrough):

The Environment and Resource Studies (ERS) Minor is available to University of Waterloo Honours students in other departments.

A total of ten courses (5.0 units) are required. Within these, three ENVS courses (1.5 units) are permitted as follows: ENVS 178, ENVS 195, ENVS 200. All remaining courses must be ERS-labelled. Cumulative average for all ten courses must be at least 70%. 

Rationale: Lowering the average will bring this minor in line with other options and minors offered in the faculty.

International Development

Minor & Option

4. Motion: To approve the following changes to the plan (Note: new text = bold; deleted text = strikethrough):

International Development Minor

The requirements of the Minor are 5.0 units (ten courses) with a minimum overall cumulative average of 70% and the completion of the International Community Service Experience.

International Development Option

The requirements of the Option are six courses (four core and two elective) with a minimum overall cumulative average of 70% and the completion of an International Community Service Experience.

International Development Minor and Option

International Community Service Experience Requirement

Completion of a pre-approved international community service experience or travel seminar studying community development issues of at least three weeks duration in a linguistic and cultural
context different from that of the student's national origin, and in a location outside of Canada, the United States, Great Britain or Australia and New Zealand. An exception may be made for community service experiences in an Aboriginal community in Canada, the United States, Australia or New Zealand. Pre-approval and permission for exception is the final decision of the International Development Field Placement and Language Program Coordinator. This requirement must be organized by the student and is to be completed at the student's own expense. Co-op work terms that meet the above description will normally qualify for the requirement.

Completion of a pre-approved community service experience or educational seminar focused on community development issues of at least three weeks duration in Canada or internationally. Pre-approval is required by the International Development Field Placement and Language Program Coordinator (INDEV FPC). This requirement must be organized by the student with support from INDEV FPC and is to be completed at the student's own expense. Co-op work terms that meet the above description will normally qualify for the requirement.

Rationale: Change to the Community Service Experience has opened up the options that a student can use to satisfy this requirement. The change to the cumulative average requirements brings INDEV in line with other option and minor plans in the Faculty of Environment.

FACULTY REGULATION CHANGES

Faculty of Environment

Clearing Averages for Internal Transfers and Readmits

5. Motion: To approve the following changes to the faculty’s regulation re: clearing averages for internal transfers and readmits: (Note: new text = bold; deleted text = strikethrough):

Admission:

Students transferring from faculties within the University, or former University of Waterloo students returning after an absence, generally have the option of either transferring previous Waterloo courses with 60% or better (Planning and Knowledge Integration require 65%) without including these in the cumulative average, or including all courses passed and failed in the cumulative average.

Examination and Standings:

8. A student who continues in his/her studies after either a successful Foundation Term or an absence of two consecutive academic terms will have her/his record cleared; that is, grades achieved in all previous terms will not be included in the calculation of cumulative averages. Calculation of cumulative averages will begin with the Foundation Term or upon readmission after an absence of two consecutive academic terms.

Courses taken prior to the Foundation Term or readmission will remain on the student’s official academic record. Cleared courses with grades 50% and above over 60% (65% for Planning and Knowledge Integration) will contribute to the total credits required up to 10.0 units for Honours and 7.5 units for General Geography and Environmental Management students (50% of degree requirements).

Students are allowed to have only one Foundation Term or Failed standing on their transcript while in their ENV program. Students not achieving their program averages for a second time will be unable to continue in their ENV program.

Rationale: Requesting students to repeat courses that they have passed (50%) provides no benefit to the student. Students who petition for a CR/NCR are granted credit for courses in which a grade of 50% or above has been achieved. Finally, an arts student may only repeat a previously passed course (50%) if he/she obtains approval to do so. This has caused a few issues in the past for the
faculty’s students, especially when credit is not given for ECON 101 & 102 due to environment’s clearing rules, but the courses have been passed.

**Faculty of Mathematics**

**Degree Requirements**

**6. Motion:** To approve the following changes to the various faculty regulations (labelled A.-F.) below: (Note: new text = **bold**; deleted text = strikethrough):

**A. Co-op Regulations:**

General regulations:
- Co-operative mathematics students are expected to follow the normal academic/work-term sequence appropriate to their plan from admission through to graduation.
- Students admitted at the 1A level, with the exception of those in the Mathematics/Chartered Accountancy and BBA/BMath Double Degree plans, will normally have eight academic terms and six work terms.
- Students may not end their sequence with a work term.
- Students must satisfy all degree course requirements within one calendar year after the end of their approved sequence, or they will only be eligible for a regular degree.
- Students’ requests to re-arrange their sequence must be directed to the Standings and Promotions Committee. Such requests will normally be approved if all the criteria listed on the Academic/Work Term Sequence Change form are met. Students who alter their sequence without obtaining prior approval may be required to withdraw from the co-op system. It is the student’s responsibility to deal with any timetabling difficulties that may arise and to select courses for subsequent terms.

**Rationale:** The requirement to finish within a year of the last work term has not been enforced in recent years, and it requires nontrivial administrative resources to enforce it.

**B. Other Course Rules: (add the following text)**

**Policy for late switches from advanced section MATH courses to regular section equivalents**

At any time before the end of the “Drop, Penalty 1” period, students may switch from an advanced section MATH course to the equivalent course at the regular honours level:

<table>
<thead>
<tr>
<th>Advanced section</th>
<th>Regular section</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 145</td>
<td>MATH 135</td>
</tr>
<tr>
<td>MATH 146</td>
<td>MATH 136</td>
</tr>
<tr>
<td>MATH 147</td>
<td>MATH 137</td>
</tr>
<tr>
<td>MATH 148</td>
<td>MATH 138</td>
</tr>
<tr>
<td>MATH 245</td>
<td>MATH 235</td>
</tr>
<tr>
<td>MATH 247</td>
<td>MATH 237</td>
</tr>
<tr>
<td>MATH 249</td>
<td>MATH 239</td>
</tr>
</tbody>
</table>

Students making this kind of switch will normally only be graded based on course elements from the regular section course. Any marks from the advanced section course will be disregarded. Students are responsible for making up any material in the regular section course that they may have missed, and are required to discuss their situation with the regular section instructor as soon as possible after making the switch.

Students in MATH 147 who have transfer credit for MATH 137 may elect instead to drop the class, retroactive to the first day of lectures. If such a student chooses to switch to MATH 137 instead, then he/she will forfeit any transfer credit for MATH 137.

Students in MATH 247 who have already gained credit for MATH 237 may elect instead to drop the class, retroactive to the first day of lectures.
Rationale: This rule is what the faculty currently does, and it seems like a good idea to put it in the calendar so students are aware of it.

C. Academic Standing within the Faculty: (to allow advisors to exempt students from the course attempt rule)

This section specifies the rules that determine a student’s academic standing. A student’s standing determines whether a student is able to proceed in the Faculty or in his or her chosen plan, how many courses they are able to take in the next term, etc.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of the following:</td>
<td>Required to withdraw – may not continue in Faculty</td>
</tr>
<tr>
<td>• The student has more than 3.0 units of <strong>failed or</strong> excluded courses, or</td>
<td></td>
</tr>
<tr>
<td>• The student’s total unit value of unusable course attempts exceeds 5.0 units, or</td>
<td></td>
</tr>
<tr>
<td>• The student did not pass at least two courses in his or her first full-time 1A term, unless the one course passed is a math course with a grade of at least 60% and the Standings and Promotions Committee has approved the student to continue with his or her studies, or</td>
<td></td>
</tr>
<tr>
<td>• The student cannot earn a degree within the permitted maximum number of course attempts* (see Table 1 in “Degree Requirements”), or</td>
<td></td>
</tr>
<tr>
<td>• The student’s standing from the previous full-time term or equivalent is Probation or Probation/Conditional, his or her CAV is less than 60%, and his or her latest TAV is less than 65%, or</td>
<td></td>
</tr>
<tr>
<td>• In the opinion of the Standings and Promotions Committee, the student is unlikely to profit from further study in the Faculty or is not making satisfactory progress toward fulfilling degree requirements</td>
<td></td>
</tr>
</tbody>
</table>

* This requirement may be waived at the discretion of the student’s academic advisor.

...Table I – Degree Requirements

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Four-Year Honours Plans</th>
<th>Double Degree Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Co-op</td>
<td>Regular</td>
</tr>
<tr>
<td>Minimum course units (excluding PD courses and co-op work-term courses)</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Minimum co-op work-term course units</td>
<td>2.5*</td>
<td>0</td>
</tr>
<tr>
<td>Minimum PD course units</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Minimum work reports</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Minimum non-math units</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Minimum Cumulative Average (CAV)</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Minimum Major Average (MAV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• All AMATH and PMATH plans, including Mathematical Physics</td>
<td>65%</td>
<td></td>
</tr>
<tr>
<td>• ACTSC plans, including Mathematical Finance</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>• All other plans</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Maximum excluded/failed or excluded course units (excluding PD courses and co-op work-term courses)</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Maximum allowed units of course attempts (excluding PD courses and co-op work-term courses)**</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Minimum number of full-time terms</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>English Writing Skills</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The minimum co-op work term course units for the Chartered Accountancy and Teaching plans are 2.0.
**This requirement may be waived at the discretion of the student’s academic advisor.**

**Rationale:** Note that this change does not propose to change the minimum unusable course attempt rule, which states that students may not amass more than 5.0 units of unusable course attempts. Instead, this change proposes to remove the cap on the total number of courses attempted by a student, which currently serves mostly to frighten strong students into taking fewer courses.

**D. Academic Standing within the Faculty:** (to remove the requirement to require students to withdraw if their average is below the required minimum by too much or for too long)

This section specifies the rules that determine a student’s academic standing. A student’s standing determines whether a student is able to proceed in the Faculty or in his or her chosen plan, how many courses they are able to take in the next term, etc.

<table>
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<tr>
<td>• In the opinion of the Standings and Promotions Committee, the student is unlikely to profit from further study in the Faculty or is not making satisfactory progress toward fulfilling degree requirements</td>
<td></td>
</tr>
</tbody>
</table>

*This requirement may be waived at the discretion of the student’s academic advisor.*

**Rationale:** A significant number of students can recover from many consecutive terms of low marks to get to the point where they are getting consistent good marks in upper year courses. This suggests that it is unnecessarily punitive to require students to withdraw for low marks, even for several consecutive terms.

**E. Averages for Math students:** (to stop excluding courses from averages in several regulations)

… Notes:

1. All failed courses taken in the fall 2004 term or later are automatically excluded. Courses taken earlier than fall 2004, and courses with a grade of 60 or higher, cannot be excluded. Students must request voluntary exclusions within six months of the appearance of the grade in Quest.

2. A passed course may be repeated at most once unless an academic advisor has given prior approval. Failing grades less than 32 and grades of DNW (did not write exam), FTC (failure to complete), NMR (no mark reported), and WF (withdraw/failure) are counted as 32 for average-calculation purposes.

And, also under “Exceptions”:

For students near graduation: Any student who has more than 3.0 **failed** or excluded units, or more than 5.0 units of unusable course attempts, and has no more than 0.5 units remaining to satisfy degree requirements, may enrol in one additional term. The student will still qualify for an Honours degree if, at the end of that term, he/she:

• satisfies all degree requirements other than the failure or attempt limit
• has credit for at least 1.5 units in the additional term, and
- has no failed or excluded courses, WDs, or CLCs in that term

No student may take advantage of this provision more than once.

And, also under “Academic Enrollment Blocks”:

In some instances a student will be blocked from enrolling in classes. Any student with an enrolment block should speak to their academic advisor concerning their situation. A student will be blocked, regardless of their academic standing for the term, in the following circumstances:

- after the term in which a student reaches 2.0 failed or excluded units; and
- when the Writing Skills Requirement is not completed before enrolling in 2A

And, also in the “Degree Requirements Table” and its “Term Description:

Maximum excluded/failed or excluded course units (excluding PD courses and co-op work-term courses)

Excluded Course: A course taken between fall 2004 and spring 2013 either with a grade below 50, or a course that a student has voluntarily excluded. See section 2 in Faculty Policies.

And, also in the “Degree Requirements – Honours Fallback Provision”:

Students who satisfy all of the following conditions may elect to graduate with a three-year BMath General Regular degree:

1. Minimum of 15.0 total units passed
2. Minimum of 5.0 non-math units passed
3. Maximum of 25.0 units of course attempts
4. Maximum of 4.0 units failed or excluded
5. A minimum cumulative average (CAV) of 60%
6. Minimum 8.0 math units including the following courses passed

Rationale: In 2005, the faculty introduced the course exclusion rules in an attempt to improve student retention. In some sense, the rule changes were successful, in that students did indeed stay in the faculty longer, but graduation rates were unchanged. In the meantime, the exclusion rules have caused a great deal of work for faculty and staff across campus, and have created situations in which students with failures are treated more generously than students with low passing marks.

F. Degree Requirements: (to remove the CAV requirement of 60% for the “Honours Fallback Provision”)

Students who satisfy all of the following conditions may elect to graduate with a three-year BMath General Regular degree:

1. Minimum of 15.0 total units passed
2. Minimum of 5.0 non-math units passed
3. Maximum of 25.0 units of course attempts
4. Maximum of 4.0 units failed or excluded
5. A minimum cumulative average (CAV) of 60%
6. Minimum 8.0 math units including the following courses passed

Rationale: The proposed policy changes to allow students to continue with low averages may create situations in which a student has a persistently low average that allows him/her to continue but prevents him/her ever graduating. Removing the minimum CAV requirements from the Fallback Provision will allow the student at least to get a General degree.
FOR INFORMATION

Academic Program Review Reports

Classical Studies – See attachment #3.
School of Pharmacy – See attachment #4.

Academic Program Review Two Year Progress Reports

Economics – See attachment #5.
Social Development Studies – See attachment #6.

CURRICULAR MODIFICATIONS

Changes to academic plans, new courses, course changes and course inactivations were approved for the faculties of: applied health sciences (kinesiology); engineering (chemical engineering, civil engineering, complementary studies list, computer engineering and electrical engineering, environmental engineering option, management engineering, mechanical engineering, school of architecture, software engineering option, systems design engineering); engineering and mathematics (software engineering); environment (environment and business, environment and resource studies, environmental studies, geography and environmental management, international development, school of planning); mathematics (combinatorics and optimization, computer science, mathematical business, mathematical finance, mathematical optimization, statistics); and science (biology, pharmacy).

/kjj Geoff McBoyle
October 26, 2012 Associate Vice-President, Academic
Memo

To: Senate Undergraduate Council
From: Ken Lavigne, Registrar
CC: Carmen Roecker
    Charlene Schumm
Date: October 1, 2011
Re: 2013-2014 Calendar Dates

Attached are the proposed dates for 2013-2014.

1. The dates for all three terms meet the specifications in the guidelines.
2. In order to balance the number of Mondays in Spring term, I am recommending that a Monday schedule be used on Wednesday, July 30

Motion: That Council recommend Senate approval of these dates as presented.
### Academic Calendar Dates, 2013-2014

The following symbols and abbreviations are used throughout this table:

- **Days of the week:** (M) Monday, (T) Tuesday, (W) Wednesday, (Th) Thursday, (F) Friday, (S) Saturday, (U) Sunday
- **N/A – Not Applicable**

<table>
<thead>
<tr>
<th></th>
<th>Fall 2013</th>
<th>Winter 2014</th>
<th>Spring 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-operative Work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term Begins *</td>
<td>Aug. 26 (M)</td>
<td>Jan. 6 (M)</td>
<td>April 28 (M)</td>
</tr>
<tr>
<td>Lectures Begin</td>
<td>Sept. 9 (M)</td>
<td>Jan. 6 (M)</td>
<td>May 5 (M)</td>
</tr>
<tr>
<td>Reading Week</td>
<td>N/A</td>
<td>Feb. 17-21 (M-F)</td>
<td>N/A</td>
</tr>
<tr>
<td>Make-up Day</td>
<td>N/A</td>
<td>N/A</td>
<td>May 21 (W)</td>
</tr>
<tr>
<td></td>
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<td>Note: Monday schedule used.</td>
</tr>
<tr>
<td>Convocation</td>
<td>Oct. 25, 26 (F,S)</td>
<td>N/A</td>
<td>June 10-14 (T-S)</td>
</tr>
<tr>
<td>Lectures End</td>
<td>Dec. 2 (M)</td>
<td>Apr. 4 (F)</td>
<td>July 30 (W)</td>
</tr>
<tr>
<td>Pre-Examination Study Days</td>
<td>Dec. 3,4 (T,W)</td>
<td>Apr. 5-7 (S-M)</td>
<td>July 31- Aug. 4 (T-M)</td>
</tr>
<tr>
<td>On-Campus Examinations Begin</td>
<td>Dec. 5 (Th)</td>
<td>Apr. 8 (T)</td>
<td>Aug. 5 (T)</td>
</tr>
<tr>
<td>Online Class Examination Days</td>
<td>Dec. 6,7 (F,S)</td>
<td>Apr. 11,12 (F,S)</td>
<td>Aug. 8,9 (F,S)</td>
</tr>
<tr>
<td>On-Campus Examinations End</td>
<td>Dec. 20 (F)</td>
<td>Apr. 24 (Th)</td>
<td>Aug. 16 (S)</td>
</tr>
<tr>
<td>Co-operative Work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term Ends *</td>
<td>Dec. 20 (F)</td>
<td>Apr. 25 (F)</td>
<td>Aug. 22 (F)</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Pre examination study days</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Examination days</td>
<td>14</td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>

* Co-op work terms are expected to be 16 week in duration. Actual start and end dates may vary depending on employer or student requirements in consultation with CECA.
GUIDELINES FOR DETERMINING ACADEMIC CALENDAR DATES

The following are principles and guidelines either formally agreed upon by Senate or adopted as common practice in determining the dates for the academic year.

• That the practice of setting dates for each academic year continues to be an annual exercise.

• That there be no fewer than 12 examination days in the Fall and Winter Terms, and 11 examination days in the Spring Term

• That there be no fewer than 2 study days (excluding Saturday, Sunday and holidays) between the end of classes and the beginning of examinations and the university will attempt to schedule a maximum of 5 study days when possible (including Saturday, Sunday and holidays)

• That there be no fewer than 60 teaching days in a term. A clear rationale for fewer than 60 teaching days must be communicated to Senate at the time calendar dates are approved.

• That attention be given to balancing the number of meets in courses. Where an imbalance may occur because of holidays (eg, 11 Fridays and 13 Mondays), the last day of classes may use the class schedule for a different day in order to balance the number of meets across all courses.

• That Fall Term classes in September begin on the Monday following the Labour Day Holiday

• That in the Fall Term no examinations be scheduled beyond December 22

• That the start date for Winter Term be January 3 when that date falls on a Monday, Tuesday or Wednesday. Otherwise the start date is the first Monday following January 3. In the event of Monday, January 3 being a declared holiday the term would begin January 4.

• That the 5-day Winter Reading Week occurs in all Faculties and must begin on the third Monday in February in keeping with an informal agreement with Wilfrid Laurier University and University of Guelph

• The start date for Spring Term is normally May 1, 2 or 3 when these dates fall on a Monday, Tuesday, or Wednesday. Otherwise the start date is the first Monday following May 3

• In calculating teaching days in a term, Saturdays, Sundays and statutory or University holidays are excluded. In calculating examination days, Saturdays which fall within the period are included, whereas Sundays and statutory or university holidays are excluded. One exception to the above, approved by Undergraduate Operations Committee is that normally examinations will not be scheduled on the Saturday which follows Good Friday when that day falls within the examination schedule.

• Grades due dates for on-campus courses are normally scheduled seven days from the date of the final examination. Grades for courses without a scheduled final examination are normally due 14 days after the start of examinations. Grades for Distance Education courses are due on the last date of the grades submission period.

Prepared by:
K.A. Lavigne, Registrar
October 20, 2009 (replaces October 11, 2005)
Memo

To: Senate Undergraduate Council (For approval)
From: Nancy Weiner, Associate Registrar, Admissions
Date: October 9, 2012
Re: Undergraduate Admission Requirements for 2014

For your consideration and approval, the 2014 admission requirements:

1. **Change in the minimum published overall average:**

   Current:
   An overall average of 79% on the best six grade 12 courses including the required courses is normally the minimum for consideration.

   Revised:
   An overall average of 80% on the best six grade 12 courses including the required courses is normally the minimum for consideration.

   **Rationale:**
   The 80% reflects the minimum average to be used for admission in the fall 2014. The university has been increasing the published average by 1% every year until the minimum average of 80% is stated.

2. At this time, there are no changes for the Faculties of Applied Health Sciences, Arts, Engineering (including Software Engineering and Architecture), Environment, Mathematics (including Computer and Financial Management), or Science.

3. There are no changes on this chart for Optometry, Pharmacy, or Social Work.

If you have any questions, please do not hesitate to contact me at ext. 32265 or at nweiner@uwaterloo.ca.
Ontario Secondary School Applicants presenting the Ontario High School Curriculum

Ontario secondary school (OSS) students who will be completing the Ontario high school curriculum must present the Ontario Secondary School Diploma (OSSD) including a minimum of six grade 12 U or M courses. These courses must include all required courses as specified for each program.

<table>
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<td>including the required courses is normally the minimum for considerations. Higher averages are required for admission to programs in which the demand for places by qualified applicants exceeds the number of places available. The actual minimum averages required for these programs are determined each year on the basis of the number and qualifications of applicants and the number of available spaces.</td>
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In some programs, applicants may be considered for early conditional admission based on factors that include their grade 11 academic record, their grade 12 record to date, and other factors noted under "Other Documentation" in the chart.

The University reserves the right to withdraw conditional offers of admission if the applicant fails to meet the requirements specified above or any specific conditions stated on the offer of admission.
## Admission Requirements and Recommendations for Year One Programs 2014

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<td><strong>Undergraduate first-year entry programs</strong>&lt;br&gt;All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average.</td>
<td><strong>Undergraduate first-year entry programs</strong>: Courses listed are OSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. <strong>Programs requiring prior university studies</strong>: Requirements are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
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### Applied Health Sciences

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<td>Health Promotion&lt;br&gt;<strong>Regular and Co-op</strong></td>
<td>● Any Grade 12 U English&lt;br&gt;A final grade of at least 75% is normally required.  &lt;br&gt;● Additional U or M courses for a total of six.</td>
<td></td>
<td>Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
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<td>Health Studies&lt;br&gt;<strong>Regular and Co-op</strong></td>
<td>● Biology  &lt;br&gt;● Chemistry  &lt;br&gt;A final grade of at least 70% is normally required in each of the above required courses.  &lt;br&gt;● Additional U or M courses for a total of six</td>
<td>● Advanced Functions  &lt;br&gt;● English (ENG4U)  &lt;br&gt;For students considering the Pre-Health Professions  &lt;br&gt;Specialization:  &lt;br&gt;● Advanced Functions  &lt;br&gt;● English (ENG4U)  &lt;br&gt;● Physics</td>
<td>Special consideration is given on the basis of strength in Biology and Chemistry. Those not admitted to the co-op program are automatically considered for the corresponding regular program. The first co-op work term begins in Year Two.</td>
</tr>
<tr>
<td>**Kinesiology&lt;br&gt;**Regular and Co-op</td>
<td>● Advanced Functions  &lt;br&gt;● Chemistry  &lt;br&gt;● One of Biology or Physics  &lt;br&gt;A final grade of at least 70% is normally required in each of the above required courses.  &lt;br&gt;● Additional U or M courses for a total of six</td>
<td></td>
<td>Special consideration is given on the basis of strength in Advanced Functions, Chemistry, and Biology or Physics. Those not admitted to the co-op program are automatically considered for the corresponding regular program. The first co-op work term begins in Year Two.</td>
</tr>
<tr>
<td>**Recreation and Leisure Studies&lt;br&gt;**Regular and Co-op</td>
<td>● Any Grade 12 U English  &lt;br&gt;A final grade of at least 70% is normally required.  &lt;br&gt;● Additional U or M courses for a total of six</td>
<td>For all students: from Arts, Business Studies, Canadian and World Studies, Classical Studies, French as a Second Language, Interdisciplinary Studies, International Language, or Social Sciences and Humanities courses.  &lt;br&gt;For students considering the Therapeutic Recreation program:  &lt;br&gt;● Biology or Exercise Science  &lt;br&gt;For students considering the Recreation and Business program:  &lt;br&gt;● Grade 12 M Principles of Financial Accounting</td>
<td>Applicants should be aware that, although this is a social science program, courses in research methods and statistics are included in the curriculum. Writing skills are important. Involvement in extracurricular activities is an important factor in admission decisions. Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
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<td><strong>Arts (All Programs)</strong></td>
<td>Undergraduate first-year entry programs: All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Undergraduate first-year entry programs: Courses listed are OSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. Programs requiring prior university studies: Recommendations are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
<td>When the Admissions Committee considers an application individually, it bases its decision on the overall average, the English grade, and information provided on the Admission Information Form. If Grade 12 courses are repeated, the highest grade attained will be used for making admission decisions. Renison University College and St. Jerome's University have the same admission standards as the University.</td>
</tr>
<tr>
<td><strong>Honours Arts Regular</strong></td>
<td></td>
<td>For Social Science programs such as Anthropology; Economics; Political Science; Psychology; Sexuality, Marriage, and Family Studies; Social Development Studies; or Sociology: Mathematics of Data Management</td>
<td>Admission Information Form (AIF) is strongly recommended.</td>
<td>Entry to General or Honours major programs, including departmental co-op, occurs following Year One, and is based on academic performance in Year One in relevant courses in the prospective major. Honours Arts Regular is offered through the University of Waterloo, Renison University College, and St. Jerome’s University.</td>
</tr>
<tr>
<td><strong>Arts and Business Regular and Co-op</strong></td>
<td>In addition to the requirement for all Arts programs specified above, a final grade of at least 70% in any Grade 12 U English is required.</td>
<td>For Economics: Calculus and Vectors is also recommended; however, students may decide to take an introductory calculus course in first year to acquire additional background.</td>
<td></td>
<td>Selection of the Honours major which is to be combined with Arts and Business occurs following Year One and is based on academic performance in the prospective major in Year One. Honours Arts and Business is offered through the University of Waterloo, Renison University College, and St. Jerome’s University. Those not admitted to the Co-op program are automatically considered for the corresponding Regular program.</td>
</tr>
<tr>
<td><strong>Global Business and Digital Arts Regular</strong></td>
<td>In addition to the requirement for all Arts programs specified above, a final grade of at least 75% in any Grade 12 U English is required.</td>
<td>Mathematics of Data Management is strongly recommended</td>
<td>Admission Information Form (AIF) is strongly recommended.</td>
<td></td>
</tr>
<tr>
<td><strong>Social Development Studies Regular Renison University College</strong></td>
<td>In addition to the requirement for all Arts programs specified above, a final grade of at least 70% in any Grade 12 U English is required.</td>
<td>Mathematics of Data Management</td>
<td>Admission Information Form (AIF) is strongly recommended.</td>
<td>Those not admitted to Social Development Studies in Year One are automatically considered for Honours Arts Regular through Renison University College. Based on academic performance in Year One, admission to General or Honours Social Development Studies at the Year Two level is possible.</td>
</tr>
</tbody>
</table>
### Admission Requirements and Recommendations for Year One Programs 2014

#### Arts (Continued)

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<tr>
<th>Faculty/Program</th>
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| Accounting and Financial Management - Business and Finance Co-op | - Any Grade 12 U English. A final grade of at least 75% is required.  
- Advanced Functions  
- Calculus and Vectors A final grade of at least 70% is normally required in each of the math courses listed above.  
- Three other U or M courses | - Grade 12 M Principles of Financial Accounting  
- Grade 12 U Mathematics of Data Management | Admission Information Form (AIF) is required.  
Accounting and Financial Management Admissions Assignment. See notes section. | Applicants are selected to complete the Accounting and Financial Management Admissions Assignment (AFMAA) on the basis of grade 11 final marks and any interim or final grade 12 marks available at the time the AFMAA invite selection occurs. Those selected to complete the AFMAA are invited and expected to come to the University when the Assignment is scheduled. Arrangements will be made for applicants who cannot write the AFMAA on campus. Admission is based on secondary school or any post-secondary school achievement, the results of the AFMAA, and the Admission Information Form. |

#### Arts and Mathematics

<table>
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<tr>
<th>Faculty/Program</th>
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</table>
| Computing and Financial Management Co-op | - Advanced Functions  
- Calculus and Vectors  
- Any Grade 12 U English. A final grade of at least 75% is required.  
- One other Grade 12 U course  
- Two other U or M courses | - Grade 11 U Introduction to Computer Science  
- Grade 12 M Principles of Financial Accounting | Admission Information Form (AIF), which includes a teacher reference, is strongly recommended. All applicants are encouraged to write the Euclid Mathematics Contest. Applicants not currently attending an Ontario Secondary School are strongly advised to write the Euclid contest to demonstrate that they have sufficient mathematical background. The Canadian Computing Competition is recommended. | In addition to a strong academic background, other factors considered in the admission process include performance in contests such as the Euclid Mathematics Contest and the Canadian Computing Competition, the number and variety of courses taken, involvement in extracurricular activities in the school and/or the community, and teacher recommendations. Those not offered admission to Computing and Financial Management may be considered for alternative programs in the Faculty of Mathematics. |
### Admission Requirements and Recommendations for Year One Programs 2014

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<td>Programs requiring prior university studies: Requirements are as listed.</td>
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#### Engineering (Co-op)

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<tr>
<th>Architecture Co-op</th>
<th>English (ENG4U). A final grade of at least 75% is normally required.</th>
<th>Grade 11 or 12 M Art courses</th>
<th>Interview</th>
<th>Applicants are selected for the interview on the basis of grade 11 marks and any interim or final OSS grade 12 marks available at the time interview selection occurs. Those selected for an interview are expected to come to the University. Admission is based on the results of the interview, the portfolio, the English précis-writing exercise, and secondary school achievement.</th>
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<td>Advanced Functions</td>
<td>Advanced Functions Calculus and Vectors Physics A final grade of at least 70% is normally required in each of these courses. Two other U or M courses</td>
<td>Creative and cultural studies such as visual arts and history</td>
<td>English précis-writing exercise</td>
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<td>Chemistry</td>
<td>English (ENG4U)</td>
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<td>Portfolio</td>
<td>In addition to a strong academic background, other factors which will be considered in the admissions process include involvement in extracurricular activities in school and/or in the community; evidence of an interest in engineering; and strong performance in mathematics, science, or engineering-related competitions. Those not offered admission to their first-choice program may be considered for other engineering programs that they specify on the Admission Information Form.</td>
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<td>Electrical Engineering</td>
<td>Advanced Functions Calculus and Vectors Chemistry English (ENG4U) Physics A final grade of at least 70% is normally required in each of these courses. One other U or M course</td>
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<td>In addition to a strong academic background, other factors which will be considered in the admissions process include involvement in extracurricular activities in school and/or in the community; evidence of an interest in software engineering, additional OSS Grade 12 courses; and participation in mathematics, science, engineering, or programming competitions. All applicants are encouraged to write the Euclid Mathematics Contest. Those not offered admission to Software Engineering may be considered for alternate engineering programs or for computer science; applicants specify their preferences for alternate programs on their Admission Information Form.</td>
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<td>Environment and Business Co-op</td>
<td>● Any Grade 12 U English. A final grade of at least 70% is normally required. ● Five other U or M courses</td>
<td>● One Grade 12 U Mathematics ● One Grade 12 U Science ● Grade 12 M Principles of Financial Accounting ● Analysing Current Economics Issues (where offered)</td>
<td>Admission Information Form (AIF)</td>
<td>Those not admitted to Honours Environment and Business Co-op are automatically considered for Honours Geography and Environmental Management. The first co-op work term begins in Year Two.</td>
</tr>
<tr>
<td>Environment and Resource Studies Regular and Co-op</td>
<td>● Any Grade 12 U English. A final grade of at least 70% is normally required. ● Five other U or M courses</td>
<td>At least one Grade 12 U or M course from each of ● Canadian and World Studies or Social Sciences and Humanities or the Arts ● Mathematics or Science</td>
<td>Admission Information Form (AIF)</td>
<td>In accordance with the trans-disciplinary nature of ERS, we value flexibility and breadth of learning and experience. Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
</tr>
<tr>
<td>Geography and Aviation Regular</td>
<td>● Any Grade 12 U English. A final grade of at least 70% is normally required. ● A Grade 12 U Mathematics. A final grade of at least 70% is required. ● Four other U or M courses</td>
<td>● One or more Grade 12 U or M Geography courses are strongly recommended. ● A second Grade 12 U Mathematics ● Earth and Space Science</td>
<td>Admission Information Form (AIF) Program Briefing Session Transport Canada Category 1 Medical Certification</td>
<td>Those not admitted to Honours Geography and Aviation are automatically considered for Honours Geomatics Regular.</td>
</tr>
<tr>
<td>Geography and Environmental Management Regular and Co-op</td>
<td>● Any Grade 12 U English. A final grade of at least 70% is normally required. ● Five other U or M courses</td>
<td>● One or more Grade 12 U or M Geography courses are strongly recommended. ● A Grade 12 U Mathematics ● Earth and Space Science</td>
<td>Admission Information Form (AIF)</td>
<td>Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
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#### Environment (cont’d)

<table>
<thead>
<tr>
<th>Geomatics Regular and Co-op</th>
<th>▪ Any Grade 12 U English. A final grade of at least 70% is normally required.&lt;br▪ A Grade 12 U Mathematics. A final grade of at least 70% is required.&lt;br▪ Four other U or M courses</th>
<th>▪ A second Grade 12 U Mathematics&lt;br▪ Grade 11 U Introduction to Computer Science is highly recommended.&lt;br▪ Grade 12 U Computer Science would be an asset.</th>
<th>Admission Information Form (AIF)</th>
<th>Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Development Regular</td>
<td>▪ Any Grade 12 U English. A final grade of at least 70% is normally required.&lt;br▪ At least one Grade 12 U Science or Mathematics course. A final grade of at least 70% is normally required.&lt;br▪ Four other U or M courses</td>
<td>▪ At least one Grade 12 U course in a second language</td>
<td>Admission Information Form (AIF) is required.</td>
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<tr>
<td>Knowledge Integration Regular</td>
<td>▪ Any Grade 12 U English. A final grade of at least 75% is normally required.&lt;br▪ Any Grade 12 U Science. A final grade of at least 75% is normally required.&lt;br▪ Any Grade 12 U Mathematics. A final grade of at least 75% normally required.&lt;br▪ Three other U or M courses</td>
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<td>Admission Information Form (AIF) is required.</td>
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<tr>
<td>Planning Co-op</td>
<td>▪ Any Grade 12 U English. A final grade of at least 75% is required.&lt;br▪ Five other U or M courses&lt;br▪ Grade 12 U or M courses from the following: Canadian and World Studies Mathematics Science, preferably Biology or Earth and Space Science</td>
<td></td>
<td>Admission Information Form (AIF)</td>
<td>The first co-op work term begins in Year Two.</td>
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<td>Programs requiring prior university studies:</td>
<td>Requirements are as listed.</td>
<td>Programs requiring prior university studies: Recommendations are as listed.</td>
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#### Mathematics

- **Computer Science**
  - Regular and Co-op Mathematics
  - Regular and Co-op Mathematics/Chartered Accountancy
  - Co-op Mathematics/Chartered Accountancy
  - Administration
  - Regular and Co-op Mathematics/Financial Analysis and Risk Management
  - Regular and Co-op Business Administration
  - Double Degree Co-op Business Administration
  - Computer Science Double Degree Co-op

- **Bioinformatics**
  - Regular and Co-op Bioinformatics

- **Advanced Functions**

- **Calculus and Vectors**

- **Any Grade 12 U**

- **English**

- **One other Grade 12 U**

- **Two other U or M courses.**

Applicants to all programs in Mathematics:

- **Grade 11 U Introduction to Computer Science**

Applicants to Mathematics/Chartered Accountancy:

- **Grade 12 M Principles of Financial Accounting**


For all other programs, the AIF is strongly recommended, especially for co-op programs.

All applicants are encouraged to write the Euclid Mathematics Contest. Applicants not currently attending an Ontario Secondary School are strongly advised to write the Euclid Contest to demonstrate that they have sufficient mathematical background.

For those applying to Bioinformatics, Computer Science, Business Administration and Computer Science Double Degree, the Canadian Computing Competition is recommended.

All Mathematics programs are offered through the University of Waterloo and St. Jerome’s University. The decision to register at St. Jerome’s occurs after admission.

In addition to a strong academic background, other factors considered in the admissions process include performance in contests such as the Euclid Mathematics Contest and the Canadian Computing Competition, the number and variety of courses taken, involvement in extracurricular activities in the school and/or the community, and teacher recommendations.

Those not offered admission to their first choice program will be considered for other Mathematics programs.

The Faculty administers the English Language for Academic Studies program for those with exceptional mathematics skills who do not meet normal English language requirements.

Admission to the Mathematics/Teaching Co-op program occurs in Year Two after successful completion of Year One in either Honours Co-op Computer Science or Honours Co-op Mathematics.

Honours Business Administration and Mathematics Co-op is a double degree program offered jointly by Wilfrid Laurier University and Waterloo leading to BBA and BMath degrees.

Honours Business Administration and Computer Science Co-op is a double degree program offered jointly by Wilfrid Laurier University and Waterloo leading to BBA and BCS degrees.
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<tr>
<td><strong>Science</strong></td>
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<tr>
<td>Biotechnology/ Chartered Accountancy</td>
<td>Six Grade 12 U or M courses including</td>
<td>• Biology</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
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<tr>
<td>Co-op</td>
<td></td>
<td>• Chemistry</td>
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<td></td>
<td></td>
<td>• Grade 12 M Principles of Financial Accounting</td>
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<tr>
<td>Biotechnology/ Economics Co-op</td>
<td></td>
<td>• Biology</td>
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<tr>
<td></td>
<td></td>
<td>• Chemistry</td>
<td></td>
<td></td>
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<tr>
<td>Honours Science Regular</td>
<td>Any Grade 12 U English.</td>
<td>• Biology</td>
<td>Admission Information Form (AIF) is strongly recommended.</td>
<td>Where an entry program is available in both co-op and regular, those not admitted to co-op are automatically considered for the corresponding regular program.</td>
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<tr>
<td></td>
<td>Advanced Functions</td>
<td>• Chemistry</td>
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<td></td>
<td>Calculus and Vectors</td>
<td>• Earth and Space Science</td>
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<tr>
<td>Environmental Science Regular and Co-op</td>
<td>A final grade of at least 70% is normally required in each of these courses.</td>
<td>• Chemistry</td>
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<td></td>
<td>• Earth and Space Science</td>
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<td></td>
<td></td>
<td>• Physics</td>
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<tr>
<td>Life Sciences Regular and Co-op</td>
<td>Two of</td>
<td>• Biology</td>
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<td></td>
<td>• Biology</td>
<td>• Chemistry</td>
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<td></td>
<td>• Chemistry</td>
<td>• Earth and Space Science</td>
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<td>• Earth and Space Science</td>
<td>• Physics</td>
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<td></td>
<td>• Mathematics of Data Management</td>
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<td>Physical Sciences Regular and Co-op</td>
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<td>• Chemistry</td>
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<td></td>
<td>• Chemistry</td>
<td>• Earth and Space Science</td>
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<td></td>
<td>• Earth and Space Science</td>
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<td></td>
<td>• Mathematics of Data Management</td>
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<tr>
<td>Science and Aviation Regular</td>
<td>One additional U or M course.</td>
<td>• Chemistry</td>
<td></td>
<td>The first co-op work term begins in Year Two for all Faculty of Science students.</td>
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<tr>
<td></td>
<td></td>
<td>• Earth and Space Science</td>
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<td></td>
<td></td>
<td>• Physics</td>
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<tr>
<td>Science and Business Regular and Co-op (All specializations)</td>
<td></td>
<td>• Chemistry</td>
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<tr>
<td></td>
<td></td>
<td>• Grade 12 M International Business Fundamentals</td>
<td></td>
<td>Please refer to the School of Optometry website regarding required and recommended university-level courses.</td>
</tr>
<tr>
<td>Optometry Regular</td>
<td>Successful completion of at least three full years of university-level science with specific course requirements.</td>
<td>• Optometry Admissions Test (OAT)</td>
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<td></td>
<td></td>
<td>• Autobiographical Sketch</td>
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<td>• Essay</td>
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<td>• Optometrist and Academic References</td>
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## Pharmacy Co-op

**Pharmacy Co-op**

- Successful completion of at least two full years of university-level science with specific course requirements.

- • Pharmacy Admission Profile
  • Letter of Reference Form
  • Interview
  • Reading Comprehension/Writing Test

- Please refer to the School of Pharmacy website regarding admission averages and required university-level courses.
- Secondary School applicants applying to Honours Science or Honours Life Sciences may also be considered for conditional admission to Pharmacy. Refer to School of Pharmacy website regarding requirements.

## Independent Studies

### Independent Studies Regular (Upper year entry only)

- Successful completion of at least one full year of university undergraduate with an overall university average of C (65%) or a minimum two years of community college studies with an overall average of B (75%) and a minimum of 70% in Grade 12 U English (or equivalent) is required.

- Autobiographical Letter
  - Interview
  - Letters of Reference

- Applicants should be capable of doing university-level work on their own and should be planning studies that can be done at the University of Waterloo.

## Social Work

### Social Work - Regular Renison University College

- Successful completion of either a three-year or a four-year undergraduate university degree with a B average and at least 6.0 units in the social sciences, including 10 specified courses from the Renison curriculum or their equivalents.

- Letter of reference and personal statement which demonstrates sufficient practical experience and personal suitability are required.

- Please refer to the Social Work website regarding required university-level courses.
CLASSICAL STUDIES

Review Process

This was the third formal review of the undergraduate program of the Department of Classical Studies. The most recent review was in 2003. The self-study for this review was submitted 30 June, 2011; the site visit occurred 26 and 27 January, 2012; the review team report was submitted 8 February, 2012; and the Department’s and Dean’s responses were received 18 July, 2012. The self-study was a group effort involving students, alumni, faculty members and the one staff person.

Characteristics of the Program

Historical Overview

The Department of Classical Studies was created in 1975, when the Department of Classical and Romance Languages was separated into its constituent parts.

Although the 2003 review was very positive it did identify some concerns; such as the heavy teaching loads; the attrition from first-year language courses; the need to strengthen the Greek program; the need to consider pulling out of distance education or finding additional resources; and the need to explore more co-op opportunities or at least encourage experiential learning.

The Department pulled out of offering a degree by distance education but is now embracing the idea of offering its mythology course online as part of a degree. The Department has involved students in working opportunities in Classics by: offering teaching assistantships (TAs); working on faculty members’ projects; promoting internships with the Canadian Institute in Greece; and offering the Classical Studies Abroad course.

The Department has increased from 5.5 faculty members in 2003 to 7 at the time of the review.

The Department has worked closely with its counterpart at Wilfrid Laurier University (WLU) for many years but in the past two years the Classics faculty complement at WLU has dropped dramatically with the result that WLU is no longer able to support teaching senior undergraduate language courses. This teaching now has to be done by faculty members in the Department of Classical Studies at the University of Waterloo (UW), further increasing the work load.

The Department also manages the Medieval Studies program and a faculty member in the Department of Classical Studies is co-director of this program.

Program Objectives

The Department of Classical Studies defines its mission in the following ways:

In teaching – The Department strives to acquaint students with the historical forces, various philosophical contributions, aesthetic values in art and literature, ancient languages and social habits of the ancient Greeks and Romans as well as the other people with whom they interacted. The Department also seeks to educate students who will question, challenge and actively participate in the ongoing dialogue of social progress, and who will become engaged citizens in the fullest sense of the word.

In scholarship – the Department seeks to make scholarly contributions to contemporary- and future-centered discussions of culture and society by bringing the ancient paradigms to bear on the present.

The Department’s programs and courses are reasonably aligned with the OCAV UDLEs. However, certain gaps and areas have been identified to enhance students’ skills, viz. more team projects; more oral presentations; a greater understanding of methodologies; and the application of knowledge. The Department has started to address these and others through more interdisciplinary and team-taught
courses; a Hellenistic specialization at the undergraduate level; and the development of an online course at the senior level.

**Academic Plans Offered**

- General Three-year BA degree in Classical Studies;
- General Four-year BA degree in Classical Studies;
- Honours Four-year BA degree in Classical Studies;
- Honours Four-year BA degree in Classical Studies (Languages Specialization);
- Honours Four-year BA degree in Classical Studies (Arts and Business, co-op or regular);
- Joint Honours BA degree in Classical Studies with Department X;
- Minor in Classical Studies;
- Minor in Greek;
- Minor in Latin;
- Certificate in Classical Studies;
- Certificate in Classical Languages.

**Faculty**

Departments of Classical Studies in Canada average 6.3 faculty members although Toronto, the largest, has 22 faculty members. At the time of the program review the Department at UW had 7 full-time Associate Professors. None of these individuals will be retiring for at least a decade. In addition, there were 4 adjunct lecturers who teach most of the large first- and second-year courses e.g. CLAS 103 with 84 students; CLAS 104 with 219 students; CLAS 201 with 221 students; CLAS 202 with 216 students.

