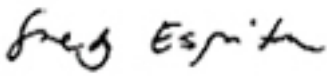


March 20, 2012

To : Graduate Council

From : 
Medy Espiritu
Assistant Secretary and SynApps System Administrator

The next meeting of Graduate Council will be held on **Tuesday, March 27, 2012 at 2:00 p.m. in MUSC-318.**

Listed below are the agenda items for discussion.

Please email espiritu@mcmaster.ca if you are unable to attend the meeting.

A G E N D A

- I. Report from the Associate Vice-President and Dean of Graduate Studies
- II. Report from the Associate Deans of Graduate Studies
- III. Report from the Assistant Dean, Graduate Student Life and Research Training
- IV. New scholarship: CIBC Murray Hogarth Scholarships
- V. Report from the Faculty of Business Graduate Curriculum and Policy Committee (Dr. J. Medcof)
- VI. Report from the Faculty of Engineering Graduate Curriculum and Policy Committee (Dr. H. Sheardown)
- VII. Report from the Faculty of Health Sciences Graduate Policy and Curriculum Council (Dr. C. Hayward)
- VIII. Section 2.5 (Graduate Course Work) and Section 2.6 (Supervision) of the current graduate calendar (Dr. C. Hayward)
- IX. Report from the Joint Faculties of Humanities and Social Sciences Graduate Curriculum and Policy Committee (Dr. D. Goellnicht)
- X. Report from the Faculty of Science Graduate Curriculum, Policy, Admissions and Study Committee (Dr. D. Welch)
- XI. New program: M.Sc./Ph.D. Collaborative Program in Astrobiology (Dr. D. Welch)
- XII. Name change for the School of Computational Engineering and Science (Dr. D. Welch)
- XIII. New degree designation: Master of Technology Entrepreneurship and Innovation
- XIV. Other business

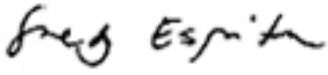
NEW GRADUATE SCHOLARSHIP

CIBC Murray Hogarth Scholarships

Awarded for outstanding academic achievement and exhibited leadership within the MBA community. Two awards of \$1,000 each to be awarded to eligible MBA candidates, who have preferably worked, studied or lived in Burlington.

March 16, 2012

To : Graduate Council

From : 
Medy Espiritu
Assistant Secretary and SynApps System Administrator

Re : Report from the Faculty of Business Graduate Curriculum and Policy Committee

At its meeting on February 16, 2012, the Faculty of Business Graduate Curriculum and Policy Committee approved the following graduate curriculum recommendations.

Please note that the Faculty of Business approved the recommendations on March 15, 2012.

FOR APPROVAL OF GRADUATE COUNCIL

- I. MBA Grade Scale Conversion
- II. GRE as an alternative to GMAT
- III. Human Resources and Management Area – Ph.D. program
 - Change in course requirements
 - Change in comprehensive examination procedure

FOR INFORMATION OF GRADUATE COUNCIL

- I. TOEFL requirement for Ph.D. program – Section 2.1.9 of the current Graduate Calendar
- II. Change in the minor of the Accounting and Financial Management Services – addition of an elective course, *A727 – Financial Fraud and Market Surveillance
- III. New course: *F735 – Financial Modelling
- IV. Health Management courses
 - *700 – Health Systems and Policy Analysis
 - *705 – Evaluating Sources of Evidence for Management and Evaluation
 - *706 – Health Management Foundations I
 - *707 – Health Management Foundations II

- *708 – Leadership in Health Organizations
- *730 – Scholarly Paper

V. Human Resources and Management Area – Ph.D. program

- *B790 – Management Theory – change in course number from *B778 to *B790
- *B791 – Field Survey: Organizational Behaviour and Organization Theory – new course
- *B792 – Field Survey: Human Resources and Industrial Relations – new course
- *B793 – Applied Multivariate Statistics – change in course number from *B782 to *B793
- *B794 – Research Methods and Design – change in course number from *B780 to *B794
- *B795 – Research Issues: Organizational Behaviour and Organization Theory – new course
- *B796 – Research Issues: Human Resources and Industrial Relations – new course
- *B797 – Research Project Course I – new course
- *B798 – Research Project Course II – new course
- *B799 – Selected Topics in Management of Organizational Behaviour and Human Resources – change in course number from *B783 to *B799
- *B779 – Research Issues I – course cancellation
- *B781 – Research Issues II – course cancellation