Regular faculty members all teach extensively in the undergraduate program, with a teaching load of 5 courses, and the Department’s research and publication record is commensurate with this relatively heavy teaching load. Reduction of the teaching load to 4 courses would further facilitate faculty research and publication, and support more sustained exploration of external funding opportunities. Nonetheless, the reviewers emphasize that the scholarly profile of the Department is perfectly respectable in all areas of research endeavour.

The Department’s annual teaching load of 5 courses for regular faculty members, while sufficient for the delivery of the undergraduate (and current MA) programs, is higher than normal in the Faculty of Arts at UW and warrants reconsideration in the light of a number of factors: WLU’s withdrawal from the joint MA program (effective fall 2012); the (UW) Department’s new commitment to offer a stand-alone MA program; and WLU’s capacity and commitment, given their recent retirements, to continue the institutions’ shared delivery of upper-level language teaching. If the memorandum of agreement with WLU is to be maintained, decanal support at both institutions will be crucial; in this context, it may also be possible to consolidate second-year language offerings across the 2 institutions, at least in ancient Greek. Further consolidation of courses at the first-year level in the CLAS curriculum and in the upper years of language study would enable professorial faculty to reduce their annual teaching load to 4 courses without decreasing student numbers or diminishing curricular focus. A reduction in the teaching load would also enable faculty members to devote more time to research and publication, in recognition of the increased demands and responsibilities of their new roles as graduate instructors in the MA program and research associates in the Waterloo Institute for Hellenistic Studies (WIHS).

In 2010/11, there were over 2,000 student enrolments in CLAS/LAT (Latin)/GRK (Greek) undergraduate courses. Of these students 1,000 to 1,200 were from Departments outside of Classical Studies in the Faculty of Arts, and a further 300 to 400 were from other Faculties in the University. The most popular courses were the ancient society survey courses and the mythology course.

Faculty members in the Department are considered good teachers. In fact the reviewers noted that “The Classics program has identified fuelling students’ enthusiasm for the history and culture of the ancient
and medieval world as a major priority.” The student course evaluations are higher than those in the Faculty of Arts as a whole. The average ratings for Classical Studies’ courses are in the 4.35 to 4.49 range out of a possible value of 5.

The Department’s research profile includes scholars of political, intellectual and social history, literature, language and material culture. Since 2003 faculty members in the Department have received 20 grants totaling $257,000 in research funding from agencies such as SSHRC, the Alexander von Humboldt Foundation and the Onassis Foundation University seminar program. Faculty members have produced 4 monographs, 42 refereed articles and book chapters, 39 encyclopedia articles and book reviews, and 82 conference presentations.

Faculty members have acted as executive officers or board members of the Classical Association of Mid-West and South; Canadian Institute in Greece; Canadian Society of Medievalists; Ontario Classical Association, Societas Magica. In addition they have reviewed articles for many academic journals and for publishing houses.

The implementation of a new MA program 3 years ago (originally joint with WLU, but from 2012 a stand-alone program at UW) and the nearly simultaneous establishment of the WIHS have enhanced the quality of the undergraduate program in Classical Studies in a variety of ways. The WIHS library collection is available for undergraduate use in a newly renovated study space that is also well used by students. WIHS also sponsors lectures, conferences, and other events that have increased undergraduate exposure to, and participation in, scholarly research in classical studies. In addition, the new student and faculty exchanges that WIHS has begun to sponsor, through its partnerships with Edinburgh and Exeter, promise to enhance significantly the academic opportunities available to undergraduates in terms of both student experience and internationalization of the curriculum.

The Department participates in a host of advancement and outreach activities, e.g., through the co-op program, the distance learning program, and the WIHS, in addition to individual faculty members’ own commitments. However, their proliferation comes at the cost of considerable time to faculty members’ teaching and research commitments. In view of the importance of advancement to the support of the WIHS, and the Institute’s enhancement of the Department’s undergraduate and graduate teaching and research missions, it may be prudent for faculty members to focus their outreach activities on the Institute.

The students with whom the reviewers met were very enthusiastic about the undergraduate program as well as the teaching abilities of the faculty members and did not suggest any modifications. It is the impression of the reviewers that faculty members are deeply involved in student learning and strongly committed to teaching, which reflects very well on the quality and engagement of the students.

Students

Over the period, 2004/05 to 2010/11 inclusive, the annual average number of majors enrolled in the Department of Classical Studies was 134, ranging from a low of 113 in 2008/09 to a high of 160 in 2006/07. Only a handful of these were Arts and Business students.

The annual number of students choosing Classical Studies after their first year in the Faculty of Arts averaged 10 over the period 2004/05 to 2010/11, 6 in Honours and 4 in General. The number of Honours students reached a high of 10 in 2006/07 and a low of 4 in 2007/08 and 2008/09. Most of the students who entered Classical Studies in year two entered University from high school with grades in the 80 to 85% range, although prior to 2007/08 some students were admitted with grades below 75%.

The number of co-op students in Arts and Business in the Department of Classical Studies has increased from 3 to 6 in the last 7 years. Even with these small numbers course scheduling is difficult.
The Department specifically expressed the wish to increase the number of students pursuing co-op, but also acknowledges the problems this would create for the faculty members, who would increasingly need to teach second-year language courses on overload. Currently, the number of students taking this option is 6, a number that works well. The review team sees the merit of such a program, but also sees the challenges for making it work for both students and faculty members, if the number of students in the program increases.

Discussion with undergraduate majors suggests that there is considerably less support for the co-op program among students than in the Faculty and Department. They were concerned that the co-op stream was diverting resources from their classical studies, and several of them expressed the view that the co-op stream should be closed. Administrators in both the co-op program and in the Department, however, regard the co-op program as a success: Classical Studies students who have completed the program in Arts and Business have done well, while participation in the co-op program assists the Department in undergraduate recruitment.

The curriculum in the Department of Classics underwent a significant modification a few years ago and both faculty members and students are happy with the outcome of this change. The students interviewed, however, expressed a concern regarding the variety of courses available in the upper-level CLAS, LAT and GRK curricula. They feel that a potential change of a 5-course teaching load to a 4-course teaching load for faculty members would negatively affect the variety of topics taught at the 300- and 400-levels. While acknowledging this concern, the review committee is of the opinion that in order to relieve the burden of teaching for faculty members the Department could combine more 300- and 400-level courses with courses taught on the graduate level, without negatively affecting the learning outcomes for students.

In the self-study, the Department expressed a desire to further develop distance learning, especially in order to enlarge the number of majors, but also noted that it could only do so if additional resources were made available. The review committee endorses this point of view but values this priority lower than others, such as the sustainability of the MA program, now that WLU has withdrawn its support of that program, and the proposed move towards a 4-course teaching load.

The review committee supports the continued cooperation with WLU on the undergraduate level, most notably regarding the teaching of GRK 202W. It acknowledges that decanal support to sustain this cooperation will be crucial for the integrity of the curriculum, especially in view of the proposed move to a 4-course teaching load.

Class sizes vary from 100 to over 200 in first year to less than 10 in many third- and fourth- year courses.

Over the period, 2003 to 2010 inclusive, the annual per cent of Classical Studies’ students on the Dean’s Honour Roll was 31%, ranging from a low of 8.3% in 2004 to a high of 50% in 2010.

Funds are shrinking for student bursaries to travel to the annual international conference in medieval studies at Kalamazoo, MI and to the Mediterranean to participate in CLAS 390, a capstone course the Department offers triennially. Support for these travel and course opportunities should be a priority for funding from the Faculty and Central Administration, as they enhance the student experience profoundly, especially in the areas of experiential learning and internationalization of the curriculum.

A Classical Studies’ degree is very versatile and equips graduates for careers in a wide variety of professions – skills imparted include oral and written communication, critical thinking, analyzing, problem solving and the ability to apply these skills to new domains outside the discipline. Many graduates proceeded to graduate school in areas as diverse as Classical Studies, Library and Information Science, Rural Planning and Archaeology. The students would appreciate it if the Department could bring in alumni to discuss job opportunities with them. The Department is also considering career counseling for their students, which is to be commended, but the review committee feels that it would put another strain on the Department’s already limited resources.
Surveys of alumni and current students, as well as student focus groups, indicated that students and alumni were satisfied with the Classical Studies Department.

Students indicated that their experience at UW had assisted them in:

- acquiring a broad general education;
- writing clearly and effectively;
- analyzing problems; learning effectively on their own;
- thinking critically and analytically;
- understanding themselves.

However, improvements that students would like to see are:

- more variety of upper-year courses;
- integrating courses better;
- integrating research into courses;
- reducing scheduling constraints;
- increasing opportunities to work effectively with others;
- experiencing the opportunity to be involved in more oral projects and presentations;
- making the connection with the real world.

**Concerns and Opportunities for Improvement**

In summary, the reviewers recommend the following:

**Recommendation 1:** The Department should move towards the implementation of a 4-course teaching load for full-time professorial-stream faculty, through:

a. consolidation of course offerings in the CLAS 1xx stream, with
   i. the cancellation of CLAS 103, and
   ii. a reduction in the annual number of offerings of CLAS 104;

b. more sustained use of adjunct faculty to staff multiple sections of LAT 101/102;

c. renewed commitment to the Memorandum of Understanding already in place between the UW Department and the WLU Department of Archaeology and Classics, to facilitate the joint offering of courses in the upper-level language programs;

d. exploration of the possibility of UW/WLU jointly offering GRK 201/202; and

e. consolidation of upper-level and MA language course offerings (i.e., beyond the consolidation of GRK/LAT 3**/4** and GRK/LAT 4**/6**, into GRK/LAT 388/4**/6**), commensurate with provincially-mandated standards of graduate instruction.

**Response:** Overall, the members of the Department are in favour of a reduced teaching load, but with the important caveat that we do not want to compromise the quality of either the undergraduate or the graduate education that the Department offers. That said, we are certainly open to suggestions about how to reduce our regular teaching load down to 4 courses.

One means of doing so, which we ourselves had identified (the reviewers did not address this), is through reducing the number of 300-level courses we offer. We have in the past offered too many CLAS 3xx in
the same term, with the result that we split the audience and end up with low enrollments across all the 3xx courses. In future, we will be careful not to do so. We may also be able to coordinate with WLU on this front, allowing both institutions to reduce their 3xx offerings and at the same time maintain healthy enrollments in these courses.

The cancellation of CLAS 103. We are open to this suggestion, especially as CLAS 103 this past Winter term (2012) had lower than usual enrollments (84 out of a cap of 104 – not horrendously low, but usually the course fills to capacity). We would like to run it again in the coming year to see whether this year’s enrollment was an anomaly (and was perhaps affected by the concurrent offering of CLAS 104: see next point). If enrollments continue to be weak, we will consider withdrawing this course.

A reduction in the annual number of offerings of CLAS 104. This we will certainly do. CLAS 104 draws the student interest – it is an extremely popular course and generally fills to its limit of about 350 – and we are particularly keen to maintain some degree of commitment to the kind of service teaching represented by this course. Nevertheless, we do not need to run it in every term.

More sustained use of adjunct faculty to staff multiple sections of LAT101/102. This we have been doing and will continue to do. We need to balance such a measure against other factors: (i) the availability of sessional monies to cover the offering of courses by adjunct instructors; and (ii) the need for quality control. Some of our core faculty members are superb instructors of first-year Latin, and while we have one adjunct faculty member who is also a very good language instructor, it would be counter-productive to take our excellent Latin teachers out of the first-year classroom. These faculty members have taught students who have gone on to graduate work at places like Oxford and Harvard, and we are regularly told by the University of Toronto that our students who go there for graduate work are particularly well prepared in the languages. We are moreover committed in principle to the notion that first-year students should have the experience of being taught by regular faculty members.

Renewed commitment to the Memorandum of Understanding already in place between the UW Department and the WLU Department of Archaeology & Classics, to facilitate the joint offering of courses in the upper-level language programs. Discussions have begun with both WLU and Guelph to make the language offerings sustainable for students at all three institutions. It is important to note that WLU does not require languages for its program in Ancient Mediterranean Cultures (it no longer has a Classics program per se), though it does have an ancient language option; Guelph still requires languages for an Honours degree in Classical Studies. We would like to explore the possibility of electronic classrooms as a method of language delivery for the upper-year courses. UW representatives have already met with Dean Carroll of WLU and a WLU faculty member to discuss the possibility of further sharing of resources. For the future, provided it does not suffer any more dramatic financial problems that would necessitate a re-negotiation, WLU is prepared to offer GRK 202 and a GRK 4xx/6xx every second year. Both institutions are now investigating ways of sharing certain CLAS courses as well.

Exploration of the possibility of UW/WLU jointly offering GRK201/202. Please see previous point.

Consolidation of upper-level and MA language course offerings (i.e., beyond the consolidation of GRK/LAT 3xx/4xx and GRK/LAT 4xx/6xx, into GRK/LAT 3xx/4xx/6xx), commensurate with provincially-mandated standards of graduate instruction. Members of the Department expressed concerns about trying to teach languages simultaneously to graduate students and to students who have only completed their second year in the language. We were assured by one of the reviewers that the University of Toronto follows this approach and has found it to be successful. Although we still have doubts about this, we are not against making the experiment; but it should be noted that our current scheduling of languages (undergraduate and graduate) already maximizes efficiency (i.e., there would be no further gains from employing the 3xx/4xx/6xx combination).
**Recommendation 2:** Department members should consolidate their outreach activities to support the advancement initiatives sponsored by the WIHS.

*Response:* This is something we are already doing: in the winter term of 2012, for example, the Institute offered a “course” in the Hellenistic World to the Third Age Learning group (average attendance 300). We do intend to continue our commitment to activities that support our research and teaching mission (for example, engaging in high school recruitment through inviting high school classes onto the campus). These activities do not constitute a drain on our resources.

**Recommendation 3:** The Faculty should provide significant new funds in the form of student bursaries to support the Department’s ongoing commitment to the enhancement of student experience and the internationalization of its curriculum both through curricular offerings, e.g., in CLAS 390, and through extracurricular activities, e.g., participation in the International Congress on Medieval Studies held annually at Kalamazoo, MI.

*Response:* The Faculty of Arts is currently in the process of creating a strategic plan. One of the priorities of this plan is student experience and travel, and we hope that Classics students along with other Arts students will have enhanced opportunities for international experiences.

**Recommendation 4:** The Faculty and Central Administration should support the program commitments and research aspirations of the Department by authorizing at least one new faculty appointment. The top priority is in the area of material culture (ancient art and archaeology).

*Response:* As part of its strategic planning process, the Faculty of Arts is undertaking a complement review. We hope that one of the results of such a review could be an incremental position for the Classical Studies Department. We feel that such an investment would be particularly worthwhile in assisting Classics at UW in its continuing mission to be a Canadian and international leader in the area of Hellenistic Studies.

In the interim, we are already exploring the possibility of creating a continuing lecturer position as one way of reducing the teaching load for regular faculty members. We plan to advertise a definite-term position for 2013/14 as an initial step towards the identification of an individual who would be suitable for a position as a continuing lecturer.

**Recommendation 5:** The University should expand the space available to the Department and its associated Institute when the new Arts Building is built, either by expanding the Department’s space allocation in its current site or by moving the Department into the new Arts Building.

*Response:* A space plan is also part of the Arts strategic planning process. We are confident that increased space for the Department and for the Institute will be found when the new Arts building is built.
### Summary of Implementation Responsibilities and Timelines:

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Primary Recommendation</th>
<th>Secondary Recommendation</th>
<th>Responsibility</th>
<th>Resources Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013/14</td>
<td>4-course teaching load for all regular faculty members.</td>
<td>Consolidation of course offerings.</td>
<td>Chair/Dean</td>
<td>Funding for additional position and/or sessional monies.</td>
</tr>
<tr>
<td>2013/14</td>
<td></td>
<td>Reduction in annual offerings of CLAS 104.</td>
<td>Chair</td>
<td></td>
</tr>
<tr>
<td>2012/13</td>
<td></td>
<td>Use of adjunct faculty for LAT 101/102.*</td>
<td>Chair</td>
<td>Funding for additional position and/or sessional monies.</td>
</tr>
<tr>
<td>Ongoing</td>
<td></td>
<td>Renewed cooperation with WLU in language offerings.*</td>
<td>Chair/Dean</td>
<td></td>
</tr>
<tr>
<td>2012/13</td>
<td></td>
<td>Consolidation of UG and G language offerings (3xx/4xx/6xx).*</td>
<td>Ongoing</td>
<td></td>
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<tr>
<td>NA</td>
<td></td>
<td>Consolidate outreach activities to support WIHS.</td>
<td>Ongoing</td>
<td></td>
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<tr>
<td>2012-2015</td>
<td>Enhance financial support for student experience, esp. international.</td>
<td>Chair/Dean/ Director, Arts Advancement</td>
<td>Chair/Dean/ Director, Arts Advancement</td>
<td>Faculty- and/or University-level bursary funding; fund-raising for creation of Departmental bursary fund.</td>
</tr>
<tr>
<td>Unknown</td>
<td>One new regular faculty appointment.</td>
<td></td>
<td>Dean/Provost</td>
<td>Funding for additional position. In the interim, we are exploring ways to create a continuing lecturer position (beginning 2012/13).</td>
</tr>
<tr>
<td>Unknown</td>
<td>Expand space available to Department and to WIHS.</td>
<td></td>
<td>Dean</td>
<td>Costs associated with new Arts building.</td>
</tr>
</tbody>
</table>

*Indicates recommendations (whether primary or secondary) that may not be feasible or fully feasible for reasons given above.
SCHOOL OF PHARMACY

Review Process

This was the first formal review of the undergraduate program of the School of Pharmacy. The School was founded in 2004. The School has now completed its first complete four-year academic cycle, with students in all four years of the program and is looking forward to the graduation of its first cohort of students.

Since the accreditation process of the Canadian Council for Accreditation of Pharmacy Programs (CCAPP) is taking place at the same time as the University of Waterloo’s (UW’s) undergraduate academic program review of the School, it was agreed that the CCAPP documents, which include a self-study, would suffice to meet UW’s requirements as long as there was an addendum that addressed any unanswered questions that were required by UW’s process.

To develop the self-study five teams, composed of faculty and staff members as well as students, where appropriate, were identified. These groups developed content and reviewed drafts of the document.

The self-study and other documents were received July 14, 2011; the site visit occurred on 6 to 9, November, 2011; the accreditation report was received January 23, 2012; and the School’s and the Dean’s responses were received July 13, 2012.

Characteristics of the Program

Historical Review

In six years, UW’s School of Pharmacy has moved from concept to full reality. The circumstances of the School’s founding and its rapid growth have intrinsically shaped its culture.

Since 2004 both undergraduate and graduate curricula have been developed and implemented; two new buildings have been designed and constructed; a dynamic complement of faculty and staff members has come together; an active research program has been established; and $54 million in government investment and more than $6 million in private donations have been raised. This speaks to the accelerated rate of change.

The School’s culture encourages collaboration amongst its members. This belief extends to the professional, student and external communities. The very first meeting to discuss a UW Pharmacy curriculum involved individuals from a range of Pharmacy practice disciplines, none of whom was associated directly with UW.

The School of Pharmacy project involved not only a new professional program, but a new campus in Kitchener. Having been created through the generosity and involvement of the community, the School maintains a significant focus on community involvement and partnership.

The Pharmacy School became Canada’s first and only co-operative education (co-op) Pharmacy program. It graduated its first cohort of students in 2011.

Program Objectives

The School of Pharmacy is committed to pushing the frontiers of discovery in order to improve human health and well-being. It will pursue the ideals of learning and knowledge through academic excellence, creativity and exemplary scholarship. It will embrace such pursuits by emphasizing interdisciplinary collaboration, diversity of thought and mutual respect. In its quest for innovation, it will promote research that spans the spectrum from fundamental science to clinical care.
Academic Programs Offered

Honours BSc in Pharmacy.

The curriculum is built on innovation, best practices in curriculum design and teaching and a commitment to moving the Pharmacy profession forward. The curriculum is outcome-based and outcomes are integrated across the curriculum and not the sole responsibility of individual courses or instructors. The curriculum content is informed by Pharmacy and community stakeholders. The curriculum has seven academic terms and four co-op terms. In addition to co-op, there are two other experiential elements: community service learning and clinical rotation.

The courses cover the four main areas of a Pharmacy curriculum: Biomedical Science, Pharmaceutical Science, Clinical Science, and Social and Administrative Studies. However, the curriculum has an unusually high percentage of Clinical Science. This is because much of the Biomedical and Pharmaceutical Sciences’ content is included in the Integrated Patient-Focused Care (IPFC) nine-course series where concepts from clinical biochemistry, pathophysiology, pharmacology, medicinal chemistry, pharmacokinetics, alternative medicines and care, together with microbiology and therapeutics are integrated.

Distinctiveness/Benchmarking

The School delivers the only Pharmacy co-op program in Canada, and is one of two co-op programs in North America. The program is applauded by Pharmacists and Pharmacy academics as resonating with the needs of that community in offering a uniquely integrated program and a comprehensive experiential learning model. This innovative curriculum has won so far three awards that specifically highlight “innovation” in their title or description.

Students

To be admitted to the School of Pharmacy an applicant has to have completed two years of undergraduate science with at least 75% or equivalent. In addition, the individual has to undertake an interview and a reading comprehension/writing test. These entrance procedures have resulted in low attrition rates, positive co-op work term ratings, high academic success and motivated students.

The School has also initiated a Conditional Admission to Pharmacy (CAP) program for outstanding high school students who can enter the BSc Pharm program in their third year of University studies if they meet specific criteria. For the class of 2014 admission cycle, there were 212 CAP applicants.

During the four years in which the School has been admitting students, the average annual number of applicants was 474 with a high of 614 in the first year. The average annual entry grade was 80.6% with a range from 75% to 94%.

The average rating given by students to the overall quality of teaching in 127 courses delivered over the last seven terms in the School of Pharmacy was 3.9 on a five-point scale where five is “excellent” and one is “poor”. It would appear that students are satisfied with the teaching being offered by the School.

Of the 10 Pharmacy Schools in Canada with a total of 4,902 students, UW is the sixth largest with 430 (8.8%) of these students. The enrolment in first-year Pharmacy is limited to 120 students and in 2010-11, the first year had 117 students. The second year had 122 students, the third year had 103 and the fourth year had 88 students. The academic average each term for these students has consistently been above 76%.

The School is working to develop a range of scholarships and awards. Currently there are 13 awards totaling $46,000.
There has been full employment of Pharmacy students in their co-op terms and employers are consistently positive in their opinion of the students. Over 91% of the co-op positions are in Ontario. The practice setting profile of co-op employers is consistent with the distribution of licensed pharmacists in Ontario: 53% in community, 24% in hospitals, 3% on long-term care, 3% in the pharmaceutical industry and 17% in other areas.

The attrition rate form the School is very low as would be expected with the thorough admission procedures.

Since the School involves all stakeholders it is no surprise to find that students are represented on all major committees.

Faculty

At full complement there will be 30 faculty members. At the time of the review there were 15 full-time faculty members; three Full Professors, two Associate Professors, nine Assistant Professors and one Clinical Lecturer. Of these 15, two are in Biomedical Science, six in Pharmaceutical Science, four are in Behavioural, Social and Administrative Sciences and three are in Clinical Sciences. Several of these faculty members are cross appointed in other Departments including Chemistry, Biology, Chemical Engineering and the School of Optometry. In addition, there were 27 part-time faculty members and 23 staff members.

Currently 28% of Pharmacy courses are taught by tenured or tenure-track faculty members. Full-time faculty members coordinate two courses and spend an average of 44.2 hours in classroom and 7.2 hours in lab teaching per year.

In the 10 Pharmacy Schools in Canada, the student/faculty ratio ranges from 38:1 at Dalhousie to 12:1 at Memorial. AT UW it is 36:1. When adjunct faculty members are factored in, the ratio decreases to 25:1. The ratio is high at UW primarily due to delays in hiring faculty members.

Over the past six years, faculty members have published 91 journal articles and one refereed conference proceeding, attended 134 professional meeting, delivered 63 invited lectures and attracted $4.5 million from 48 grants. It must be remembered that from 2006 to 2009 there were fewer than nine faculty members in the School, that number increased to 11 in 2011 and 13 in 2012.

Faculty members have also been heavily involved in professional associations.

Strengths and Concerns

Strengths

- Support of the University administration and the Faculty of Science for the program;
- The faculty members are to be congratulated on all the accomplishments since the last CCAPP visit. A core group of faculty members have developed a unique program well respected by the professional community;
- State of the art physical facilities, though it is noted that there is an urgent need for access to a second large classroom to accommodate an entire class;
- A dedicated, enthusiastic group of faculty members;
- Centre for Teaching Excellence whose staff has provided a wealth of guidance and support to the faculty members and the program;
- Passionate, energetic, well qualified students who are proud to be part of this program;
- The co-op program which allows for integration of knowledge and skills to meet the outcomes and competencies of the program;
- Strong community engagement and support;
- Well qualified Director who is eager to move the program to the next level.

For accreditation, the CCAPP has 23 standards for which compliance is required. Thirteen were met; eight were partially met; and two were not met. The two not met relate to the need for a strategic plan and academic program evaluation. The eight that were partially met were:

- Evaluating the outcomes of the School;
- School/University relationships;
- University/Affiliated health Care Organizations’ relationships;
- Organization and administration of the School;
- Faculty and staff resources to meet the needs of the School;
- Evaluation of individual faculty members;
- Adequacy and accessibility of library and learning resources.
- Most of these are stated in the concerns below.

Concerns

- While support for Pharmacy is evident, Governance under the Faculty of Science is unconventional for a Pharmacy program and results in:
  - The inability to respond efficiently to rapid changes in the profession due to delay in processes in such areas as curriculum change, policy and procedure approval etc.
  - Limited understanding of the requirements for delivery of clinical curricula
  - CCAPP recommends that there be exploration of the best way to meet the needs of Pharmacy and perhaps other Health Professional faculties on campus
  - Recognising that discussions are underway, a permanent budget with independent authority and responsibility is recommended as soon as possible
  - Need for the development of a strategic plan with succinct mission and vision, goals, objectives, timelines and performance measurements
  - Lack of a program evaluation structure
  - Lack of tenured stream faculty teaching core components of the curriculum:
    - Heavy reliance on adjunct faculty members who provide the expertise in core curriculum.
    - These positions are not formally recognised in the current University environment. Perhaps consideration should be given to converting some of these positions to clinical professorships
  - One of the requirements of CCAPP standards is that faculty members develop relationships with other health profession Faculties. The new standards, which will be released next year specify that there must be a close relationship with a Faculty of Medicine and Nursing. We recognise that the Medicine satellite is relatively new at the University of Waterloo but we are disappointed that the relationship seems under-developed. Given the close proximity to the McMaster Faculty of Medicine Satellite program, a number of opportunities exist that would benefit both programs such as inter-professional education, (IPE) library facilities and resources and curriculum delivery
Faculty members and students should be commended for their leadership in IPE, however, a formal strategy by the University is recommended to ensure compliance with the increasing emphasis of IPE by all health professional accreditation bodies.

Committee structures were reviewed and due to the importance of the curriculum committee to the mandate of the school, CCAPP recommends the chair should always be a pharmacy faculty member.

**Action Items related to the External Review of the Pharmacy Program**

**Item 1:** The School must move forward with strategic planning including developing a succinct mission, vision, goals and objectives with performance measurements and timelines; it has been difficult to measure success without a strategic plan.

**Response:** Although the School currently has a mission and vision statement, this needs to be revised. In addition, the School does not currently have a strategic plan. There was little opportunity to engage in formalized strategic planning prior to 2011 given that there were relatively few faculty and staff members until recently. In addition, at the same time, the School underwent a period of transition related to the retirement of the founding Director.

**Plan:** A strategic planning process is scheduled to begin in summer 2012. The anticipated process and timeline is outlined in the following diagram with the goal of having a new mission and vision statement adopted in 2012 and completion of a strategic plan by June 2013.

![Strategic Planning Timeline for Waterloo School of Pharmacy](image)

**Figure 1. Strategic Planning Timeline for Waterloo School of Pharmacy.**
**Item 2:** The draft constitution needs to be approved according to UW procedures and implemented.

**Response:** The School of Pharmacy adopted a constitution in 2010 that was modeled in part on the Faculty of Science constitution and provided a governance structure for the School. However, the external reviewers pointed out that this document was not approved by any University committee or body outside the School of Pharmacy. In addition, concern was expressed with the inclusive nature of the voting privileges defined in the constitution. Full voting rights were granted to a wide spectrum of part-time faculty and staff members which could in theory permit these individuals to play an important role in decisions which should more properly be decided upon by full-time faculty members.

**Plan:** The constitution has been significantly revised with input from the Executive Committee of the School of Pharmacy. This will be presented at the next scheduled faculty meeting in fall 2012 for discussion and approval. In the absence of specific University guidelines regarding approval beyond the School, we believe that it would be appropriate that Science Faculty Council be asked to review the constitution and provide its input and support.

**Item 3:** Curricular mapping must be completed.

**Response:** Although the Pharmacy curriculum was designed several years ago, it was not until the end of the spring term 2011 that all courses had been offered. The School of Pharmacy held a curriculum retreat in fall 2011 to begin the process of mapping the curriculum with respect to content and desired outcomes.

**Plan:** The Curriculum Committee, a standing committee of the School of Pharmacy, is charged with completing the curricular mapping process. The curriculum has been divided into several components for mapping with sub-groups assigned to review each component. Significant progress has been made in mapping the Professional Practice sequence (four laboratory and three didactic courses) together with the nine courses that comprise the Integrated Patient Focused Care sequence. Completion of the curricular map for this section is expected by the end of 2012. A similar time frame is anticipated for completion of the practical training components of the curriculum (co-op, clinical capstone, objective structured practical exams). We anticipate that the full curricular map should be finished by mid-2013.

**Item 4:** Co-op experiences need to be evaluated to ensure adequate exposure to patient care in both community and hospital settings.

**Response:** Co-operative education is an innovative model for providing students with practical experience that enhances and reinforces classroom learning. UW’s School of Pharmacy is the only pharmacy program in North America that provides essentially all of its practical experiences using a co-op model. Co-op offers our students exposure to a much broader range of potential career opportunities than traditional experiential education. Students may work in community pharmacy, hospital pharmacy, long-term care, family health teams, pharmaceutical industry, government, and professional organizations.

A concern that has been raised by external evaluators is that co-op is an employer-driven model with the priorities for the work term primarily established by the employer. Since the employer is paying the student, it is difficult for the University to impose rigid expectations for student learning during the co-op experience. Training of health care professionals has traditionally used a highly structured model in which preceptors (typically clinicians working in a variety of health care settings) provide close supervision of students under their direction to ensure that students are meeting a rigid set of outcomes established by the university. The majority of these clinical rotations typically take place in hospitals and other acute care settings.
Plan: Responsibility for ensuring that our Pharmacy students are learning the skills that they need to provide patient care rests primarily with our Curriculum Committee as well as the individuals who direct experiential education within the School. As part of the strategic planning process, we will need to determine whether or not our current structure for experiential education is meeting the needs of our students as well as the requirements for accreditation. Depending on the outcome of this evaluation, a re-structuring of our experiential program may be required, particularly given the new accreditation standards that are quite explicit regarding the timing, length and nature of practice experiences:

**Criterion 28.1:** The curriculum must include practice experiences where students can develop the appropriate clinical skills to assist a variety of patients, including the management of patients with acute illnesses and/or chronic conditions in primary care, long-term care, critical or emergency care, and those in the transitions between levels of care.

**Criterion 28.4c:** For the Bachelor’s degree, a sustained period of required concluding practice experiences near the end of the program must involve at least 12 weeks (480 hours) of fulltime, student placement in practice sites.

**Item 5:** The program needs to implement a systematic approach for program evaluation including assessment of teaching effectiveness.

**Response:** The external review noted that the School did not have a coordinated plan in place to assess and monitor progress towards achieving the objectives of the program. As a result, Standard 13: Academic Program Evaluation was judged as “not met”. The ability to collect and analyze data related to the achievement of curricular and other programmatic goals was limited prior to the graduation of the first class to complete the entire curriculum in fall 2011.

**Plan:** The School has created an Assessment Committee which will be charged with developing and implementing a comprehensive plan for assessing the intended outcomes of the program. This committee is expected to collect or co-ordinate the collection of data from students, alumni, faculty, staff and external stakeholders needed to fulfill its mandate. In addition, the Assessment Committee will work closely with other standing committees such as the Curriculum Committee and Admissions Committee to identify areas where improvement is needed.

**Item 6:** The full complement of faculty vacancies needs to be approved for hiring and filled; the large number of sessional appointments, rather than full-time faculty members in the professorial stream, who are teaching major components of the curriculum creates some vulnerability to the program.

**Response:** A number of factors have contributed to the current situation in which many courses in the Pharmacy curriculum are not being taught by full-time faculty members in the professorial stream. Chief among these is the relatively small number of full-time faculty members. Although there have been four new hires in the past 12 months, there are still only 16 full-time faculty members in the School. It was originally anticipated that the full faculty complement would be 30. In addition to full-time faculty members, several faculty lines are currently occupied by part-time faculty members who are typically pharmacists whose expertise is needed to deliver the clinical portion of the pharmacy curriculum.

Recruiting the projected number of required faculty members has occurred more slowly than expected. Delays in completing the new Pharmacy building made it difficult to recruit faculty members with laboratory-based research programs and the lack of affiliated teaching hospitals in the Kitchener-Waterloo region has posed a challenge in attracting clinical faculty members who require access to patients for their teaching, research and service activities.

**Plan:** The administration of the School of Pharmacy is eager to move forward aggressively with hiring new faculty members. There is currently only one open position and a preferred candidate has been
identified. We are optimistic that this search will result in the addition of a senior faculty member joining
the School in fall 2012. Further additions to the faculty complement will require approval of additional
positions within the budget for the program (see Item 7). The hiring plan will also include provisions for
consolidation of some of the faculty lines currently occupied by part-time or sessional instructors.
However, it should be noted that there will continue to be a need to hire some practicing pharmacists as
part-time and sessional faculty members to teach pharmacy students.

Item 7: A finalized budget for the School needs to be established that provides the School with the
necessary resources to achieve its mission.

Response: It has been difficult to plan and prioritize spending within the School to achieve our
objectives without a defined budget. In addition, new faculty positions need to be approved within the
budget in order to reach the anticipated full complement of faculty and staff (see Item 6).

Plan: A budget proposal has been developed by the administration of the School of Pharmacy in
conjunction with the Dean of the Faculty of Science. Further progress in this area is dependent on
approval by the Provost’s Office and central administration of the University.

Item 8: Strengthen and expand inter-professional education (IPE) with a particular focus on relationships
with medicine and nursing.

Response: Inter-professional education has been a significant challenge for the School of Pharmacy.
Every other Pharmacy program in Canada is located in a University that has Medicine and Nursing
programs as well as an affiliated network of teaching hospitals. Faculty, staff and students at the School
have worked hard to create an inter-professional group involving Optometry (Waterloo), Medicine
(McMaster University satellite campus), Nursing and Health Sciences (Conestoga College) and Social
Work (Wilfred Laurier University). Despite these efforts, the external reviewers noted that the current
level of activity is at the level of inter-professional discussion and needs to move to a higher level of
interaction. The site team also expressed disappointment that a more significant working relationship has
yet to be developed with McMaster University School of Medicine given that a satellite campus for this
program is located on the Health Sciences Campus of University of Waterloo.

Plan: The School of Pharmacy is committed to moving forward in this area to address the concerns of
the external reviewers as well as to meet increasing expectations in this area by CCAPP. The new
accreditations standards for Pharmacy programs, effective January 2013, include two new standards
related to inter-professional education and specifically require a strong commitment to IPE on the part of
the University:

Standard 3: The University has integrated and endorsed the concept of interprofessional
education and collaboration in practice.

Our efforts will be primarily devoted to enhancing IPE with Medicine and Nursing. These are the
primary health care professionals that pharmacists must work with in order to effectively manage the
medication requirements of patients and are explicitly mentioned in the new accreditation standards:

Standard 1, Criterion 1.1: At a minimum, the other health professions must include Medicine
and Nursing. If the University does not have these programs, the Faculty must establish a formal
alliance at another University within close proximity.

A retreat has been scheduled with McMaster University School of Medicine, Kitchener satellite for
Monday, July 23 to discuss a variety of topics of common interest. Professor Edwards, the Director of
the School of Pharmacy, is scheduled to meet with officials from Conestoga College in early August to
discuss enhancing the relationship between Pharmacy and the Nursing program at Conestoga (also
affiliated with McMaster University). In addition to these initiatives, we have had preliminary discussions with both the Schulich School of Medicine and Dentistry at the University of Western Ontario and the Northern Ontario School of Medicine (NOSUM) regarding how we might further relationships with both of these programs.

**Item 9:** Library resources need to be assessed and possibly upgraded. Preceptors and employers involved in the supervision of students on clinical placements should have access to appropriate electronic and other resources as needed.

**Response:** Efforts to move forward with improving the resources in the Pharmacy library as well as the service offered to students, faculty and staff were hindered until recently by the lack of a permanent pharmacy liaison librarian. A recent agreement by the Provost’s Office to support the permanent position within the library budget was a significant positive development.

**Plan:** A search for a Pharmacy liaison librarian was initiated in late April with the search committee including representatives from both the School of Pharmacy and the library. Finalists were identified and interviews conducted in late June. An offer has been made to the preferred candidate. The successful candidate will be expected to assess current library resources, hard copy and electronic, and upgrade the collection as needed. The Pharmacy liaison librarian will also develop a plan for meeting the library needs of students, staff and faculty. This includes the need to provide access to appropriate resources for individuals who are supervising the education of Pharmacy students at clinical sites that are remote from the University of Waterloo campus.
Two-year Progress Report from the Department of Economics

Introduction

The self-study for the augmented review, where both undergraduate and graduate programs are reviewed together, was completed on 20 June, 2008, and the site visit was conducted 27 to 29 April, 2009. The review team submitted its report on 19 May, 2009. The academic program review report was presented to Senate on 20 September, 2010. This report was received 31 August, 2012, and describes progress made in the past two years.

State of the Department

Students today are aware of the need for a good understanding of economics for careers in both the public and private sectors. There are increasing numbers of students from all faculties registering in economics undergraduate classes and economics graduate degrees are in high demand. The Department of Economics welcomes these trends and we strive to provide the best economics education possible for these students.

The chart below shows class enrollment trends since 1996. In the 2010-2011 academic year the Department had 14,851 class enrollments.

The following chart shows enrollment by majors for selected departments in Arts. The number of economics majors has grown steadily and is now over 500.
Enrollment in our economics graduate programs is shown in the chart below. We have a long-standing successful MA program, which is unique in that it offers a co-op option. We have made a number of changes to our graduate program over the past few years in order to make it more rigorous and to help our students succeed. We are proud of the quality of our graduates and believe our program’s reputation will continue to strengthen as our alumni build their careers.
In 2004 we began a PhD program and have been working hard to make it successful. We have had four students graduate so far. A PhD defense is scheduled for September 2012, and another student is expected to defend sometime in fall 2012. All of our PhD graduates have obtained jobs in their chosen fields either in academia or the private sector. Our MA graduates are also meeting with success in the job market and in PhD programs in top Canadian universities.

The trend in economics faculty numbers is shown in the chart below. As of August 2012 we had 24 regular faculty members, one definite term assistant professor, and four continuing lecturers. In the 2011-2012 academic year we had 72 undergraduate course sections taught by sessional instructors.
**Background**

Subsequent to the 2009 departmental review, OCGS recommended that the MA and PhD programs be viewed as being of good quality but that the Department should in two years report on (1) progress in the recruitment of faculty members, (2) progress in the review of curriculum for both courses and examinations, and (3) enrolments and continuation rates in the PhD program. An update was prepared by the Department and submitted to the OCGS in May 2011. A subsequent letter, dated June 14, 2011, was submitted by the Chair of Economics responding to additional questions from the OCGS. In a letter dated June 17, 2011, from OCGS, we were informed that our MA and PhD programs were judged to be of good quality.

The progress report given below is more general than the one done in mid-2011, and addresses all the issues raised by the reviewers.

1. **Faculty Resources**

**Issue:** At the time of the review the Department had 23 faculty members (six full, six associate and 11 assistant) and one continuing lecturer. The reviewers expressed concern about the number of faculty members given the high level of teaching activity in the Department, as well as the need for senior professors to mentor more junior faculty members.

**Progress:** Since 2009 we have been able to hire five faculty members at the junior level, but there have also been three retirements. In addition, we have hired three continuing lecturers and one definite-term...
assistant professor. Our total complement is 29 faculty members, of whom 24 are regular tenured or tenure-track appointments. We were not successful at hiring more senior professors, due in part to the large salaries needed to induce senior faculty members to relocate. However, we are currently trying to hire two senior economists, and are very hopeful that this will work out. A number of our assistant professors are applying for tenure this year, so the assistant/associate balance should improve. We will continue to try to recruit more faculty members at both the senior and junior levels to support the demands of our undergraduate and graduate programs and the huge demand for service teaching from across the university.

2. **Other program resources**

   **Issue:** The reviewers noted that staff resources are inadequate. The Department previously had four staff members and now has only three, despite greatly increased student enrollment. To quote from the review report “(f)or comparison, the economics departments at both UWO and Queen’s had 9 staff members this year, and each has about 28-30 tenure-track faculty - - not much more than the Waterloo department.”

   **Progress:** The Department still has only three staff members, which is unsustainable given current student enrollment levels. This is a critical need and we are currently drafting a job description for a fourth person.

   **Issue:** The Department does not have adequate common space for faculty members and graduate students. This is important for the cohesiveness of the graduate student class and for faculty interaction.

   **Progress:** We have created a lounge for our graduate students including a fridge and microwave. It is located in the PAS building, so is not near the Department. Nevertheless it is much appreciated by students.

   We also converted an office to a faculty lounge which includes a few chairs, as well as a desk for visitors. While this is better than nothing, it is a small area and we are still much in need of a larger lounge space.

3. **Recommendations regarding the graduate program**

   **Issue:** To support the graduate program, the Department needs more faculty strength in microeconomic theory and econometrics.

   **Progress:** We have hired two micro-economists and two econometricians since 2009.

   **Issue:** The reviewers felt that there were difficulties with the PhD microeconomic theory sequence. In their view, the curriculum and comprehensive exams were too difficult and should be more oriented to the applied economics mission of the program.

   **Progress:** The microeconomic theory sequence has been adapted so that it is more suited to the applied economics nature of our PhD program. This has been facilitated by the hiring of two faculty members who are specialists in microeconomics.

   **Issues:** There were several other specific recommendations for changes to the PhD and MA programs which have been implemented.
Progress:

- The Economics of Technology and Management Field has been eliminated. Students wishing to pursue this area of research can do so under the umbrella of our remaining field of Public Economic Policy.
- The co-op requirement has been eliminated from the PhD program.
- The research and writing requirements have been increased for MA students, who must now write a research paper with a value of at least 30 percent in one of their courses. In addition, MA students take a course in Research Methodology where writing skills are a focus.
- The seminar series budget has been increased to $8,000, somewhat below the $10,000 budget recommended by the reviewers.
- We have provided office space for first-year PhD students in the Department in Hagey Hall. Beyond the first year, PhD offices are located in PAS. We also have created a small PhD computer lab.
- PhD students are now required to attend a significant number of Department seminars each year. This is monitored to ensure students comply.

4. Recommendations regarding the undergraduate program

Issue: The reviewers noted the heavy reliance on sessional lecturers and recommended that it be reduced.

Progress: Although we have hired some regular faculty members, teaching demands have continued to increase with growing enrollments as well as the demands of running a reputable graduate program. The Department still remains heavily reliant on sessional lecturers with 72 sections taught by sessionals in 2011-2012. While we do have some excellent sessional lecturers, overall this is a job with a high turnover rate and quality control is difficult. We look forward to reducing the number of sections taught by sessional lecturers as we are able to hire more faculty members in the future. We are also hoping to recruit more continuing lecturers.

Issue: The reviewers found that the undergraduate program is of good quality despite low funding compared to other G13 universities. However some recommendations for improvements were made. These relate mainly to serving the needs of different types of students, such as those who want to pursue graduate studies in economics versus those who may pursue graduate studies in other areas (such as law) or are completing a terminal BA degree.

Progress:

- A new degree in mathematical economics has been created. Students can be registered either in mathematics or in economics to pursue this degree. This program is excellent preparation for students wanting to pursue graduate degrees in economics or finance.
- The reviewers noted that we were not offering some important elective courses. We have been able to address this to some extent with the hiring of more faculty members. For the first time we will be offering an undergraduate course in game theory in the winter term, 2013. This is long overdue. We have also introduced other electives to provide students with a broader range of course choices, including “Law and Economics”, “Economics of Sport”, and “Numerical Methods”.
• The reviewers noted a lack of communication amongst instructors teaching course sequences such as microeconomics and mathematical economics. Our Undergraduate Committee has worked to improve this coordination and lists of requirements for what should be covered in each year of a particular sequence have been created. We have also worked to upgrade our mathematical economics courses so students are better prepared for their senior courses.

• The reviewers mentioned the importance of keeping software in the Arts computing lab up to date. Since the report was done we have upgraded and expanded both the hardware and software in the lab.

Current Plans and Direction

The Department will continue to develop and improve our graduate and undergraduate programs. We will seek increases in faculty members, staff members and other resources needed to serve our growing student population.

Our Undergraduate Committee continues to focus on how best to meet the needs of our diverse student population and is undertaking a broad overview of our undergraduate academic plans. We are improving the coordination across the multiple sections of first- and second-year courses with the goal of increasing consistency and quality control. The Undergraduate Committee is examining innovative teaching techniques using new technology and teaching ideas to enrich the undergraduate experience for our students.

Our graduate program has been significantly enhanced over the past few years with the maturing of our PhD program and an increase in graduate courses offered. Most recently the Graduate Committee has been considering how to help PhD students make an easier transition into their research so that they are able to finish their degrees in a timely manner and to prevent attrition from the program. A change that is being implemented this year is to increase the number of elective courses students must take, in order to provide students with a more in-depth review of their areas of specialization. We have also introduced more careful monitoring and nurturing of PhD students through the declaration of fields of specialization and the introduction of specialized seminar courses.

One goal of our graduate programs is to increase the recruitment of top quality domestic students. To this end the Graduate Committee has worked on publicity for our program through posters and the creation of a video now posted on YouTube. http://www.youtube.com/watch?v=ooyv9T5r8Y. Our Graduate Associate Chair has made presentations to undergraduates at the University of Waterloo and other Ontario universities encouraging excellent students to apply for graduate school. We believe we are seeing the effect of this marketing by an increase this year in the number of domestic applicants from top Canadian universities such as Queens, Western, and the University of Toronto.

The Department hopes in the next few years to participate in new collaborative programs with other departments. There are some natural areas of collaboration such as in behavioral decision sciences, accounting and finance, and environmental sciences which hold great potential for new programs. For example, we are participating in a new interdisciplinary program being proposed by the Water Institute.
Two-Year Progress Report of the Department of Social Development Studies

Background

This report is an update to the Department of Social Development Studies (SDS) “Response to the Report of the Review Team: the strategic plan for the next seven years”, which was submitted to the Office of the Associate Vice-President, Academic Programs and Strategic Initiatives on April 27, 2010 and considered by Senate in June 2010.

The Review Team offered 12 recommendations in order to help all SDS stakeholders develop an even stronger program. The following is an update on the progress to date for each recommendation.

1. **Revise the mission statement.** Acting upon the recommendation of the review team, a new SDS mission statement has been developed along with a new description of the program, both of which now appear in the calendar and in various recruitment documents both online and in print.

   *Mission:* Social Development Studies applies an interdisciplinary approach to address the human condition in relation to social issues in local, national, and global contexts.

   *Description:* This innovative program offers courses in human and social development, including psychology, sociology, and social work. The curriculum develops skills in critical thinking, problem solving, interpersonal relations, leadership, civic engagement, and global citizenship. The various plans provide an excellent foundation for graduate studies, professional programs, and careers in human and public service.

2. **Apply the SDS rubric to all courses.** The Review Team recommended that SDS be adopted as the rubric for all courses offered by the Department of Social Development Studies, suggesting that this rubric would instill the cohesion that many people involved in the program wanted to see and may nudge what structurally appears to be a multidisciplinary program into the territory of true interdisciplinarity. Acting upon the recommendation, the Department has adopted the SDS rubric and renamed all ISS courses as SDS to come into effect in Fall 2012. We are, unfortunately, not able to convince other Departments (Sociology, Psychology, and School of Social Work) to let us use the SDS rubric for courses in our shared disciplines. As a result, the rubrics for courses in Psychology, Sociology, and Social Work offered by SDS will remain unchanged.

3. **Explore new curriculum directions by foregrounding the non-social service aspect of the program and including other disciplines in the mix.** SDS has successfully launched three new area specializations within the honours program taking effect in fall 2012, namely Education, Social Policy, and Individual Well-Being and Development. One additional specialization in Cultural Diversity is under development. The Cultural Diversity specialization has received approval from the academic council at Renison and will be presented at the next meeting of the Undergraduate Affairs Group of the Faculty of Arts. The goal is to have this fourth honours specialization come into effect in Fall 2013. Heeding the recommendation of the Review Team, these specializations incorporate many courses from various Departments in Arts. However, the design of these specializations follows the principle that SDS will offer a sufficient number of courses required within each plan to ensure that students have adequate support and accessibility to the required...
courses to complete their chosen area of specialization. We have been giving out information about these specializations at student information sessions and on our website. The initial response from current students has been overwhelmingly positive. It is expected that these area specialization plans will help SDS recruit more high quality students into the program as well. In fact, SDS has enjoyed considerable growth in the number and the quality of applications in the past few years as shown in the table below. The Arts Faculty has been raising admission average steadily over the past few years from 75% to 79%. Even with a higher admission standard, we were able to give out 151 offers this year and have 77 students confirmed.

<table>
<thead>
<tr>
<th>Year</th>
<th>1st choice</th>
<th>2nd choice</th>
<th>3rd Choice</th>
<th>Top 3 Total</th>
<th>Total</th>
<th>Offers</th>
<th>Enrollment *confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS  Direct Entry</td>
<td>2009</td>
<td>108</td>
<td>50</td>
<td>46</td>
<td>204</td>
<td>251</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>111</td>
<td>65</td>
<td>73</td>
<td>249</td>
<td>324</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>124</td>
<td>98</td>
<td>77</td>
<td>299</td>
<td>409</td>
<td>108</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>131</td>
<td>88</td>
<td>80</td>
<td>299</td>
<td>407</td>
<td>151</td>
</tr>
</tbody>
</table>

4. **Promote Certificates, Diplomas, and Options.** The Arts Faculty has abandoned “Options” and decreased the number of required courses for “Minors” from 10 to eight. To streamline the plans that SDS offers, the Department has also decided to deactivate both the Diploma and the Certificate offered previously, and bring forward in their place a Social Work specialization within the SDS program for all SDS students. The required courses for the Social Work specialization are in line with the 10 pre-requisite courses for the Bachelor of Social Work (BSW) program to facilitate a smoother transition for students who are interested in entering this one-year post-degree professional program.

5. **Add a wider range of courses to strengthen the interdisciplinary nature of the program.** The Review Team encouraged SDS to go beyond the three existing main disciplines (Psychology, Sociology and Social Work) and to embrace interdisciplinarity fully by bringing in courses from fields not currently covered by the program and to hire faculty members from outside the core areas to enrich the implicit definition of interdisciplinarity in Social Development Studies. We have taken the Review Team’s suggestion to heart in our new hire search. In 2011, two new faculty members, Dr. Jason Blokhuis and Dr. Christine Logel joined SDS. Dr. Blokhuis is a philosopher of education and academic jurist whose research interests include comparative public education law and policy. Dr. Logel is a social psychologist whose research extends to weight loss (health), and racial and gender equality. We have also invited other professors in different disciplines at Renison to contribute to the SDS curriculum. Since April 2010, the following 15 new courses have been added to the SDS major offerings to strengthen the curriculum and to support the new specialization plans:

- SDS 205R History of Education in Canada
- SDS 210R Children's Rights in Canada
- SDS 215R Education and Social Development from a Global Perspective
- SDS 231R Introduction to Social Policy Processes
- SDS 331R Social Inequality, Social Justice, and Public Policy

49 2
Two additional courses are being proposed to support the new proposed Cultural Diversity specialization, namely “Race and Gender Equity” and “Cosmopolitanism and Social Development”.

6. **Expand the applied apprenticeship program and investigate ways of attracting students to the co-op program.** The review team commended the applied apprenticeship course that SDS has put in place in 2010 for upper-year students and encouraged SDS to investigate the feasibility of developing a co-op program outside of the Arts and Business program. The applied apprenticeship course utilizes a service-learning model to offer upper-year SDS students rich experiential learning opportunities. The course continues to receive enthusiastic response from students and great reviews from community partners. As for an SDS stand-alone co-op program, although students expressed a great deal of interest, the response we received from Co-operative Education and Career Action (CECA) was less than enthusiastic. We were told that paid opportunities are not easy to find for our students and that the Department will need to provide evidence that jobs are readily available for our students if we were to establish a co-op program. This matter will be revisited in two years.

7. **Keep communication between SDS and BSW programs open.** The Review Team commended the Chair of Social Development Studies and the Director of the School of Social Work for their commitment to maintaining open communication and regular contact. The concerns voiced to the Review Team about overlap between the two programs have been addressed by regular review of course offerings and syllabi. The yearly review by the Chair of SDS and the Director of Social Work of course offerings and syllabi has been ongoing. In addition, the Chair of SDS and the Director of Social Work continue to hold periodic meetings to address matters of mutual interest, such as further collaboration for college students’ pathway to the BSW program. A dual degree program for SDS/BSW has also been under discussion. Although not going forward at this time, it is a concept worth revisiting in the future.

8. **Explore different models for academic advising.** The Review Team encouraged SDS to explore other advising models in order to come up with one that provides a maximum amount of continuity and recommended steps to be taken to investigate options. After the review, the Department immediately implemented several new measures, including centralizing all inquiries with an SDS e-mail address and providing students with easy-to-use plan checklists, a frequently asked questions (FAQ) page, and a chart to identify their academic advisors easily. In 2010, a work-study student was hired to help conduct a study to test students’ level of satisfaction with the existing academic advising system, to assess the effectiveness of various new initiatives, and to explore different options. Based on the results from this study, a new academic advising system was implemented in May 2012. Under this new system, students will have the same advisor throughout their study after...
the first year. Students in the first year will have living-learning community leaders as their “mentors”. Information sessions will be held in the beginning of the Fall term for all students. The Department will continue to improve the SDS website and use the SDS community group on Desire 2 Learn (D2L) to provide timely program related information to all students.

9. **Establish a student society.** The review team thought that with such a large undergraduate student body, SDS should have its own student society that is separate from the student governance of Renison University College so that it can address SDS-specific issues. It took considerable effort to convince the stakeholders within Renison to support the establishment of a SDS student society. Ultimately an election for the President of SDS society was held in March 2012, which generated considerable student interest. Going forward, special effort will be made to support its activities. The society will also send a representative to attend the SDS departmental meetings.

10. **Institute more career advising.** Students indicated that they would welcome career advising targeted to their specific needs and professions. The Department has since invited Career Action personnel to speak to the students. But attendance at this information session was poor. We will continue to visit this matter and work with the newly established SDS student society to design SDS-specific programming for SDS students. Also, a plan is underway to post more information and stories about SDS alumni and their career paths to help guide and inspire current students.

11. **Provide a better framework for enabling increased research intensity.** SDS agrees with the Review Team that research intensity needs to be increased and has started implementing specific measures. The existing Research Apprenticeship course has been broadly advertised to recruit students to work with faculty members on their research. SDS is also committed to having continuing research colloquium for faculty members to share their research ideas and outcomes with the larger University of Waterloo (UW) community. The College has also continued the practice of providing a one-course relief to new faculty members to help them launch their research programs. Moreover, every effort has been made to ensure that faculty members are kept informed of grants available from the UW Office of Research. The quality and the quantity of research produced by SDS faculty members has increased significantly in the past couple of years with the addition of five talented new scholars. In 2011, SDS faculty members presented eight conference papers, published nine articles (six refereed), completed two reports, helped organize two national/international conferences and received approximately a total of $80,000 from external sources (three SSHRC grants and one foundation grant). We have continued to receive good news related to our faculty research this year. In May alone, one faculty member was awarded the best publication of the year, a national award in her field; one faculty member was successful in her SSHRC insight grant application ($224,148 over five years); and another has received a grant from the prestigious Spencer Foundation ($37,400 US

12. **Increase administrative support.** The Review Team observed the inadequate level of administrative support the Department had and recommended additional support. The Department has made gradual improvement on this front. The part-time assistant to the Chair position became full-time in 2010. A part-time program assistant was added in May 2012. Starting in Fall 2012, there will be a full-time program assistant in addition to a full-time assistant to the Chair. The
increased administrative support will allow the Department to function well, to serve students better, and to explore opportunities for new programming.

Summary

Considerable effort has been invested to implement successfully changes laid out in the SDS strategic plan in response to the recommendations from the review team. Faculty renewal brought new ideas and new possibilities for the program. The curriculum revitalization and the addition of specializations to the plan have received enthusiastic response from both SDS students and high school students. We have seen healthy growth in the applications and enrollments into the SDS program in the past few years.

In short, actions undertaken in the past few years have enriched the SDS curriculum, strengthened its academic rigour, supported research and scholarship, and enhanced the quality of the educational experience of SDS students. The progress accomplished to date has made SDS an even stronger program academically within Renison University College and the Faculty of Arts at University of Waterloo.
FOR INFORMATION

Recognition and Commendation
Professor David DeVidi of the Department of Philosophy is the first recipient of the Status of Women and Equity Committee (SWEC) Equity and Inclusivity Award. The prize, to be awarded annually, is a celebration of excellence in equity, inclusivity, and diversity. It recognizes an individual or unit whose actions have demonstrated an exemplary commitment to improving equity, inclusivity, and diversity at the University of Waterloo. Although SWEC is a committee of the Faculty Association of University of Waterloo, the new award is open not just to faculty members but to any member or affiliate of the University of Waterloo community. SWEC Chair Diana Parry praised DeVidi for his outstanding contributions to equity and inclusivity both within the university and in the broader community. “Through his principled leadership, his generous mentorship, and his inexhaustible humanity, Dave quite simply makes the University of Waterloo a better place for everyone to work and study,” said Parry, “he is a model of progressive good citizenship.” [11 October 2012 Daily Bulletin]
FOR INFORMATION

A. APPOINTMENTS

Adjunct Appointments

Research

DUIZER, Lisa, Assistant Professor, Department of Kinesiology, September 1, 2012 to June 30, 2015.

Graduate Supervision and Research

SHAW, Sue (Distinguished Professor Emerita), Professor, Department of Recreation and Leisure Studies, July 1, 2012 to June 30, 2013.

Undergraduate Instruction

BRISCOE, Carrie, Lecturer, Department of Recreation and Leisure Studies, September 1, 2012 to December 31, 2012.

Cross Reappointment

DRYSDALE, Maureen, Associate Professor, St. Jerome’s University to School of Public Health and Health Systems, April 1, 2012 to June 30, 2017.

Postdoctoral Fellow to Part-time Lecturer Appointment

FORTUNE, Darla, Department of Recreation and Leisure Studies, September 1, 2012 to August 31, 2013.

Postdoctoral Fellow to Research Appointments

AKRAM, Sakineh, Department of Kinesiology, August 1, 2012 to April 30, 2013.

GONZALEZ, David, Department of Kinesiology, July 1, 2012 to December 31, 2012.

METHEREL, Adam, Department of Kinesiology, September 1, 2012 to August 31, 2013.

VAN OOTEGHEM, Karen, Department of Kinesiology, August 1, 2012 to April 30, 2013.

B. SABBATICAL LEAVE

McKILLOP, Ian, Associate Professor, School of Public Health and Health Systems, November 1, 2012 to October 31, 2013 at full salary.

C. ADMINISTRATIVE APPOINTMENT

RUSH, James, Associate Dean, Faculty of Applied Health Sciences, July 1, 2013 to June 30, 2016.
A. APPOINTMENTS

Tenured Appointments

COLEMAN, William (BA Carleton 1972, MA (1974) and PhD (1979) University of Chicago), Professor, Department of Political Science, effective July 1, 2012. Dr. Coleman’s career started and spanned many years at McMaster University. He began as a lecturer (1977-79), then assistant professor (1979-84), associate professor (1984-89), and professor (1989-2009). Dr. Coleman founded the Theme School on Globalization, Social Change and the Human Experience in 1998, and directed the school until 2002. He earned the designation of Distinguished University Professor in 2003, and currently holds a Centre for International Governance Innovation Chair in Globalization and Public Policy at the Balsillie School of International Affairs. Dr. Coleman’s research interests are globalization studies, internationalization of public policy, comparative agricultural, industrial and financial services policy, as well as business-government relations. His peers describe him as “an internationally respected researcher,” “a pioneer in advancing interdisciplinary research across the social sciences and the humanities” and someone who “is deeply and passionately committed to both the research and teaching aspects of [his] professional career.”

SCOTT, Thomas (BComm (1976) and MBA (1979) McGill University, PhD Queen’s University 1988), Professor, School of Accounting and Finance. Dr. Scott’s career started as a financial analyst before assuming the position of assistant professor at Mount Allison University (1979). He later became an adjunct lecturer at Queen’s before joining the University of Alberta in 1987 as a member of the Faculty of Business. Dr. Scott most recently served as vice dean for the university’s School of Business and has significantly raised the reputation of that institution. He has also served as a board member on the Accounting Standards Board of Canada, and as a member of the Institute of Chartered Accountants of Alberta from which he earned a Distinguished Service Award in 2009. Dr. Scott’s research interests focus on financial reporting, measurement of financial markets and compensation, the reporting of and valuation of earnings per share, and complex capital structures and securities. He is praised by peers as one who “affords his team the latitude to be autonomous and entrepreneurial within a refined and exciting set of guiding principles,” and is “highly strategic and can visualize future success” and a “strategic thinker who also has the ability to implement strategy.”

Adjunct Appointment

Instruction

SHNIER, Joan, Lecturer, Department of Spanish and Latin American Studies, January 1, 2013 to April 30, 2013.

Adjunct Reappointments

Instruction

ABBOTT, Bill, Associate Professor, Independent Studies, January 1, 2013 to April 30, 2013.

ADAMS, Russell, Assistant Professor, Department of Anthropology, January 1, 2013 to April 30, 2013.

ARNASON, Mark, Lecturer, School of Accounting and Finance, September 1, 2012 to December 31, 2012.

ATOCHE, Cristina, Lecturer, Department of Spanish and Latin American Studies, January 1, 2013 to April 30, 2013.
CHASMAR, Hugh, Lecturer, School of Accounting and Finance, September 1, 2012 to December 31, 2012.

CHEUNG, Tiki, Lecturer, School of Accounting and Finance, September 1, 2012 to December 31, 2012.

DAGG, Anne Innis, Associate Professor, Independent Studies, January 1, 2013 to April 30, 2013.

FLERAS, Augie, Professor, Department of Sociology and Legal Studies, January 1, 2013 to April 30, 2013.

GEORGE, Ryan, Lecturer, Department of Economics, January 1, 2013 to April 30, 2013.

HUTTER, Daniel, Lecturer, Department of Classical Studies, January 1, 2013 to April 30, 2013.

LAIKEN, Stan, Professor, School of Accounting and Finance, September 1, 2012 to December 31, 2012.

LEVINSON, Daniel, Lecturer, Department of Drama and Speech Communication, January 1, 2013 to April 30, 2013.

LITTLE, Melinda, Lecturer, Department of Drama and Speech Communication, January 1, 2013 to April 30, 2013.

MACDONALD, Robert, Assistant Professor, Department of Anthropology, January 1, 2013 to April 30, 2013.

MCAULEY, Eva, Lecturer, Department of Fine Arts, January 1, 2013 to April 30, 2013.

MORTON, Janet, Lecturer, Department of Fine Arts, January 1, 2013 to April 30, 2013.

NUNEZ, Camelia, Lecturer, Department of Spanish and Latin American Studies, January 1, 2013 to April 30, 2013.

OLDHAM, Andrew, Lecturer, School of Accounting and Finance, September 1, 2012 to December 31, 2012.

PARKIN, Melanie, Lecturer, Department of Psychology, September 1, 2012 to December 31, 2012.

PORTER, Robert, Assistant Professor, Department of Classical Studies, January 1, 2013 to April 30, 2013.

RICHARDS, Edward, Lecturer, Department of Political Science, January 1, 2013 to April 30, 2013.

ROTH, Wendy, Lecturer, Department of Economics, January 1, 2013 to April 30, 2013.

SETH, Amit, Lecturer, School of Accounting and Finance, September 1, 2012 to December 31, 2012.

SVENSON, Stephen, Lecturer, Department of Sociology and Legal Studies, January 1, 2013 to April 30, 2013.

WATSON, Patrick, Lecturer, Department of Sociology and Legal Studies, January 1, 2013 to April 30, 2013.
Graduate Supervision

GIFFORD, Shannon, Assistant Professor, Department of Psychology, September 1, 2012 to August 31, 2013.

MACDONALD, Robert, Assistant Professor, Department of Anthropology, September 1, 2012 to August 31, 2017.

SNELGROVE, W. John, Psychiatrist, Department of Psychology, September 1, 2012 to August 31, 2013.

TOMAN, Philip, Assistant Professor, Department of Psychology, September 1, 2012 to August 31, 2013.

Special Appointment

SCOTT, Julianne, Research Associate, Department of Psychology, November 1, 2012 to December 31, 2012.

Staff to Faculty Appointments

WINDSOR, Kate (Safety Office), Lecturer, Department of Psychology, January 1, 2013 to August 31, 2013.

BREUGST, Eric (Arts Undergraduate Office), Lecturer, Faculty of Arts, September 1, 2012 to December 31, 2012.

Graduate Student to Part-time Lecturer Appointments

CROSSSEN, Jonathan, Department of History, September 1, 2012 to December 31, 2012.

FINN, Tracy, Department of Philosophy, September 1, 2012 to December 31, 2012.

GUENTHER, Melissa, Department of French Studies, September 1, 2012 to December 31, 2012.

HAIGHT, Ian, Department of History, September 1, 2012 to December 31, 2012.

JENSEN, Candice, Department of Psychology, September 1, 2012 to December 31, 2012.

LASSALLE, Amandine, Department of Psychology, September 1, 2012 to December 31, 2012.

MASSARD, Jessica, Department of Fine Arts, September 1, 2012 to December 31, 2012.

ROSS, George, Department of Political Science, September 1, 2012 to December 31, 2012.

WHYTE, Sarah, Department of Political Science, September 1, 2012 to December 31, 2012.

Douglas M. Peers
Dean, Faculty of Arts
FOR INFORMATION

A. APPOINTMENTS

Definite-term Reappointments


Visiting Appointments

AGATHEESWARRAN, Nithya, Scholar, Department of Chemical Engineering, September 5, 2012 – December 31, 2012.


BEZDEK, Siegfried, Scholar, Department of Chemical Engineering, January 14, 2013 – April 19, 2013.

CHIU, Gordon, Scholar, Department of Chemical Engineering, September 1, 2012 – June 30, 2014.


CUI, Dan, Scholar, Department of Civil & Environmental Engineering, October 15, 2012 – April 15, 2013.

DUAN, Aoshu, Scholar, Department of Chemical Engineering, October 1, 2012 – August 31, 2013.


XIE, Run, Scholar, Department of Mechanical & Mechatronics Engineering, December 5, 2012 – June 5, 2013.

YU, Shuaibo, Scholar, Department of Chemical Engineering, October 1, 2012 – August 31, 2013.

Visiting Reappointments

CHARRY, Jennifer, Scholar, Department of Chemical Engineering, September 1, 2012 – May 31, 2013.

LIU, Yan, Scholar, Department of Chemical Engineering, September 1, 2012 – December 31, 2012.
ZOU, Ray, Scholar, Department of Chemical Engineering, September 1, 2012 – December 31, 2012.

Adjunct Appointments

Instruction

BATAY-CSORBA, Andrew, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.


FLEMING, Kevin, Assistant Professor, School of Architecture, November 1, 2012 – December 31, 2012.

GASTMEIR, William, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.

HURST, Ada, Lecturer, Department of Management Sciences, September 1, 2012 – October 31, 2012.

JACKSON, Tim, Lecturer, Conrad Centre for Business, Entrepreneurship and Technology, Dean of Engineering Office, September 1, 2012 – August 31, 2013.

LEU, Christine, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.


MANNING, Thomas, Lecturer, Department of Management Sciences, September 1, 2012 – December 31, 2012.

MENESI, Wail, Lecturer, Department of Civil & Environmental Engineering, January 1, 2013 – April 30, 2013.

NAKAMURA, Hajime, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.


PEARSON, Christine, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.

RAYMOND, Christopher, Lecturer, Department of Civil & Environmental Engineering, January 1, 2013 – April 30, 2013.

ROMERO, Clara, Lecturer, School of Architecture, September 1, 2012 – December 31, 2012.
TAYLOR, Victoria, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.

Graduate Supervision
SULTAN, Zuraimi, Associate Professor, Department of Mechanical & Mechatronics Engineering, June 1, 2012 – May 31, 2015.

Graduate Supervision and Research
SEGLENIEKS, Frank, Assistant Professor, Department of Civil & Environmental Engineering, July 1, 2012 – June 30, 2014.

Research
WRIGHT, Douglas, Professor, Department of Systems Design Engineering, September 1, 2012 – August 31, 2015.

Adjunct Reappointments
Instruction
AHMED, Mohamed, Lecturer, Department of Electrical & Computer Engineering, September 1, 2012 – December 31, 2012.


SCOTT, Tim, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.

SORLI, Scott, Assistant Professor, School of Architecture, September 1, 2012 – December 31, 2012.

Graduate Supervision
KARBASI, Hamidreza, Assistant Professor, Department of Mechanical & Mechatronics Engineering, February 1, 2012 – January 31, 2015.

Graduate Supervision and Research

FAHIDY, Tom, Professor, Department of Chemical Engineering, November 1, 2012 – October 31, 2014.

QUINTON, William, Associate Professor, Department of Civil & Environmental Engineering, July 1, 2012 – June 30, 2013.

ROBERTS, Steven, Associate Professor, Department of Systems Design Engineering, October 1, 2012 – September 30, 2015.

SCHARCANSKI, Jacob, Associate Professor, Department of Systems Design Engineering, October 1, 2012 – September 30, 2015.

SCHMITKE, Chad, Assistant Professor, Department of Systems Design Engineering, September 1, 2012 – August 31, 2015.
Other
ROE, Peter, Director of Exchange Program in the Faculty of Engineering, Engineering Undergraduate Office, October 1, 2012 – September 30, 2013.

Cross Reappointment
CALLAGHAN, Jack, Professor, Department of Kinesiology, Faculty of Applied Health Sciences to Department of Mechanical & Mechatronics Engineering, November 1, 2012 – October 31, 2013.

Change in Appointment
DOUGLAS, Supaporn, Adjunct Lecturer changed to Definite-term Lecturer, Department of Chemical Engineering, September 1, 2012 – April 30, 2013.

Graduate Student to Part-time Lecturer Appointments
CHUNG, So-Ra, Department of Systems Design Engineering, August 1, 2012 – December 31, 2012.
DONKOR, David, Department of Chemical Engineering, September 1, 2012 – December 31, 2012.
FINKLE, Andrew, Department of Chemical Engineering, September 1, 2012 – December 31, 2012.

Graduate Student to Part-time Lecturer Reappointment

B. ADMINISTRATIVE APPOINTMENTS
CALAMAI, Paul, Associate Chair, Undergraduate Studies, Department of Systems Design Engineering, September 1, 2012 – August 31, 2013.


C. SABBATICAL LEAVES
For Approval by the Board of Governors
KHAJEPOUR, Amir, Professor, Department of Mechanical & Mechatronics Engineering, January 1, 2013 – June 30, 2013 at 100% salary.

SHEPPARD, Lola, Associate Professor, School of Architecture, May 1, 2013 – April 30, 2014 at 85% salary.

YARUSEVYCH, Serhiy, Associate Professor, Department of Mechanical & Mechatronics Engineering, January 1, 2013 – June 30, 2013 at 100% salary.

Pearl Sullivan
Dean, Faculty of Engineering
FOR INFORMATION

A. APPOINTMENTS

Definite-term Appointment

YATES, Colin, Lecturer, Faculty of Environment, October 1, 2012 to September 29, 2014: PhD (Planning), Waterloo, 2012; MES, Waterloo, 2008; BSc (Hons), Brock University, 2006. The primary duties associated with this position include teaching and educational outreach at the Waterloo Summit Centre for the Environment, Huntsville.

Adjunct Appointments

Graduate Committee Membership

FITZPATRICK, Patricia, Associate Professor, Department of Geography and Environmental Management, September 1, 2012 to August 31, 2015.

Graduate Supervision

PERESSINI, Tracy, Associate Professor, School of Planning, September 1, 2012 to August 31, 2015.

Cross Appointment

PARKER, Dawn, Associate Professor, School of Planning to the Department of Geography and Environmental Management, October 1, 2012 to September 30, 2015.

B. ADMINISTRATIVE APPOINTMENT

SCOTT, Dan, Director, Interdisciplinary Centre on Climate Change, October 15, 2012 to February 28, 2014.

C. SABBATICAL LEAVE

For Approval by the Board of Governors

CASELLO, Jeffrey, Associate Professor, School of Planning and Department of Civil and Environmental Engineering, January 1, 2013 to June 30, 2013 at full salary.
FOR INFORMATION

A. APPOINTMENTS

Tenured Appointment

COOK, William (BA, 1979, Rutgers University; MS, 1980, Stanford University; PhD, 1983, University of Waterloo), Professor, Dept. of Combinatorics and Optimization, January 1, 2013. Dr. Cook is the Chandler Family Professor in the H. Milton Stewart School of Industrial & Systems Engineering at Georgia Tech, where he has been since 2002. His research interests are in integer programming and combinatorial optimization. He is best known for his work on the traveling salesman problem, and authored the 2012 book “In Pursuit of the Traveling Salesman: Mathematics at the Limits of Computation.” Dr. Cook will serve as chair of the Mathematical Optimization Society from 2013-2016, and is presently chair of the INFORMS Computing Society. He is editor-in-chief and founding editor of “Mathematical Programming Computation,” and has served as editor-in-chief of “Mathematical Programming, Series A” and “Mathematical Programming, Series B.” He is a member of the National Academy of Engineering, a SIAM Fellow, a 2010 INFORMS Fellow, and received the 2000 Beale-Orchard-Hays Prize from the Mathematical Programming Society.

Definite-term Appointment

ADCOCK, James (BSc Hons, 1997; MSc, 2000, both from the University of Western Ontario), Lecturer, Dept. of Statistics and Actuarial Science, September 1, 2012 – August 31, 2013. Mr. Adcock will teach six courses per year and participate in departmental activities as required.

Definite-term Reappointments

BLAKE, Peter (BMath, 1982, University of Waterloo; Chartered Accountant, 1983), Lecturer, Office of the Dean, September 1, 2012 – August 31, 2015. Mr. Blake will teach a minimum of four and a maximum of six undergraduate courses. The duties also include student advising, program development, course development and outreach with industry, co-op employers and professional organizations as appropriate in order to promote the Math/Business, Finance and Accounting programs externally.

SKRZYDLO, Diana (BMath, 2006; MMath, 2007, both from the University of Waterloo), Lecturer, Dept. of Statistics and Actuarial Science, January 1, 2013 – December 31, 2015. Mrs. Skrzydlo’s duties will be to teach six undergraduate courses per year and perform service duties such as academic advising and course coordination.

Visiting Appointments


XIONG, Xin, Research Associate, Dept. of Combinatorics and Optimization, September 1, 2012 – April 30, 2013.

Adjunct Appointments

Instructor

Research
SINGH, Radhey, Professor, Dept. of Statistics and Actuarial Science, September 1, 2012 – August 31, 2017.

Adjunct Reappointments
Research
BRZOZOWSKI, Janusz, Professor, David R. Cheriton School of Computer Science, July 1, 2012 – June 30, 2015.


DJOKVIC, Dragomir, Professor, Dept. of Pure Mathematics, September 1, 2012 – August 31, 2015.


Graduate Student to Part-time Lecturer Appointment

Postdoctoral Fellow to Part-time Lecturer Reappointment

B. RETIREMENT
MATTHEWS, David, Professor, Dept. of Statistics and Actuarial Science, effective August 31, 2012.

C. SABBATICAL LEAVES
For Approval by the Board of Governors
GIESBRECHT, Mark, Professor, David R. Cheriton School of Computer Science, January 1, 2013 – June 30, 2013 with 85% salary. This is an early sabbatical.

LEUNG, Debbie, Associate Professor, Dept. of Combinatorics and Optimization, January 1, 2013 – June 30, 2013 with 85% salary.

MARCOUX, Laurent, Professor, Dept. of Pure Mathematics, January 1, 2013 – June 30, 2013 with 85% salary. This is an early sabbatical.

Approved by the Board of Governors
TOMPA, Frank, Professor, David R. Cheriton School of Computer Science, November 1, 2012 – April 30, 2013 with 100% salary.

Ian P. Goulden
Dean, Faculty of Mathematics
FOR INFORMATION

A. APPOINTMENTS

Tenured Appointments

**BLAY, Jonathan**, Professor, School of Pharmacy, November 1, 2012. [ONC (Medical Laboratory Subjects), College of Technology, UK (1977); B.Sc., University of Bradford, UK (1981); Ph.D., University of Cambridge, UK (1985).] Dr. Blay has accepted the position as associate director, research and graduate studies. Following his Ph.D., he completed a postdoctoral fellowship at the University of Calgary. He has had a distinguished career as a scientist and educator in the Department of Pharmacology, Faculty of Medicine, Dalhousie University and also held the position of Scientific Director of the Beatrice Hunter Cancer Research Institute in Halifax. Dr. Blay’s research is focussed in the area of cancer therapeutics. He brings a wealth of experience in mentoring graduate students and will provide leadership to a rapidly growing graduate program in the School of Pharmacy.

**McCULLOCH, Daphne L.**, Professor, School of Optometry and Vision Science, March 1, 2013. [O.D., University of Waterloo (1979); Fellowship in Primary Care Optometry (1981); Ph.D., Indiana University (1988).] Dr. McCulloch has held positions at the School of Optometry (Indiana), Hospital for Sick Children (Toronto), and the Children’s Hospital (Los Angeles). For the past 11 years, Dr. McCulloch has been a professor of visual neurophysiology at Vision Sciences, Glasgow Caledonian University where she has been the associate dean for research, knowledge transfer and commercial development. Her professional service also includes being the past secretary of the International Society for Clinical Electrophysiology of Vision (ISCEV). Dr. McCulloch’s two main academic interests are normal and abnormal visual development, and visual electrophysiology. During her career, Dr. McCulloch has published over 70 articles in refereed journals, three book chapters and approximately 160 conference presentations as well as delivered over 75 invited talks, seminars and continuing education lectures. The school looks forward to her arrival in March 2013.

**MURPHY, Paul James**, Professor, School of Optometry and Vision Science, January 1, 2013. [B.Sc., Cardiff University (1988); Ph.D., Glasgow Caledonian University (1996); Postgraduate Certificate in Education (PGCE TLTM), Glasgow Caledonian University (2000).] Dr. Murphy is currently a reader and director of teaching in the School of Optometry and Vision Sciences at Cardiff University. His research concentrates on ocular surface sensation, contact lenses and the tear film, and where these three factors interact in dry eye disease. Dr. Murphy will be taking on the role of director to the School of Optometry and Vision Science when he arrives. He brings extensive administrative experience to his new role as well as a great vision for the future of the school.

Probationary-term Appointment

**BASU, Nandita**, Assistant Professor, joint appointment with Department of Civil and Environmental Engineering and Department of Earth and Environmental Sciences, January 1, 2013 to June 30, 2016. [B.Eng., Jadavpur University (1977); M.Tech., Indian Institute of Technology (2001); Ph.D., Purdue University (2006).] Dr. Basu’s research focuses on the fate and transport of contaminants in surface and near-surface waters, watershed modeling ecosystem restoration, and human impacts and water resource sustainability. She joins the Department of Earth and Environmental Sciences in support of the CERC program in Ecohydrology.
Definite-term Reappointments
LEONENKO, Yuri, Assistant Professor, joint appointment with Department of Physics and Astronomy and Department of Chemical Engineering, September 1, 2012 to August 31, 2013.

ROBERTSON, William D., Research Associate Professor, Department of Earth and Environmental Sciences, July 1, 2012 to June 30, 2015.

Adjunct Appointments
Graduate Supervision
LEGGE, Gordon E., Professor, School of Optometry and Vision Science, September 1, 2012 to August 31, 2015.

PEHME, Peeter, Assistant Professor, Department of Earth and Environmental Sciences, October 1, 2012 to September 30, 2015.

Undergraduate Instruction, Graduate Instruction and Research
ABANIN, Dmitry A., Assistant Professor, Department of Physics and Astronomy, September 1, 2012 to August 31, 2017.

DITTRICH, Bianca, Assistant Professor, Department of Physics and Astronomy, September 1, 2012 to August 31, 2017.

HARRIS, Gretchen L.H., Associate Professor, Department of Physics and Astronomy, September 1, 2012 to August 31, 2015.

Adjunct Reappointments
Research
VAN GEMERT-PIJNEN, Lisette, Associate Professor, School of Optometry and Vision Science, August 1, 2012 to July 31, 2013.

SENCHYNA, Michelle D., Associate Professor, School of Optometry and Vision Science, September 1, 2012 to August 31, 2015.

Graduate Supervision and Research
MUIR, Derek C.G., Professor, Department of Biology, October 1, 2012 to September 30, 2015.

Graduate Supervision, Research and Other
METCALFE, Christopher D., Professor, Department of Biology, October 1, 2012 to September 30, 2015.

Undergraduate Instruction
BOWLES-JORDAN, Jane A., Assistant Professor, School of Pharmacy, September 1, 2012 to December 31, 2013.

Undergraduate Instruction, Graduate Instruction, Graduate Supervision and Research
SPEKKENS, Robert, Assistant Professor, Department of Physics and Astronomy, November 1, 2012 to October 31, 2017.
Cross Appointment
DUNCAN, Robin, Assistant Professor, Department of Kinesiology cross appointed to Department of Biology, October 1, 2012 to September 30, 2015.

Cross Reappointments
GU, Frank X., Assistant Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2012 to August 31, 2015.

PENLIDIS, Alexander, Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2012 to August 31, 2015.

SIMON, Leonardo, Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2012 to August 31, 2015.

SOARES, Joao B.P., Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2012 to August 31, 2015.

TAM, Michael, Professor, Department of Chemical Engineering cross appointed to Department of Chemistry, September 1, 2012 to August 31, 2015.

B. ADMINISTRATIVE APPOINTMENT
GUILLEMETTE, Guy, Director, Guelph-Waterloo Centre for Graduate Work in Chemistry (GWC), September 1, 2012 to August 31, 2015.

T.B. McMahon
Dean, Faculty of Science
FOR INFORMATION

Council of Ontario Universities (COU)
Report on Academic Colleagues and Council Meeting (Toronto)
October 11, 2012 – Sheila Ager (sager@uwaterloo.ca)

A. Academic Colleagues Meeting(s) – 10:00-11:45 am and 2:00-3:30 pm

The morning session of the AC meeting was taken up with a discussion of the MTCU document, *Strengthening Ontario’s Centres of Creativity, Innovation and Knowledge*, a discussion paper with the stated purpose of “making our university and college system stronger” ([http://www.tcu.gov.on.ca/pepg/publications/DiscussionStrengtheningOntarioPSE.pdf](http://www.tcu.gov.on.ca/pepg/publications/DiscussionStrengtheningOntarioPSE.pdf)). The paper was made public in the summer of 2012, and PSE institutions were invited to send representatives to a series of roundtable discussions and asked to respond to the paper by the end of September (Waterloo’s response is available on the Provost’s website: [http://uwaterloo.ca/provost/university-waterloo-strategic-plan](http://uwaterloo.ca/provost/university-waterloo-strategic-plan)). At the same time, universities were also asked to prepare and submit Strategic Mandate Agreements, all of which have now been made public (Waterloo’s SMA is also accessible on the Provost’s website).

The COU had already prepared and submitted a response to the MTCU discussion paper ([Transforming Ontario Universities](http://www.cou.on.ca/publications/reports)). Nevertheless, October 11 marked the first meeting of Council since the paper had been published, and it was the main agenda item on the full Council meeting; it was therefore felt to be worthwhile for the Colleagues to discuss it in the morning session. While Colleagues are agreed that there is scope for improvement in post-secondary education in Ontario, serious concerns were expressed about the MTCU paper, including the following:

- The emphasis of the paper is on undergraduate education; graduate education and research are not addressed.
- The suggestions appear to be driven by financial concerns, but are phrased in the language of innovation and enhanced productivity (the latter term nowhere defined).
- The emphasis on productivity and the tone of the report in general suggests that the role of PSE is to produce economic actors rather than citizens. The role of a liberal arts education is not addressed.
- The paper stresses the creation of three-year degrees and/or the acceleration of students in current program models through year-round attendance, with no attention to such issues as student mental health, student earning power during the course of a degree, academic credibility of the degree, necessary time for faculty research, and students’ ability to compete for entry into graduate programs.
- There are certain inherent contradictions within the paper:
Universities are expected to differentiate themselves, but pressures to enhance transfer credit mobility and to collaborate in online offerings tend towards standardization.

The push towards three-year degrees conflicts with the push to enhance experiential learning (and the paper regularly conflates “experiential” with “entrepreneurial”).

- On the issue of transfer credit mobility, the paper seems to lean towards treating university and college credits as interchangeable.
- There is a heavy emphasis on the potential for technology – i.e., online learning, especially collaboratively between institutions – to resolve financial pressures. No recognition is given to the costs of online course development and maintenance or to the literature which expresses reservations about student learning and satisfaction in the online environment.

The afternoon session of the AC meeting was devoted to various items of business with respect to forthcoming discussion papers and a presentation on a current COU initiative springing from the Accessibility for Ontarians with Disabilities Act:

- Discussion paper topics for the coming year will include transfer credits, academic integrity, and the balancing of faculty responsibilities in teaching, research, and service. Current and past AC discussion papers are available on the COU website (http://www.cou.on.ca/publications/academic-colleague-papers).
- The COU, in partnership with Guelph, Toronto, and York, is in the process of preparing an “Educators Accessibility Resource Kit”, a series of tip sheets and guidelines intended to assist institutions and specifically faculty members in attaining compliance with the AODA legislation. As this kit is further refined it will be made available to all institutions.

B. Council Meeting – Working Lunch, 12:15-1:45 pm

The main item on the agenda was the MTCU discussion paper. The President of COU, Professor Bonnie Patterson, gave a presentation summarizing the responses of various stakeholders: OCUFA, OPSEU, CUPE, OUSA (Ontario Undergraduate Student Alliance), CFS-O (Canadian Federation of Students – Ontario), and Colleges Ontario. These bodies echoed most of the concerns itemized above. Additional points raised include the following:

- The real problem is chronic underfunding (OPSEU, CUPE, OCUFA)
- Funding should not be tied to learning outcomes (OPSEU, OCUFA)
- MTCU needs to undertake a comprehensive data collection exercise (OCUFA)
- Online education and credit transferability should be increased, but with caution; neither is a cure-all and institutions need to be able to control both; online consortium should not be degree-granting (OCUFA, OPSEU, CUPE, CFS-O, Colleges Ontario)
- E-portfolios and degree supplements should be encouraged (OUSA)
- Criticism of the new “G-7” Credit Transfer Consortium (Guelph, McMaster, Ottawa, Queen's, Toronto, Waterloo, and Western) as elitist and restrictive (OUSA)
- Tuition levels should be reduced to 2005 levels (CFS-O)
- HEQCO (Higher Education Quality Council of Ontario) should be eliminated (CFS-O)
• Colleges should be allowed to grant three-year and Honours four-year degrees (Colleges Ontario)

The concerns expressed by the Academic Colleagues with respect to the Ministry paper were also presented to Council, and met with agreement in principle from the Executive Heads. Caution was expressed, however, to the effect that the universities need to be strategic in their response to the Ministry, and that a wholesale rejection of the items raised in the discussion paper is unlikely to result in a positive way forward in the relationship between the province and its PSE institutions.

On this point, it should be noted that the universities’ responses and SMAs tend to be both positive in tone and strategic in outlook (some responses do call attention to the concerns expressed at COU). They largely succeed in aligning their institutions with various Ministry goals while at the same time asserting the importance of core activities (such as graduate education and research) neglected by the MTCU paper. They also stress the innovative practices already put in place by Ontario institutions (practices unacknowledged in the paper). The response of COU itself is likewise strategic, and emphasizes its role in supporting and facilitating the following:

• Establishment of online education consortium
• Enhancement of: learning outcomes assessments; experiential learning; transfer credit opportunities; degree supplements
• Sharing of best practices in teaching and learning, efficiency and productivity

MTCU has requested that the Higher Education Quality Council of Ontario (HEQCO)* establish a peer review panel to evaluate the SMAs in terms of their “ability to achieve significant improvements in productivity, quality and affordability through both innovation and differentiation.” The peer review panel will identify those colleges and universities “whose submissions demonstrate the greatest ability to serve as lead institutions…those that provide the most compelling and promising visions, mandate statements and plans that advance government policies, objectives and goals…The lead institutions selected through this exercise would be the first to receive funding to pursue their mandates starting as early as 2013-14.” (HEQCO website, http://www.heqco.ca/en-CA/About%20Us/policyadvice/Pages/smas.aspx).