- Change in the calendar description of the Ph.D. degree

VI. Strategic Management Leadership and Health Services Management

New courses:

- *C700 – Introduction to Health Management
- *M758 – Sustainability and Corporate Social Responsibility

VII. Change in course title and description

- *O711 – Risk Models in Operations Management
- *O721 – Materials Management and Production Planning

VIII. Change in course description

- *V700 – Strategic Business Analysis and Valuation
- *V703 – Financial Modeling and Valuation

MBA Grade Scale Conversion
9-point system to 6-point system

All graduate programs at McMaster University, except for the MBA program, follow a 6-point grading scale (A+, A, A-, B+, B, B-, F). The School of Graduate Studies has asked the MBA program to align with other graduate programs on this matter. This change will be in effect as of September 2012.

There are two main challenges in the required conversion: (1) new percentage to grade point conversion; and (2) implementation of new grade point conversion.

1. New Percentage to Grade Point Conversion

First, we must decide upon a percentage to grade point conversion that would work well for our MBA program with the new 6-point grading scale.

For your reference, below is our current 9-point MBA scale:

| Grade (Points) | Percentages |
|----------------|-------------|
| A+ (9) | 90-100 |
| A (8) | 85-89 |
| A- (7) | 80-84 |
| B+ (6) | 75-79 |
| B (5) | 70-74 |
| B- (4) | 65-69 |
| C+ (3) | 60-64 |
| C (2) | 55-59 |
| C- (1) | 50-54 |
| F (0) | 00-49 |

Most graduate programs at McMaster (which are thesis-based) simply assign letter grades without calculating percentages. The most comparable programs to our MBA program on campus are Engineering's MEEi (Master in Engineering Entrepreneurship and Innovation) and MTEI (Master of Technology Entrepreneurship and Innovation) programs, as they are course-based (without thesis). For their percentage to grade point conversion, they have taken the 12-point undergraduate scale and cut it off after 6-points. Below is the MEEi and MTEI 6-point scale:

| Grade (Points) | Percentages |
|----------------|-------------|
| A+ (6) | 90-100 |
| A (5) | 85-89 |
| A- (4) | 80-84 |

| | |
|--------|-------|
| B+ (3) | 77-79 |
| B (2) | 73-79 |
| B- (1) | 70-72 |
| F (0) | 00-69 |

As shown above, for the MEEi and MTEI programs, anything less than 70% is considered a failure. This will likely be a difficult adjustment for our MBA instructors, who are used to anything less than 50% is a failure. Examining the conversion scales of some other MBA programs in Canada (see Appendix A) and considering magnitude of the mindset shift that will be required by all our MBA instructors when we convert to the new scale, the below conversion scale is recommended:

Recommended Conversion Scale:

| Grade (Points) | Percentages |
|----------------|-------------|
| A+ (6) | 90-100 |
| A (5) | 85-89 |
| A- (4) | 80-84 |
| B+ (3) | 75-79 |
| B (2) | 70-74 |
| B- (1) | 60-69 |
| F (0) | 00-59 |

With the above recommended conversion scale, an overall grade of less than 60% would be a failure. This is an adjustment from the current 50% failure cut-off, but not as much of an adjustment as a 70% failure cut-off. This recommendation was brought forward to the Faculty Council (during its November meeting) and consensus was obtained for the above recommended conversion scale. Subsequently, the above scale was approved by the SGS Executive for the MBA program during its January 17th, 2012 meeting.

Motion for Approval: The DeGroot MBA program change its current 9-point grading scale to a 6-point grading scale, following the percentage to grade point conversion shown above, effective September 2012.

2. Implementation of new grade point conversion

There are several issues that need to be considered as we move from a 9 to 6-point grading scale. We have been working with the School of Graduate Studies (SGS) and Centre for Leadership in Learning (CLL) to help us make this implementation as smooth as possible. Some of the key implementation issues are outlined below.