Items of regular business at the full Council meeting on October 11 included updates on the AODA legislation (upcoming compliance dates and development by COU of support tools) and the Quality Council (OUCQA,* Ontario Universities Council on Quality Assurance, responsible for review of new and existing programs); presentation of the COU strategic plan; and reports from the major COU affiliates (such as OCAV, OCUR, OCGS, etc.). These items were circulated in written form and were not discussed at the meeting.

*Note: HEQCO is an agency of the provincial government; OUCQA is an arm’s-length body established by the COU.
FOR APPROVAL

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Undergraduate Council Appointment

Motion: That Senate approve the appointment of Rob Gorbet as the environment faculty representative, replacing John Lewis, term to 30 April 2013.
FOR APPROVAL

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Undergraduate Council Appointment

Motion: That Senate approve the appointment of Rob Gorbet as the environment faculty representative, replacing John Lewis, term to 30 April 2013.
The Senate Executive Committee met on 5 November 2012 and agreed to forward the following item to Senate for information.

FOR INFORMATION

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December Meeting of Senate
Although there currently appears to be insufficient agenda to warrant a December meeting, the committee will hold its December meeting date and advises Senate to do likewise. The secretary will advise the Executive Committee within a week of its December meeting whether a meeting is warranted and Senate will be so advised. [Process instituted by the Executive Committee in November 2006.]

The Senate Executive Committee met on 1 October 2012 and agreed to forward the following item to Senate for approval.

FOR SECOND READING

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Senate Bylaw 11: A bylaw relating to the naming of additional ex officio members of the Senate of the University of Waterloo [Attachment 1]
The amended bylaw is recommended to Senate for second reading [first reading at 15 October 2012 meeting]*. The substantive change is the addition of the vice-president, advancement and the vice-president, university relations as ex officio members of Senate. The other changes are minor housekeeping amendments.

The addition of two ex officio members necessitates increasing the number of faculty-at-large members by one. There is no impact on Senate representation from other constituencies.

*The passage of a new bylaw or amendment(s) to an existing bylaw is accomplished in two readings of the document by Senate. At the first reading, such discussion of the document as is deemed appropriate by Senate shall take place. At the second reading, further discussion may take place and the vote on the document shall be taken. The two readings shall take place at different, but not necessarily consecutive, meetings of the Senate. [Senate Bylaw 7: A bylaw relating to the procedure for creating new bylaws or amending existing bylaws of Senate]

Feridun Hamdullahpur
President
Senate Bylaw 11
A bylaw relating to the naming of additional *ex officio* members of the Senate of the University of Waterloo.

BE IT ENACTED as a bylaw of the Senate of the University of Waterloo, as follows:

WHEREAS the University of Waterloo Act, 1972 provides in Section 18.a.9. that the Senate of the University may add to its membership such other *ex officio* members as Senate by Bylaw may, from time to time, designate, and

WHEREAS the University of Waterloo Act, 1972 provides in Section 18.b.2. that elected members of the faculty shall equal in number one more than the total number of all other members of Senate, and

WHEREAS the University of Waterloo Act, 1972 provides in Section 18.c. that upon the designation of and addition, from time to time, by the Senate of any additional *ex officio* members, the number of elected members from the Board of Governors, the undergraduate students, the graduate students and the alumni shall be increased by whatever numbers are necessary to retain the ratios, in each case, of the number of such elected persons to the number of elected faculty.

BE IT THEREFORE enacted as a Bylaw of the Senate of the University of Waterloo as follows:

1. That the following be named as *ex officio* members of the Senate:
   a. The Associate Provost, General Services & Finance
   b. The Vice-President, Administration & Finance
   c. The Vice-President, University Relations
   d. The Vice-President, University Research
   e. The Associate Provost, Academic & Student Affairs Resources
   f. The President of the Faculty Association of the University of Waterloo
   g. The President of the Federation of Students, University of Waterloo
   h. The President of the Graduate Student Association - University of Waterloo

2. That the Chief Returning Officer be empowered upon passage of this Bylaw to take whatever steps are necessary to carry out such elections or by-elections as may be necessary to comply with the provisions of the University of Waterloo Act, 1972, cited above and arising from the designation of *ex officio* members of Senate by the passage or amendment of this Bylaw.

*Approved by Senate May 20, 1975.*

Amended by Senate at two meetings December 5, 1980 and January 19, 1981.
Amended by Senate at two meetings December 19, 1983 and January 16, 1984.
Amended by Senate at two meetings May 19, 1987 and June 15, 1987.
Amended by Senate at two meetings May 22, 1990 and June 18, 1990
Senate Graduate & Research Council met on 15 October 2012 and agreed to forward the following items to Senate for approval. These items are recommended for inclusion in the regular agenda.

Further details are available at: www.adm.uwaterloo.ca/infosec/Committees senate/sgrc.htm

FOR APPROVAL

NEW PROGRAMS

Doctor of Philosophy in Pharmacy

1. **Motion:** To establish a Doctor of Philosophy in Pharmacy program to be offered by the School of Pharmacy in the Faculty of Science as described in attachment 1.

   **Rationale:** The proposal to establish a PhD Program has been guided by an acknowledgement of the fundamental link between the advancements in pharmaceutical sciences and the improvements in healthcare and health outcomes. The School’s current complement of faculty (15 Pharmaceutical and Applied Health Sciences Faculty and 21 Adjunct Faculty) reflects the diversity of disciplines inherent to pharmacy and the pharmaceutical sciences. Since the School opened in 2007, there have been 12 PhD students supervised by Pharmacy Faculty through their cross-appointments in other University of Waterloo departments. Based on the success of the MSc program as well as the school’s involvement in PhD supervision over the past 5 years, it is believed that a significant and expanding number of students would choose to pursue a PhD program in Pharmacy at the University of Waterloo.

   The proposed PhD Program leads to the Doctor of Philosophy degree. It is structured as a research based thesis degree incorporating milestones that reflect the educational outcomes the Program. Program fees and program length for a research based program are set by the University of Waterloo’s Graduate Studies Office.

   Several University of Waterloo departments will be associated with this Program through collaborative research, facility and equipment utilization and cross departmental co-supervision and advisory guidance of program candidates. It is expected that the following University of Waterloo faculties/departments/schools currently interacting with our MSc program as well as with pharmacy faculty-supervised PhD students will continue to do so within the proposed PhD program.

PROGRAM CHANGES

Masters of Health Informatics

2. **Motion:** To approve the change in course delivery method for the Master of Health Informatics degree program, computer science field, to an online delivery format effective September 2013 as described in attachment 2.

   **Rationale:** This will allow a larger pool of candidates to apply for the Master of Health Informatics program as they do not have to relocate to Waterloo. The Master of Health Informatics is a professional Masters’ degree; hence many candidates have work and/or family constraints that prevent them from moving to Waterloo. Once the program is offered online, these constraints should be mitigated.
Master of Environmental Studies in Environment and Resource Studies

3. **Motion.** To approve adding a new Major Research Paper (MRP) option for the Master of Environmental Studies in Environment and Resources Studies as described in attachment 3.

**Rationale.** The new Master of Environmental Studies in Environment Major Research Paper option is designed to add an attractive further possibility for graduate studies in Environment and Resources Studies, complementing the success for Master of Environmental Studies in Environment Thesis option. The addition will maintain and enhance the department’s strength as a hub for leading edge transdisciplinary research and education in environmental issues, sustainability and social-ecological systems. It is a response to ongoing changes in academic, professional practitioner and government circles, and society. Graduates will emerge with the understandings and capabilities they need to address contemporary and future social-ecological challenges. It is also designed to attract additional strong applicants and to provide a basis for increased master’s program enrollment if the Environment and Resources Studies faculty complement is expanded to supply the capacity to deliver the program to more students.

Master of Arts / Master of Environmental Studies in Planning

4. **Motion:** To approve the Master of Arts/Master of Environmental Studies in Planning degree requirement changes as follows and as described in attachment 4:

- Increase core course requirements from 3 to 5
- Increase electives from 2 to 3
- Introduce studio project courses (2 at 1.0 units)
- Introduce internship requirement

**Rationale.** The Canadian Institute of Planners (CIP) has adopted new guidelines and expectations for degree requirements at the Masters level, most importantly that the program must have the equivalent of 60 units (where 3 units would be the equivalent of a 0.5 course) of credit. The degree requirement changes have been designed to enhance this integrative experience, maintain the relevance, quality, and complementary strengths of the degree, and position our degree to remain competitive in the Canadian context and beyond. The proposed changes also provide an opportunity to enhance working collaborations among faculty through involvement in project studio courses and focused attention on enforcing a structured approach to completion of research theses.

Master of Applied Environmental Studies in Planning

5. **Motion:** To approve the change in course delivery method for the Master of Applied Environmental Studies in Planning degree program to an online delivery format as described in attachment 5.

**Rationale.** The change in delivery format is designed to maintain and enhance the School of Planning’s position as a leading institution for Planning education and research. It is a response to a number of key factors: the Canadian Institute of Planners (CIP), has recently adopted major changes in their requirements for practitioners; enrollments in the existing Master of Applied Environmental Studies in Planning program (approved in 2005) have been low because working professionals cannot meet the demands of the current delivery format and schedule (daytime offerings of electives for example and requisite travel from the GTA and beyond); and University of Waterloo is the first institution to engage in the development of this delivery model in the Planning field. This provides a distinct competitive advantage in the Canadian context and allows for the potential to tap into a much broader global market for planning education.
SENATE BYLAW 8
Pending approval by Senate Graduate and Research Council on 12 November 2012.

Membership. Council agreed to recommend to Senate that the membership of the Senate Graduate and Research Council be amended as follows and as outlined in attachment 6 [underline = new text]:

The membership of this Council shall consist of the following:

- The membership of this Council shall consist of the following:
- President of the University
- Vice-President, Academic & Provost
- Associate Provost, Graduate Studies, who shall co-chair this council
- Associate Dean of Graduate Studies
- Vice-President, University Research, who shall co-chair this council
- Associate Vice President, Research
- Associate Vice President, External Research
- Director, Research Ethics & Grants
- Director, Contracts Research & Industrial Grants
- Director of Graduate Studies, Academic Services
- University Librarian
- President of the Graduate Student Association
- Two faculty members with Approved Doctoral Dissertation Supervisor (ADDS) status from each faculty, one of whom must be an associate dean with a research and/or graduate studies portfolio [associate dean positions are ex-officio; others are two years]
- One faculty member from the Federated University & Affiliated Colleges, who shall serve for a term of two years.
- One graduate student from each faculty, each of whom shall serve for a term of two years.

Rationale
The associate vice-president, external research will provide valuable insight on external research grants and contracts focussing on Waterloo’s strategic strengths and external opportunities.

/md
George Dixon  
Vice-President, University Research

Sue Horton  
Associate Provost, Graduate Studies
UNIVERSITY OF WATERLOO

GRADUATE PROGRAM PROPOSAL
OF THE

DOCTOR OF PHILOSOPHY
IN
PHARMACY

Submitted to the
Ontario Universities Council on Quality Assurance

VOLUME I – PROPOSED BRIEF

MAY 2012
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1. INTRODUCTION

1.1 Brief listing of the program

The School of Pharmacy at the University of Waterloo (UW) is the first new pharmacy school in Canada in over 20 years and the first in Ontario since 1953. The School accepted its first undergraduate cohort in January 2008. At that time, the Pharmacy building was under construction and the 120,000 sq. ft. facility was occupied by faculty, staff and students in January 2009.

The School is committed to expanding the frontiers of discovery to improve human health and well-being. Key to realizing this goal is the establishment of a rigorous graduate program on innovative, interdisciplinary and collaborative research in all aspects of pharmacy.

Sub-disciplines within pharmacy range broadly from those grounded in discovery-driven, chemical and biological pursuits to those linked with clinical applications and aspects of patient care and treatment. As a result, our proposal to establish a PhD Program (hereafter, the Program) has been guided by an acknowledgement of the fundamental link between the advancements in pharmaceutical sciences and the improvements in healthcare and health outcomes. The School’s current complement of faculty (15 Pharmaceutical and Applied Health Sciences Faculty and 21 Adjunct Faculty) reflects the diversity of disciplines inherent to pharmacy and the pharmaceutical sciences.

The Masters in Pharmacy program (M.Sc. Pharmacy) was approved by the Ontario Council on Graduate Studies (OCGS) on April 23 2010, and commenced on September 1, 2010. From inception to Winter 2012, 19 students have been enrolled in this thesis-based program and 2 students have defended. Since the School opened in 2007, there have been 12 PhD students supervised by Pharmacy Faculty through their cross-appointments in other UW departments. Based on the success of our M.Sc. program as well as our involvement in PhD supervision over the past 5 years, we believe that a significant and expanding number of students would choose to pursue a PhD program in Pharmacy at UW.

The proposed PhD Program leads to the Doctor of Philosophy degree. It is structured as a research-based thesis degree incorporating milestones that reflect the educational outcomes the Program. Program fees and program length are those set by the Graduate Studies Office of UW for a research-based program.

Several UW departments will be associated with this Program through collaborative research, facility and equipment utilization and cross departmental co-supervision and advisory guidance of program candidates. We expect that the following UW faculties/departments/schools currently interacting with our M.Sc. program as well as with pharmacy faculty-supervised PhD students will continue to do so within our proposed PhD program.

**Faculty of Science:** Departments of Biology, Chemistry, Physics & Astronomy; School of Optometry and Vision Science

**Faculty of Mathematics:** Departments of Applied Mathematics, Statistics and Actuarial Science

**Faculty of Engineering:** Departments of Chemical Engineering, Electrical and Computer Engineering
Faculty of Applied Health Sciences: Department of Kinesiology; School of Public Health and Health Systems

1.2 Method used for preparation of the brief

Following the successful development of the M.Sc. program, the development of the PhD program has been an important goal for the School of Pharmacy.

The PhD proposal brief was authored by a sub-committee of School of Pharmacy faculty, with frequent meetings, exchanges and consultation with all School of Pharmacy faculty. Tarek Mohamed, a PhD candidate in the Department of Chemistry (housed in Pharmacy) and also the Vice-President Internal Affairs and Finance of the Pharmacy Graduate Association (PhGA) provided comments on Volume I of the brief. Tarek was also the first M.Sc. graduate of the Pharmacy M.Sc. Program. As the School of Pharmacy’s Graduate Officer, Dr. Andrea Edginton directed the preparation of the brief. Ms. Sarah Rae, the Graduate Administrator, coordinated the required information and edited the brief.

Institutional data was provided by the Office of Research and assistance with the financial resources was given by Ms. Jennifer Keiffer and Ms. Mary Soulis of the UW Institutional Analysis and Planning office.

Information on library support was provided by Angela Madden, School of Pharmacy Librarian, in consultation with Mark Haslett, University Librarian.

Also consulted were Veronica Brown of the Centre for Teaching Excellence, Dr. Sue Horton, the Associate Provost of Graduate Studies, Lynn Judge, Director of Graduate Academic Services and Dr. Roland Hall, Associate Dean of Graduate Studies for the Faculty of Science.

The brief was approved by core faculty at the School of Pharmacy on May 8, 2012.

1.3 Objectives of the program

Consistency of the program with the UW mission and academic plan

Our Vision, Mission and Values have been developed with the clear understanding that we are an integral part of the University of Waterloo and we aim to support the overall University Mission.

The University of Waterloo's Mission is:

*to advance learning and knowledge through teaching, research, and scholarship, nationally and internationally, in an environment of free expression and inquiry.*

The Mission and Vision of the Faculty of Science are:

**Mission:** As a community of scientists, we are committed to transforming local and international education, discovery and knowledge transfer.

**Vision:** To be recognized globally as a preferred destination for students, researchers and partners seeking exceptional opportunities to learn and engage in scientific research, discovery and innovation.
The University of Waterloo’s guiding strategic document is its Sixth Decade Plan (2007 – 2017) (http://secretariat.uwaterloo.ca/SixthDecadePlanFinal.pdf). The School of Pharmacy’s Mission has been mapped to UW’s Sixth Decade Plan and is presented in Appendix 1A. The School of Pharmacy’s draft Constitution is presented in Appendix 1B and is currently being reviewed and finalized within the School of Pharmacy’s Strategic Planning Framework (Appendix 1C).

Program Requirements and Learning Outcomes

The objective of the PhD Program is to prepare students for advanced research careers in academia, government, healthcare or industry. The PhD will be awarded to those candidates who have:

I. completed requisite graduate courses
II. participated in graduate seminar
III. successfully defended a thesis proposal
IV. passed the comprehensive examination and,
V. completed a written thesis and its oral defence.

The PhD milestones are detailed in Section 4.

The learning outcomes for graduates of the PhD Program are as follows:

1. Complete a research-based thesis: graduates will complete a research project encompassing original, independent work developed through application of critical thought, technical expertise and problem-solving skills.
2. Develop a broad understanding of Pharmacy and the Pharmaceutical Sciences: graduates will differentiate among the Pharmaceutical Science disciplines such as drug delivery, pharmaceutics, pharmaceutical chemistry, pharmacokinetics, pharmacodynamics and health outcomes and describe how pharmacy integrates these disciplines.
3. Demonstrate depth of knowledge: graduates will demonstrate an appropriate depth of knowledge within their specific discipline.
4. Evaluate disciplinary context: graduates will demonstrate, in writing and oral presentation, how their research question is framed in the context of previous works within the discipline including critical evaluation of this literature.
5. Apply the scientific method: graduates will apply the scientific method in design of their research project and will apply appropriate statistical analyses.
6. Focus on innovation and discovery: graduates will contribute novel scientific ideas and/or technologies and/or products to their discipline.
7. Effective dissemination of knowledge: graduates will demonstrate effective communication skills through oral presentation of their research findings at a scientific forum and through publication of research works. It is also expected that graduates will communicate knowledge to a more varied audience through either scholarly or teaching activities.
8. Uphold ethical standards: graduates are expected to uphold the values inherent to academic pursuits. Ethical standards relating to academic integrity, human ethics and the ethical use of animals will be practiced at the highest level at all times.
As demonstrated by Tables 4.1 and 4.2, the Program is consistent with the graduate level degree expectations (GLDEs) as well as Pharmacy-oriented learning outcomes, respectively.

1.4 Admission requirements

The traditional route of entry into the Program is following completion of a M.Sc. degree or equivalent (see Section 4 for details on equivalency) with a 78% overall standing and three letters of reference of which at least two must be academic. For international students, evidence of English Language Proficiency certification (unless ELP exempt; see http://grad.uwaterloo.ca/students/prospective/ESLexemptions.html) is also required.

We expect that most students entering the Program will do so with a thesis-based M.Sc. degree. A non-traditional route of entry into the Program is through a mid-stream transfer from a M.Sc. program to the PhD Program or direct admission from a B.Sc. degree (PhD Direct). Both are detailed in Section 4.

Regardless of the route of entry into the Program, the admissions committee will require evidence that the student has fulfilled our M.Sc. outcomes, even in the absence of the M.Sc. degree. These outcomes are as follows:

1. Identify specific research questions and pose hypotheses
2. Design a realistic research program to answer these questions or test hypotheses
3. Collect, manage, analyze and present data in a scientifically appropriate fashion

This is to ensure that incoming students have the necessary background to successfully achieve the PhD Program learning outcomes (Table 4.1 and 4.2).

1.5 Structure & Effect of structure on quality

a) Structure

The PhD in Pharmacy is granted to candidates who have adequately reached the PhD graduate degree level outcomes (Table 4.1) as well as achieved the School of Pharmacy learning outcomes as listed in Table 4.2. Degree requirements and milestones for the Program are listed below:

- Three to five courses one-term (0.5 unit weight) graduate-level courses inclusive of PHARM610: Topics in Drug Development (see section 4.2.3.1), depending on route of entry into the Program
- Milestone 1: Academic Integrity Workshop Attendance (see section 4.2.3.2)
- Milestone 2: PhD Thesis Proposal (written and oral) (see section 4.2.3.3)
- Milestone 3: Satisfactory performance in a Comprehensive examination (see section 4.2.3.4)
- Milestone 4: PhD Graduate Seminar requirement (see section 4.2.3.5)
- Milestone 5: Submission and defence of a thesis, embodying the results of original research (see section 4.2.3.6)

The Program will follow a traditional format in terms of its pedagogical delivery. This is outlined in Table 4.3. In their first year, students will establish their supervisory committee, begin their course work and research as well as define and present their thesis proposal. Course work fulfills the outcomes of 1) breadth through a core course and 2) depth of knowledge through two elective courses (see Table 4.1 and 4.2). In this year, students also make a public presentation of their thesis proposal to their
supervisory committee and any interested parties so they can receive valuable feedback on their work. The thesis proposal provides the student with an opportunity to demonstrate the breadth and depth of knowledge as well as demonstrate an understanding of how their research aligns within their discipline. The thesis proposal is also a mechanism to assess the ability of the student to conceptualize and design research that is innovative.

The second year is devoted to intensive preparation for their comprehensive examination, completion of courses and continuation of research. The Comprehensives milestone allows the student to demonstrate and be assessed on their breadth and depth of their knowledge as well as their ability to present their arguments in a coherent, logical and scientific manner.

The third and fourth years of the student’s program are devoted to researching, writing, and defending the thesis. As the defense nears, students are also required to make a public presentation of their research, part of the Program’s commitment to the public intelligibility of scholarship. As participants and beneficiaries of the public university system, we are committed to the public intelligibility of our scholarship. In addition to the ability to carry out research and teaching at the highest intellectual level, our students are expected to be able to communicate the fruits of that research to a much wider audience than simply those with expertise in their particular area of specialty.

All aspects of the Program work together to provide a rigorous scholarly foundation on which our students can build successful and distinguished careers. The time-line for the Program is in line with Senate guidelines (http://gradcalendar.uwaterloo.ca/page/GSO-Min-Require-PhD) and is long enough to ensure that learning outcomes are met but short enough to ensure that students complete in a timely manner.

b) Effect of structure on quality

The Program requirements are designed to ensure the appropriate intellectual development of the student. The timeline to achieve these requirements is such that it allows students the necessary time to develop intellectually as well as to perform innovative research. Based on the mapping of learning outcomes, both the GDLEs and the Pharmacy-specific outcomes (Tables 4.1 and 4.2), all skills are practiced or assessed prior to the handing-in of the written thesis and the oral defence. While the written thesis and the oral defence of the thesis map to a significant portion of our learning outcomes, other courses and milestones are strategically placed to ensure that the student is ready to handle the written thesis and defence (see Table 4.3 in section 4 for timeline details).

Breadth and depth of knowledge is assessed considerably in the course work as well at the Thesis proposal defence and Comprehensive exam, all of which are normally completed in the first two years of the Program. Presentation skills are practiced and/or assessed in all years of the program with oral presentation at the Thesis Proposal Defence, Comprehensives exam, Graduate Seminar requirement and finally the Thesis Defence. Contribution to the discipline through innovative research is also not left solely to the thesis and oral defence but is assessed at the Thesis Proposal Defence (year 1) and is monitored during, at least, once yearly Advisory Committee meetings. The placement of both summative and formative assessments (for more on summative vs. formative assessments see section 1.8) throughout the 4 years of the Program will ensure that the student has adequate research and intellectual progress to continue in the PhD Program.
1.6 Program Content

The Program will be housed in the School of Pharmacy. The School’s core faculty are diverse in disciplines but fall under two major areas of research, Pharmaceutical Sciences Research and Applied Health Sciences Research. Because of the relatively small size of our faculty (15 core faculty) only one field has been identified (see section 1.9). We expect that as we reach our steady state faculty complement (20 full-time faculty) the fields will be further specialized. The following narrative outlines the content for this research-focused program with more details to be found in Section 4: Curriculum.

Regardless of the area of research the student is employed, there is an expectation that the student has a breadth of knowledge that covers both research areas. This is to ensure that the student leaves our Program with an understanding of how their specific discipline links to the interdisciplinary field of Pharmacy. This is the reason for inclusion of the core course PHARM610 ‘Topics in Drug Development’ that focuses on all areas of drug development including the pharmaceutical sciences, clinical sciences and post-marketing health outcomes research. Every PhD student entering the Program is required to take this course.

To ensure depth of knowledge, we have required two specialized graduate level courses that will fall directly in the area in which the student researches. These courses may take the form of didactic specialized courses (e.g. PHARM604: Gene Therapy, PHARM607: Advanced Pharmaceutical Analysis) or may be a more student-specific reading/review paper/data analysis courses (e.g. PHARM608A: Selected Topics in Pharmaceutical Sciences, PHARM611: Special Topics in Pharmacy Practice). Our courses have been identified/developed based on the needs of the faculty thus far with respect to the M.Sc. Pharmacy Program and the PhD students that faculty have co-supervised through cross-appointments in other Departments. With the recent hiring of faculty in the past year, we expect their needs will drive more graduate level courses to be developed.

Breadth and depth of knowledge is assessed primarily in the Comprehensives exam as well as in the thesis-related assessments as outlined in Tables 4.1 and 4.2.

The major research requirements within our program are focused around the thesis. This includes the thesis proposal, the written thesis and the oral thesis defence. The thesis proposal is included to allow for an early assessment (in Year 1) of the students’ abilities to (1) develop focused and relevant research questions and hypotheses to test; (2) identify realistic research goals; and (3) design a realizable program to address these questions and test hypotheses. The written thesis and oral defence is a typical structure for a research-based program and is highlighted in detail in Section 4: Curriculum. These components assess items 1-3 above but also the ability to (4) collect, manage, analyze and present data in a scientifically appropriate fashion.

One of our learning outcomes is focused on research innovation and discovery. Students will contribute novel scientific ideas and/or technologies and/or products to their discipline and they will do so in an inventor-centered environment unique to the University of Waterloo where all Intellectual Property (IP) belongs to the inventor. We believe that the culture of innovation at the University of Waterloo and the IP policies will be a draw to future students and will set our program apart from all other Pharmacy graduate programs in Canada.
1.7 Mode of delivery

The PhD Program is a traditional, science-based program. The courses and the milestones are all included to achieve a specified level of competence in areas outlined by our learning outcomes (Tables 4.1 and 4.2). Courses are primarily run face-to-face and we currently have no plans to include online courses for our students. This may change in the future as we have had much success with blended learning (online and face-to-face) courses in the undergraduate program.

1.8 Assessment of teaching and learning

Assessment of teaching and learning is both at the student level and at the Program level. Assessment will be based on the following:

1. **Summative assessment**
2. **Formative assessment**
3. **Program level assessment**

The *summative assessment* includes those components of the Program that are graded (i.e. courses) or have a pass/fail outcome (i.e. Milestones). A significant portion of our learning outcomes are addressed through the thesis and thesis defence (Tables 4.1 and 4.2) however student assessment must be not be left solely to the end of the program. As a result, completion of the Program requires both serial and parallel assessments. Parallel assessments are those that must be completed before the thesis defence and include the course requirements, Milestone 1: Academic Integrity Workshop and Milestone 4: Graduate Seminar. Serial assessments are those Program components that must be done in a linear fashion such that the student cannot continue in the Program with a fail. These include Milestone 2: Thesis proposal, Milestone 3: Comprehensive exam and Milestone 5: Thesis writing and oral defence. These three milestones are completed one after the other within a given timeline to ensure adequate intellectual development and research progress of the student. Ensuring that the student has adequately passed these summative assessments allows us to feel confident that the student has achieved all PhD Program learning outcomes.

The *formative assessments* include those components of the Program that allow the faculty/supervisor to gather information on how well the student is progressing on a more day-to-day level. The summative assessments allow us to determine if the student has achieved the learning outcomes while formative assessment allows us to determine if the student is progressing towards successful completion of the outcomes. These formative assessments include, at least, a once per year Advisory Committee meeting (may or may not be combined with a milestone assessment) with a resulting narrative report on student progress, a research progress report written by the student prior to the Advisory Committee meetings in year 3-5 (see section 4 Table 4.3) and day-to-day communication between the supervisor and the student. These can aid the Supervisor/Advisory Committee in assessing if the student is likely to be progressing positively towards reaching the Program outcomes and may help the Supervisor to provide additional support in the event that the student requires it.

The *program-level assessment* is completed at the departmental level, primarily through the Graduate Committee. Once per year, the Graduate Committee will meet to discuss the Program statistics such as milestones successfully achieved by current students, teaching assistant evaluations, course grades and any withdrawals. While this is not a formal process, it allows the Committee time to reflect on current practices and to determine if these practices are producing students who will successfully achieve the Program learning outcomes.
The students will be directly assessed based on both summative and formative criteria while the program will be assessed based on the success of the student community in Pharmacy.

1.9 Fields in the Program

Because we do not currently have our full complement of full-time faculty, we have proposed only one field. This encompasses the research of all current full-time faculty and we expect that as the program grows and new faculty are hired, there will be a separation of this field.

Field 1: Pharmaceutical Discovery & Evaluation

This field includes the sciences involved in the drug discovery pipeline and evaluation of pharmacotherapy. This includes the area of molecular pharmacology intended to elucidate the molecular basis of disease and the development of novel drug targets, leading to rational drug design and medicinal chemistry, which, in turn, take into consideration principles from pharmacokinetics, pharmacodynamics and toxicology. Also included in the field are the clinical and post-marketing phases of the drug discovery pipeline including pharmacotherapy in sub-populations (e.g. disease state or age) and evaluation of outcomes as well as pharmacoepidemiology. Currently, fifteen School of Pharmacy core faculty members (Drs. Beazely, Chang, Edginton, Edwards, Foldvari, Grindrod, Joseph, Maxwell, Nekkar, Rojas-Fernandez, Schneider, Spagnuolo, Slavcev, Waite, Wettig) are associated with this Field.
2 HUMAN RESOURCES

2.1 Resources for graduate programs only

Much has been achieved since 2004 when Jake Thiessen accepted the challenge of creating the best Pharmacy program in North America. Of Jake’s many strengths, perhaps the most significant was his understanding that most fundamental to achieving his goal of excellence was to hire the right people. The “right” people needed to share his desire for excellence; they had to be risk-takers to join a program that did not have a curriculum developed or a physical facility until January, 2009; they had to have passion for their work whether that was conducting world-class research or providing Pharmacy education in non-traditional ways. Jake interviewed every individual who joined the organization to ensure the right people were in place. While Jake is no longer our Director, his legacy is manifested in the exemplary group of faculty and staff at University of Waterloo School of Pharmacy. The focus on finding the right people continues. We have not yet attained our full complement although we do now have a critical mass of researchers, instructors and clinicians.

All faculty members are committed to the proposed graduate program, and we expect that of the 30 FTEs that will ultimately comprise the School of Pharmacy’s faculty, more than 20 FTEs will take an active role in graduate student supervision. Remaining faculty members are those who will teach primarily undergraduate Pharmacy students. Although clinical adjunct faculty will be extensively involved in undergraduate teaching, they will also contribute to the proposed graduate program as resources and as members of thesis advisory committees.

Our faculty and staff are grouped into five categories: tenured/tenure-track faculty (Category 1; Table 2.1), part-time adjunct faculty or non-core faculty (Category 2; Table 2.1), associated faculty (Category 5; Table 2.1), sessionals and staff. Part-time adjunct faculty are primarily practicing clinicians who teach in the undergraduate program. These faculty can, and are, sitting on graduate thesis advisory committees. Other adjunct faculty are the associated faculty (Category 5; Table 2.1) who may participate by research collaborations and by sitting as members on graduate thesis advisory committees. As of March 31, 2012, we have 15 full-time tenured/tenure-track faculty; we have 7.45 full-time equivalents (FTE) in adjunct faculty or sessional positions (29 individuals comprise the part-time faculty FTE); and 19.7 FTE in staff positions (23 individuals comprise the staff FTE).

Of the 15 tenured/tenure-track faculty members in the School of Pharmacy, 13 are cross appointed to other departments or schools at UW. Each faculty member, his or her research interests and cross appointments are described below.

- **Dr. Michael Beazely** is a tenure-track Assistant Professor of Pharmaceutical Sciences. His research focuses on understanding how growth factor receptors and G protein-coupled receptors modulate ion channels in excitatory neurotransmission, neuroprotective mechanisms and neuronal development. He also focuses on intracellular signalling pathways downstream of GPCRs such as the 5-HT7 receptor and growth factor receptors such as the PDGF receptor.

  Dr. Beazely is cross-appointed to the UW Departments of Biology and Chemistry.

- **Dr. Feng Chang** is a tenure-track Assistant Professor. Dr. Chang serves as the Chair of Rural Pharmacy with Gateway Rural Health Research Institute (www.gatewayresearch.ca). Her
research interests focus on delivering integrated interprofessional patient care solutions to ensure safe, effective, and efficient medication use, particularly in the rural elderly; amplifying local health care professional capacity; and expanding access to care that leads to defined outcomes and demonstrable impact.

Dr. Chang holds a cross-appointment in the School of Public Health and Health Systems at the University of Waterloo

- **Dr. Andrea Edginton** is a tenure-track Assistant Professor of Pharmaceutical Sciences. Her research focuses on building virtual organisms to study the pharmacokinetics of drugs and environmental contaminants. These physiologically-based pharmacokinetic (PBPK) models provide a mechanistic means of understanding how changes in physiology can affect the absorption, metabolism and excretion of a chemical. PBPK models are predictive and can be used to scale pharmacokinetics among species (e.g., from rat to human) and within a species (e.g., from healthy adults to children or patients) with an eye toward determining the right dose of medicine or determining differential risks associated with contaminant exposure in human health risk assessment.

Dr. Edginton is cross-appointed to the UW Department of Biology.

- **Dr. David Edwards** is a tenured Professor and the Hallman Director and Associate Dean, Pharmacy. His research has focused on the effect of food, beverages, herbal products and other drugs on drug metabolism and disposition. He is the author of more than 85 papers in the biomedical literature including several investigating the mechanism and significance of the interaction between grapefruit juice and prescription medication.

- **Dr. Marianna Foldvari** is a tenured Professor of Pharmaceutical Sciences, a Tier I Canada Research Chair in Bionanotechnology and Nanomedicine, and the Associate Director of Research and Graduate Studies. Her research program focuses on the development of intelligent delivery systems and biomolecular devices. Her objectives are to develop new, non-invasive technologies to deliver therapeutic agents into the body to specifically target diseased tissues, and to investigate the fundamental properties of these delivery technologies and the cells and tissues they target.

Dr. Foldvari is cross-appointed to the UW Departments of Chemistry and Chemical Engineering.

- **Dr. Kelly Grindrod** is a tenure-track Assistant Professor. Her research interests include the role web technologies play in the delivery of primary care services. She is currently examining the use of social media in community-based pharmacy practice. She is also interested in how community-based health professionals’ perceive electronic interventions for modifying prescribing (e.g., internet-based academic detailing).

Dr. Grindrod holds a cross-appointment in the School of Public Health and Health Systems at the University of Waterloo
• **Dr. Jamie Joseph** is a tenure-track Assistant Professor of Pharmaceutical Sciences. Two themes are explored in his research: (1) ascertaining how the β-cell senses glucose and (2) searching for ways to reduce the number of islets required for islet transplantation. These two themes are connected in that the first theme provides novel targets to enhance islet function in the second theme. His long-term goals are to discover novel drug targets for enhancing islet function to treat type 2 diabetes and to develop a renewable source of β-cells (e.g., cell therapy) to treat both type 1 and type 2 diabetes.

Dr. Joseph is cross-appointed to the UW Departments of Biology and Chemistry.

• **Dr. Colleen Maxwell** is a tenured Professor. Dr. Maxwell’s primary research interests are in the areas of Pharmacoepidemiology and Aging with a particular focus on Alzheimer’s disease and vascular dementia, depression and health services and outcomes research. She is also involved in national and international research examining the health and quality of care needs of older residents within Assisted Living and Long Term Care settings. She holds a cross-appointment in the School of Public Health and Health Systems at the University of Waterloo and is an Adjunct Scientist with the Institute for Clinical Evaluative Sciences (ICES) in Toronto.

Dr. Maxwell holds a cross-appointment in the School of Public Health and Health Systems at the University of Waterloo

• **Dr. Praveen Nekkar** is a tenure-track Assistant Professor of Pharmaceutical Sciences. His major research focus is on medicinal and bioorganic chemistry. His main objective is to explore rational drug design aided by molecular modelling techniques; small molecule synthetic organic/medicinal chemistry, including method development; solid phase peptide synthesis of bioactive peptides / peptidomimics; modern analytical techniques such as nuclear magnetic resonance spectroscopy, mass spectroscopy and high performance liquid chromatography; and development of high-throughput biochemical screening protocols to discover lead candidates.

Dr. Nekkar is cross-appointed to the UW Departments of Biology and Chemistry.

• **Dr. Carlos Rojas-Fernandez** is a tenure-track Assistant Professor and a Schlegel Research Chair in Geriatric Pharmacotherapy. His research has the goal to enhance the quality of life and care of senior citizens by addressing the safe and appropriate use of medications across different care settings. Opportunities for optimising medications in older people are identified, prioritized, and developed into appropriate clinical research projects utilizing various research methods, as appropriate, including population-based methods, patient-level implicit and explicit methods, as well as qualitative methods.

Dr. Rojas-Fernandez holds a cross-appointment in the School of Public Health and Health Systems at the University of Waterloo.

• **Dr. Eric Schneider** is a tenured Associate Professor. Dr. Schneider’s areas of interest and expertise related to education include curricular assessment as well as interprofessional education. He is also interested in clinical research centered on chronic disease management, quality of care, and utilization of healthcare teams in patient management.
• **Dr. Roderick Slavcev** is a tenure-track Assistant Professor of Pharmaceutical Sciences. His research focuses on bacteriophage-based biotechnology and includes the use of coliphages to design and construct vectors for the development of novel vaccines, pharmaceuticals and gene delivery systems, and the identification and application of novel phage genomic antibacterial genes with potential phage therapy applications. Dr. Slavcev also has an MBA in biotechnology management and commercialization. As the Shopper’s Drug Mart Professor of Business and Entrepreneurship he directs and delivers the School of Pharmacy's novel business curriculum initiative.

Dr. Slavcev is cross-appointed to the UW Departments of Biology, Chemistry and Chemical Engineering.

• **Dr. Paul Spagnuolo** is a tenure-track Assistant Professor of Pharmaceutical Sciences. His research focuses on investigating the potential anti-cancer treatment applications of nutraceuticals. Specifically, he is interested in 1) identifying novel anti-cancer nutraceuticals, 2) determining the biochemical and molecular mechanisms by which nutraceuticals regulate cell death processes (i.e., apoptosis, autophagy) and 3) characterizing nutraceutical/chemotherapeutic drug interactions. The goals of his research are to improve the efficacy and safety of cancer treatments and to define the role of nutraceuticals in cancer chemotherapy.

• **Dr. Nancy Waite** is a tenured Associate Professor of Pharmacy Practice and the Associate Director of Practice-Based Education. With the School of Pharmacy’s curriculum acting as a living laboratory, she is examining the impact of curricular mapping on student achievement of outcomes, methods of student outcome assessment and comparison of different instructional methods. While this research involves many components of the curriculum, the areas of interprofessional education, patient safety, co-operative experiential education, business, and community service learning are her current areas of focus.

Dr. Waite is cross-appointed to the UW School of Optometry.

• **Dr. Shawn Wettig** is a tenure-track Assistant Professor of Pharmaceutical Sciences. His research focuses on the design, synthesis and characterization of novel surfactants with an eye toward their application in drug delivery. His current research projects are focused on the study of novel cationic lipid DNA complexes with potential application to genetic therapies, the characterization of novel amino acid derivatives for transdermal drug delivery, and the development of fluorescent surfactants for mechanistic studies.

Dr. Wettig is cross-appointed to the UW Departments of Biology, Chemistry and Chemical Engineering.

School of Pharmacy faculty supervise eighteen Master’s, ten PhD candidates and two Postdoctoral Fellows. However, as the PhD graduate program in Pharmacy does yet not exist, PhD candidates are pursuing graduate degrees through enrolment in the departments in which their Pharmacy supervisors are cross-appointed. We expect that some of these students will transfer to Pharmacy once a PhD program has been established, in the same way as M.Sc. students transferred when the M.Sc. Pharmacy program commenced in 2010.
2.1.1 List of faculty by field

There are 15 full-time tenured/tenure-track faculty members. There is currently 1 vacant faculty position for the Associate Dean, Graduate Studies & Research that has been interviewed for and negotiations are ongoing.

We expect that we will be hiring several more faculty as part of the original plan for the School of Pharmacy, but we will not be able to advertise for new positions until after our permanent budget is approved. We are hoping that the budget will be approved before the new Provost commences in July 2012, but this is difficult to predict.

All full time tenured/tenure-track faculty (Category 1; table 2.1), part-time adjunct faculty or non-core faculty (Category 2; Table 2.1) and associated faculty (Category 5; Table 2.1) are permitted to sit on graduate student advisory committees. Only full time tenured/tenure-track faculty (Category 1; Table 2.1) can co-supervise/supervise PhD students. Only those faculty with ADDS status (denoted as ‘Full’ under Supervisory Privileges’ in Table 2.1) can solely supervise a PhD student.

Table 2.1 lists faculty members who will be involved in the PhD Program in Pharmacy, identifies their gender, appointment status, home unit affiliation and extent of graduate supervisory privileges.
TABLE 2.1

<table>
<thead>
<tr>
<th>Faculty Name &amp; Rank</th>
<th>Gender (M/F)</th>
<th>Home Unit</th>
<th>Supervisory Privileges</th>
<th>Pharmaceutical Discovery and Evaluation*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Beazely - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Feng Chang - Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>David Edwards - Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Full</td>
<td>X</td>
</tr>
<tr>
<td>Andrea Edginton - Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Marianna Foldvari - Professor</td>
<td>F</td>
<td>PHARM</td>
<td>Full</td>
<td>X</td>
</tr>
<tr>
<td>Kelly Grindrod - Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Jamie Joseph - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Full</td>
<td>X</td>
</tr>
<tr>
<td>Colleen Maxwell - Professor</td>
<td>F</td>
<td>PHARM</td>
<td>Full</td>
<td>X</td>
</tr>
<tr>
<td>Praveen Nekkar - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Full</td>
<td>X</td>
</tr>
<tr>
<td>Carlos Rojas-Fernandez - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Eric Schneider - Associate</td>
<td>M</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Roderick Slavcev - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Paul Spagnuolo - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
<tr>
<td>Nancy Waite - Associate</td>
<td>F</td>
<td>PHARM</td>
<td>Masters, PhD (co-sup)</td>
<td>X</td>
</tr>
</tbody>
</table>

Category 1: Tenured or tenure-track core Faculty whose graduate involvement is exclusively in the program under review.
<table>
<thead>
<tr>
<th>Name</th>
<th>Sex</th>
<th>Title</th>
<th>Program</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shawn Wettig - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Full</td>
<td>X</td>
</tr>
</tbody>
</table>

**Category 2: Non-tenure-track core Faculty whose graduate involvement is exclusively in the program under review.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Sex</th>
<th>Title</th>
<th>Program</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Janie Bowles-Jordan - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Brett Barrett - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Grant Bunston - Clinical Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Barb Coulston - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Sally Ebsary - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Venita Harris - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Certina Ho - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Danny Ho - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Verna Hutchinson - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Andrea Main - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Jeff Nagge - Clinical Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Nardine Nakhla - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Tejal Patel - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Barry Power - Clinical Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Cynthia Richard - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Cathy Schill - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Victoria Sills - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Angela Stark - Clinical Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>Anson Tang - Clinical Lecturer</td>
<td>M</td>
<td>PHARM</td>
<td>Masters</td>
<td></td>
</tr>
<tr>
<td>Luis Viana - Clinical Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Advisory Committee</td>
<td></td>
</tr>
</tbody>
</table>
### Category 5: Other core Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Department</th>
<th>Title</th>
<th>Advisory Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Parniak - Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Ross Tsuyuki - Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Klaus Schaffler - Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Owen van Cauwenberghe - Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Alan Viau - Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Gideon Koren - Research Professor</td>
<td>M</td>
<td>PHARM</td>
<td>Research Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Katariina A. Skolnik - Research Professor</td>
<td>F</td>
<td>PHARM</td>
<td>Research Professor</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Lisa Dolovich - Associate</td>
<td>F</td>
<td>PHARM</td>
<td>Associate</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Barbara Farrell - Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Assistant</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Frederick FJ (Joe) Lee - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Assistant</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Linda Lee - Assistant</td>
<td>F</td>
<td>PHARM</td>
<td>Assistant</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Tom Smiley - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Assistant</td>
<td>Advisory Committee</td>
</tr>
<tr>
<td>Michael Sullivan - Assistant</td>
<td>M</td>
<td>PHARM</td>
<td>Assistant</td>
<td>Advisory Committee</td>
</tr>
</tbody>
</table>

**Notes:**
* The PhD Pharmacy program has only one specialised field, Pharmaceutical Discovery and Evaluation, which encompasses the research of all Core Faculty.
1. This is the department of the faculty member associated with the program under review. Appointment Type and Department Org Unit are as recorded in Human Resources.
2. The level of supervisory privileges held by each faculty member, e.g. full, masters, PhD co-supervision only, etc.
2.1.2 External operating research funding

Table 2.2 presents research funding secured by Pharmacy faculty by source since the School’s inception in 2006 until 2012. As most grants run over several years, the amounts reflect dollar figures dispersed in the year in which they were paid.

The School of Pharmacy is a new academic unit within the Faculty of Science and ten of the School’s fifteen faculty members are Assistant Professors early in their academic careers, so also reported in Table 2.2 are amounts secured for equipment, which have allowed faculty to purchase state-of-the-art instruments for research. Start-up grants are not reported in Table 2.2 but amount to $3,100,000 for the core faculty.

Of note, more than $5 million since 2006 have been secured by School of Pharmacy faculty through competitive grants, public and private sector funding and internal awards. We feel that this amount reflects positively on the productivity of senior faculty and the potential of junior faculty, as well as on the ability of the School to offer a well-funded graduate program.
### TABLE 2.2

Operating Research Funding ($) by Source and Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Tri-Agency Awards</th>
<th>Public Sector and Non-Profit Funding</th>
<th>Private Sector Funding</th>
<th>Internal Awards</th>
<th>Equipment Awards</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>2005/06</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2006/07</td>
<td>$121,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$121,000</td>
</tr>
<tr>
<td>2007/08</td>
<td>$467,000</td>
<td>$246,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$713,000</td>
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<tr>
<td>2008/09</td>
<td>$447,000</td>
<td>$575,000</td>
<td>$0</td>
<td>$0</td>
<td>$125,000</td>
<td>$1,147,000</td>
</tr>
<tr>
<td>2009/10</td>
<td>$523,000</td>
<td>$627,000</td>
<td>$311,000</td>
<td>$0</td>
<td>$251,000</td>
<td>$1,712,000</td>
</tr>
<tr>
<td>2010/11</td>
<td>$539,000</td>
<td>$321,000</td>
<td>$30,000</td>
<td>$8,000</td>
<td>$31,000</td>
<td>$929,000</td>
</tr>
<tr>
<td>2011/12*</td>
<td>$553,000</td>
<td>$252,000</td>
<td>$5,000</td>
<td>$8,000</td>
<td>$33,000</td>
<td>$851,000</td>
</tr>
<tr>
<td>Totals</td>
<td>$2,650,000</td>
<td>$2,021,000</td>
<td>$346,000</td>
<td>$16,000</td>
<td>$440,000</td>
<td>$5,473,000</td>
</tr>
</tbody>
</table>

1. Data is reported on the primary investigator only. Table includes research awards for primary investigators identified in Table 1. Data is reported for the 7 most recent fiscal years, from 2005/06 to 2011/12, inclusive. 2011/12 data is preliminary and reported as of January 31 2012.
2. The fiscal year used when reporting research awards is the fiscal year used by the government granting agencies. The government fiscal year runs from April 1st until March 31st, thus the 2010/11 fiscal year runs from April 1st, 2010 until March 31st 2011.
3. Excludes equipment grants (e.g. NSERC RTI).
4. Excludes equipment grants and internal awards (e.g. CFI, UW-RIF, UW-SSHRC).
5. Includes funding received from Industry partners.
6. Includes UW-RIF and UW-SSHRC.
7. Includes NSERC-RTI and CFI.
2.1.3 Graduate supervision

Table 2.3 lists completed and ongoing supervision of master's, doctoral and post-doctoral candidates by faculty members as well as Post-PharmD Residency or Fellowship supervision. The School of Pharmacy is a new academic unit, so current supervision numbers in parentheses represent students accepted into collaborating UW departments through cross-appointment of School of Pharmacy faculty into these departments.
TABLE 2.3

Completed and Current Numbers of Thesis Supervisions by Faculty Member

<table>
<thead>
<tr>
<th>Faculty Name and Rank 1</th>
<th>Career 2</th>
<th>Current 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Post-PharmD Residency or Fellowship 4</td>
<td>Master's</td>
</tr>
<tr>
<td>Michael Beazely - Assistant</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Feng Chang - Assistant</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>David Edwards - Professor</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>Andrea Edgeinton - Assistant</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Marianna Foldvari - Professor</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Kelly Grindrod - Assistant</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Jamie Joseph - Assistant</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Colleen Maxwell - Professor</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>Praveen Nekkar - Assistant</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Carlos Rojas-Fernandez - Assistant</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>Eric Schneider - Associate</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>Roderick Slavcev - Assistant</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Paul Spagnuolo - Assistant</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Nancy Waite - Associate</td>
<td>9</td>
<td>—</td>
</tr>
<tr>
<td>Shawn Wettig - Assistant</td>
<td>—</td>
<td>2</td>
</tr>
</tbody>
</table>

Category 2

<table>
<thead>
<tr>
<th></th>
<th>—</th>
<th>—</th>
<th>—</th>
<th>—</th>
<th>—</th>
<th>—</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Janie Bowles-Jordan - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Brett Barrett - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Grant Bunston - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Barb Coulston - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sally Ebsary - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Venita Harris - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Certina Ho - Clinical Assistant</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<td>Danny Ho - Assistant</td>
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<td>Tejal Patel - Clinical Assistant</td>
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Cynthia Richard - Clinical Assistant | — | — | — | — | — | — | —  
Cathy Schill - Clinical Assistant | — | — | — | — | — | — | —  
Victoria Sills - Clinical Assistant | — | — | — | — | — | — | —  
Angela Stark - Clinical Assistant | — | — | — | — | — | — | —  
Luis Viana - Clinical Assistant | — | — | — | — | — | — | —  

| Category 5 |  
| Michael Parniak - Professor |  
| Ross Tsuyuki - Professor |  
| Klaus Schaffler - Professor |  
| Owen van Cauwenberghe - Professor |  
| Alan Viau - Professor |  
| Gideon Koren - Research Professor |  
| Katariina Aleska Skolnik - Research Professor |  
| Lisa Dolovich - Associate |  
| Barbara Farrell - Assistant |  
| Frederick FJ (Joe) Lee - Assistant |  
| Linda Lee - Assistant |  
| Tom Smiley - Assistant |  
| Michael Sullivan - Assistant |  
| Owen van Cauwenberghe |  

Notes:
1. Faculty members are listed in the categories specified in Table 2.1.
2. Numbers in parentheses represent students supervised in graduate programs in other departments. These figures show completed supervisions, so students who withdrew from their graduate program, regardless of reason, are not included in this table.
3. Numbers in parentheses represent students supervised in graduate programs in other departments.
4. The two major graduate training programs for students with the undergraduate Doctor of Pharmacy (PharmD) degrees are the Post-doctoral Residency, or Post-doctoral Fellowship. A Residency program is typically 1 year in length and consists of a variety of clinical rotations and a research paper, overseen by a Residency Director. The Fellowship program builds on this and is typically 2 years in length. Supervisions indicated above are those where Faculty members were the supervisor and director of the student’s research during the Residency/Fellowship.
5. None of the Category 5 adjuncts have supervised a graduate student thus far in Pharmacy although many are independent researchers with long histories of graduate student supervision at their own institutions.
2.1.4 Commitment of faculty from other graduate programs/other institutions

Pharmacy faculty are cross-appointed to UW Departments (see section 2.1). As such, 12 PhD candidates have been or are under the supervision of Pharmacy faculty and are co-supervised by a faculty member in the UW department in which the Pharmacy supervisor holds his or her cross-appointment.

We expect that faculty from these departments will be committed to the graduate program through their cross-appointment to Pharmacy, continued and newly appointed co-supervision of graduate students, cross-disciplinary research projects and graduate teaching.

2.2 Quality of faculty

The faculty in the school of pharmacy provide research expertise over a wide range of disciplines including chemistry, biology, pharmaceutical sciences and applied health. As a new school, the majority of the faculty are still in tenure track positions (10/15), but have already made significant accomplishments. In the period 2008-2012, the faculty have attracted over 7.5 million dollars in external research funding as principle or co-principle investigator. Awards earned by faculty members in the same period include a tier 1 Canada Research Chair, a CIHR new investigator award, and two Ontario early researcher awards. The presence of the faculty in the international community is demonstrated by the activity in 18 different journal editorial boards. Collaborations (section 4.5) with academic institutions (e.g. University of Saskatchewan, University of Toronto, Massachusetts Institute of Technology, Stanford University), industry/hospitals (e.g. Bayer Technology Services Germany, Princess Margaret Hospital University of Toronto, Children’s Hospital of Philadelphia, Jewish General Hospital in Montreal Quebec) and government bodies (e.g. Ontario Health Human Resources Research Network (Ottawa), US Food & Drug Administration, BC Ministry of Health’s Pharmaceutical Services Division, Canadian Institute for Health Information, Public Health Agency of Canada) both within Canada and abroad demonstrate the breadth of research opportunities in which graduate students may participate. The clinical expertise of the faculty is highlighted by having 2 Fellows of the American College of Clinical Pharmacists. Research carried out by pharmacy faculty members is represented in high impact journals including Science, Diabetes, Nano-Letters, Langmuir, Clinical Pharmacology and Therapeutics and Neuroscience Letters. As an example of the impact of these publications, in 2011 there were over 950 citations to publications from UW pharmacy faculty.
3 PHYSICAL AND FINANCIAL RESOURCES

The School of Pharmacy facilities are a showpiece both for our program and for the Kitchener-Waterloo region. The building has won three architectural awards and is highly functional with state-of-the-art technology. Recent completion of the fourth floor (early 2011) has allowed our researchers to have more laboratory space onsite, and has increased offices for both faculty and graduate students.

The School of Pharmacy, officially opened in April 2009, is the anchor of University of Waterloo’s downtown Kitchener Health Sciences Campus. The campus has attracted visitors from various countries and encouraged development and revitalization of other properties in the downtown core. The City of Kitchener estimates that since the announcement of the Health Sciences Campus, more than $150 million in capital development has taken place.

3.1 Library Resources

The uWaterloo Library comprises the Dana Porter Library, Davis Centre Library, Musagetes Architecture Library, the Witer Learning Resource Centre (Optometry), Health Sciences Campus Learning Resource Centre, and the Federated and Affiliated College Libraries. In addition, the libraries of Career Services and Teaching Resources and Continuing Education are catalogued and accessible to uWaterloo community members. The combined collections of these libraries exceed 7 million items. The Electronic Library, an extensive and growing collection of resources and services, receives approximately 15,000 hits a day. Students have access, both on campus and remotely, to more than 8,000 full-text electronic journals.

The collections and services provided by the uWaterloo Library support a wide range of undergraduate and graduate programs. With respect to the PhD program under review herein, material will be collected to support learning, teaching and research with emphasis on the following areas:

- pharmacology
- pharmacokinetics
- intelligent drug delivery
- microbiology
- professional practice
- surfactants

The decision to purchase Library materials for the Pharmacy PhD program is the responsibility of the Liaison Librarian for Pharmacy in consultation with the Faculty Library Representative. Selection will be guided by a Collection Development Policy, which will be developed by the Liaison Librarian in consultation with faculty members in the School of Pharmacy. Materials are obtained in a variety of ways including firm orders, open orders, approval plans, and subscriptions.

The Library obtains resources in electronic format whenever possible and practical. Some electronic resources are obtained through membership in the Ontario Council of University Libraries (OCUL) and the Canadian Research Knowledge Network (CRKN), and some are obtained directly by the uWaterloo Library. Access to and use of electronic resources is generally governed by licence agreements with the publisher or vendor.

Some key resources purchased for Pharmacy include the following:

- International Journal of Pharmaceutical Compounding
- Therapeutic Drug Monitoring
- e-Therapeutics+
- Lexi-Comp Academic Solution
The current journal collection was compared with the 2010 American Association of Colleges of Pharmacy (AACP) core list of 79 journals of specific interest to Pharmacy. Of these journals on the core list, 69 are available through the uWaterloo Library. Most have been acquired through purchase of electronic journal packages. Five have ceased publication and one is available via document delivery from the University of Guelph.

The Library’s collection was compared with the list of titles recommended for first purchase on the AACP’s Basic Resources for Pharmacy Education, January 2012 edition. Of the 115 titles, 78 are in the Pharmacy collection, 16 more are available electronically, with 6 more print volumes at other uWaterloo library locations.

The Library, along with the libraries of the University of Guelph (UG) and Wilfrid Laurier University (WLU), is a member of the Tri-University Group of Libraries (TUG) consortium. The University of Guelph’s collection supporting its Veterinary Science program is of specific interest to the School of Pharmacy and is likely to enhance the depth and breadth of local material available to support Pharmacy. Five additional titles from the AACP list are available at Guelph.

In addition to resources purchased specifically for Pharmacy, the Library subscribes to a variety of databases that would be of interest to the School of Pharmacy. These include the following:

- CancerLit (1963-)
  The Cochrane Library
- DART – Development and Reproductive Toxicology (1965-)
- EMIC – Environmental Mutagens Information Centre (1965-)
- General Science Full Text (1984-)
- Scopus (all subjects included cited reference searching, 1966-)
- Toxline (1965-)

3.1.1 Access to Print Collections

The Library’s print collections for Pharmacy are housed in the Health Sciences Campus Learning Resource Centre (HSCLRC), which occupies 93 m² on the foundation level of the School of Pharmacy building. The HSCLRC is maintained and managed by the School of Pharmacy and provides open study spaces and carrels, as well as group study rooms for students. Access to the entire Library collection, as well materials held by UG and WLU, is available through the Web accessible tool known as PRIMO (http://primo.lib.uwaterloo.ca). The Library’s automated circulation system allows users to charge out materials during the hours that the Library or HSCLRC is open and to renew items online any time.
Except for the current issues of print journals and reference materials, most of the material in the Library’s collection circulates. Faculty, graduate students and staff may borrow most monographs for a term at a time.
The Library also delivers to faculty, students and staff copies of print journal articles from any of the uWaterloo Library locations, and from the libraries of the uWaterloo-affiliated and federated colleges and universities. Faculty, students and staff can also place holds on books from any of these libraries for pickup at any of the uWaterloo Libraries’ circulation desks or at the HSCLRC. Books and journal articles not owned by the uWaterloo Library but held by UG or WLU may be requested through PRIMO. Books and copies of journal articles are delivered to faculty, students and staff within three working days. The cost is of these services is absorbed by the Library.

In partnership with UG and WLU, the Library owns a facility, known as the Annex, which is used to house low-use print research material. In keeping with the University’s research-intensive status, an agreement among the TUG libraries ensures that a last copy is maintained in perpetuity. The Preservation of Last Copy Agreement can be found at http://www.lib.uwaterloo.ca/staff/irmc/last_copy_agreement_sept06.html. As with material from UG and WLU, books and copies of journal articles housed in the Annex are made available to faculty, students and staff within three working days. The cost is absorbed by the Library.

3.1.2 Access to Electronic Resources

The primary tool for accessing electronic resources selected by the Library is its Web site (http://www.lib.uwaterloo.ca). This site organizes and provides access to licensed resources available only to uWaterloo faculty, students and staff, as well as Web resources freely available to anyone. The site also provides access to electronic resources hosted by the OCUL Scholars Portal program (http://www.scholarsportal.info/index.html) and available to the uWaterloo community through the Library’s participation in consortia purchasing through OCUL. In addition, many of the Library’s electronic resources can be found through a search of Google Scholar (http://scholar.google.com/).

The Library uses linking technology (SFX) to enable users to link directly from research databases to the uWaterloo Library full-text electronic journal subscription or to the catalogue record for holdings and call number information. The Library also provides access to RefWorks, bibliographic management software. uWaterloo faculty, students and staff may access electronic research databases and full-text electronic journals from off-campus via the Library’s Proxy Server / Connect from Home feature. In addition, the Pharmacy building has wireless Internet access, allowing students, faculty and staff to access electronic resources from anywhere in the building.

3.1.3 Statistics and Numeric Data

Also available to members of the uWaterloo academic community are the data holdings of <odesi>, OCUL’s digital repository for social science data (http://odesi.ca). <odesi> provides web access to resources such as the Statistics Canada surveys and datasets, including the Canadian Census, through the Library’s membership in the Data Liberation Initiative (DLI) and Canadian public opinion polls.

Access is also available to the data holdings of the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan, in Ann Arbor, Michigan (http://www.icpsr.umich.edu/icpsrweb/ICPSR/).

3.1.4 Access to Resources from Institutions other than the TUG consortium

The Interlibrary Loan/Document Delivery (ILL) service provides faculty, students and staff with books, copies of journal articles, theses, and government documents from libraries within Canada and elsewhere. The uWaterloo Library uses OCUL’s RACER Web-based interlibrary loan system.
(http://racer.scholarsportal.info/vdx/index.html) to facilitate ILL access and service for users. With minor exceptions, the cost for this service is absorbed by the Library.

Canadian university libraries extend in-person borrowing privileges to faculty, students and staff from across the country. Faculty, students and staff are entitled to borrowing privileges at participating libraries (http://www.coppul.ca/rb/rbindex.html).

3.1.5 Information Services

Information Literacy: Research Skills, Critical Appraisal, Ethical Use

Drawing from the Ontario Council of Academic Vice-Presidents’ Guidelines for University Graduate Degree Level Expectations and the Association of College and Research Libraries’ Information Literacy Competency Standards for Higher Education, the Liaison Librarians develop information literacy-related activities and materials, in consultation with faculty. These may include the development of online modules, research guides and screencasts as well as seminars and outcomes-based workshops for students in the program. These sessions support graduate students completing their literature reviews, comprehensives and graduate information research endeavours as part of their degree requirements and complement faculty mentoring in the same areas.

Reference/research assistance is available in person or by telephone, e-mail, and on-line chat (http://www.lib.uwaterloo.ca/asklib/index.html). Graduate students are kept informed of new developments in the Library through news @ your library (http://www.lib.uwaterloo.ca/newsatlib/), an electronic newsletter prepared periodically and distributed to graduate students via the University’s Graduate Studies listserv.

3.1.6 Financial Support

Since fiscal 2007/08 approximately $150,000 has been spent annually for Pharmacy information resources. Most of the expenditures have been used for subscriptions to online resources.

It is important to note that in addition to resources purchased specifically for Pharmacy, resources purchased for other graduate programs will also support Pharmacy. These graduate programs include those in the uWaterloo Departments of Biology, Chemical Engineering, Chemistry, Health Studies and Gerontology, and Kinesiology, as well as in the School of Optometry.

3.2 Laboratory Resources

The School of Pharmacy research laboratory facilities have been constructed to support state-of-the-art research in bio-nanotechnology, drug delivery, and other multidisciplinary studies leading to discovery of novel drug targets for diseases like diabetes and Alzheimer’s disease.

The equipment located in the School of Pharmacy presents a core resource for the full-spectrum of technologies needed in pharmacological research and divided into two major facilities: the Pharmacy Core Research Facility and Regular Department facilities.

3.2.1 Pharmacy Core Research Facility instruments:
1. **SpectraMax M5 multimode microplate reader (Molecular Devices)**

The SpectraMax M5 is a dual-monochromator, multi-detection microplate reader with a triple-mode from cuvette port up to 384-microplate reading capability. Detection modalities include absorbance (UV-Vis), fluorescence intensity, fluorescence polarization, time-resolved fluorescence and luminescence. Endpoint, kinetic, spectrum and area-well scanning read types and the path-check sensor allow homogeneous and heterogeneous biochemical- or cell-based microplate assays to be performed. The SpectraMax easily converts and optimizes very-low-throughput to medium-high-throughput assays for faster, more precise results.

2. **Agilent 2100 bioanalyzer automated lab-on-a-chip system (MJS Biolynx/Agilent)**

Miniaturization of analytical instrumentation has many advantages over conventional techniques, including improved data precision and reproducibility, short analysis times, minimal sample consumption, improved automation and integration of complex workflows. The Agilent 2100 can be used for both electrophoretic separation and flow cytometric analysis of cell fluorescence, making this bioanalyzer indispensable in molecular biology and biochemistry. The Agilent 2100 bioanalyzer has a range of analysis kits available: (1) on-chip flow cytometry to acquire dual-colour, cell-based fluorescence data; (2) RNA quality check with RIN, the industry standard for RNA analysis; (3) DNA size and quantity determination for high-resolution separation and quantification of DNA; and (4) SDS-PAGE replacement for protein analysis to determine the quantity and purity of proteins.

3. **Malvern ZetaSizer Nano ZS (Spectra Research Corp.)**

The Malvern Zetasizer is the top-of-the-line light-scattering system. It can determine the particle size (from 0.6 to 6 nm), zeta potential and molecular weight (1000 to 20 million Da) of colloids, nanoparticles and biomolecules. The Malvern Zetasizer has applications in emulsions formulation, bionanotechnology, protein analysis and pharmaceutical development. The system is equipped with an autotitration module that allows rapid determination of both size and zeta potential as a function of pH or concentration.

4. **Bio-Plex 200 System with Bio-Plex HTF (Bio-Rad)**

The Bio-Plex 200 is a bioassay system that can simultaneously detect and quantify up to 100 different analytes in a single sample. To detect and quantify each captured analyte, a fluorescently labelled reporter molecule that specifically binds the analyte is added. Multiplexing yields data that are linked within a system so complex relationships and pathways of biomolecules can be revealed.

5. **VP-differential scanning calorimeter (DSC), with specialized workstation (Microcal Corp.)**

The Microcal VP-DSC scanning calorimeter provides crucial information regarding the stability of biological systems and drug delivery formulations. DSC directly measures heat changes that occur during controlled increase or decrease in temperature, making it possible to study materials in their native state. It also measures the changes resulting from unfolding due to heat denaturation or phase transitions associated with changes in the structure of a delivery system.

6. **VP-isothermal titration calorimeter (ITC), with specialized workstation (Microcal Corp.)**
ITC is the gold standard for measuring biomolecular interactions and ideally suited for the study of binding interactions between both large and small molecules. ITC simultaneously determines all binding parameters (n, K, ΔH and ΔS) in a single experiment, information that cannot be obtained from any other method. Binding interactions between proteins, nucleic acids, and small molecule therapeutics can be carried out with small sample volumes at low concentrations.

7. **Z2 Coulter Counter (Beckman Coulter) (funds for purchase provided by Merck-Frosst)**

In addition to reporting both count and concentration results, the Z2 provides size distribution of the cell population. The Z2 displays the entire size distribution graph, or the size statistics and counts between user-selectable areas of the graph.

8. **Axio Imager A1 Microscope with CCD imaging camera and Inverted Microscope (Zeiss)**

The Axio Imager A1 is optimized for routine microscopy in pathology, histology, cytology and anatomy. The optical arrangement also ensures homogeneous illumination throughout the range of condenser lens magnifications between 2.5x and 100x. The result is convenient observation and documentation of histological sections in brightfield, phase contrast, darkfield and simple polarization contrast.

9. **StepOnePlus™ Real-Time PCR System (Applied Biosystems)**

StepOnePlus™ Real-Time PCR System delivers remarkable plug-and-play convenience and uncompromising performance. It supports the full range of TaqMan® assays while providing ease-of-use and a small footprint. The instrument is featured with 96-well platform, four-color system and equipped with independently thermally regulated VeriFlex™ blocks for better optimization of the cycling conditions. The system offers intuitive software, fast runs (<40 minutes) and standard runs (<2 hours), and are configured for PC-free or networked operation. The system provides quantitative (real time) and qualitative (endpoint) detection of target nucleic acid sequences.

**Pharmacy Core Research Facility – Cell Culture Suite**

The School of Pharmacy maintains a spacious, state-of-the-art, self-contained Cell Culture Suite that houses all equipment needed for the growth, maintenance, and analysis of cells. The Suite is well equipped with laminar flow hoods for the sterile handling of cells, as well as incubators for growing cells. Zeiss Inverton 40C inverted microscope and Z1™ Series COULTER COUNTER® Cell and Particle Counter are available for cell analysis. The suite also equipped with freezer and refrigerator for reagents and media storage, and Cryobiological Storage system for long-term storage of cells. The facility also has basic research laboratory equipment tailored to the individual needs of the users – tabletop centrifuge with exchangeable rotors, autoclave, pH meter, analytical balance, and vacuum pump for sera transfer.

**Recent Core Research Facility Acquisitions**

In addition to the items listed above the core research facility has recently acquired five additional Mettler-Toledo balances, a stability chamber and two additional environmental chambers, a disintegration apparatus, two additional refrigerators and two additional freezers, HPCL degasser, pump, UV detector, and autosampler with thermostat, a Metrohm coulometric titration cell, a portable water purification system, a gas chromatography system, five pipette sets, digital thermometers, a refractometer, desnitometer, osmometer, and a UV/VIS spectrophotometer.
3.2.2 Regular Department facilities

In addition to the instruments available to all faculty and their graduate students in the Pharmacy Core Research Facility, individual faculty members have purchased equipment specific to their research programs. Listed below are significant instruments faculty have acquired. Key instruments are available for use by Pharmacy graduate students through arrangements with the respective faculty member.

**Dr. Michael Beazely**

1. **Kodak 4000 MM Pro Imaging Station**, The KODAK Image Station 4000MM Pro brings a higher level of automation and precision, providing reproducible and quantitative imaging of chemiluminescent, fluorescent, chromogenic and radioisotopic labels in gels, blots, and plates. Excitation and emission filters are combined with a cooled 4-million pixel CCD camera, true 16-bit imaging, and imaging software. Fluorescent imaging from 380nm to 830nm is possible. The camera includes a 10x optical zoom, auto-focus lens, and high resolution CCD. We can image a wide range of in vitro assays including gels, blots, plates, tissue samples, and several others.

2. **SNAP i.d. ultra-fast Western blotting system**, This novel method allows optimization of blotting conditions with significant (> 90%) reductions in time requirements. The SNAP i.d. system minimizes overblocking by using lower concentrations of blocking agents. In addition, more effective wash steps remove unwanted contaminants from the membrane. The SNAP i.d. system decreases background, improves signal-to-noise ratios, increases reproducibility from blot to blot, without compromising sensitivity.

**Dr. Marianna Foldvari**

1. Zeiss Confocor3 confocal microscope
2. IKA high-velocity mixer
3. SPEX Freezer Mill 6870 grinding system
4. Labconco biosafety cabinet
5. Misonix sonicator
6. Mettler Toledo analytical balance and Mettler Toledo XP6U Ultra Micro Comparator
7. Sartorius top-loading balance
8. Padgett Model S dermatome
9. Skin diffusion cell system for in vitro studies
10. Laurell Technologies spin coater
11. BEE International NanoDeBee homogenizer
12. VWR Symphony pH meter
13. Sorvall Legend 17 microcentrifuge
14. Isotemp 20L waterbath
15. VWR 10L circulating waterbath

Dr. Foldvari’s **Zeiss Confocor3 confocal microscope** is a significant research instrument, purchased through combined infrastructure grants from CFI and ORF to support her appointment as the Canada Research Chair in Bionanotechnology and Nanomedicine. This fluorescence cross-correlation confocal microscope provides two main functions in her research program on the development of intelligent delivery systems and biomolecular devices: ultrasensitive, live monitoring of cellular processes and...
tissue distribution of gene expression; and fluorescence cross-correlation spectroscopy to investigate concentration, location, interaction and mobility of drug molecules in cells and tissues.

Dr. Jamie Joseph

The following pieces of equipment were purchased with Dr Joseph’s equipment grant from the Canadian Foundation for Innovation (CFI) and Dr. Joseph’s laboratory start-up money. The following pieces of equipment are already in place.

1. **Vevo 770™ High-Resolution In Vivo Imaging System.** This key piece of infrastructure will be used for gene delivery in vivo in a tissue specific manner (UTMD). This piece of equipment includes the instrumentation hardware and an analytic software package for B-mode (2D) image capture and analysis, software analytics for advanced measurements and annotations and ECG on-screen trace. *Visual Sonics Vevo SoniGene*-The Vevo SoniGene is an ultra-low frequency ultrasound device that is integrated with the Vevo system and delivers a low frequency/high-powered ultrasound pulse sequence. When used in conjunction with the gas filled microbubbles, SoniGene will cause a sonoporation of the targeted cells and gene delivery.

2. **Aperio ScanScope whole-slide scanning system and image analysis software.** This infrastructure is capable of performing IHC slide analysis and includes software upgrades capable of calculating beta cell and alpha cell mass using color deconvolution with Aperio’s Colocalization Analysis tools on the same pancreatic section. This system is capable of performing numerous other types of analysis of IHC slides (http://www.aperio.com).

3. **The Agilent 5975C Series Gas Chromatograph/Mass Selective Detector (GC/MSD)** with the Triple-Axis HEDEM Detector and the mass selective detector (MSD) is configured for electron ionization or chemical ionization. This system includes high throughput sample preparation suite. This equipment is essential for metabolic analysis of cell lines and islets. This instrument can simultaneously assess over 1200 endogenous metabolites in a single sample.

4. **EasyRatioPro complete imaging platform.** A ratiometric imaging system will be used to investigate the metabolic function of our clonal model cell line and islets. This set-up includes an Nikon inverted microscope, table and ratiometric imaging system to monitor islet calcium signaling, mitochondrial membrane potential as well as other metabolic parameters in our model systems. The system includes the Dual Emission option for fluorescent probes such as JC-1 which is used for measuring mitochondrial membrane potential. This system also includes a two laser Total Internal Reflection Fluorescence (TIRF) Upgrade.

Additional equipment:
5. Two cell culture suites (One in the animal facility and two in the main laboratory).
6. Perkin Elmer β- and γ-counters for radiometric assays (e.g. insulin, glucose oxidation and glucose utilization assays).
7. Molecule cloning equipment (e.g. Alpha Innotech gel doc system, gel boxes, other)
8. Low, high speed and ultraspeed centrifuges
9. Islet perifusion and perfused pancreas systems (Warner 8-line temperature controller, peristaltic pump, tubing, other)

Dr. Praveen Nekkar
1. **Carousel parallel synthesis reaction station** (Radley’s) – shared with Dr. Wettig. This state-of-the-art parallel synthesizer is ideally suited to achieve compound/polymer libraries synthesis in a short period of time. The carousel can be used to run 12-reactions simultaneously thereby drastically reducing the time required to prepare compound/polymer libraries. The carousel is suited to handle reactions from millimoles to gram scale.

2. **Computational software: Discovery Studio: Structure-Based-Design from Accelrys**. This is a state-of-the-art computational software that is widely used in the Pharmaceutical industry to develop compound libraries and predict activity by investigating inhibitor-enzyme/protein binding affinities. Other applications include development of 3D pharmacophore models, quantitative structure-activity relationships (QSAR). In addition, protein-protein, protein-ligand (docking), molecular dynamics (MD) experiments of compound libraries can be investigated routinely for “lead” optimization.

Additional equipment:
3. Rotary evaporators
4. Drying oven
5. Brinkmann WKL recirculating chiller
6. Two Denver analytical balances
7. Two Corning stirring hot plates
8. Four Fisher melting point apparatus
9. Fisher ultrasonicator
10. Brinkmann ultrasonicator
11. Agilent 1100 series analytical HPLC
12. Genesys UV-Vis Spectrometer

**Dr. Roderick Slavcev**

1. **Nanodrop UV-Vis spectrometer for quantifying DNA and protein.**

The Thermo Scientific NanoDrop 2000 is the only micro-volume spectrophotometer with a patented sample retention technology that allows for sample volumes as small as 0.5 µL. It offers: Direct, easy measurements in less than 5 seconds – just pipette & wipe Full spectral output Measures DNA, RNA (A260) and Protein (A280) concentrations and sample purity (260/280 ratio) Large concentration range (2 ng/µL – 15,000 ng/µL dsDNA) without dilutions Pre-configured methods for common applications such as Nucleic Acid, Protein A280, Microarray, Proteins & Labels, Bradford, BCA, Lowry and Pierce 660nm – and more User-friendly software that includes Custom Methods and data export capabilities Simple self calibration check using control fluid – no instrument adjustments Low-cost operation – no plates or other consumables

Additional equipment:
2. High-throughput (potential) thermocycler
3. Molecular Biology reagents and equipment
4. Incubators

**Dr. Shawn Wettig**
1. Carousel parallel synthesis reaction station (Radley’s) – shared with Dr. Nekkar

2. *Lauda TE3 automated tensiometer*

The Lauda TE-3 tensiometer is capable of measuring surface tensions of aqueous solutions of drug molecules, as well as surfactants, polymers, and lipids that are commonly used as excipients in pharmaceutical dosage forms. In addition the instrument can determine interfacial tensions across oil/water interfaces, and contact angles of powders. The system comes equipped with an autotitrator allowing for rapid and accurate determinations of surface tension and any derived parameters, such as the critical aggregation concentration(s) of self-assembling systems.

Other equipment:
3. Rotary evaporator (Heidolph)

4. pH, ion-specific, conductometric automated titration system

**Teaching labs**

1. *Waters Alliance HPLC system.*

State of the art chromatographic system with both dual wavelength UV-VIS and refractive index detection. This combination of detectors allows for the detection of nearly any active pharmaceutical ingredient or excipient in a pharmaceutical dosage form. The system also provides for rapid separation, detection and quantification of novel drug molecules that are synthesized as part of the drug discovery process. The system runs the Waters Empower Chromatographic software which is the recognized standard in the pharmaceutical industry."

2. *Milli-Q water purification system.*

### 3.2.3 **Access to Other UW Facilities**

Several facilities on UW’s campus are available for use by Pharmacy faculty. Below are the most relevant and significant facilities that support faculty research.

a) **WATSPEC Spectrometry Facility, UW Department of Chemistry**

The WATSPEC Mass Spectrometry Facility comprises two instruments — a Micromass Q-TOF Ultima Global LC/MS/MS system and a JEOL HX110 double-focusing mass spectrometer.

The Micromass Q-TOF Ultima Global LC/MS/MS system is equipped with atmospheric pressure ionization as well as a matrix-assisted laser desorption ionization source. It is capable of performing MS, MS /MS as well as high-resolution / accurate mass determinations and is interfaced to a Waters CapLC. The JEOL HX110 is primarily used for probe analysis and high-resolution elemental composition determinations of low molecular weight (<1,000 Da) volatile and thermally stable organic species. The WATSPEC Mass Spectrometry Facility provides mass spectrometric service to UW researchers. It is managed by Dr. Richard Smith.
b) The WATSPEC NMR Facility, UW Department of Chemistry

The WATSPEC NMR Facility houses the following instruments: two Bruker 300 MHz high-resolution spectrometers, one Bruker 500 MHz high-resolution spectrometer with solid capabilities, and one Bruker 600 MHz high-resolution spectrometer with solid capabilities. Trained graduate and undergraduate students run most of the equipment. The facility also has NMR personnel to maintain and help with complicated or new experiments.

c) Waterloo Advanced Technology Lab (WATLab)

WATLab is a multi-user research facility at UW to support the diverse materials science and engineering research programs of over 70 research groups across 10 departments.

WATLab provides a dynamic research environment for university research groups and their industrial partners (1) to pursue a diverse range of materials research projects with state-of-the-art synthesis and fabrication and characterization tools, (2) to facilitate exchange of ideas and knowledge with other user groups working in related fields, (3) to train graduate students and postdoctoral fellows with the most up-to-date equipment, and (4) to further attract external collaborations and joint ventures from other application areas while enhancing the overall materials research activities in Canada.

State-of-the-art instrument clusters have been established in the following three areas, to allow users to design and build novel materials and prototype devices and to fully characterize their physical, chemical, electronic and optical properties for a wide range of materials, including metals, semiconductors, oxides and composites, polymers, biomaterials and other soft materials.

A. Materials Synthesis and Device Fabrication for synthesizing novel materials and material systems (including clusters and thin films) on a substrate by both thermal and non-equilibrium methods, and for in-situ monitoring of their physical and electronic properties during growth.

1. Electrochemistry workstations and microbalance, and “beaker” chemistry workstation

2. Chemical vapour deposition (CVD) system with multiple gas injection sources and oven temperature up to 1200°C, plus optical lithography and portable clean-room facility

3. PVD NanoPLD/MAPE pulsed laser deposition system

4. Omicron dual molecular beam epitaxy (MBE) instrument cluster, equipped with an on-system X-ray photoelectron spectrometer and a variable-temperature scanning probe microscope

B. Microscopy and Lithography for “non-invasive” imaging of surface morphology at near-atomic resolution and high-resolution crystal structure determination of thin films and nanoscale materials, and for high-resolution patterning by e-beam or tip-based writing.

1. LEO 1530 field-emission scanning electron microscope (SEM), fully equipped with an EDAX energy-dispersive X-ray analysis (EDX) system and an orientation imaging microscope (OIM)
2. Raith-Nabity e-beam lithography (EBL) system, plus pattern generation and development tools
3. Digital Instruments Nanoscope IV scanning probe microscope (SPM) with nanolithography
4. PANalytical MRD high-resolution 4-circle X-ray diffractometer (XRD)

C. Spectromicroscopy for composition analysis of chemical states and elemental distributions of the resolution, and for chemical characterization of electronic and vibrational structures by optical spectroscopies.

1. Thermo VG Scientific ESCALab 250 Imaging ESCA microprobe
2. Thermo VG Scientific MicroLab 350 Auger nanoprobe
3. Optical spectroscopy fleet, including Bruker Senterra Raman confocal microscope, Bruker Tensor 27 FTIR spectrometer, Perkin-Elmer Lambda-35 UV/Vis spectrophotometer, and Perkin-Elmer LS-55 Luminometer

Pharmacy faculty also have access to the animal facilities in Departments of Biology and Psychology.

d) Healthcare Facilities

Pharmacy faculty have access to resources, clinics and patients at Grand River Hospital, St. Mary’s General Hospital, the Centre for Family Medicine Family Health Team, and the Schlegel-UW Research Institute for Aging, a community-based long-term care facility for seniors. Pharmacy faculty also have access to resources, clinics and patients at the Institute for Safe Medication Practices, various medical pharmacies (i.e., pharmacy consultants who provide services to long-term care facilities), and the Thames Valley Family Health Team in London, Ontario. Many of the School’s part-time clinical adjunct faculty have worked for years within these health care organizations and have developed strong clinical and research programs.

3.2.4 Science Technical Services

Science Technical Services supports the research activities of the UW Faculty of Science. STS’s staff provides custom electronics, machining, welding and other support and can transform ideas from sketches or detailed drawings to a final product.

The Electronics Group (EG) provides technical support for research programs in the Faculty of Science. Activities include design and construction of new electronic/electrical, electro-mechanical instrumentation, modification and repair of commercial scientific equipment, advice to faculty and students on various technical aspects of lab setups and measurements. The group also has a broad library of catalogues, data books and tools and instruments that may be rented or borrowed.

The EG has acquired a specialized CNC Mill for manufacturing prototype printed circuit boards and SOFTWIRE software to write small executable programs for data acquisition in Visual Basic environment. The EG also has the ability to program some PLD devices, EPROMs and Micros.
The Machining Group (MG), employs four full-time and technicians/machinists. The MG provides technical support to the Faculty of Science in many mechanical and machining aspects of research activities from high vacuum chambers to minor repairs of scientific equipment. The MG has a large selection of machine tools and specialized tools such as lathes, milling machines, including the CNC mill, welding equipment, plasma torch, grinders, jewellery lathe and drill press, spot welder, sand blaster, anodizing equipment, vacuum leak detector and wide variety of hand tools. The MG has the capacity to design equipment (AutoCAD, MasterCam). Among specialized repair services is a vacuum pump repair facility.

3.2.5 Access to Other Research Facilities in Region

Several Pharmacy faculty members are regular users of McMaster University’s Canadian Centre for Electron Microscopy. The CCEM provides researchers with a world-class electron microscope facility that comprises the following instruments —

High-resolution transmission electron microscopes
- FEI Titan 80-300 Cubed
- FEI Titan 80-300 Cryo- In-situ

Analytical transmission electron microscopes
- JEOL 2010F STEM
- VG HB601 Cryo

Conventional TEM
- Philips CM12

Scanning electron microscopes
- Philips 515
- JEOL 7000F
- Focused Ion Beam
- Zeiss NVision40

Scanning probe microscopy
- Digital Instruments Nanoscope III
- Light Microscopes
- Zeiss Axiosplan
- Nikon Confocal Microscope
- Leica metallographic light microscope with Clemex Digital Image Analysis System

Pharmacy faculty are also users of the University Health Network’s Microarray Centre, a facility established as part of a consortium of research institutions including the Ontario Cancer Institute, Mount Sinai Hospital, the Hospital for Sick Children and the University of Toronto, with commercial partnerships and collaborations, including Allelix Biopharmaceuticals (now NPS Allelix), GeneFocus and Engineering Services Inc. The Microarray Centre produces various types of cDNA and oligonucleotide microarrays using high-precision robotics. Clones are spotted in either single or duplicate on glass slides at high density (up to 37,000 elements on a standard 75x25 mm slide). In
addition to standard array products, the Centre also provides custom arraying and clone production using state-of-the-art robotics and high-throughput liquid handling systems.
3.3 Computer facilities

All faculty and graduate students are provided with an account on the Faculty of Science file server. Each comes with 200 MB of storage. Wireless Internet access is available throughout the Pharmacy building. Software packages, sold at discounted prices through educational software licences, are available through the Campus Tech Shop. The Campus Tech Shop sells and services PC and Apple computers at educational discounted prices. Additional software will be purchased as needed to support various research activities in the School of Pharmacy.

Each faculty member has 1 to 2 computers for office use. In addition, five computers are available in the laboratory, used primarily to control various pieces of equipment, but which can also be used by graduate students for other research-related purposes.

Graduate students have personal computers as well as access to the library computers. The School of Pharmacy also has two LCD projectors and three laptops that may be signed out by faculty and graduate students for presentations. There are also nine computer labs with over 400 workstations available for graduate student use across campus. Science printers use the XAS printer accounting system to manage student printing accounts. XAS is integrated between the Faculties of Applied Health Sciences, Engineering, and Science and student residences. Science students can print in any of these locations provided they have set up a printer account and have added sufficient funds. Scanners are also available. Graduate students have access to these labs.

In the School, each graduate student has access to printing either on a printer that is owned by the research group, or on a shared printer that is owned by the School of Pharmacy and charged back to the supervisor.

Classrooms (Figure 3.1)

The School of Pharmacy at the University of Waterloo employs the most advanced Audio Visual equipment currently in use at the University. Our Audio Visual systems are comprised of Christie Projectors, makers of such well known equipment as the IMAX series of projectors, two of which are deployed in our main lecture hall, and a 3D capable Christie HD8K. Christie is a local manufacturer famous for providing the A/V solution for the opening and closing ceremonies at the Beijing Olympics.

All teaching equipment is controlled via Crestron Touch Panels, manufactured by the global leader of control and automation solutions. We also have video conferencing equipment manufactured by Polycom - The worldwide leader in unified communication and collaboration, video conferencing, voice conferencing, data and Web communications solutions. This allows us to broadcast and receive lectures to and from anywhere in the world in full High Definition.
In our main lecture hall, each student desk is equipped with a built in camera and microphone so the remote site can see the student and hear their questions clearly. We can videotape these broadcasts on our Phillips HD DVRs using our Sony HD Motorised Cameras and make them available on our Pharmtube website for viewing and downloading.

We also have SMART Document Cameras and Smart Board functionality in all major lecture halls which offers lecturers a convenient way to display and explore images of objects or deliver dynamic lessons, write notes in digital ink, and save their work – all with the simple touch of a finger anytime without losing the momentum of their lesson.

**Video Conferencing Facility**
The School of Pharmacy has several A/V rooms that can be used for meetings and presentations by graduate students, one of which is video conference-equipped. The video conferencing facility is located on the third floor. The facility has a state-of-the-art Polycom HDX-9004 videoconferencing unit, which has the following features:

- Up to 1280x720 resolution at 30 fps (720p)
- Maximum bandwidth of 6 Mbps for HDX 9004, 4 Mbps for HDX 9002 and HDX 9001
- Five HD video inputs (HDX 9004) / 4 (HDX 9002/HDX 9001), all with professional connectors: HDCI, Component (YbPbR) and DVI, along with professional Phoenix audio connectors
- Ability to add peripherals such as HD-DVD, VCR, HD document camera and recording devices
- POTS connection to allow additional telephone or cell phone callers directly into the conference without tying up the conference phone

With the two Sharp 52” Professional LCD Monitors with 2-megapixel (1920 x 1080) HD resolution, School of Pharmacy faculty and graduate students will be able to hold a videoconference in high-definition with other similarly equipped facilities anywhere on the globe, saving thousands of dollars on travel and accommodation.

**SHARCNET**
The Shared Hierarchical Academic Research Computing Network — SHARCNET — is the largest high-performance computing consortium in Canada. The network is headquartered at the University of Western Ontario and involves clusters of computers at the University of Waterloo and 10 other universities and colleges across southern Ontario.

SHARCNET is a grid of high-performance clusters of thousands of processors on a dedicated, private high-speed, wide-area network. The network has over 6,000 processors, nearly 500 terabytes of storage, and a throughput of 1 Gigabits per second, as well as established protocols and software to make the parallel computing network readily accessible to the Canadian researchers. A program that would take months to run on a single PC could run within a few hours on SHARCNET, provided the program can take advantage of parallel processors.

Research areas in pharmacy that could make use of SHARCNET computing resources include resource-intensive computational biology, computational chemistry, health informatics, mathematical biology and molecular modeling and simulation.
Primary SHARCNET accounts are available to faculty at Canadian institutions. Undergraduate students, graduate students, postdoctoral fellows and research fellows must be sponsored by a faculty-level account holder. Both primary and sponsored accounts are available free of charge.

3.4 Space

The 120,000 square feet (ft²) Pharmacy building (Figure 3.2) features three tiered lecture halls, classrooms, laboratories for research and undergraduate support, the FlexLab (wet teaching lab), Professional Practice Lab, an undergraduate student lounge, graduate student lounge (Figure 3.2), a small library, faculty and staff offices, office space for the undergraduate student society and clubs, several conference/meeting rooms and a cafe. Renovation is discussion to house a temporary animal research facility on the fourth floor.

The second building on the Health Sciences Campus was completed in January 2010. The Integrated Health Building, next door to the School of Pharmacy, brings together various disciplines in a clinic/education/research facility. A regional program of McMaster University’s Michael G. DeGroote School of Medicine, a family medicine teaching program, the Centre for Family Medicine Family Health Team, a teaching and service clinic for the Waterloo Optometry, and pharmacy clinicians and students are located here.

![Figure 3.2 School of Pharmacy building](image)

**Space Allocation**

Space in the School of Pharmacy is assigned by the Hallman Director in coordination with the Administrative Officer, the Associate Director, Practice-Based Education and the Associate Director, Research & Graduate Studies as appropriate. The School is charged with assigning its own space.

The School of Pharmacy building has 2,100 m² of research-related space available for faculty and graduate students (Table 3.1). All full-time faculty members have private offices with telephone and Ethernet connections and are on floors three to seven. Part-time faculty (0.5-2 days/week) have shared office space on the fourth and fifth floors. There are a total of 27 faculty offices.

The graduate student offices on the third and fourth floors of the building are external to the laboratory space but are located adjacent to the labs, so research and study areas are in close proximity. In total six offices on the third floor are available to graduate students, each of which is equipped with a desk, telephone, computer and Ethernet connection. Five of the offices hold four graduate students each and the large room can house approximately 10 graduate students (third floor offices can accommodate up
to 30 students). On the fourth floor, there are nine graduate offices. Eight of these can house four graduate students each and are equipped with a desk, telephone, computer and Ethernet connection. The additional room can house up to 6 graduate students (fourth floor offices can accommodate up to 38 students). In total, The School can currently house 68 graduate students.

Not included in Table 3.1 is a planned Animal Holding facility in the receiving area (12 m$^2$) of the School as well as a renovation to the laboratory on the fourth floor for animal holding (approx. 12 m$^2$). This renovation is awaiting budget approval.

Graduate student social space includes the café on the first floor and the graduate student lounge on the fourth floor (Figure 3.3).

![Figure 3.3 Graduate Student Lounge, PHR 4016.](image)
Table 3.1. Research-related space in the School of Pharmacy.

<table>
<thead>
<tr>
<th>Space Description</th>
<th>Size (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement Library</td>
<td>272</td>
</tr>
<tr>
<td>Basement Dry Lab Space</td>
<td>82</td>
</tr>
<tr>
<td>2nd Floor Seminar/Conference Rooms (3)</td>
<td>123</td>
</tr>
<tr>
<td>3rd Floor Faculty Offices (5)</td>
<td>84</td>
</tr>
<tr>
<td>3rd Floor Research Assistant/Post-doc Office</td>
<td>14</td>
</tr>
<tr>
<td>3rd Floor Research Lab</td>
<td>245</td>
</tr>
<tr>
<td>3rd Floor Graduate Student Office Space</td>
<td>127</td>
</tr>
<tr>
<td>3rd Floor Video Conference Meeting Room</td>
<td>23</td>
</tr>
<tr>
<td>4th Floor Faculty Offices (9 – single and shared)</td>
<td>154</td>
</tr>
<tr>
<td>4th Floor Research Office Space (grad students/RAs/co-op students)</td>
<td>19</td>
</tr>
<tr>
<td>4th Floor Graduate Student Lounge</td>
<td>25</td>
</tr>
<tr>
<td>4th Floor Research Lab</td>
<td>474</td>
</tr>
<tr>
<td>4th Floor Graduate Office Space</td>
<td>84</td>
</tr>
<tr>
<td>5th Floor Faculty Offices (6 – single and shared)</td>
<td>131</td>
</tr>
<tr>
<td>5th Floor Research Office Space (RA/visiting scientist)</td>
<td>11</td>
</tr>
<tr>
<td>6th Floor Faculty Offices (2)</td>
<td>58</td>
</tr>
<tr>
<td>7th Floor Faculty Offices (5)</td>
<td>75</td>
</tr>
<tr>
<td>7th Floor Faculty Lounge</td>
<td>41</td>
</tr>
<tr>
<td>7th Floor Conference Room</td>
<td>59</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,101 m²</strong></td>
</tr>
</tbody>
</table>
Virtual Space (LEARN)

The University of Waterloo Course Environment (LEARN) is a web-based course management system available 24 hours a day, 7 days a week that allows instructors to manage course materials and interact efficiently with students online. LEARN can both complement traditional on-campus classes or be used as the primary method of delivering distance-education courses.

Of relevance to this appraisal brief, LEARN can facilitate learning, interaction and discussion among graduate students via online collaborative learning assignments, access to supplemental resources, quick and efficient instructor feedback, and student-to-student learning via online discussion boards.

3.5 Financial support

The School of Pharmacy offers financial support to its graduate students in accordance with, and under the terms of, the Graduate Studies Office Guidelines on Graduate Student Support: http://www.grad.uwaterloo.ca/students/GSOsupportguide.asp

Under these guidelines, the annual minimum level of financial support provided for doctoral students whose admission is effective May 1, 2012 or later will be not less than $20,000. This commitment applies to the first three years (9 terms) of full-time enrollment in a doctoral program.

3.5.1 Summary of Graduate Tuition Fees for 2012-2013 academic year

Canadian citizens and Permanent Residents
• $2684 per term for full-time studies
• $1369 per term for part-time studies

International students
• $6296 per term for full-time studies
• $3289 per term for part-time studies

3.5.2 Summary of Graduate Student Financial Support

Full-time students receive guaranteed support from Graduate Research Studentships (GRS), Teaching Assistantships (TA), and Science Graduate Experience Award (SGEA) income (and International Doctoral Student Award (IDSA) for international students.) Each of these sources of support is outlined in section 3.5.3.

Table 3.2 describes the funding support provided to PhD students. Full-time students, not fully-funded from external sources, are guaranteed TA units (1 TA unit = 60 hours per term or 5 hours per term week) and their per term funding sources can be different depending on the number of TA units in that term. To date, the School has only enrolled (through Biology) one part-time PhD student and the student is currently paid an amount equal to tuition and is not provided TA units. We expect to continue this funding model for part-time PhD students. There are however no minimum funding level regulations surrounding part-time students.
Table 3.2  Funding model for domestic and international PhD students

**Domestic students**
*Full-Time – minimum $20,000 per year*

<table>
<thead>
<tr>
<th>Income Per Term</th>
<th>2 TA Term</th>
<th>1 TA term</th>
<th>No TA term</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRS $12,314</td>
<td>$ 1542</td>
<td>$ 4105</td>
<td>$ 6667</td>
</tr>
<tr>
<td>TA* $4986</td>
<td>$3324 ($831/mo)</td>
<td>$1662 ($415.50/mo)</td>
<td>$0</td>
</tr>
<tr>
<td>SGEA** $2700</td>
<td>$1800</td>
<td>$900</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Term Total</strong></td>
<td><strong>$ 6666</strong></td>
<td><strong>$ 6667</strong></td>
<td><strong>$ 6667</strong></td>
</tr>
</tbody>
</table>

**International Students**
*Full-Time - minimum $30,140 per year*

<table>
<thead>
<tr>
<th>Income Per Term</th>
<th>2 TA Term</th>
<th>1 TA term</th>
<th>No TA term</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRS $12,314</td>
<td>$ 1542</td>
<td>$ 4105</td>
<td>$ 6667</td>
</tr>
<tr>
<td>TA* $4,986</td>
<td>$3324 ($831/mo)</td>
<td>$1662 ($415.50/mo)</td>
<td>$0</td>
</tr>
<tr>
<td>SGEA** $2700</td>
<td>$1800</td>
<td>$900</td>
<td>$0</td>
</tr>
<tr>
<td>IDSA award $10,140</td>
<td>$3380</td>
<td>$3380</td>
<td>$3380</td>
</tr>
<tr>
<td><strong>Term Total</strong></td>
<td><strong>$ 10,046</strong></td>
<td><strong>$ 10,047</strong></td>
<td><strong>$ 10,047</strong></td>
</tr>
</tbody>
</table>

**NOTE:**
* Vacation pay of 4% will be added to TA income in the last month of term.
** The SGEA award is not paid per month; it is applied directly against tuition with a Promissory Note or paid at the start of term if tuition has been fully arranged by another method. The award is non-taxable.
3.5.3 Explanation of Sources of Support

Graduate Research Studentships (GRS)
This funding comes from the student’s Supervisor(s) and their research funds. The funds are paid as a non-taxable award at the beginning of each term.

Teaching Assistantships (TA)
Graduate students in the School of Pharmacy will receive a guaranteed number of Teaching Assistant (TA) positions per year (outlined in their Offer of Admission letter.) Pharmacy graduate students are eligible for up to 3 TA positions per year (referred to as ‘TA units’), and each TA unit equates to 5 hours/week x 12 weeks (approx. 60 hours total.) Based on the University’s current compensation rate, students earn $27.70/hour – so a student working 1 TA unit (60 hours) earns $1662, and a student working 2 TA units earns $3324 – plus an additional 4% vacation pay.

Science Graduate Experience Award (SGEA)
The Science Graduate Experience Award (SGEA) is awarded by the School of Pharmacy to graduate students who acquire experience by working as a Teaching Assistant (TA). Students who TA for 5 hours a week receive a $900 award, and students who TA 10 hours per week receive an $1800 award, up to a yearly maximum of $2700. The SGEA will only be awarded to students who are within the program time-limits.

International Doctoral Student Award (IDSA)
Full-time international students starting the program will receive an International Doctoral Student Award (IDSA) valued at $3,380 per term (the value is approximate to the full differential fee per term) for 3 years (up to term 9.0). Students who are receiving major external awards or sponsorship are not eligible to receive this award.

Doctoral Year 4 Support (for students admitted from a Master’s degree)
Full-time international students (who were admitted from a master’s degree) in a research-based PhD program will receive an International Doctoral Student Award Year 4 (IDSA4) valued at $3,380 per term (the value is approximate to the full differential fee per term) for year 4 (terms 10 to 12) and will be funded as follows:

- 2/3 from University/Faculty (1/3 from each) totaling $2,253 per term as an award (IDSA4)
- 1/3 from the supervisor/department in the amount of $1,127 per term as an award i.e. GRS, UW scholarship, etc.

Students who are receiving major external awards or sponsorship are not eligible to receive this award.

3.5.4 Continuation of Financial Support

The School of Pharmacy draws its policy in this regard from the Graduate Studies Office ‘Guidelines on Graduate Student Support’:

“Financial support will normally continue as promised if the student maintains full-time registration in the degree program and fulfills the necessary academic requirements. This
includes maintaining a minimum 70% average in coursework (individual programs may have higher requirements), and passing PhD comprehensive examinations. Continued support in the form of awards and scholarships may require maintaining a higher average in coursework, according to the particular terms of reference (80% is the minimum for certain scholarships for example).

The student must also satisfactorily perform the particular duties required for the support. Performance is assessed by the supervisor for research assistants, and by the instructor, department chair or graduate officer for teaching assistants. A student whose performance as an RA/TA is judged to be unsatisfactory will normally receive written warning and suggestions for improvement. If the student's performance does not improve sufficiently within a reasonable time period, financial support may be reduced or discontinued. Written warning and an opportunity for improvement need not be given in cases of serious misconduct or serious neglect of duties.

It is recognized that difficulties may arise owing to inadequate transfer payments from the province, or to nonrenewal of external research grants and contracts. However, the university will make every effort to maintain financial support for continuing graduate students at the levels promised. Primary responsibility rests at the department and faculty levels, where decisions concerning admissions and offers of financial support are made. In emergency situations, request for assistance may be made through the faculty Associate Dean to the Associate Provost, Graduate Studies or through the faculty Dean to the Provost.”

3.5.5 Internal Scholarships

We currently have four internal scholarships available to Pharmacy students. They do not require an application; the School of Pharmacy Graduate Committee nominates eligible students every term/year.

University of Waterloo President’s Graduate Scholarship

Students who are successful in the Tri-Council Scholarships or Ontario Graduate Scholarship competition and stay at the University of Waterloo will receive the President’s Graduate Scholarship valued at up to $10,000/year (excluding the Vanier Canada Graduate Scholarship).

- $1,666 per term will be paid by the University as a scholarship
- $1,666 will be paid by the Faculty/Department as a scholarship or Teaching Assistantship or Research Assistantship or a combination of all.

University of Waterloo Graduate Scholarships

University of Waterloo Graduate Scholarships are allocated by Departments each term to full-time, registered graduate students with first-class (80%) standing. The awards may be given as UW entrance scholarships, as UW merit scholarships, or as a UW scholarship, and may be paid over three terms or as a one term award. UW Graduate Scholarships are valued at a minimum $1,000 per term.

We began allocating UW Graduate Scholarships in 2011 and have since given out 5 of these Scholarships for a total of $5,000 (as of Winter 2012).

School of Pharmacy Rx&D Graduate Research Scholarship
This Scholarship is made possible by a donation from RX&D, the association of Canada’s leading research-based pharmaceutical companies, as part of its efforts to support the next generation of health researchers in Canada. A Scholarship valued at $8,300 is awarded annually to a full-time graduate student in their first year of the Master’s program in the School of Pharmacy. A student’s Supervisor(s) can utilize up to $5000 of the funds to offset their Graduate Research Studentship (GRS) provision in the year the Scholarship is awarded. Recipients are selected on the basis of academic excellence (minimum 80% average in final two years of undergraduate study.)

School of Pharmacy Donald and Kathleen MacDougall Graduate Scholarship

Janet McDougall, BSc’71 has established this award to honour her parents, Donald Joseph and Kathleen Donihee McDougall. Don was a practicing pharmacist from 1934 through 1993, and loved his profession. Both Don and Kay were community leaders, dedicated volunteers, and civic activists. This award honours their contributions and their belief in service to the community.

One scholarship, valued at $5,000, will be awarded annually to a full-time University of Waterloo graduate student in the School of Pharmacy, who holds an Ontario Graduate Scholarship (OGS) or an Ontario Graduate Scholarship in Science and Technology (OGSST). If there is no qualified candidate who holds an OGS or OGSST, the scholarship will be awarded to a Pharmacy graduate student based on academic merit and financial need. A student’s Supervisor(s) cannot utilise any part of this award to offset their Graduate Research Studentship (GRS) provision.

3.5.6 External Awards

Faculty encourage eligible students to apply for external funding. The Graduate Studies Office offers a searchable scholarship database (http://www.grad.uwaterloo.ca/scholarships/index.asp) as a resource for students and faculty.

Since 2009, graduate students housed in Pharmacy, either in the M.Sc. Pharmacy program or in a PhD program in another department but with the primary co-supervisor in Pharmacy, have been awarded a total of $517,350 in external funding (not including internal awards – section 3.5.5). Some of these monies were declined due to external funding rules on multiple award holdings. This represents 19 of 30 students from 2009 to present.

3.6 Financial Resources

We are currently undergoing our budget finalization and, according to the human resource plans for the School of Pharmacy (full core faculty complement of 20 FTEs) there is no request for additional human resources beyond those initially planned for the School’s development.
4 CURRICULUM

4.1 The intellectual development and the educational experience of the student

The UW School of Pharmacy strives to promote research spanning the spectrum from fundamental science to health outcomes. Our graduate program will champion this aim through fundamental understanding and application of concepts, collaborative discovery and innovative, leading-edge research. Our goal is to train graduates who will be recognized for their expertise and leadership, while making significant contributions to the global scientific, academic and healthcare communities.

The first mandatory milestone for PhD students is attendance at a Faculty of Science organized workshop on academic integrity. Academic integrity is discussed in relation to both the students’ research and in the undergraduate assignments they evaluate as part of their TA responsibilities. This workshop is run in both the Fall and Winter terms.

New student orientation is a half-day workshop that we have run for our M.Sc. program (program started in September 2010) students in the Fall and Winter terms and will, in future, include our PhD students. This workshop begins with a welcome address from the Director of the School and the Graduate Officer. This is followed by introduction to the Pharmacy Graduate Association (PhGA), library resources, the Centre for Teaching Excellence, the Centre for Career Action and Student Services. The Graduate Officer then outlines the Program regulations and the expectations of the graduate program. Students not only learn about University and School of Pharmacy resources, they interact with other new students to begin the process of integrating into the graduate community.

Many of our graduate students are partially funded through Teaching Assistant (TA) positions. Each semester, the School of Pharmacy runs a full day workshop (9 am to 4 pm) for new TAs to discuss the roles and responsibilities of TAs, laboratory safety, the diversity of the undergraduate classroom, copyright laws, training on the online course system LEARN, proctoring and academic integrity. To help standardize teaching and grading of undergraduates, graduate students will be given a TA manual to guide their teaching, to establish standardized lab protocols and demonstration procedures, and to formalize grading of reports, tests and exams.

PhD candidates for whom advanced-level teaching forms part of their career goals will be encouraged to pursue the Certificate in University Teaching offered by the UW Centre for Teaching Excellence (CTE) (see http://cte.uwaterloo.ca/graduate_programs/index.html). Similarly, graduate students seeking additional training as teaching assistants will be encouraged to attend CTE’s Departmental TA Workshops (see http://cte.uwaterloo.ca/graduate_programs/TA_workshops.html). Students new to Canada for whom English is not the first language will be encouraged to enroll in CTE’s International TA Training program (see http://cte.uwaterloo.ca/graduate_programs/ITATraining.html).

Creating effective communicators is a goal of the Program. All graduate students will be required to present their research three times during the course of the Program: thesis proposal defence, research seminar at a scientific forum and thesis defence. This will give students an opportunity to practice public speaking, to present research results to their advisors and peers, and to scientifically address critiques of their proposal/research. Effective oral communication is also emphasized in the core course PHARM610 ‘Topics in Drug Development’ where students must present their critique of a selected journal article.
To fulfill the requirement of oral presentation of research at a scientific forum, students will be encouraged to present their research at a major national or international conference, providing important exposure to the larger academic and research community. This educational experience will help provide highly trained graduates ready for research in academia, industry or healthcare. Students will also be encouraged to participate in UW’s Graduate Student Research Conference, an annual event UW hosts to provide students experience in conference presentation (see http://www.grad.uwaterloo.ca/Conference/index.asp). Like most Science Departments at UW, we aim to hold our own annual graduate research seminar day and presentation at this forum will fulfill the oral presentation milestone.

With an aim to re-iterate the scientific method and the role of hypothesis testing in research, the core course PHARM610 will address research methods and some basic statistics often relied upon in scientific research. For those students whose previous training is deficient in data analysis and statistical hypothesis testing, they will be encouraged to take at least one graduate-level statistics course.

Our students are also encouraged to participate in Drug Safety and Effectiveness Cross-Disciplinary Training (DSECT): a competitive entry CIHR training program in bridging scientific domains for drug safety and effectiveness. This training program bridges biosciences, clinical therapeutics, population health, epidemiology, biostatistics, and health services and policy research to better understand choosing, using, and losing medications within the context of medication safety and effectiveness. Six School of Pharmacy students have been or are currently in the program and three faculty members are currently serving as mentors. This program allows students to interact with mentors and each other through an Annual Symposium, workshop days and learning activities (e.g. book clubs).

While the School of Pharmacy only recently acquired the M.Sc. program (2010), the graduate students, both M.Sc. Pharmacy and PhD students with a co-supervisor in pharmacy, have been active in organizing a Pharmacy Graduate Association (PhGA). This volunteer, student-run, not-for-profit association was established in early Spring of 2011. The primary objective of the PhGA is to represent the graduate student body at the School of Pharmacy in on- and off-campus meetings, affairs and events. While the constitution is currently under review, the structure of the association includes an elected President, Vice-President Internal Affairs & Finance and Vice-President Communications & Events (https://sites.google.com/site/uwaterloophga/home). Although current PhD candidates are based in other departments on main campus, the PhGA fully represents each and every graduate student affiliated with the School of Pharmacy. In its short life, the PhGA has been active through acquisition of funds to furnish the grad student lounge in the Pharmacy building, running journal clubs, social events and a future outlooks seminar featuring lecturers discussing career options. The School is supportive of this group as it allows students an opportunity to develop leadership skills, build community and learn from each other.
4.2 Program regulations

UW’s minimum degree requirements for doctoral degrees are stipulated in the UW Graduate Studies Academic Calendar (http://gradcalendar.uwaterloo.ca/page/GSO-Min-Require-PhD). The graduate program regulations noted here are partly taken from these guidelines.

4.2.1 Application

Only students who are graduates of approved universities and colleges are eligible for admission to graduate studies at UW. Application for admission must be made using UW’s online application for admission system (see http://www.grad.uwaterloo.ca/students/prospective/admissions.asp). A non-refundable application fee of $100 is required for each application submitted.

4.2.2 Admission

Admission to the PhD program requires a two-year MSc degree or equivalent in a relevant field. An overall average of 78% in the previous graduate degree will be the minimum requirement for admission to the PhD in Pharmacy. Three letters of reference, with at least two being academic referees, are required for admission to the PhD program.

We expect that most students entering our program will have previously graduated from a thesis-based M.Sc. degree. There is a possibility to be admitted to the PhD program in the absence of a M.Sc. degree and equivalency will be established on a case-by-case basis. The admissions committee however, will require evidence that the student has fulfilled our M.Sc. outcomes even in the absence of the M.Sc. degree. These outcomes are as follows:

1. Identify specific research questions and pose hypotheses
2. Design a realistic research program to answer these questions or test hypotheses
3. Collect, manage, analyze and present data in a scientifically appropriate fashion

Students providing evidence of such scholarly outcomes may be considered to have adequate M.Sc. equivalency.

4.2.2.1 Admission of Students from Outside Canada or US

International applicants must apply to Citizenship and Immigration Canada, in their home country, for a Study Permit. Admitted students will be instructed to not leave for Canada until they have received a Letter of Acceptance issued by the UW Graduate Studies Office and a Study Permit (IMM 1442) valid for study at UW, issued by Citizenship and Canada Immigration. These two documents are required for international applicants to enroll at UW. Applicants will be directed to consult the appropriate Citizenship and Immigration Canada office for instructions to apply for a Study Permit.

An official academic transcript from each post-secondary institution must be submitted with the application for admission. Transcripts must show all courses, marks and the awarding of degrees. A transcript is considered official only if it is received in a signed and sealed university envelope (signed on the flap by the official in the university office issuing the transcript). A certified English translation must also be included if the official transcripts are written in a language other than English. Transcripts will be verified by UW for authenticity.
The School of Pharmacy will adopt the international admission guidelines, as stipulated by UW Graduate Studies (http://www.grad.uwaterloo.ca/students/prospective/International/intl_adm_guide.asp). For international students requiring proof of English proficiency the minimums required by UW will be used (see section 4.2.2.2).

### 4.2.2.2 English Language Requirements

The School of Pharmacy will adopt the minimum English language proficiency requirements of the University of Waterloo.

Applicants who have not completed three or more years of post-secondary work at a Canadian institution or at an institution at which English was the primary language of instruction, or have not been employed for a similar period of time in a position in which English was the primary language of business will be required to provide certification of English language proficiency through one of the accepted examinations below (see http://gradcalendar.uwaterloo.ca/default.aspx?pageID=8945).

<table>
<thead>
<tr>
<th>Accepted Examinations</th>
<th>Required Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test of English as a Foreign Language (TOEFL) or Internet-based TOEFL</td>
<td>580 minimum overall score; or Internet-based minimum overall score of 90, plus 25 minimum in Speaking and Writing sections.</td>
</tr>
<tr>
<td>Michigan English Language Assessment Battery (MELAB)</td>
<td>85 minimum overall score; minimum of 80 in each section</td>
</tr>
<tr>
<td>International English Language Testing System (IELTS)</td>
<td>7.0 minimum overall score; minimum 5.5 in each section</td>
</tr>
<tr>
<td>Canadian Academic English Language Assessment (CAEL)</td>
<td>70 minimum overall score; minimum 60 in each section; plus 70 minimum in Speaking and Writing sections.</td>
</tr>
<tr>
<td>Pearson Test of English (PTE) Academic</td>
<td>63 minimum overall score; plus 65 minimum in Speaking and Writing Sections</td>
</tr>
<tr>
<td>English for Academic Success (EFAS)</td>
<td>80% overall in level 400</td>
</tr>
</tbody>
</table>

### 4.2.2.3 MSc-to-PhD transfer Process

The MSc-to-PhD transfer option may be appropriate for MSc candidates who have entered graduate studies from an undergraduate program and who have expressed interest in completing a PhD.

An MSc student may request to transfer to the PhD program after the end of the first year of studies but no later than the end of the second year. A recommendation to transfer will be initiated through a
meeting of the student’s Advisory Committee. The recommendation is sent to the Pharmacy Graduate Officer to consider approval of the transfer. The following conditions must be met to transfer:

- The student must be in good academic standing, including not being on probation or carrying incompletes.
- The student must demonstrate good progress in a research project that could be expanded to a PhD project.
- The student must demonstrate superior academic, research and scientific writing and oral presentation skills such that the experience of conducting research, collecting and analyzing data and preparing and defending a thesis at the MSc level could be bypassed. Implicit in this is that the student must demonstrate the necessary research skills and knowledge to successfully complete a PhD.
- The student normally must have completed two courses (a total of 1.0 credit units) and have achieved acceptable grades (75% or higher) in those courses.
- The student must successfully pass the M.Sc. Thesis Proposal Milestone before being recommended for transfer. This examination must be at least as rigorous as an MSc thesis defence and the results must clearly indicate that the student has the potential to obtain sufficient knowledge of his or her field of study to proceed toward PhD candidacy.

If the above-mentioned conditions are met, the Graduate Officer will approve the transfer and ensure that a new Advisory Committee and Program of Studies are established and approved.

Enrolment in the PhD Program for transfer students will be counted from the date of initial registration in the MSc program. The student may begin work on the PhD only after the transfer is approved.

4.2.3 Degree Requirements

The PhD in Pharmacy is granted to candidates who have adequately reached the graduate degree level outcomes (Table 4.1) as well as reached the School of Pharmacy outcomes as listed in Table 4.2. Degree requirements and milestones for the Program are listed below:

- Three to five, depending on route of entry into the Program, one-term (0.5 unit weight) graduate-level courses inclusive of PHARM610: Topics in Drug Development (see section 4.2.3.1)
- Milestone 1: Academic Integrity Workshop Attendance (see section 4.2.3.2)
- Milestone 2: PhD Thesis Proposal (see section 4.2.3.3)
- Milestone 3: Satisfactory performance in a Comprehensive examination (see section 4.2.3.4)
- Milestone 4: PhD Graduate Seminar requirement (see section 4.2.3.5)
- Milestone 5: Submission and defence of a thesis, embodying the results of original research (see section 4.2.3.6)
### Table 4.1. PhD Requirements Mapped to the Doctoral Graduate Degree Level Expectations (GDLEs)

<table>
<thead>
<tr>
<th>1. Depth and Breadth of Knowledge</th>
<th>Breadth of Discipline Requirements</th>
<th>Specialization Courses</th>
<th>Academic Integrity Milestone</th>
<th>Comprehensive Examination</th>
<th>Thesis Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>A thorough understanding of a substantial body of knowledge that is at the forefront of their academic discipline or area of professional practice.</td>
<td>PHARM610</td>
<td>PHARM6XX (x2)</td>
<td>Ma (Breadth)</td>
<td>Ma (Depth)</td>
<td>Ma (Depth)</td>
</tr>
<tr>
<td>2. Research and Scholarship</td>
<td></td>
<td></td>
<td>Mi (Breadth)</td>
<td>Ma (Depth)</td>
<td>Ma (Depth)</td>
</tr>
<tr>
<td>a. The ability to conceptualize, design, and implement research for the generation of new knowledge, applications, or understanding at the forefront of the discipline, and to adjust the research design or methodology in the light of unforeseen problems;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ma</td>
</tr>
<tr>
<td>b. The ability to make informed judgments on complex issues in specialized fields, sometimes requiring new methods; and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ma</td>
</tr>
<tr>
<td>c. The ability to produce original research, or other advanced scholarship, of a quality to satisfy peer review and to merit publication.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ma</td>
</tr>
<tr>
<td>3. Level of Application of Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The capacity to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Undertake pure and/or applied research at an advanced level; and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ma</td>
</tr>
<tr>
<td>ii) Contribute to the development of academic or professional skills, techniques, tools, practices, ideas, theories, approaches, and/or materials.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ma</td>
</tr>
</tbody>
</table>
4. Professional Capacity/Autonomy

| a. The qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex situations; | Mi | Mi | Mi | Mi | Ma | Mi |
| b. The intellectual independence to be academically and professionally engaged and current; | Mi | Ma | Ma | Ma | Ma | Ma |
| c. The ethical behavior consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research; and | Mi | Mi | Mi | Ma | Mi | Mi | Ma | Ma |
| d. The ability to evaluate the broader implications of applying knowledge to particular contexts. | Mi | Mi | Mi | Ma | Ma | Ma |

5. Level of Communications Skills

The ability to communicate complex and/or ambiguous ideas, issues and conclusions clearly and effectively.

| Mi | Ma | Mi | Ma | Ma | Ma | Ma |

6. Awareness of Limits of Knowledge

An appreciation of the limitations of their own work and discipline, of the complexity of knowledge, and of the potential contributions of other interpretations, methods, and disciplines.

| Mi | Mi | Mi | Mi | Ma | Ma |

Ma = Major contribution toward fulfilling the outcome
Mi = Minor contribution toward fulfilling the outcome
Table 4.2. PhD Requirements Mapped to the UW School of Pharmacy Learning Outcomes

<table>
<thead>
<tr>
<th>Breadth of Discipline Requirements</th>
<th>Specialization Courses</th>
<th>Academic Integrity Milestone</th>
<th>Comprehensive Examination</th>
<th>Thesis Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHARM610 Graduate Seminar</td>
<td>PHARM6XX (x2)</td>
<td>Proposal</td>
<td>Written Thesis</td>
<td>Oral Defence</td>
</tr>
</tbody>
</table>

| 1. Complete a research-based thesis | Ma | Ma | Ma |
| 2. Develop a broad understanding of Pharmacy and the Pharmaceutical Sciences | Ma | Mi | Ma |
| 3. Demonstrate depth of knowledge | Ma | Ma | Ma | Ma |
| 4. Evaluate disciplinary context | Mi | Mi | Ma | Ma | Ma |
| 5. Apply the scientific method |  |  |  |  |
| 6. Focus on innovation and discovery | Mi | Mi | Ma | Ma |
| 7. Effective dissemination of knowledge | Mi | Ma | Mi | Ma |
| 8. Uphold ethical standards | Mi | Mi | Mi | Ma | Ma |

Ma = Major contribution toward fulfilling the outcome
Mi = Minor contribution toward fulfilling the outcome
4.2.3.1 Course and Time Requirements for the PhD Degree

If a candidate accepted into the PhD program already has a M.Sc. degree, a minimum of three graduate-level courses will be required, inclusive of the core course PHARM610. If a candidate is accepted into the PhD program from a four-year honours undergraduate degree (PhD Direct), a minimum of five 0.5 credit unit graduate-level courses will be required, inclusive of the core course PHARM610.

A minimum of 60% must be achieved in all coursework taken for credit. The candidate must obtain an average of at least 70% in the courses presented in fulfillment of the degree requirements.

Where a grade of less than 60% is obtained in a course, and on the recommendation of the Associate Director of Research and Graduate Studies, School of Pharmacy, and the approval of the Associate Dean of Graduate Studies, Faculty of Science, the PhD student may repeat the course for higher standing or take an alternate course for credit. If the Associate Director of Research and Graduate Studies does not make such a recommendation, or if the recommendation is not approved by the Associate Dean of Graduate Studies, the student will be required to withdraw. A student who obtains a grade of less than 60% in more than one course will normally be required to withdraw. If progress in research is unsatisfactory, as evidenced by two consecutive unsatisfactory progress reports, a student will be required to withdraw.

The requirements for the PhD degree must be completed within the time periods stipulated by UW Senate — i.e., a maximum of 12 terms (four years) from a Master's degree or its equivalent, or a maximum of 18 terms (six years) from a four-year BSc degree or from a M.Sc. transfer.

Students in the MSc program may apply to transfer to the PhD program (see 4.2.2.3) after their first year in the MSc program but not later than the second year. To be eligible to transfer, students must have high academic standing, demonstrated ability to conduct research at the PhD level and completed two courses each with a grade of at least 75%.

Below is a summary of the required number of courses, grade minimums for graduate studies in Pharmacy, and degree completion periods:

<table>
<thead>
<tr>
<th>Program</th>
<th>Required Courses</th>
<th>Grade Minimums</th>
<th>Degree Completion Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Program</td>
<td>Two one-term (0.5 unit weight) graduate courses, PHARM610 (0.5 unit weight)</td>
<td>All graduate courses with a final mark of 60% or</td>
<td>Completed by 12 terms (four years)</td>
</tr>
<tr>
<td>(admission</td>
<td></td>
<td>greater, overall cumulative average 70% or greater</td>
<td></td>
</tr>
<tr>
<td>with M.Sc. or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>equiv.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PhD Program</td>
<td>Four one-term (0.5 unit weight) graduate courses, PHARM610 (0.5 unit weight)</td>
<td>All graduate courses with a final mark of 60% or</td>
<td>Completed by 18 terms (six years)</td>
</tr>
<tr>
<td>(transfer</td>
<td></td>
<td>greater, overall cumulative average 70% or greater</td>
<td></td>
</tr>
<tr>
<td>from MSc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PhD Direct</td>
<td>Four one-term (0.5 unit weight) graduate courses, PHARM610 (0.5 unit weight)</td>
<td>All graduate courses with a final mark of 60% or</td>
<td></td>
</tr>
<tr>
<td>(direct from</td>
<td></td>
<td>greater, overall cumulative average 70% or greater</td>
<td></td>
</tr>
<tr>
<td>BSc)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
All graduate courses with a final mark of 60% or greater
Overall cumulative average 70% or greater
Completed by 18 terms (six years)

4.2.3.2 Milestone 1: Academic Integrity Workshop

The first mandatory milestone for PhD students is attendance at a Faculty of Science organized workshop on plagiarism and the importance of academic integrity. Academic integrity is discussed in relation to both the students’ research and in the undergraduate assignments they evaluate as part of their TA responsibilities. This workshop is run in both the Fall and Winter terms. Details can be found online (http://science.uwaterloo.ca/graduate-studies/resources/academic-integrity-workshops).

4.2.3.3 Milestone 2: PhD Thesis Proposal

The PhD Thesis Proposal should be completed by the end of the second term in the PhD program and no later than the third term. The objectives are to encourage PhD students to use the literature to stimulate in-depth thinking about the basis of their thesis research project and to encourage development of their scientific oral presentation skills. It involves the preparation of a written research proposal and oral defence of the proposal. The Thesis Proposal should outline the reasons for undertaking the project, concisely survey the relevant literature, present a detailed description of the methodology to be used and outline any preliminary results.

Summary of the steps for completion:

**Step 1:** Select examination committee (can be the same as the advisory committee – see section 4.2.5) and set up date for oral Thesis Proposal defence. Within the first term in the PhD program, the student is required to arrange a suitable date for their seminar which accommodates other commitments of their Advisor, their examination committee members (at least two faculty familiar with the students field of study and no more than three faculty inclusive of a co-supervisor) and the Graduate Officer (or assigned chair). A signed scheduling form giving their seminar title must be returned to the Graduate Administrator.

**Step 2:** Prepare written Thesis Proposal and submit two weeks prior to oral defence to examination committee. The completed thesis proposal should be no longer than 15-20 pages of text, not including figures, legends and references, double-spaced with 1 inch margins and size 12 font in Times New Roman.

**Step 3:** Orally defend Thesis Proposal. The oral defense consists of a short 30 minute presentation followed by questions from the committee. The question period involves questions by the examination committee lasting 15 minutes per committee member followed by questions by the audience. Anyone can come to the defense and they can ask questions after the committee has finished its questioning.

**Assessment of the Thesis Proposal**

The written proposal will be evaluated by members of the examination committee according to the following categories:
1. Overall impression (appearance, organization, format)
2. Quality of English (grammar, spelling, style)
3. Knowledge of the relevant literature
4. Scientific content of the proposal (understanding, depth, coherence, applications)
5. Comprehensibility of the proposal to a non-expert

The oral seminar will be assessed by the following criteria:

1. Preparation, presentation (audibility, speech and grammar) and organization
2. Apparent understanding of the material
3. Ability to handle discussion
4. Comprehensibility of the presentation to a non-expert

The committee will assess the written and oral presentation as well as the responses to all questions into account in reaching its decision. The decision may be pass, fail, or deferred. A failure requires withdrawal from the program. A deferred decision requires a written explanation by the committee and a fixed date for a revised proposal and subsequent defense. Decisions cannot be deferred a second time.

4.2.3.4 Milestone 3: Comprehensive Examination

The Comprehensive Examination tests the knowledge of the PhD candidate on topics related to the student's field of research and is used to judge whether the student has a mature, broad and substantial understanding of the discipline as a whole, as evidenced by an oral examination.

The comprehensives Examination Committee will be comprised of three expert members, normally from the Supervisory Committee, and an impartial chair from the School of Pharmacy appointed by the Graduate Officer. If an Advisory Committee member cannot be present (e.g., is on sabbatical leave), an alternate will be selected. Faculty who are not members of the student’s Advisory Committee may, at the recommendation of the Advisory Committee, be invited to the Comprehensive Examination. If they are invited they are granted full voting privileges.

The Comprehensive exam should be completed by term 4 of entry to the program. Failure to complete the exam within the first 7 academic terms may require the student to withdraw from the program. In the case of non-traditional routes of entry into the program (M.Sc. transfer or PhD Direct), Table 7 presents the timeline for completion of the Comprehensive Examination milestone.

At least eight weeks prior to the Comprehensive Examination, the Advisor, in consultation with the other examiners must declare to the Graduate Administrator: 1) the Examination Committee membership, 2) the subject matter of the examination and 3) the proposed date. Eight weeks prior to the Comprehensive Exam, the student will receive a letter or email from the Graduate Officer stating the subjects for examination, including any reference materials. Four weeks in advance of the exam, the Advisor will collate and submit the Examination Committee’s questions and answers to the Graduate Administrator. Each expert member is required to submit 3 questions, each requiring about 10 minutes to orally answer. Along with the questions, the expert examiners will also submit the expected answers. This will ensure that the questions are of the right length but will also help non-experts to assess the students’ answer. Failure of the Advisor to submit examination questions and answers 4 weeks before the exam will result in cancellation of the exam.
The exam will run for 2 hours. One hour before the exam, the student will be given the Exam questions. During the 2 hour exam, the impartial Chair will select the questions which each expert member will ask. At least 6 questions should be addressed within the 2 hour limit, with at least one being from each expert member.

Immediately following the exam, the student will leave the room. The Examination committee will discuss the students’ performance and assess the response to each of the questions. A vote will be taken for a pass/fail on every question (majority rules) and the student must attain a 60% Pass for a global recommendation of Option 1 or 2 (see below). The committee makes one of the following recommendations to the School Director:

1. Pass
2. Pass but some remedial work is required and will be assessed by the Supervisory Committee by some reasonable and specified time
3. Re-appear
4. Fail, required to withdraw

Option 3 will be available to the student only once and will be completed within two terms of the first attempt. For the second attempt, the Examination Committee should remain the same but may be changed if approved by the Graduate Officer. The same exam structure will follow as in the first attempt however the examination questions will be different.

Regardless of the recommendation, the impartial chair will provide a brief written report to the student, the supervisory committee and the School Director conveying the results, including any special conditions to be met (with timelines).

4.2.3.5 Milestone 4: Graduate Seminar Requirement

To fulfill the requirement of oral presentation of research at a scientific forum, students will be encouraged to present their research at a major national or international conference, providing important exposure to the larger academic and research community. This educational experience will help provide highly trained graduates ready for research in academia, industry or healthcare. Students will also be encouraged to participate in UW’s Graduate Student Research Conference, an annual event UW hosts to provide students experience in conference presentation (see http://www.grad.uwaterloo.ca/Conference/index.asp). We aim to develop our own annual one day graduate research seminar day where participation in an oral presentation will count towards completion of this milestone.

The milestone will be considered complete when the Graduate Officer has approved the setting as a reasonable avenue for scientific presentation and has received confirmation of abstract acceptance. This milestone will be given a Pass/Fail grade.

4.2.3.6 Milestone 5: PhD Thesis and Oral Defence

All students are expected to consult the University of Waterloo Thesis Regulations website for detailed guidelines: http://www.grad.uwaterloo.ca/students/current/thesis_regulations.asp
Preparation of PhD Thesis for Defence

The student submits a draft thesis to his or her supervisor/co-supervisor for review. The supervisor/co-supervisor will provide comments and the student will prepare subsequent revisions as required. When a satisfactory version of the thesis is completed, the student provides the thesis to the Advisory Committee. The student must ensure that all revisions recommended by the Advisory Committee are completed and prepares a final version of the thesis for submission to the External Examiner. The Advisory Committee may be required to meet if major concerns are raised or another review of revisions is required.

The selection of an External Examiner is guided by UW policies that can be found at http://gradcalendar.uwaterloo.ca/page/GSO-Min-Require-PhD.

Thesis submission to the Office of the Associate Dean (Graduate Studies) of the Faculty and thesis review is outlined at http://gradcalendar.uwaterloo.ca/page/GSO-Min-Require-PhD.

PhD Thesis

The PhD Examination Committee will consist of an impartial Chair appointed by the Dean of Graduate Studies, the Supervisor, the Advisory Committee members, and the External Examiner.

As indicated in the University of Waterloo guidelines (http://gradcalendar.uwaterloo.ca/page/GSO-Min-Require-PhD), the External Examiner must provide the Associate Dean of Graduate Studies with a written assessment of the thesis at least one week before the scheduled defence. Whether the assessment is positive or negative, the Associate Dean will copy the report of the External Examiner to the Supervisor, who will inform the candidate of any major criticisms of the thesis, so that the student can respond to these, but the evaluation must not be shown to the candidate. (The candidate may be shown the evaluation after the defence, with the permission of the External Examiner.) Should the assessment be negative, the Associate Dean may wish to advise that the candidate withdraw the dissertation and defend with the same external examiner at a later date. A candidate may withdraw the thesis only once. Despite a negative assessment, a candidate has the right to proceed to a defence.

The defence is open to all and observers may be permitted to ask questions at the discretion of the Chair. The defence consists of a public presentation about 30-40 minutes long of the research contained in the thesis, followed by an extensive oral examination and question period.

After the candidate and observers have withdrawn, the Examiners will discuss the quality of the thesis and its defence. They will make one of the following recommendations to the Dean of Graduate Studies:

1. Accepted
2. Accepted conditionally (may require further consultation with the Examiners)
3. Decision deferred (thesis must be revised and resubmitted for re-examination)
4. Rejected
The Examiners have the authority to recommend substantial changes in interpretation of results, that additional experimental work be conducted, and that the thesis be completely rewritten, as well as set deadlines for completion of any additional experimental work or revisions. The candidate will be deemed to have passed the defence if not more than one of the members of the Examining Board votes negatively.

According UW regulations, the student and supervisor(s) may request a closed thesis examination and a restriction on the circulation of the thesis, if intellectual property protection is being considered. A Request to Restrict Circulation of Thesis Form (see http://www.grad.uwaterloo.ca/forms/Thesis/requesttorestrictcirculation.pdf) must be submitted. In these cases the committee members, including the external examiner, will be asked by the University of Waterloo to sign a non-disclosure agreement (see http://www.grad.uwaterloo.ca/forms/nondisclosure.pdf) regarding the contents of the thesis before its examination.

After the PhD candidate has made the revisions, he or she must verify with the supervisor and one of the designated readers that the revisions have substantially addressed concerns and deficiencies and that the revisions are complete. When this has occurred, a final copy, with all revisions, must be submitted as outlined in http://www.grad.uwaterloo.ca/students/current/thesis_regulations.asp.

4.2.4 Program of Studies

Upon entry into the Program, students will complete an orientation session and receive a Student’s Handbook (Appendix 1D).

The student and his or her supervisor will normally meet before the first meeting of the student’s Advisory Committee to discuss which graduate courses the student will enroll in, including the core course, PHARM610. These courses will become part of the student’s individualized program of studies. The program of studies can be prepared before the first meeting of the student’s Advisory Committee, but it is formalized at that meeting.

The program of studies will include the following:

- Establishing the members of the student’s Advisory Committee
- Establishing course requirements, including PHARM610, in consultation with the supervisor and Advisory Committee, ensuring that appropriate courses are chosen and that the minimum number of credit units are met.
- Determining if any additional non-credit courses, such as animal care and use, laboratory safety, radiation safety and biosafety courses or workshops, must be taken.
- Determining whether ethics approval is required for the proposed research and when it will be granted. As per UW policy, ethics approval is needed for all research involving humans or animals.
- Approving transfer credits for courses from another university, if applicable; original transcripts for these courses must be on file with UW Graduate Studies and a copy placed in the student’s file in the School of Pharmacy.
The program of studies is approved by the School of Pharmacy’s Graduate Officer and submitted to the Associate Director of Research and Graduate Studies. A copy will be given to the student, which will form a contract between UW and the student, noting the requirement to successfully complete courses, meet other requirements, pass examinations and defend a thesis.

Changes in course requirements, supervisor or Advisory Committee members, or a significant change in the student’s research area, will require that a new program of studies be prepared, approved and submitted.

4.2.5 Student Advisory Committee

An Advisory Committee is established as soon as possible after a candidate’s registration. The supervisor determines the members of the Advisory Committee, in consultation with the student and the Graduate Officer. Subsequent changes to the Advisory Committee are made by the Committee itself.

A PhD Advisory Committee must include at least three members in addition to the Advisory Committee Chair, comprised of the following individuals:

- **Advisory Committee Chair** – This may be the Pharmacy Graduate Officer or his or her designate. In most cases, the designate will be an Advisory Committee member who is otherwise required to be present to facilitate efficiency.

- **Supervisor** – A faculty member within the School of Pharmacy.

- **Co-supervisor** – If applicable, persons who are not faculty members in the School of Pharmacy or who are not Adjunct Professors may be granted permission to be a co-supervisor by the Associate Director, Research and Graduate Studies. Co-supervisors count as one member in the Advisory Committee and share one vote in decision-making at the oral defence.

- **Additional Members** – A minimum of two for a PhD candidate. One must be a faculty member or adjunct faculty of the School of Pharmacy.

- **Associate Director of Research and Graduate Studies** – The Associate Director of Research and Graduate is an ex officio member of the Advisory Committee and normally attends meetings only under exceptional or extenuating circumstances.

4.2.6 Annual Committee Meetings and Progress Reports

The progress of PhD students will be monitored regularly. A student may be required to withdraw from the graduate program if progress has not been satisfactory, as evidenced by sub-standard course work, a mediocre or untenable research proposal, lack of research activity, poor comprehensive exam performance or other such deficiencies that have not been adequately remedied.

All PhD students will meet with their Advisory Committee shortly after enrolment to select courses necessary to meet program and personal requirements. After this initial meeting, PhD students will meet with their Advisory Committee within the first year of their program and present a research
proposed program. The Advisory Committee will assess the proposal for scientific merit and feasibility, and set program milestones.

Students will continue to meet with their Advisory Committee annually, and submit a progress report they prepare for its members at least one week before the annual meeting, to report on their research progress and objectives thus far attained. The Committee will assess the student’s progress and suggest corrective measures, if necessary, and may also suggest new or alternate avenues to advance the student’s research. In certain years the annual meeting with the Advisory Committee will coincide with other major programmatic milestones, such as the Thesis Proposal Defence, Comprehensive Examination or Thesis Defence, as outlined in Table 4.3.

Monitoring the academic progress of graduate students is the primary responsibility of the supervisor, co-supervisor and Advisory Committee. Chairs of Advisory Committees should bring any problems related to academic progress to the attention of the Associate Dean of Graduate Studies, Faculty of Science.

The Graduate Officer will review the progress of all graduate students at least once a year, based on any or all of the following: academic transcripts, progress reports for annual Advisory Committee meetings and student CVs. All graduate students will be expected to submit an updated CV each year when requested by the Graduate Office.

The Graduate Officer, in consultation with the research supervisor(s), will inform students in writing of unsatisfactory progress.
TABLE 4.3: Suggested timelines and milestones to complete Doctoral degree in Pharmacy

### Doctoral degree in Pharmacy, after completion of an MSc — maximum of 12 terms (4 years)

<table>
<thead>
<tr>
<th>Year I</th>
<th>Terms 1, 2 and 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Select supervisor and research topic</td>
</tr>
<tr>
<td></td>
<td>● Select Advisory Committee</td>
</tr>
<tr>
<td></td>
<td>● Determine individual program of studies, including graduate courses necessary to fulfill requirements (courses selected in consultation with supervisor and Advisory Committee)</td>
</tr>
<tr>
<td></td>
<td>● Begin course work</td>
</tr>
<tr>
<td></td>
<td>● Begin research</td>
</tr>
<tr>
<td></td>
<td>● <strong>Annual committee meeting #1: PhD Thesis Proposal Defence</strong> (Term 2 or no later than Term 3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year II</th>
<th>Terms 4, 5 and 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Continue research and course work</td>
</tr>
<tr>
<td></td>
<td>● Complete course work (if course requirements have not been met by end of year I)</td>
</tr>
<tr>
<td></td>
<td>● <strong>Annual committee meeting #2: Take Comprehensive Examination</strong> (usually between Terms 4 and 7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year III</th>
<th>Terms 7, 8 and 9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Assess research plan’s progress and feasibility; if necessary, develop an alternate plan with the approval of supervisor and Advisory Committee</td>
</tr>
<tr>
<td></td>
<td>● Continue research</td>
</tr>
<tr>
<td></td>
<td>● <strong>Annual committee meeting #3: Toward end of Year III, prepare Progress Report for Advisory Committee Meeting</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year VI</th>
<th>Terms 10, 11 and 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Complete research</td>
</tr>
<tr>
<td></td>
<td>● Prepare manuscripts; write and defend thesis</td>
</tr>
</tbody>
</table>

### Doctoral degree in Pharmacy, MSc-to-PhD transfer option — maximum of 18 terms (6 years)

<table>
<thead>
<tr>
<th>Year I</th>
<th>Terms 1, 2 and 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Select supervisor and research topic</td>
</tr>
<tr>
<td></td>
<td>● Select Advisory Committee</td>
</tr>
<tr>
<td></td>
<td>● Determine individual program of studies, including graduate courses necessary to fulfill requirements (courses selected in consultation with supervisor and Advisory Committee)</td>
</tr>
<tr>
<td></td>
<td>● Begin course work</td>
</tr>
<tr>
<td></td>
<td>● Initiate research</td>
</tr>
<tr>
<td></td>
<td>● Graduate student and supervisor meeting to assess progress on research and coursework with a view to transfer to PhD program</td>
</tr>
<tr>
<td></td>
<td>● <strong>Annual committee meeting #1: MSc Thesis Proposal Defence</strong> (Term 2 or no later than Term 3)</td>
</tr>
</tbody>
</table>

| Year II | |
|---------| ● Continue research |
### Proposed Program – Doctor of Philosophy [PhD] Pharmacy

| Terms 4, 5 and 6 | Continue course work (if course requirements have not been met by end of year I)  
| | **Annual committee meeting #2: PhD Thesis Proposal Defence** (usually by end of Term 6) |
| **Year III**  
| Terms 7, 8 and 9 | Continue research  
| | Complete course work (if course requirements have not been met by end of year II)  
| | **Annual committee meeting #3: Take Comprehensive Examination** (usually between Terms 7 and 10) |
| **Year IV**  
| Terms 10, 11 and 12 | Continue research  
| | **Annual committee meeting #4: Toward end of Year IV, prepare Progress Report for Advisory Committee** |
| **Year V**  
| Terms 13, 14 and 15 | Continue research  
| | **Annual committee meeting #5: Toward end of Year V, prepare Progress Report for Advisory Committee** |
| **Year IV**  
| Terms 16, 17 and 18 | Complete research  
| | Prepare manuscripts; write and defend thesis  
| | **Annual committee meeting #6: Defend Thesis** |

**Doctoral degree in Pharmacy, PhD Direct from B.Sc. option — maximum of 18 terms (6 years)**

| **Year I**  
| Terms 1, 2 and 3 | Select supervisor and research topic  
| | Select Advisory Committee  
| | Determine individual program of studies, including graduate courses necessary to fulfill requirements (courses selected in consultation with supervisor and Advisory Committee)  
| | Begin course work  
| | Initiate research  
| | **Annual committee meeting #1: Assess program of studies** |
| **Year II**  
| Terms 4, 5 and 6 | **Annual committee meeting #2: PhD Thesis Proposal Defence** (usually between Terms 4 and 6)  
| | Continue research  
| | Continue course work (if course requirements have not been met by end of year I) |
| **Year III**  
| Terms 7, 8 and 9 | Continue research  
| | Complete course work (if course requirements have not been met by end of year II)  
| | **Annual committee meeting #3: Take Comprehensive Examination** (usually between terms 7 and 10) |
| **Year IV**  
| Terms 10, 11 and 12 | Continue research  
| | **Annual committee meeting #4: Toward end of Year IV, prepare Progress Report for Advisory Committee** |
| **Year V**  
<p>| Terms 13, 14 and 15 | Continue research |</p>
<table>
<thead>
<tr>
<th>Year IV Terms 16, 17 and 18</th>
<th>• Annual committee meeting #5: Toward end of Year V, prepare Progress Report for Advisory Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Complete research</td>
</tr>
<tr>
<td></td>
<td>• Prepare manuscripts; write and defend thesis</td>
</tr>
<tr>
<td></td>
<td>• Annual committee meeting #6: Defend Thesis</td>
</tr>
</tbody>
</table>
4.3 Part-time studies

The PhD Program may be offered part-time on a case-by-case basis upon consideration of the circumstances by the Associate Director of Research and Graduate Studies, School of Pharmacy, and the Associate Dean of Graduate Studies, Faculty of Science.

Students can switch to part-time to complete their program if circumstances change. To change status, students need obtain permission from their Supervisor(s), the Graduate Officer, and the Associate Dean, Graduate Studies for the Faculty of Science.

4.4 Curriculum

4.4.1 Courses and Milestones in the School of Pharmacy

School of Pharmacy graduate courses and the faculty who will be primarily responsible for teaching them in are listed in Table 4.4. The frequency of course offerings will be adjusted by demand. A minimum enrolment number will be needed to offer courses in each year. If enrolment is lower than the limit set for the course, the course may be offered the following year. The core course PHARM610 will be offered every year.

4.4.2 Courses in other departments relevant to the graduate program in Pharmacy

Current graduate level courses from other UW departments relevant to the graduate Program in Pharmacy are listed in Appendix 1E.
Table 4.4. Courses developed or to be developed within the Graduate Program in Pharmacy

<table>
<thead>
<tr>
<th>Course/Milestone</th>
<th>Course Title (weight)</th>
<th>Faculty member(s) responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milestone 1</td>
<td>Academic Integrity Workshop</td>
<td></td>
</tr>
<tr>
<td>Milestone 2</td>
<td>PhD Thesis Proposal</td>
<td>Appendix 1F</td>
</tr>
<tr>
<td>Milestone 3</td>
<td>Comprehensive Examination</td>
<td>Appendix 1F</td>
</tr>
<tr>
<td>Milestone 4</td>
<td>Graduate Seminar</td>
<td>Appendix 1F</td>
</tr>
<tr>
<td>Milestone 5</td>
<td>PhD Thesis</td>
<td>Appendix 1F</td>
</tr>
<tr>
<td>Pharm 602</td>
<td>Grant Writing in the Sciences (0.5)</td>
<td>Team taught; will require preparation of a research-based Tri-Council grant application (or other appropriate peer-reviewed, competitive application) and 50-minute oral defence of same</td>
</tr>
<tr>
<td>Pharm 603</td>
<td>Selected topics in medicinal chemistry (0.5)</td>
<td>Nekkar</td>
</tr>
<tr>
<td>Pharm 604</td>
<td>Gene Therapy (0.5)</td>
<td>Wettig, Slavcev, Foldvari</td>
</tr>
<tr>
<td>Pharm 605</td>
<td>Physical Chemistry and Application of Surfactants (0.5)</td>
<td>Wettig</td>
</tr>
<tr>
<td>Pharm 606</td>
<td>Neuroscience in the 21st Century (0.5)</td>
<td>Beazely</td>
</tr>
<tr>
<td>Pharm 607</td>
<td>Advanced pharmaceutical analysis (0.5)</td>
<td>Nekkar</td>
</tr>
<tr>
<td>Pharm 608A</td>
<td>Selected Topics in the Pharmaceutical Sciences (0.5)</td>
<td>TBD</td>
</tr>
<tr>
<td>Pharm 609</td>
<td>Advanced Pharmacokinetics (0.5)</td>
<td>Edginton</td>
</tr>
<tr>
<td>Pharm 610</td>
<td>Topics in Drug Development (0.5)</td>
<td>Team taught (Syllabus presented in Appendix 1G)</td>
</tr>
<tr>
<td>Pharm 611</td>
<td>Special Topics in Pharmacy Practice (0.5)</td>
<td>TBD (SGRC new course template - Appendix 1H)</td>
</tr>
<tr>
<td>Pharm 612</td>
<td>Pharmacoepidemiology (0.5)</td>
<td>Maxwell (Proposed description - Appendix 1H)</td>
</tr>
</tbody>
</table>

1 Course numbers have not yet been assigned
The calendar descriptions of the PhD-relevant Pharmacy graduate-level courses are listed below.

PHARM 602 Grant Writing in the Sciences (0.50) LEC  
Course ID: 013817
The course is designed to teach the student how to critically review the literature, ask the right scientific questions, generate hypotheses, and write a professional curriculum vita and a fundable grant proposal. The course will include lectures from the instructor and guest speakers, small group discussion, student presentations and a final written grant proposal.

PHARM 603 Selected Topics in Medicinal Chemistry (0.50) LEC  
Course ID: 013818
This course provides an introduction to basic principles in medical chemistry such as physiochemical properties, drug design and pharmacological actions. A brief overview of the theory and application of computer aided drug design principles will provide a basic understanding of the "in silico" drug design concepts. The student will develop an understanding toward the concepts of peptide/petidomimetic design as therapeutic agents. A series of case studies on clinical drugs will be presented with major emphasis on their design, synthesis, reaction mechanisms and structure-activity relationship studies. A section of the course will address the pathophysiology and pharmacology of diseases affecting the central nervous system. In addition, learning activities and assignments include a term paper submission and in class presentation of current topics in medicinal chemistry.

PHARM 604 Gene Therapy (0.50) LEC  
Course ID: 013819
Gene therapy offers extraordinary potential to treat both inherited and acquired diseases by using the body's own machinery to produce a therapeutic compound or protein, or up-regulate/down-regulate specific cellular processes. This course will examine the various extra- and intracellular barriers to DNA transfection, and the common vectors used in gene therapy. Various routes of administration, such as injected, inhaled, and transdermal will be discussed in terms of their challengers, and the successes of recent formulations described in the literature.

PHARM 605 Physical Chemistry and Application of Surfactants (0.50) LEC  
Course ID: 013820
Surface active compounds, more commonly known as surfactants are found in nearly every aspect of day to day life, including motor oils, pharmaceuticals, cosmetics, detergents, and paints and inks to name a few. This course will introduce the student to the structures of classical and emerging classes of surfactants and their fundamental properties that make these systems so useful. The self-assembly of these compounds into micelles will be discussed in detail using both thermodynamic and kinetic modules and modern methods of characterizing these systems will be examined. The application of surfactants in a variety of industries will be introduced. The capstone activity of this course will entail a critical analysis of a relevant recent journal article, and presentation to the class.

PHARM 606 Neuroscience in the 21st Century (0.50) LEC  
Course ID: 013821
Intensively examines medical and technological advances in neuroscience. Students will first develop a deep understanding of the structure and function of the central nervous system, neuronal cell biology and physiology, and neurotransmission. Explores selected CNS disease states and identify mechanisms of neuropathology by biological, environmental, and iatrogenic causes. Advances in technology and nanotechnology is and will continue to transform the treatment of diseases of the nervous system and these issues will be explored by expert guest lecturers.

PHARM 607 Advanced Pharmaceutical Analysis (0.50) LEC  
Course ID: 013822
This course provides an introduction to modern spectroscopic methods with emphasis on
pharmaceutical analysis. First few lectures will cover the theory and application of UV-Vis and IR spectroscopy. A review of NMR spectroscopy will focus on commonly used techniques such as 1H NMR and 13C NMR and their application. The student will get a practical experience in spectroscopic methods for structural elucidation by using UVS-VIS, IR and NMR spectrometers. In addition, a section will address the theory and application of mass spectrometry. Examples of drug molecules/pharmaceuticals and their spectroscopic characteristics will be discussed. In addition, learning activities and assignments include problem sets and structural elucidation of an unknown organic molecule.

PHARM 608A Selected Topics in Pharmaceutical Sciences (0.50) LEC,RDG,TUT Course ID: 013919
This course will discuss specialized topics that are related to the research interests of faculty members in the field of Pharmaceutical Sciences. Topics could include, for example, the areas of drug delivery systems, diabetes, bacteriophage derived therapeutics, central nervous disorders, medicinal chemistry, pharmacokinetics, biophysical methods, bionanotechnology, nanomedicine among others. This course may be presented in any of the following formats, reading based, lecture based, project based or online learning. [Instructor Consent Required]

PHARM 609 Advanced Pharmacokinetics (0.50) LEC Course ID: 014082
This course details the concepts and techniques involved in the quantitative description of absorption, distribution, metabolism, and elimination of drugs. Basic concepts in pharmacokinetics will be thoroughly discussed along with special topics of non-linear kinetics, pharmacodynamics, therapeutic drug monitoring, drug-drug interactions and the mechanistic basis for pharmacokinetic variability. Modeling and simulation exercises using software common to the industry will be completed by the student incorporating non-compartmental, compartmental and physiologically-based pharmacokinetic modeling.

PHARM 610 Topics in Drug Development (0.50) LEC Course ID: 014083
This course will cover all aspects of drug development, from basic research through to post-marketing surveillance of drug safety and efficacy. Faculty members from the UW School of Pharmacy and beyond will provide their expertise on aspects of the drug development process. Students will gain valuable knowledge and appreciation of the drug development process from “bench to bedside”. Using real-life drug research problems, students will learn how identification of disease stat pathophysiology directs drug design, how medicinal chemistry optimizes lead molecule creation, how drug dosage forms are designed, pharmacokinetic studies, how animal models are used to test the efficacy and toxicity of lead compounds, the design and evaluation of clinical trials, drug manufacturing, perspectives from the pharmaceutical industry, as well as business and regulatory issues.

PHARM 611 Special Topics in Pharmacy Practice (0.50) LEC,RDG,TUT Course ID: Not yet available
This course will discuss specialized topics that are related to the research interests of faculty members in the field of Pharmacy Practice. Topics could include, for example, pharmacy education; rural pharmacy practice; geriatrics and aging; pharmacoepidemiology; the role of technology in primary care; chronic disease management; expanded scope of practice; collaborative practice in different settings; health services design and care delivery; among others. This course may be presented in any of the following formats, reading based, lecture based, project based, or online learning.
4.5 Collateral and supporting departments

Pharmacy faculty members have ties both recently established and long-standing with researchers in other UW departments as well as at universities, institutions and healthcare facilities provincially, nationally and internationally. School of Pharmacy faculty members hold cross-appointments in the UW Departments of Biology, Chemistry and Chemical Engineering as well as in the UW School of Optometry. Drs. Joseph and Wettig are members of the Guelph-Waterloo Centre for Graduate Work in Chemistry and Biochemistry, one of Canada’s largest graduate schools (see http://www.gwc2.on.ca/).

Dr. Beazely collaborates with Drs. Nekkar, Slavcev, and Wettig in the area of Alzheimer’s disease research, and co-supervises 1 MSc student with Dr. Rojas-Fernandez within the School of Pharmacy. He collaborates with Drs. Zoya Leonenko and Melanie Campbell from the Department of Physics (Leonenko and Campbell) and School of Optometry (Campbell) at the University of Waterloo. He collaborates with researchers at the Roberts Research Institute at the University of Western Ontario and with medical scientists at the University of Toronto. Dr. Beazely also collaborates with the Ontario Health Human Resources Research Network (Ottawa) in areas of health policy.

Dr. Chang collaborates with the Gateway Rural Health Research Institute in Seaforth Ontario, School of Public Health and Health Systems at the University of Waterloo, the Leslie Dan Faculty of Pharmacy at the University of Toronto, and the Schulich School of Medicine and Dentistry at the University of Western Ontario through cross-appointments. She also works closely with the North York General Hospital based in Toronto Ontario, Jewish General Hospital in Montreal Quebec, the Eugene Applebaum College of Pharmacy and Health Sciences at Wayne State University in the US, and the West China School of Pharmacy at SiChuan University in China on joint research projects and publications.

Dr. Edginton collaborates with the Systems Biology group at Bayer Technology Services in Leverkusen, Germany with joint publications and software assessments and use. She has worked closely with Defence Research and Development Canada and with colleagues in the Faculty of Pharmaceutical Sciences at the University of British Columbia through a research contract. Dr. Edginton also works closely on grant proposals and joint publications with colleagues at the University of Bath, UK, Children’s Hospital of Philadelphia and HPR Dr. Schaffler GmbH, a contract research organization specializing in pain research. Dr. Edginton also has been working with the Food and Drug Administration on pediatric trial planning with recent talks on-site in Maryland and at a Clinical Pharmacology Advisory Committee Meeting.

Dr. Edwards collaborates with the Department of Biostatistics and Research Epidemiology at Henry Ford Health System, Detroit, Michigan in the area of pharmacoepidemiology. He maintains a number of research affiliations with colleagues in the College of Pharmacy and Health Sciences and the School of Medicine, Wayne State University.
**Dr. Fernandez** is the Schlegel Research Chair in Geriatric Pharmacotherapy with the RBJ Schlegel-UW Research Institute for Ageing. He is responsible for the Optimising Medications for Seniors Research program that is designed to improve the care and overall quality of life of older adults. Dr. Fernandez collaborates with various researchers at the University of Waterloo’s Faculty of Applied Health Sciences (Kinesiology, Public Health and Health Systems, and Recreation and Leisure Studies) as well as with collaborators from McMaster medical school. Dr. Fernandez also collaborates with the Institute for Clinical Evaluative Sciences in Toronto. In addition, he also works closely with faculty members from Texas Tech University Health Sciences Centre School of Pharmacy on joint publications.

**Dr. Foldvari** continues to conduct collaborative research with her colleagues in the Western College of Veterinary Medicine (co-supervision of 2 graduate students) and College of Pharmacy and Nutrition at the University of Saskatchewan in the areas of gene therapy and vaccine development. In other areas of non-invasive technologies to deliver therapeutic DNA and proteins into the body and to specifically target these therapeutics to diseased tissues she has collaborations at the Massachusetts Institute of Technology, Stanford University, Semmelweis University, University of Colorado, University College London and University of Queensland. She also collaborates with colleagues and research scientists at the National Synchrotron Light Source at Brookhaven National Laboratory in New York and the Canadian Light Source (co-supervision of 1 student).

**Dr. Grindrod** is cross-appointed to the Faculty of Applied Health Sciences at the University of Waterloo. In addition, she works closely with Dr. Susan Leat at the School of Optometry (UW) and Dr. Lisa Dolovich at McMaster University’s Department of Family Medicine to build a vision screening mobile application for community pharmacies. Nationally, she works with the BC Ministry of Health’s Pharmaceutical Services Division to evaluate a province-wide, pharmacist-run academic detailing program for family physicians. She has recently undertaken a collaboration with Dr. France Légaré at the Université Laval as part of a national team studying knowledge translation in primary care.

**Dr. Joseph** has built strong collaboration locally and abroad. He collaborates with researchers at the University of Alberta, University of Toronto, York University, Lund University in Sweden and Duke University in the United States. Dr. Joseph’s group has also developed strong collaborative ties locally at the University of Waterloo.

**Dr. Maxwell** Dr. Maxwell is involved in national and international research examining the health, medication and quality of care needs of older adults. She holds a cross-appointment in the School of Public Health and Health Systems at the University of Waterloo, an Adjunct Scientist position with the Institute for Clinical Evaluative Sciences (ICES) in Toronto and an Adjunct Professor position with the Department of Community Health Sciences, University of Calgary. She is involved in collaborative aging research with investigators affiliated with the Universities of Alberta, Calgary, Lethbridge, Saskatchewan, Manitoba, Toronto, McGill and Montreal. Her research involves linkages with provincial / national decision-makers in health and continuing care, including the Canadian Institute for Health Information and the Public Health Agency of Canada. She is a current board member of the International Society for Pharmacoepidemiology and a researcher with the interRAI Network of Canada.
Dr. **Nekkar** collaborates with researchers and colleagues at the University of Alberta (Faculty of Pharmacy and Pharmaceutical Sciences and Faculty of Medicine); Department of Chemistry, The Scripps Research Institute, La Jolla, USA; National Cancer Institute, Bethesda, USA; Department of Chemistry and Biochemistry, Florida Atlantic University, USA and Manipal College of Pharmacy, India in the area of drug discovery. Dr. Nekkar also has active collaborations with Drs. Beazely, Slavcev and Wettig within the School of Pharmacy.

Dr. **Schneider** collaborates with colleagues at the Centre for Family Medicine/McMaster DeGroote School of Medicine on outcomes based research in the areas of geriatrics and heart failure. He is also working with local pharmacists to improve drug-related outcomes as they relate to hospital discharge. Dr. Schneider also works with colleagues at the University of Arkansas for Medical Sciences College of Pharmacy and Area Health Education Centers with a practice-based family medicine research network studying health outcomes in primary care.

Dr. **Slavcev** collaborates with Drs. Beazely, Nekkar and Wettig (co-supervise a graduate student) within the School of Pharmacy, and Dr. Marc Aucoin (co-supervise a graduate student) in the Department of Chemical Engineering. He also has a collaboration with Dr. Chil-Yong Kang in the Department of Virology at the University of Western Ontario, on the development of a novel HIV vaccine.

Dr. **Spagnuolo** collaborates with colleagues in the Food Science Departments at Rutgers University and the University of Guelph as well as with colleagues at the Departments of Kinesiology and Engineering at the University of Waterloo. Collaborations will include joint supervision of graduate students and/or grant writing. He continues to work closely with colleagues at Princess Margaret Hospital/University of Toronto on joint publications and clinical trials. Dr. Spagnuolo has also established an industrial partnership with Frutarom Ltd, which is an international company that creates, develops, and manufactures ingredients for the nutraceutical industry.

Dr. **Waite** has collaborative educational research projects with researchers and staff within Centre for Teaching Excellence, Cooperative Education and Career Action Centre, Faculty of Arts, Conrad Grebel College, the Faculty of Applied Health Sciences, the Social Innovation Generation and Optometry at the University of Waterloo. Within the region, she has ongoing clinical and community based research projects and shared funding with the Centre for Family Medicine, New Vision Family Health Team, Grand River Hospital, St. Mary’s Hospital and local community not-for-profit agencies. Her provincial level research in practice and curricular change occurs with the Ontario College of Pharmacists, Leslie Dan Faculty of Pharmacy, University of Toronto and Gateway Rural Research Institute. She has been involved in national research projects with the Canadian Society of Hospital Pharmacists, Canadian Pharmacists Association, Institute for Safe Medication Practices Canada, Rx&D Canada and Pfizer Canada. Her research success is highly dependent on these partnerships and has led to numerous joint projects, funding applications, presentations and manuscripts.

Dr. **Wettig** currently collaborates with Drs. Beazely, Nekkar, and Slavcev from the School of Pharmacy in the area of Alzheimer’s disease research. He also has collaborations with Drs. Lyndon Jones (Optometry), Zoya Leonenko (Physics), and Jean Duhamel (Chemistry) at the University of Waterloo on various projects examining applications of novel surfactants. On a national level, he collaborates with Dr. Ron Verrall from the University of Saskatchewan and Dr. Gerry Marangoni.
from St. Francis Xavier University in the area of surfactant design and characterization. Internationally he collaborates with researchers at the University of Bordeaux in France, and the National Synchrotron Light Source in Brookhaven NY. Dr. Wettig is also a member of the CIHR Drug Safety and Effectiveness Cross-Disciplinary Training (DSECT) program, led by Dr. Lisa Dolovich from McMaster University. Additionally Dr. Wettig has industrial collaborations with Accucaps Inc. (Strathroy ON) and ABCR Healthcare (Oakville ON).

At the institutional level, the School also has begun to forge strong research ties to the local healthcare community. The School has spearheaded a joint initiative with St. Mary’s General Hospital and Grand River Hospital to support an infectious disease faculty position and research program. The School has links to the Centre for Family Medicine family health team to support both primary care and inter-professional education research and shared clinical adjunct faculty positions. The Centre for Family Medicine is located in the Integrated Health Building, adjacent to the School of Pharmacy on the Health Sciences Campus. In planning the scope of the Campus, a deliberate choice was made to include a facility where direct patient care is offered. The intent is to create a model environment where School of Pharmacy researchers and clinical faculty can examine the efficacy of multi-disciplinary teams, conduct investigations related to primary care, and explore inter-professional education and curriculum development.

Discussions are underway with local hospitals, the University of Guelph Centre for Nutrition Modelling, private research companies, and the Local Health Integration Network to develop collaborative practice and research partnerships.

These substantive and far-reaching collaborative links will enhance the Pharmacy Graduate Program by ensuring that students will have access to a wide range of lab equipment, techniques, clinical facilities, technical personnel and academic/research support.

4.6 Organizational structure

The School of Pharmacy is in the Faculty of Science. Figure 4.1 presents the University governance and senior administration organization chart. Figure 4.2 presents the Faculty of Science organizational chart. Figure 4.3 presents the School of Pharmacy organizational chart.

4.6.1 Roles of Associate Director of Research & Graduate Studies (AD) and Graduate Officer (GO)

As presented in Figure 4.3, the GO reports to the AD. The current AD is Jamie Forrest. Dr. Forrest is the current Associate Dean of Research in the Faculty of Science (Figure 4.2) and he is filling this role for Pharmacy on a one day a week basis until a new AD is hired. The AD and GO each have specific roles within the Pharmacy Graduate Program.

The AD role, with respect to the graduate program, will be responsible for:

- Creating and supporting a vision for research and graduate education at the School of Pharmacy
- The AD is the contact person for senior administration at UW concerning the graduate program
- Working with the Hallman Director and other members of the executive team, the AD will promote continued growth of existing graduate programs as well as the development of new programs.
• Chair the School of Pharmacy Graduate Committee
• The AD would have final responsibility in terms of admission processes, exceptions and decisions.

The GO is responsible for the day-to-day operation of the graduate program as follows:

• Development and maintenance of graduate program policies in collaboration with the AD
• Direct development and implementation of graduate program curricular plan in collaboration with the AD
• Manage graduate student issues (e.g. academic integrity, grievances, conflict resolution) and make recommendations to the Associate Dean of Graduate Studies Faculty of Science (Table 4.2)
• Work with Graduate Administrator to determine the teaching assistant schedule and graduate student funding letters each term
• Support development of future graduate programming submissions
• Act as a lead in ranking pharmacy graduate application (e.g. OGS, NSERC)
• Make graduate program day-to-day decisions in collaboration with AD
• Act as a member of Faculty of Science Graduate Studies Committee
• Act as a member of the Pharmacy Graduate Committee and act as chair if the AD is unavailable
Figure 4.1 Organizational Chart: University Governance & Senior Administration
Figure 4.2 Organizational Chart: Faculty of Science
Figure 4.3 Organizational Chart: School of Pharmacy
5 PROJECTED ENROLMENT

Describe projected enrolment for the next 7 years, full and part time, projected domestic and international students.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FULL-TIME</th>
<th></th>
<th></th>
<th>PART-TIME</th>
<th></th>
<th></th>
<th>TOTAL ENROLMENT</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intake</td>
<td>Enrolments</td>
<td>Intake</td>
<td>Enrolments</td>
<td>M D</td>
<td>M D</td>
<td>M D</td>
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<td>7 5</td>
<td>3 2</td>
<td>14 10</td>
<td>3 2</td>
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<td>1 0</td>
<td>2 0</td>
<td>1 0</td>
<td>0 0</td>
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<tr>
<td>2014/15</td>
<td>7 5</td>
<td>3 2</td>
<td>14 10</td>
<td>6 4</td>
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<td>0 0</td>
<td>2 0</td>
<td>1 0</td>
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<tr>
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<td>9 6</td>
<td>3 2</td>
<td>16 11</td>
<td>9 6</td>
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<td>2 0</td>
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<tr>
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<td>3 2</td>
<td>18 12</td>
<td>12 8</td>
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<td>2 0</td>
<td>2 0</td>
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<tr>
<td>2017/18</td>
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<td>3 2</td>
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<tr>
<td>2018/19</td>
<td>9 6</td>
<td>3 2</td>
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<td>12 8</td>
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<td>0 0</td>
<td>2 0</td>
<td>3 0</td>
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</tr>
</tbody>
</table>

*Projected increase in faculty members as the full complement has not yet been reached
SCHOOL OF COMPUTER SCIENCE
i) Major Modification to the MHI Program (Online delivery of courses)

/mm
attachments
Major Modification

Program: Master of Health Informatics (MHI)

Degree Designation: Master of Health Informatics

Type of Modification: Change of delivery mode.

Approved at (please note date of approval at previous levels):
- School of Computer Science, June 13, 2012
- Mathematics Faculty Graduate Studies Committee, July 25, 2012 and by email during August 29-Sept. 4, 2012
- Mathematics Faculty Council, September 18, 2012

Effective Date: The proposed change shall take effect in September 2013

Description of Proposed Change: Courses will be delivered online (instead of in class). Co-op option to be approved by program Director and Co-operative Education after acceptance to the regular program.

Rationale for Proposed Change: This will allow a larger pool of candidates to apply for the MHI program since they won’t have to move to Waterloo. MHI is a professional Master’s degree, hence many candidates have work and/or family constraints that prevent them from moving to Waterloo. Once the program is offered online, these constraints should be mitigated.

Co-operative Education and Career Action (CECA) does not currently support any co-op programs that are offered completely online and needs to review processes and procedures to determine how to support students in such programs and provide access to CECA services. CECA has agreed to work with the MHI program to keep the co-op option in the calendar by approving option requests on a case-by-case basis, pending completion of a feasibility study to support the program in the long term.

Old Calendar Description (where applicable):
The David R. Cheriton School of Computer Science offers a one-year course-based master’s program leading to the degree of Master of Health Informatics. The objective of this program is to equip students who already have a computer science, software engineering, information systems, systems design engineering or other similar undergraduate degree with the domain-specific technical expertise needed to successfully apply computer science concepts in the health domain. The Master of Health Informatics program is intended to help address a critical shortage of skilled professionals who are able to bridge the fields of medicine and computer science by providing graduate level experience that will equip students to work in this complex field. The program will consist of three academic terms with a one-term optional co-op placement in the field.

[...]

Applications for the Master of Health Informatics program are normally accepted only for the Fall term (September). The application deadline for September admission is December 15th of the previous year. Late applications are accepted, but to receive full consideration, the application should be complete by the December 15th deadline.

[...]

Master of Health Informatics - Co-op Option
The Master of Health Informatics program may be undertaken on a co-operative basis, enabling a student to combine graduate studies with some work experience. The usual pattern of study and work consists of two academic terms in which courses are taken, a one-term work placement, and a final academic term in which the courses are completed. Students may indicate an interest in the Co-op option in their application and can apply for the Co-op option during their first or second term in the Master’s program after securing a work placement.

The degree requirements are the same as for the regular Master of Health Informatics program. The work placement must be related to the student’s research topic and requires the approval of the Director of Graduate Studies. The student will need to provide a work term report when they return to campus.

New Calendar Description (where applicable):

The David R. Cheriton School of Computer Science offers a one-year online course-based master’s program leading to the degree of Master of Health Informatics. The objective of this program is to equip students who already have a computer science, software engineering, information systems, systems design engineering or other similar undergraduate degree with the domain-specific technical expertise needed to successfully apply computer science concepts in the health domain. The Master of Health Informatics program is intended to help address a critical shortage of skilled professionals who are able
to bridge the fields of medicine and computer science by providing graduate level experience that will equip students to work in this complex field. The program will consist of three academic terms with a one-term optional co-op work term experience in the field. **Starting in Fall 2013, courses will be delivered online, which means that students do not have to be physically on campus. Courses may still include live lectures or other interactive components that the students are expected to participate in via the internet.**

[...]

Applications for the Master of Health Informatics program are normally accepted only for the Fall term (September). The application deadline for September admission is **July 1st** of the previous year. Late applications are accepted, but to receive full consideration, the application should be complete by the **July 1st** deadline.

[Additional section to be included after the section “elective courses”]

**Course delivery format**

Starting in Fall 2013, MHI will be offered online. This means that all required courses will be delivered via the internet. In addition, a minimum of two other graduate courses in Computer Science that may be taken as electives will also be delivered via the internet. The intent is to allow students to complete the degree without being physically on campus. Students must have a reliable high speed internet connection with a webcam, microphone and headset to access online material and participate in online interactive sessions. The precise mode of delivery will vary from course to course. Some courses may include mandatory synchronous components, where students will be required to participate in online interactive sessions at pre-determined times. Other courses may include optional synchronous components and some courses may adopt a completely asynchronous model where students access course material via the internet and progress at their own pace. For courses with mandatory synchronous components, the schedule of synchronous components will be advertised at the time of registration for the courses.

[...]

Master of Health Informatics - Co-op Option

The Master of Health Informatics program may be undertaken on a co-operative basis, enabling a student to combine graduate studies with some work experience. The usual pattern of study and work consists of two academic terms in which courses are taken, a one-term work term experience, and a final academic term in which the courses are completed. Students may indicate an interest in the Co-op option in their application and can formally apply for the Co-op option during their first or second term in the Master’s program. **The Director of the Master of**
Program
Environment and Resource Studies

Degree Designation
Master of Environmental Studies in Environment and Resource Studies (MES) Degree

Type of Modification
Addition of a new Major Research Paper (MRP) Option

Date of Proposal
10 July, 2012

Approval Dates
Department – August 22, 2012
Faculty Graduate Committee – September 17, 2012
Faculty Council – September 24, 2012

Effective Date
September 2013

Description of Proposed Changes: Modifications and Rationales

Addition of a New Major Research Paper (MRP) Option
The new Major Research Paper (MRP) option for the Master of Environmental Studies in Environment and Resource Studies will be a research degree, equivalent in credit and educational merit to the existing MES Thesis option. However, the MRP MES will involve more intensive study over a shorter time frame. Students enrolled in the MRP MES option will normally be able to complete the program within 3-4 terms, on a full-time basis. The program is to be delivered in-person through a combination of course work and one-on-one meetings with an advisor supported by a committee member. The MRP MES Option requires students to complete the following elements:

- 4 required core courses;
- 3 elective courses, at least one of which must be in ERS;
- Program milestone (initial research paper agenda statement in first term);
- Major research paper to be evaluated by the student’s advisor and one committee member.

Rationale for New Program Option
The new MES Major Research Paper option is designed to add an attractive further possibility for graduate studies in ERS, complementing the success for MES Thesis option. The addition will maintain and enhance the department’s strength as a hub for leading edge transdisciplinary research and education in environmental issues, sustainability and social-ecological systems. It is a response to ongoing changes in academic, professional practitioner and government circles, and society. The new option will attract new generations of top quality students from across Canada and around the world. Graduates will emerge with the understandings and capabilities they need to address contemporary and future social-ecological challenges.

The new MES MRP option is designed so that it can be offered with existing enrollment levels, and delivered successfully by current and immediately anticipated faculty members. However, it is also designed to attract additional strong applicants and to provide a basis for increased master’s program enrollment if the ERS faculty complement is expanded to supply the capacity to deliver the program to more students. In other words, growth of the faculty complement in ERS would permit an increase in the projected graduate admissions and total enrolments. We would concentrate growth of student enrollment resulting from additional faculty hires in the MRP program.
Program Details and Rationale

Curriculum and Course Requirements
Graduate students enrolled in the new MES program MRP option will be required to complete seven courses: four required core courses and three elective courses, at least one of which must be within ERS. Core courses for the MRP option are:

ERS 680 - Sustainability Foundations
ERS 681 - Sustainability Applications
ERS 669 - Team Research Project
ERS 670 - MES Research Development

All required and elective courses already exist. Descriptions of all ERS graduate courses are appended to this report, and are available online at http://www.ucalendar.uwaterloo.ca/SA/GRAD/1011/GRDcourse-ERS.html

Rationale for Course Requirements
The required core courses provide students with a common experience of the ERS approach to environmental work on sustainability, and build a spirit of community within each cohort. Students from diverse disciplinary backgrounds will learn together. Working collaboratively, they will experience a variety of approaches to environmental studies, and will develop a strong foundation in the transdisciplinary approach to environment and sustainability related research and problem-solving that is the hallmark strength of the ERS program. Core courses also help students to develop a strong camaraderie that enriches their educational experience and subsequent professional relationships.

ERS 680 orients ERS enquiry by reviewing theory, concepts, and examples of transdisciplinary approaches to the pursuit of sustainability in a world of complex socio-ecological systems.

ERS 681 follows and complements 680, blending social and ecological theory with examples of management and governance applications and strategies (local/global). The goal is to examine how societies can respond in practical ways to complexity, change and uncertainty.

ERS 669 utilizes team projects to demonstrate problem definition, analysis and transdisciplinary research methods in environmental studies.

ERS 670 builds on these three courses, with the goal of helping the students to formulate their individual research projects. This course guides students through a series of defined steps (effectively in-course program milestones), providing structure as individuals work with their advisor to design and implement an appropriate research project and to communicate results.

The electives that students choose (in consultation with the advisor) help them to develop their own specific interests, expand and enrich their areas of understanding and capability, and strengthen the foundations for their Major Research Paper. The program thus provides sufficient flexibility to develop individualized learning about a particular subject area, built around a strong, common, transdisciplinary core.

Completion of Major Research Paper
In addition to the course work required for the new option, each student enrolled in the MRP program will complete an individual Major Research Paper. Progress in the design and development of individual research projects, and writing a major paper, will be guided through each student’s relationship with his or her advisor, and structured according to degree milestones and the course requirements for ERS 670 – MES Research Development. Advisors will meet with incoming students in September of the first term to begin setting agendas and time frames for students’ research paper development.

Student research papers will be approximately 15,000 words in length (excluding references and appendices), and will address the topic that follows from the research proposal development process completed during their first two terms in the program. Papers will normally be completed and evaluated by the end of the third term (spring), although students may choose to extend their program involvement into the fall term.
Each paper will be evaluated by the student’s advisor and committee member (or co-advisors). Expectations for successful research papers include a clear and robust structure, sound methodology and analysis, and the demonstration of appropriate analytical thought and understanding of the subject/issue.

Rationale for Major Research Paper
The Major Research Paper provides students with experience designing, implementing and completing an individualized research paper of significant size and depth. It provides an opportunity for students to explore their individual areas of interest, and to develop specialized knowledge. It requires that students engage in a guided process of rigorous, graduate-level research, analysis and writing, that they demonstrate capacity to integrate theory with application, and that they learn to produce high quality results worthy of a graduate degree.

Time to Completion
The MES MRP option is designed so that students can complete the degree requirements within three terms (one year), although it is expected that some students will require four terms to complete the program. This flexibility will allow students to take advantage of academic and career enhancing opportunities (for example, field work, volunteering, and internships) during the Spring terms, as part of their educational experience.

Rationale for Time to Completion
In recent years the ERS Department has received increasing expressions of interest in a master’s option that can be completed with one year through intensive and focused study. The new master’s program will share the same orientation and transdisciplinary approach as the existing, highly successful MES Thesis program. At the same time, the new program will respond to a demonstrated interest among prospective students in a focused, 3-4 term degree program that complements students’ professional and career activities. The program structure (below) is designed to help students complete their program requirements within this time frame.

Terms and Milestones
Fall Term:
- By October 15th
  - Students will submit to their individual advisors an initial Research Paper agenda statement (1000-1500 words) outlining the topic, anticipated core questions, anticipated relevant literatures and anticipated research approach of their papers.
  - These research statements will be presented and discussed in a collective meeting of the MES class in late October.

Winter Term: students in the MRP program will complete the following key steps in ERS 670:
- By January 31st
  - Advisor and committee member (or co-advisors) confirmed.
  - Completion of an expanded research paper agenda statement (2000 word revision/expansion of fall milestone document) providing a definition of topic/questions, and outlines of the analytic framework, methods, and substantive background knowledge requirements.

- By March 31st
  - Submission of full draft proposal to advisor and committee member (or co-advisors).
  - Presentation of the proposal for comments by fellow students in ERS 670

- By April 30th:
  - Proposal approval by advisor and committee member (or co-advisors).

Spring Term: July 1st
Students intending to complete the program within 3 terms will submit full drafts of their research papers to their advisory committee by the beginning of July. This deadline will be extended to the fall term for those students who choose to complete the program in 4 terms rather than 3.

Rationale for Terms and Milestones
The program and course-based milestones in the MRP option are designed to help students move through a series of structured stages in order to design, research, and complete their major papers within the one year time frame of the program. These milestones will ensure a level of consistency in the timing and delivery of program requirements and project development. The milestones are also
Old Calendar Description (MES Thesis Option)

Admission Requirements
Applicants must possess an Honours Bachelor's degree or its equivalent in some environmentally related field, with at least a 75% average in the last two years. The equivalent of at least one year of related work experience is strongly recommended. Acceptance into the program will depend on academic standing, letters of reference, the student's subject area of interest in relation to expertise that can be offered through the MES program, and the availability of financial assistance if such is needed. Applications should be made as early as possible in the academic year for which admission is sought. The deadline for submission of an application is February 1 of the same year for Fall admission. Later applications may be considered if openings remain.

International Students - English Language Proficiency
For students whose first language is not English, evidence of English Language proficiency is normally required. A score of at least 600 (250 on the computerized version) is required in the Test of English as a Foreign Language (TOEFL) and 5.0 on the TWE. (See Academic Regulations - English Language Proficiency Certification for other acceptable tests of English.)

Degree Requirements
The MES program degree requirements are as follows:

- completion of two one-term elective courses; maintenance of an academic average of at least 75%; and
- completion and successful defence of a Master's Thesis

The minimum period of full-time enrollment is three terms (one year) or its equivalent. Normally degree requirements are to be completed within a maximum of six terms (two years) for full-time study or within 15 terms (five years) for part-time study. Most full-time students complete their course requirements within their first two terms and are prepared to begin thesis research in their third term.

New Calendar Description (MES MRP and Thesis Options)

Admission Requirements
Applicants must possess an Honours Bachelor's degree or its equivalent in some environmentally-related field, with at least a 75% average in the last two years. Acceptance into the program will depend on academic standing, letters of reference, the student's subject area of interest in relation to expertise that can be offered through the MES program, and the availability of financial assistance if such is needed. The deadline for submission of an application is 1 February of the same year for Fall admission. Later applications may be considered if openings remain.

International Students - English Language Proficiency
For students whose first language is not English, evidence of English Language proficiency is normally required. A score of at least 600 (250 on the computerized version) is required in the Test of English as a Foreign Language (TOEFL) and 5.0 on the TWE. (See Academic Regulations - English Language Proficiency Certification for other acceptable tests of English.)

Degree Requirements
There are two options in the MES degree program: the Thesis Option and the Major Research Paper (MRP) Option. The degree requirements for each of these options are outlined in the table below.
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<thead>
<tr>
<th>Degree Option</th>
<th>MES Thesis Option</th>
<th>MES Major Research Paper (MRP) Option</th>
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</thead>
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<td><strong>Required Courses</strong></td>
<td>Total 3 required courses.</td>
<td>Total 4 required courses.</td>
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<tr>
<td></td>
<td>ERS 670: MES Research Development</td>
<td>ERS 669: Team Research Project</td>
</tr>
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<td></td>
<td>ERS 680: Sustainability Foundations</td>
<td>ERS 670: MES Research Development</td>
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<tr>
<td></td>
<td>ERS 681: Sustainability Applications</td>
<td>ERS 680: Sustainability Foundations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ERS 681: Sustainability Applications</td>
</tr>
<tr>
<td><strong>Elective Courses</strong></td>
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<td>Total 3 elective courses.</td>
</tr>
<tr>
<td></td>
<td>ERS 669 is recommended as one of the 2 electives.</td>
<td>At least one of the electives must be an ERS course.</td>
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<tr>
<td><strong>Other Required</strong></td>
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<td>Milestone</td>
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<tr>
<td></td>
<td>Additional milestones are incorporated as course requirements in ERS 670, for Thesis students.</td>
<td>Additional milestones are incorporated as course requirements in ERS 670, for MRP students.</td>
</tr>
<tr>
<td></td>
<td>Completion and successful defence of a Master's Thesis.</td>
<td>Completion and acceptance of a Major Research Paper by advisory committee.</td>
</tr>
<tr>
<td><strong>Time for Completion</strong></td>
<td>Normally: 5-6 terms full-time</td>
<td>Normally: 3-4 terms full-time</td>
</tr>
<tr>
<td></td>
<td>Most full-time students complete their course requirements within their first two terms and are prepared to begin thesis research in their third term.</td>
<td>Most students complete their course requirements within their first two terms and are prepared to write the research paper in their third term.</td>
</tr>
</tbody>
</table>
Appendix A: ERS Course Descriptions

Core Courses for the MES MRP Option

ERS 680 - Sustainability Foundations
Course Description: This course is intended to help students establish a reasonable working base from which to explore different fields of interest related to the pursuit of sustainability in a world of complex socio-ecological systems. The course focuses on the nature and implications of the intertwined theories, concepts and principles that are foundational to studies and applications in the transdisciplinary MES program.

ERS 681 - Sustainability Applications
Course Description: The course examines how societies can respond in practical ways to complexity, change and uncertainty. Social and ecological theory is blended with examples of applications and strategies (local/global) to support management and governance in social-ecological systems. Emphasis is placed on how individuals and societies can transcend disciplinary thinking to build our capacity to foster sustainability.

ERS 669 - Team Research Project
Course Description: A team project to demonstrate problem definition, analysis and interdisciplinary research methods in environmental studies. The course will provide an examination of different modes and methods of analysis to be used in projects and thesis-based research. Students will also learn how to prepare and write proposals to granting agencies.

ERS 670 - MES Research Development
Course Description: The goal of the course is to ensure that all students will have a completed research proposal by the end of term. The course will help students design and implement an appropriate research project and communicate results. This is a pass/fail course that involves group seminars. Students will be evaluated by their respective project advisor and committee member (or co-advisors). Formal registration is in winter term.

Current Elective Courses in ERS

The following list reproduces University of Waterloo Calendar descriptions of the graduate courses that have been offered in ERS in the past seven years, and that may be taken by MES MRP students as elective courses. Core courses described above are not repeated in the list below.

The list of graduate course electives will continue to evolve in the future in recognition of emerging issues and in response to student demand. The number and range of offerings will also expand if and when the faculty complement grows in response to an increase in ERS graduate admissions.

Historically, ERS graduate students have also taken courses in other departments, including but not limited to the Department of Geography and Environmental Management and the School of Planning in the Faculty of Environmental Studies. Graduate courses under development to support a new graduate program in the School of Environment, Enterprise and Development may also be suitable for ERS MRP students. Most ERS graduate courses are open to students from other graduate programs.

ERS 604 Advanced Topics in Global Environmental Governance
This course examines the ways in which environmental challenges are being addressed by means of 'global governance' - that is, international organizations and institutions intended to deal with these environmental challenges. Concepts are investigated both to help analyze the relative strengths and weaknesses of existing structures and to suggest ways in which alternative forms of global governance might advance sustainability. Specific organizations and other actors presently active in global environmental governance are given particular attention, as is the management of selected global environmental challenges.

ERS 606 Governing Global Food and Agriculture Systems
This course examines the international rules and organizations that have emerged to govern the increasingly global system of food and agriculture. Specific themes to be covered include governance issues related to the rise of global food corporations, agricultural trade
liberalization and the WTO, food aid distribution, international agricultural assistance, the global agro-chemical industry, and agricultural biotechnology.

ERS 615 Community Economic Development

Community Economic Development is a field of theory, process and practice that is concerned with understanding the forces shaping communities and finding sustainable local solutions to economic needs. This seminar course will examine topics such as capacity-building, asset-based strategies, social capital, poverty-alleviation, social enterprises and co-operatives, and comprehensive community initiatives, using international and local examples and case studies.

ERS 619 Energy Sustainability

Renewable and non-renewable energy supply systems are compared using economic and environmental measures. Consumption trends, conservation options and choices are considered at the household, community and global scales. Projects are used to demonstrate the economic and environmental challenges in the design of sustainable energy systems.

ERS 650 Topics in Governance and Sustainable Communities

Topics in Governance and Sustainable Communities is a course that considers various contemporary socio-ecological issues and challenges in urban and rural communities. The course focuses on effective local approaches to environmental governance and decision-making. Topics will vary from year to year. Examples include integrated water, food, or energy systems, ecological design and restoration, biosphere reserves, green infrastructure, sustainable livelihoods, ecological democracy and environmental justice. Course requirements include weekly readings and discussants, a term paper and presentation related in some manner to a student's thesis work.

ERS 660 Perspectives in Resource and Environmental Management

Current research and practice in resource and environmental management.

ERS 674 Special Topics in Environment and Resource Studies

These courses allow for additions to the program on a short-term basis, and for development of future permanent courses. Recent offerings have addressed the following topics:

1 EcoHealth Perspectives
2 Georgian Bay Biosphere Reserve
3 Env. Issues in Texas
4 Sustainable Cities - 21st c.
5 ENV Green Building Projects
6 Social Marketing

ERS 675 Special Readings and Seminars on Selected Topics in Environment and Resource Studies

Particular offerings may be initiated by a faculty member in consultation with interested students. In all cases instructor consent is required.

Special Readings and Seminars on Selected Topics in Environment and Resource Studies, deserves special comment. It is a generic number, under which directed readings may be designed in support of students' particular foci. By use of index numbers, students may receive credit for more than one offering of 675. Hence the long list of topics that have been offered. This mechanism is consistent with the ERS paedagogical approach of self-directed learning and one-on-one advising. Recent offerings have addressed specific issues in a variety of topics areas, including but not limited to the list below.

1. Complexity and Socio-Ecological Systems
2. Species Distributions and Invasions
3. Soil Dynamics & Modelling
4. Habitat Suitability Modelling
5. Climate Change and Applied Topics
6. Environment & Community Health
7. Water Management, Governance, and Social Issues
8. Ecosystem Restoration: Theory and Practice
9. Protected Areas & Park Management
10. Participatory Approaches to Research and Practice
11. Sustainability and Resilience Indicators/Assessment
12. Environmental Justice
13. LCA Methodologies & Applied Topics
Program
Planning

Degree Designation
Master of Arts (MA)/ Masters Environmental Studies (MES) Planning

Type of Modification
Degree requirement changes

Date of Proposal
August, 2012

Approval Dates
[to be added as approvals received]

Effective Date
September 2013

Description of Proposed Changes: Modifications and Rationales

Degree Requirement Changes

The MA/MES degree programs are accredited professional degrees that integrate foundational curriculum, professional planning practice, and academic research. The proposed degree requirement changes have been designed to enhance this integrative experience, maintain the relevance, quality, and complementary strengths of the degree, and position our degree to remain competitive in the Canadian context and beyond.

The changes in summary are to: (see Appendix A Table 2 for details)

- Increase core course requirements from 3 to 5
- Increase electives from 2 to 3
- Introduce studio project courses (2 at 1.0 units)
- Introduce internship requirement

Rationale for Degree Requirement Changes

The proposed changes are a response to evolving factors in academia, the profession of planning, governance, and society. Academically, a critical review of graduate program curriculum in 2011, ongoing discussions with students, and examination of peer programs provided impetus for the changes proposed here. Professionally, our accrediting body, the Canadian Institute of Planners (CIP) has adopted new guidelines and expectations for degree requirements at the Masters level, most importantly that the program must have the equivalent of 60 units (where 3 units would be the equivalent of a 0.5 course) of credit. Table 1 (Appendix A) contrasts our existing program requirements against those of comparable programs where the clear gap between our current program and the accrediting requirements is obvious. Specific rationales for the proposed changes are provided in the paragraphs that follow.

The proposed changes are designed to be addressed with the existing faculty complement in the School of Planning. Further, the proposed changes provide an opportunity to enhance working collaborations among faculty through involvement in project studio courses and focused attention on enforcing a structured approach to completion of research theses.
Course Changes and Rationale

Building on the overarching rationale provided previously, the specific course changes address challenges and opportunities explored in our review process. The comparative changes are summarized in Table 2 (Appendix A) and new course descriptions are provided in Appendix B. Appendix C presents the current and revised calendar descriptions.

Increase core course requirements from 3 to 5

The intent of the core curriculum is to provide the knowledge foundation to complement practice and research skills development and experience. The learning outcomes for this core are articulated in both government and professional (CIP) expectations.

The addition of existing course Plan 701 - Land Use Fundamentals and new course Plan 704 – Methods of Planning Analysis – serve to enhance the core of our program and better prepare our students for subsequent careers in Planning and for designing and carrying out research.

Plan 701 is a course that has been taken by the majority of students over the last 5 years so rather than the exception as suggested in the current calendar description, it has become the norm. Our MA/MES degree represents a first degree in Planning for most students; hence most have been required to take Plan 701. It makes sense then to incorporate it as a core offering and deal with the exceptions on a case by case basis.

Similarly, Plan 704 (new course addition see Appendix B) provides a much needed introductory course in planning analysis and methods that is critical for those beginning their study of Planning. It also provides an important foundation for the critical 710 Research Design course which incorporates the thesis proposal milestone. The exploration of current analytical approaches in Planning and hands on experience with selected examples will enhance the subsequent development and implementation of thesis research.

Increase electives from 2 to 3

This change reflects a need to ensure that students have an opportunity to a) choose electives to support their research interests, b) broaden their exposure to subfields of planning and c) combine these in a more focused degree (i.e. transportation, health, environment, heritage – planning focused electives).

Introduce Studio Courses (2, 1.0 unit offerings)

Studio courses have a long tradition in professional planning education and are a feature of our current undergraduate program offering. The studio course enables the application of theory and knowledge to practical problems and facilitates collaborative problem-solving and creative learning. The emphasis on learning in a workshop setting, often with community engagement in a quasi-real world situation and focus on the overall process as a professional skill are distinguishing features.

The Introductory (Plan 720) and Advanced (Plan 721) studios are new course offerings that are an exciting addition to our program. They are a natural fit with institutional aims to increase the relevance of our teaching and research to society in a meaningful and tangible way (engaging the community and practitioners). They also provide an intense environment to foster a sense of community within our cohorts of students (replacing the existing teamwork strategies milestone) and faculty alike. Faculty guide student learning and as students become more self-directed, they evolve to working together on a professional level as they tackle problems from the spectrum of planning interests.

The addition of these courses allows us to more effectively meet the functional (knowledge centered) and enabling (person centered) competencies expected by the profession. They also serve an important secondary function as a means of strengthening faculty member connections with students, communities, and practitioners, thereby enhancing the professional practice element of our identity.
Introduce Internship Requirement
An internship represents an important opportunity for students in our professionally accredited program to gain invaluable practical experience and to integrate their academic learning into practice. The internship is proposed for the first summer term of program (See Table 3 Appendix A) and can involve either paid or voluntary positions in the public, private, and NGO, sectors. Students will be responsible for setting up their internships, which will be approved by the Graduate Officer. The unit will exploit its network of alumni and friends in an effort to establish a robust pool of internship options. However, the onus will be on students to ultimately secure the opportunity.

The addition of the internship places our degree program on par with the structure of competing programs. It further responds to student concerns of being at a disadvantage upon graduation given the lack of practical experience in our current program. Current students have expressed a feeling of being disadvantaged, especially with respect to undergraduates completing our full co-op undergraduate degree.

Degree Timeline and Rationale
The additional courses, studios, and internship are reflected in the timeline of Table 3 (Appendix A). The 1st term provides 3 core foundational courses in Planning along with an elective opportunity. The 1st term establishes what planning is, with the flexibility in the elective to support building research knowledge foundations as well. The 2nd term focuses on the practice of planning – the how – which extends to “the how” of research in planning. This term introduces the first studio course experience. The 3rd term is devoted to the internship while the 4th term brings students together again for their 2nd studio experience while they turn their attention to their thesis work. This continues on into the 5th term, where the final elective is undertaken as students work towards thesis completion.

The timeline described above is implemented with full consideration of student, faculty, and administrative resources, an important theme in our recent review. Specifically, the schedule ensures that course demands of time and effort will be commensurate with other professional degree programs. Expectations for course scope and evaluation components will be closely monitored and aligned before the onset of each term. Further, detailed scheduling and guidelines for thesis supervision, thesis development, content scope and presentation, will be paramount in establishing an environment to complete in a timely fashion. The internship period would allow for further reflection and refinement of the approved thesis proposal, which emerges from the completion of Plan 710.
### Table 1: Comparison of Existing MA/MES Degree Program against relevant competitor programs

<table>
<thead>
<tr>
<th>Program</th>
<th>3 unit courses (0.5)</th>
<th>studio</th>
<th>thesis</th>
<th>project</th>
<th>internship</th>
<th>other</th>
<th>Total (60 target)</th>
</tr>
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<tbody>
<tr>
<td>Waterloo CURRENT (MA/MES)</td>
<td>3 core</td>
<td></td>
<td>Yes (2.0 unit weighting)</td>
<td></td>
<td></td>
<td>milestones</td>
<td></td>
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<tr>
<td></td>
<td>2 elective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units -</td>
<td>15</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>McGill (MUP)</td>
<td>3 core (note the internship is listed as a core course)</td>
<td>3 studios at 6 units</td>
<td>yes</td>
<td>Yes (3 month between year 1 and 2)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>4 complimentary</td>
<td></td>
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<tr>
<td></td>
<td>3 Other electives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units -</td>
<td>27</td>
<td>18</td>
<td>15</td>
<td>6</td>
<td></td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>Ryerson (MPI)</td>
<td>8 core</td>
<td>2 studios at 6 units</td>
<td>yes</td>
<td>Yes (field placement in summer)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>3 elective</td>
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<tr>
<td>Assumed units</td>
<td>33</td>
<td>12</td>
<td>15</td>
<td>6</td>
<td></td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>Queens (MPI) – note thesis plus 12 courses or project plus 14</td>
<td>7 core</td>
<td>Yes (2.0 unit weight)</td>
<td>Yes (1.0 unit weight)</td>
<td>Yes (summer)</td>
<td></td>
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<td></td>
<td>3 constrained electives in area of concentration</td>
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<td>2 (4) electives</td>
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<tr>
<td>Assumed units</td>
<td>36</td>
<td>12</td>
<td>6</td>
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<td></td>
<td></td>
<td>54</td>
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<tr>
<td>Waterloo (MA/MES)</td>
<td>3 unit courses (0.5 in UW)</td>
<td>studio</td>
<td>thesis</td>
<td>internship</td>
<td>other</td>
<td>Total (60 target)</td>
<td></td>
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<td><strong>Current CORE</strong></td>
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<tr>
<td>PLAN 700 Planning Paradigms and Theory (0.50)</td>
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<td></td>
<td>Yes (2.0 course unit weighting)</td>
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<td>milestones</td>
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<tr>
<td>PLAN 703 Planning Professional Practice (0.50)</td>
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<tr>
<td>PLAN 710 Research Design (0.50)</td>
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<tr>
<td>2 Electives</td>
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<tr>
<td>PLAN 701 Land Use Planning Fundamentals (* required for non planners)</td>
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<tr>
<td><strong>Units -</strong></td>
<td>15</td>
<td></td>
<td>12</td>
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<td><strong>proposed</strong></td>
<td>5 core</td>
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<tr>
<td>700,703,710 Plan 701 PLAN 704 Methods Of Planning Analysis 3 Electives –</td>
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<tr>
<td>Introductory (720) and Advanced (721) Planning Studios</td>
<td></td>
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<td>1 –without planning background</td>
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<tr>
<td><strong>Units -</strong></td>
<td>24</td>
<td></td>
<td>12</td>
<td>15</td>
<td>6</td>
<td>57</td>
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<tr>
<td>Term 1 (F)</td>
<td>Term 2 (W)</td>
<td>Term 3 (S)</td>
<td>Term 4</td>
<td>Term 5</td>
<td>Term 6</td>
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<tr>
<td>PLAN 700 Planning Paradigms and Theory (0.50)</td>
<td>PLAN 703 Planning Professional Practice (0.50)</td>
<td>Internship</td>
<td>PLAN 721 Advanced Planning Project Studio (1.0)</td>
<td>elective</td>
<td></td>
<td></td>
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<tr>
<td>PLAN 701 Land Use Planning Fundamentals</td>
<td>PLAN 710 Research Design (0.50)</td>
<td>elective(s) (if exempt from internship)</td>
<td>Thesis</td>
<td>Thesis</td>
<td></td>
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<tr>
<td>PLAN 704 Methods of Planning Analysis</td>
<td>PLAN 720 Introductory Planning Project Studio (1.0)</td>
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<td>elective</td>
<td>elective</td>
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</tr>
</tbody>
</table>
Appendix B: Course Change Forms

Facility: ENVIRONMENT
Effective date: 9/1/2013

Course ☒ Milestone ☐ Milestone title:
New ☒ Revision ☐ Inactivation ☐

Subject code (applicable for courses only): PLAN  Course number: 704
For course revision, indicate the type(s) of changes e.g. consent, description, title, requisites:

Course title (maximum 100 characters): Methods of Planning Analysis
Course short title (maximum 30 characters): Methods of Planning Analysis
Grading Basis: NUM
Consent Required: None
Credit Weight: 0.50
Course description:
This course is a graduate level introduction into the analytical methods employed in planning research and practice. The broad spectrum of tools, approaches and techniques drawn from quantitative and qualitative traditions will be reviewed. Commonly employed examples will form the basis for developing applied problem solving skills. Operational considerations, critical assessment, and analytical communication provide important review context.

Meet type(s): SEMINAR Choose an item.
Primary meet type: SEMINAR
Requisites: Planning Graduate Students Only

Special topics course: Yes ☐ No ☒
Cross-listed: Yes ☐ No ☒
Course subject(s) to be cross-listed with and approval status:
Sections combined/held with:

Rationale: This course provides a much needed introductory course in planning analysis and methods that is critical for those beginning their study of Planning. It also provides an important foundation for the critical 710 Research Design course which incorporates the thesis proposal milestone. The exploration of current analytical approaches in Planning and hands on experience with selected examples will enhance the subsequent development and implementation of thesis research.

Prepared by: Robert Shipley  Date: 9/10/2012
Faculty: ENVIRONMENT

Effective date: 9/1/2013

Course ☒
Milestone ☐
Milestone title:

New ☒
Revision ☐
Inactivation ☐

Subject code (applicable for courses only): PLAN Course number: 720

Course title (maximum 100 characters): Introductory Planning Project Studio
Course short title (maximum 30 characters): Introductory Planning Studio

Grading Basis: NUM
Consent Required:

Credit Weight: 1.0

Course description:
This studio courses introduces students to the process of collaborative problem solving central in Planning practice. Students work in teams, led by faculty facilitators, in applying theory and knowledge from Planning and related disciplines to problems drawn from the local community planning context. The emphasis is on the development of student skills including design, plan making, teamwork, creativity, negotiation, management, and policy application and creation. Problem based learning, reflection on process and communications are central in this course.

Meet type(s): STUDIO

Primary meet type: STUDIO

Requisites: Planning Graduate Students Only

Special topics course: Yes ☐ No ☒

Cross-listed: Yes ☐ No ☒

Rationale: This provides a learning experience necessary to meet the functional (knowledge centered) and enabling (person centered) competencies expected by Planning's accrediting body (Canadian Institute of Planners). It will provide a valuable project experience, allowing students with diverse planning interests and backgrounds to learn to work collaboratively in tackling a real world planning problems. Further, it adds an important experiential learning element to our program, and will enhance community engagement internally (within the program) and externally with the broader community.

Prepared by: Robert Shipley Date: 9/10/2012
Faculty: ENVIRONMENT
Effective date: 9/1/2013

Course ☒ Milestone ☐ Milestone title:
New ☒ Revision ☐ Inactivation ☐

Subject code (applicable for courses only): PLAN Course number: 721

For course revision, indicate the type(s) of changes e.g. consent, description, title, requisites:

Course title (maximum 100 characters): Advanced Planning Project Studio
Course short title (maximum 30 characters): Advanced Planning Studio
Grading Basis: NUM
Consent Required: 
Credit Weight 1.0
Course description:
This student centered studio course involves partnering with a local community, providing student led groups an opportunity to emulate professional practice under the guidance of an assigned faculty member. Skills and knowledge developed in the introductory studio course are enhanced and important community engagement skills are emphasized in the chosen project. Reflective learning is central as students are expected to assess the process, the outcome, and the interrelationship between them. Community presentation of the problem solution is required.
Meet type(s): STUDIO
Primary meet type: STUDIO
Requisites: Planning Graduate Students Only

Special topics course: Yes ☐ No ☒
Cross-listed: Yes ☐ No ☒

Rationale: Building on the introductory studio, this advanced studio provides a further learning experience necessary to meet the functional (knowledge centered) and enabling (person centered) competencies expected by Planning’s accrediting body (Canadian Institute of Planners). It will provide another valuable project experience, allowing students to demonstrate their strengths and knowledge, and more self-directed responsibility for the project process and outcome. Further, community based learning is becoming a standard feature in graduate planning education. This course fills an important gap in our current course offerings.

Prepared by: Robert Shipley Date: 9/10/2012
# Degree Requirements for MA/MES

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Degree Requirements</th>
<th>Program Duration</th>
</tr>
</thead>
</table>
| **MA**         | • three 700-level obligatory one-term courses: 700, 703, 710 for a total of 1.5 units  
• two 600-level elective one-term courses for a total of 1.0 units [Students without a background in planning will be required to take Plan 701 - Land Use Planning fundamentals. Plan 701 will then count as one of the two elective courses.]  
• thesis (2.0 unit weight)  
• In addition, students must complete three program milestones:  
  o teamwork strategies in planning workshop (fall term)  
  o project proposal development workshop (fall term)  
  o research plan - oral presentation April of first year | 2 years - 6 terms of full-time enrollment  
5 years - 15 terms part-time enrollment |
| **MES**        | • three 700-level obligatory one-term courses: 700, 703, 710 for a total of 1.5 units  
• two 600-level elective one-term courses selected from a list of environmental courses identified by the School of Planning for a total of 1.0 units [Students without a background in planning will be required to take Plan 701 - Land Use Planning fundamentals. Plan 701 will then count as one of the two elective courses.]  
• thesis (2.0 unit weight)  
• In addition, students must complete three program milestones:  
  o teamwork strategies in planning workshop (fall of first year)  
  o project proposal development workshop  
  o research plan - oral presentation April of first year | 2 years - 6 terms of full-time enrollment  
5 years - 15 terms part-time enrollment |

### Master of Arts (MA)/Master of Environmental Studies (MES)

Some elective graduate courses may be taken in other departments but the supervisor's advice and approval should be sought before registering. One half course may be a Reading Course.

All master's students write a thesis which contains evidence of research, analysis and synthesis. The thesis is supervised by a faculty advisor, examined by a committee of three or more members and is made available for anyone in the university or general public to use. The thesis must be defended successfully before an Examining Committee composed of a minimum of the student's Supervisor, one Committee member and one Reader as per the requirements listed in the Graduate Calendar under Master's Minimum Degree Requirement.

The MA and MES master's degrees are offered on either a full-time or a part-time basis. See Residency Requirements.
### Degree Requirements for MA/MES/MAES

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Degree Requirements</th>
<th>Program Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• five 700-level obligatory one-term courses: 700, 701, 703, 704, 710, for a total of 2.5 units</td>
<td>2 years - 6 terms of full-time enrollment</td>
</tr>
<tr>
<td></td>
<td>• three 600-level elective one-term courses for a total of 1.5 units</td>
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<tr>
<td></td>
<td>• two 700 level obligatory studio courses, 720, 721 (2.0 units)</td>
<td></td>
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<tr>
<td></td>
<td>• internship required during first spring term</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• thesis (2.0 unit weight)</td>
<td>5 years - 15 terms part-time enrollment</td>
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<tr>
<td></td>
<td>• In addition, students must complete two program milestones:</td>
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<tr>
<td></td>
<td>o project proposal development workshop (fall term)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o research plan - oral presentation April of first year</td>
<td></td>
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<tr>
<td><strong>MES</strong></td>
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<tr>
<td></td>
<td>• five 700-level obligatory one-term courses: 700, 701, 703, 704, 710, for a total of 2.5 units</td>
<td>2 years - 6 terms of full-time enrollment</td>
</tr>
<tr>
<td></td>
<td>• three 600-level elective one-term courses selected from a list of environmental courses identified by the School of Planning for a total of 1.5 units</td>
<td>2 years - 6 terms of full-time enrollment</td>
</tr>
<tr>
<td></td>
<td>• two 700 level obligatory studio courses, 720, 721 (2.0 units)</td>
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<tr>
<td></td>
<td>• internship required during first spring term</td>
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<td></td>
<td>• thesis (2.0 unit weight)</td>
<td>5 years - 15 terms part-time enrollment</td>
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<td></td>
<td>• In addition, students must complete two program milestones:</td>
<td></td>
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<tr>
<td></td>
<td>o project proposal development workshop (fall term)</td>
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<tr>
<td></td>
<td>o research plan - oral presentation April of first year</td>
<td></td>
</tr>
</tbody>
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**Master of Arts (MA)/Master of Environmental Studies (MES)**

Some elective graduate courses may be taken in other departments but the supervisor's advice and approval should be sought before registering. One half course may be a Reading Course.

All master's students write a thesis which contains evidence of research, analysis and synthesis. The thesis is supervised by a faculty advisor, examined by a committee of three or more members and is made available for anyone in the university or general public to use. The thesis must be defended successfully before an Examining Committee composed of a minimum of the student's Supervisor, one Committee member and one Reader as per the requirements listed in the Graduate Calendar under Master's Minimum Degree Requirement.

The MA and MES master's degrees are offered on either a full-time or a part-time basis. See Residency Requirements.
Program
Planning

Degree Designation
Master of Applied Environmental Studies (MAES) Degree

Type of Modification
Transition to Distance Education Delivery

Date of Proposal
August, 2012

Approval Dates
[to be added as approvals received]

Effective Date
September 2013

Description of Proposed Changes: Modifications and Rationales

Transition to Distance Education Delivery
The existing coursework MAES degree in Planning (see Appendix A for Calendar Description) will be transitioned to fully online delivery format. Initially, there will be a mixed delivery of face to face courses and online courses with a plan to transition to completely online delivery in 3 years. Existing courses are going through the process of being developed into an online version but given the time and resource effort required; this will take a number of years. Once courses are transitioned, they will be offered in on-line format only to avoid duplication of effort. No new faculty resources are required as existing faculty are being compensated internally for their efforts in developing online versions as per university guidelines. Two courses will be ready for launch online in Fall of 2013 (development underway) with other courses scheduled to follow.

Rationale for New Delivery Format
The change in delivery format is designed to maintain and enhance the School of Planning’s position as a leading institution for Planning education and research. It is a response to a number of key factors. First, the accrediting body for our programs and relevant professional cohort, the Canadian Institute of Planners (CIP), has recently adopted major changes in their requirements for practitioners. Key among these changes is the requirement for continuous professional learning (CPL) for all of the 7,000 plus members of the profession. The constrained geography of potential courses delivered in traditional institutional settings has been a concern voiced by the membership. Consequently, there will be a substantial increase in demand for course offerings such as those available through our new delivery format – fully online.

Second, enrollments in the existing MAES program (approved in 2005) have been low because working professionals cannot meet the demands of the current delivery format and schedule (daytime offerings of electives for example and requisite travel from the GTA and beyond). The online delivery format will address these barriers to those interested in the MAES planning degree.

Third, discussions with colleagues at other institutions across Canada have confirmed that we are the first institution to engage in the development of this delivery model in the Planning field. In fact, one competitor institution has not chosen to pursue online delivery of their program because of our development in this area. This provides a distinct competitive advantage in the Canadian context and allows for the potential to tap into a much broader global market for planning education.
We have a highly regarded program of study and are taking full advantage of expertise within the University of Waterloo to develop a quality online experience. The evolution of this degree into this delivery format matches well with strategic institutional initiatives to enhance opportunities for professional graduate degree offerings.

**Enrollments and timelines**

Consultation with course design experts has set an initial online class size at 25 to 30 students for effective delivery. Students would be able to enrollment fulltime and take advantage of the mixture of delivery formats in the 2013 to 2015 period. They would have the option of pursuing part time studies in an online only format immediately, with full time potential (complete course offerings) by 2015.

**Enrollments and timelines rationale.**

The initial online class sizes are set to be optimal for the resources currently devoted to the development and delivery by the existing School of Planning faculty compliment. Enrollment could increase and respond to higher demands with the addition of resources to ensure faculty engagement in this program, without diminishing the delivery quality in our existing range of programs. The use of course preceptors, sessionals, and other highly qualified personnel could also serve to respond to growth in subsequent years.

The timelines for degree completion – full time in one year of study (3 terms) and part time (up to 8 terms) are currently set for the MAES degree program.
Appendix A: Current calendar description MAES coursework

<table>
<thead>
<tr>
<th>MAES (Coursework Degree)</th>
<th>5 obligatory one-term core courses: Plan 625, 700, 701, 702,703, for a total of 3.00 units,</th>
<th>1 year - coursework degree - 3 terms full-time enrollment</th>
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<tbody>
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<td></td>
<td>3 Planning elective graduate courses, for a total of 1.50 units</td>
<td>Maximum 8 terms part-time enrolment</td>
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</table>

**Master of Applied Environmental Studies (MAES)**

The MAES program provides students with a stimulating, academically sound, course-based professional Master's Degree program that equips them to further their planning related careers. Students must have two years planning related work experience; OR, registered in a program at another university that is part of a dual degree program with the MAES degree program.

The MAES degree is offered as a three-term (Fall, Winter, Spring) full-time calendar year program, or a maximum of 8 terms part-time starting Fall term (September) of each year.
Faculty: ENVIRONMENT  
Effective date: 8/22/2012

Course □ Milestone □ Milestone title:  
New □ Revision □ Inactivation □

Subject code (applicable for courses only): PLAN  Course number: 610
For course revision, indicate the type(s) of changes e.g. consent, description, title, requisites:

Course title (maximum 100 characters): Public Administration of the Environment & Natural Resources  
Course short title (maximum 30 characters):
Grading Basis: NUM  
Consent Required: None  
Credit Weight 0.50

Course description:
Contemporary instruments of policy-making and public administration in the context of natural resources will be examined. A term project which will analyze a contemporary issue in the mining, forestry, fisheries, parks or protected areas will be undertaken.

New course description (for course description revision):
Meet type(s): Choose an item.  
Primary meet type: Choose an item.
Requisites:
Special topics course: Yes □ No □
Cross-listed: Yes □ No □
Course subject(s) to be cross-listed with and approval status:
Sections combined/heldwith:

Rationale:
This course has not been offered in approximately 10 years.

Prepared by: Edie Cordwell  
Date: 8/24/2012
Senate Bylaw 8

A bylaw relating to the establishment of the Graduate & Research Council of the Senate of the University of Waterloo.

BE IT ENACTED as a bylaw of the Senate of the University of Waterloo, as follows:

1. GRADUATE & RESEARCH COUNCIL

There shall be a Council of the University, appointed by and responsible to the Senate, called the Graduate & Research Council.

2. GRADUATE & RESEARCH COUNCIL MEMBERSHIP

The membership of this Council shall consist of the following:

a. President of the University
b. Vice-President, Academic & Provost
c. Associate Provost, Graduate Studies, who shall co-Chair this Council
d. Associate Dean of Graduate Studies
e. Vice-President, University Research, who shall co-Chair this Councilf. Associate Vice President, Research
g. Associate Vice President, External Research
h. Director, Research Ethics & Grants
i. Director, Contracts Research & Industrial Grants
j. Director of Graduate Studies, Academic Services
k. University Librarian
l. President of the Graduate Student Association
m. Two faculty members with Approved Doctoral Dissertation Supervisor (ADDS) status from each Faculty, one of whom must be an associate dean with a research and/or graduate studies portfolio [associate dean positions are ex officio; others are two years]
n. One faculty member from the Federated & Affiliated Colleges, who shall serve for a term of two years.
o. One graduate student from each Faculty, each of whom shall serve for a term of two years.

3. POWERS AND DUTIES OF THE GRADUATE & RESEARCH COUNCIL

The Graduate & Research Council shall consider all questions relating to the academic quality of graduate studies and research activity within the University and, without intending to restrict the generality of the foregoing, the Graduate & Research Council shall,

a. Make recommendations to the Senate with respect to the government, direction and management of, or any changes in rules, regulations or policies for graduate studies and research in the University.
b. Advise the Vice-President, Academic & Provost on all matters relating to graduate studies and research.
c. Receive, consider, study and review briefs on any aspect of graduate studies and research from members of the University.
d. Make recommendations to Senate with respect to any financial matter pertaining to graduate studies and research.
e. Consider, study and review all proposals for new graduate programs, the deletion of graduate programs, major changes to existing graduate programs, arrange for internal appraisals as the Council shall see fit, and make recommendations to the Senate thereon.
f. On behalf of the Senate, consider and approve all new graduate courses, the deletion of graduate courses, and proposed minor changes to existing graduate courses and programs, and provide the Senate with a brief summary of Council's deliberations in this regard. Any matter of controversy that might arise may be referred to the Senate.

g. Consider, study and review all proposals for new centres and institutes, and the closure of centres and institutes, and make recommendations to the Senate thereon.

h. On behalf of the Senate, consider and approve renewals for centres and institutes, and report such renewals to the Senate for information. Any matter of controversy that might arise may be referred to Senate.

i. On behalf of the Senate, consider and approve all new graduate scholarships and awards. Any matter of controversy that might arise may be referred to the Senate.

4. INTERPRETATIONS

a. In this Bylaw, where the title "President" appears, an Acting President or President pro tem, so designated by the Board of Governors, shall serve in the place of the President, with the latter's full rights and responsibilities.

b. In this Bylaw, where the title "Vice-President, Academic & Provost" appears, an Acting Vice-President, Academic & Provost or Vice-President, Academic & Provost pro tem, so designated by the President or Acting President or President pro tem and/or the Board of Governors, shall serve in the place of the Vice-President, Academic & Provost, with the latter's full rights and responsibilities.

c. In this Bylaw, where the title "Dean of Graduate Studies" appears, an Acting Dean of Graduate Studies, or Dean of Graduate Studies pro tem, so named to serve for a period of three months or more by the President or Acting President or President pro tem of the University, shall serve in the place of the Dean of Graduate Studies, with the latter's full rights and responsibilities.

d. In this Bylaw, where the title "Vice-President, University Research" appears, an Acting Vice-President, University Research, or Vice-President, University Research pro tem, so named to serve for a period of three months or more by the President or Acting President or President pro tem of the University, shall serve in the place of the Vice-President, University Research, with the latter's full rights and responsibilities.

Senate Bylaw Number 8
Approved by Senate December 4, 1972.
Amended by Senate in two readings September - October 1975.
Amended by Senate in two readings September - October 1977.
Amended by Senate in two readings May - June 1981.
Amended by Senate in two readings April - May 1982.
Amended by Senate in two readings April - May 1987.
Amended by Senate in two readings January - February 1989.
Amended by Senate in two readings June and October, 1995.
Amended by Senate in two readings May - June 2003.
Amended by Senate in one reading May 19, 2009.

Senate Bylaw Number 12
Approved by Senate in two readings November-December, 1988.
Approved by Senate in two readings on November 15, 1993.
Approved by Senate in two readings June and October, 1995.
Amended by Senate on June 17, 1996.
Merged with revised Bylaw 8, June 2003, to reflect the amalgamation of the Senate Graduate & Research Council.
The Senate Long Range Planning Committee met on 13 September 2012 and agreed to forward the following item to Senate for approval.

FOR SECOND READING

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Senate Bylaw 4: A bylaw relating to the establishment of the Long Range Planning Committee of Senate [Attachment 1]
The amended bylaw is recommended to Senate for second reading*. The one substantive change is the addition of “One member of the Faculty Association Board of Directors” to the “Committee Membership.” The other changes are minor housekeeping amendments.

*The passage of a new bylaw or amendment(s) to an existing bylaw is accomplished in two readings of the document by Senate. At the first reading, such discussion of the document as is deemed appropriate by Senate shall take place. At the second reading, further discussion may take place and the vote on the document shall be taken. The two readings shall take place at different, but not necessarily consecutive, meetings of the Senate. [Senate Bylaw 7: A bylaw relating to the procedure for creating new bylaws or amending existing bylaws of Senate]

Sallie Keller
Vice-President, Academic & Provost
SENATE BYLAW 4
A bylaw relating to the establishment of the Long Range Planning Committee of the Senate of the University of Waterloo.

BE IT ENACTED as a bylaw of the Senate of the University of Waterloo, as follows:

1. LONG RANGE PLANNING COMMITTEE
There shall be a standing committee of Senate called the Long Range Planning Committee.

2. COMMITTEE MEMBERSHIP
The membership of this committee shall consist of the following:

   a. The president of the university.
   b. The vice-president, academic & provost, who shall be chair of this committee.
   c. The vice-president, administration & finance.
   d. The associate provost, academic & student affairs resources.
   e. The dean of each faculty, the dean of associate provost, graduate studies and the vice-president, university research.
   f. One elected faculty member of Senate from each faculty and one faculty member of Senate from the federated university and affiliated colleges.
   g. One member of the Faculty Association Board of Directors.
   h. Three members of Senate from the elected student members, at least one of whom shall be an undergraduate student and at least one of whom shall be a graduate student.
   i. One member of Senate from the community-at-large members of the Board of Governors.
   j. One member from among the alumni members of Senate.

3. POWERS AND DUTIES OF LONG RANGE PLANNING COMMITTEE
The Long Range Planning Committee shall have the following powers and duties:

   a. To make recommendations to Senate in all matters pertaining to the co-ordination of the planning of the academic, physical, and operational development of the university and the achievement of a planned rate and scope of such development.
   b. To receive from the president, for consideration, study and review, on behalf of Senate, plans for the development of the university and to make recommendations to Senate thereon.
   c. To undertake such studies, as Senate may designate, from time to time designate.
   d. To report to Senate, as expeditiously as possible, with respect to the conduct of such matters as shall be delegated by Senate to the committee from time to time.

4. TERM OF OFFICE
The term of office of members shall be for one year. Each member is eligible for re-election.

5. INTERPRETATIONS
   a. In this Bylaw, where the title “president” appears, an acting president or president pro tem, so designated by the Board of Governors, shall serve in the place of the president, with the latter’s full rights and responsibilities.
b. In this Bylaw, where the title “vice-president, academic & provost” appears, an acting vice-

president, academic & provost or vice-president, academic & provost pro tem, so designated by the

president or acting president or president pro tem and/or the Board of Governors, shall serve in the

place of the vice-president, academic & provost, with the latter’s full rights and responsibilities.

d c. In this Bylaw, where the title “associate provost, general services & finance vice-president,

administration & finance” appears, an acting “associate provost, general services & finance vice-

president, administration & finance” or “associate provost, general services & finance vice-

president, administration & finance” pro tem, so designated by the president or acting president or

president pro tem and/or the Board of Governors, shall serve in the place of the “associate provost,

general services & finance vice-president, administration & finance”, with the latter’s

full rights and responsibilities.

e d. In this Bylaw, where the title “associate provost, academic & student affairs resources” appears, an

acting associate provost, academic & student affairs resources or associate provost, academic &

student affairs resources pro tem, so designated by the president or acting president or

president pro tem and/or the Board of Governors, shall serve in the place of the associate provost,

academic & student affairs resources, with the latter’s full rights and responsibilities.

e. In this Bylaw, where the title “associate provost, graduate studies” appears, an acting associate

provost, graduate studies or associate provost, graduate studies pro tem, so designated by the

president or acting president or president pro tem and/or the Board of Governors, shall serve in the

place of the associate provost, graduate studies, with the latter’s full rights and responsibilities.

f. In this Bylaw, where the titles “dean of each faculty, or Dean of Graduate Studies” appears, an

acting dean or dean pro tem, so named to serve for a period of three months or more by the

president or acting president or president pro tem of the university so designated by the president or

acting president or president pro tem and/or the Board of Governors, shall serve in the place of the

dean, with the latter’s full rights and responsibilities.

f g. In this Bylaw, where the title “vice-president, university research” appears, an acting vice-

president, university research or vice-president, university research pro tem, so designated by the

president or acting president or president pro tem and/or the Board of Governors, shall serve in the

place of the vice-president, university research, with the latter’s full rights and responsibilities.

Approved by Senate November 16, 1972
Amended by Senate January 15, 1973
Amended by Senate in two readings September - October 1975
Amended by Senate in two readings September - October 1977
Amended by Senate in two readings April - May 1984
Amended by Senate in two readings April - May 1989
Amended by Senate in two readings February - March 1990
Amended by Senate [...]