1. All course grades MUST be submitted using letter grades rather than percentages as of September 2012. If percentages are entered they will be automatically converted via the MEEi scale where anything less than 70% is a failure.
2. This grade scale change will be effective for ALL students as of September 2012. There is no grandfathering of the old scale for students that are continuing in the program. It would be exceedingly difficult for instructors to keep track of different grading scales for different students in the same classroom if grandfathering were allowed.
3. In partnership with UTS and the Registrar's Office, transcripts will be revised to indicate the new grading system and reflect the old grading system with the September 2012 cut-off.
4. The Graduate Calendar, MBA Calendar and all related materials will be updated as necessary to reflect the new grading system.
5. The admission requirements for the MBA program will remain unchanged.
6. Currently MBA students must have an overall B average in their courses in order to graduate from the program. This will not change. The minimum mark for a B is 70%.
7. Formal academic reviews will continue to be conducted after completing 10, 15 and 20 courses.
8. CLL will work with our instructors to help in any necessary changing of mindsets as we move towards the new grade point system. Extensive communication will be conducted to ensure all instructors (full time and part time) are aware of the implications of the new grading scale on how they evaluate their students. Similarly, extensive communication will be conducted with our students so that they understand why the change is being made, how it will impact their transcripts and how to communicate with employers about their transcripts.

Appendix A

Other MBA programs vary between 6 and 9-point scales. Below is a brief summary of select schools:

Laurier:

| Grade | Grade Point Conversion |
|-------|------------------------|
| A+ | 90-100 |
| A | 85-89 |
| A- | 80-84 |
| B+ | 77-79 |
| B | 73-76 |
| B- | 70-72 |
| C+ | 67-69 |
| C | 63-66 |
| C- | 60-62 |

York:

| Letter Grade | Index | Interpretation |
|--------------|-------|----------------|
| A+ | 9 | |
| A | 8 | Excellent |
| A- | 7 | |
| B+ | 6 | |
| B | 5 | Good |
| B- | 4 | |
| C+ | 3 | |
| C | 2 | Acceptable |
| C- | 1 | |
| F | 0 | Failing |

U of T:

| Letter Grade | Grade Meaning |
|--------------|---------------|
| A+ | |
| A | Excellent |
| A- | |
| B+ | |
| B | Good |
| B- | |
| FZ | Inadequate |

Queens:

| Grade | Percentage |
|-------|------------|
| A | 80+ |
| B | 65-79 |
| C | 50-64 |
| F | 0-49 |

UBC:

| Letter Grade | Percentage (%) |
|--------------|----------------|
| A+ | 90-100 |
| A | 85-89 |
| A- | 80-84 |
| B+ | 76-79 |
| B | 72-75 |
| B- | 68-71 |
| C+ | 64-67 |
| C | 60-63 |
| F (Fail) | 0-59 |

GRE as an alternative to GMAT

Rationale: More and more business schools are adding the GRE as an alternative to the GMAT for assessing applicants. The GRE revised General Test assesses very much the same skills as the GMAT (verbal reasoning; quantitative reasoning; analytical writing skills). By accepting the GRE alternative, we may be broadening and diversifying our applicant pool.

What Schools are accepting GRE General Test for their MBA programs?

- Harvard, INSEAD, MIT Sloan, Stanford ... and more locally, U of T has recently added the GRE option.

AACSB implications?

- None. AACSB, EFMD, etc., do not require schools to take any particular standardized admission test. Many accredited schools accept GRE General Test for the MBA programs.

How is the GRE similar or different from the GMAT?

- The GMAT exam and the GRE General Test have a high correlation with each other
- Assess same skills: verbal reasoning; quantitative reasoning; analytical writing skills
- Similar question types and cover similar domains
- While the GMAT provides a total score, the GRE does not. GRE has developed a comparison tool that allows schools to predict GMAT Total Score based on GRE verbal and quantitative scores.

Who takes the GRE?

- 675,000 people from 230 countries each year.
- 48% of GRE takers have quantitative-oriented undergrads (engineering, mathematics, sciences).
- Overall, may increase our international pool and strengthen our quantitative pool.

Where can the GRE be taken?

- GRE General Test is offered at more locations than GMAT (700 test centres in 160 countries).
- GRE is less expensive than taking a GMAT

During its November 2011 meeting, the Faculty Council provided its support for this proposal to allow the GRE to be an alternative to the GMAT for our MBA applicants.

Motion for Approval: The DeGroote MBA program allow the GRE to be an alternative to the GMAT for our MBA applicants starting September 2012. The GRE Comparison Tool developed by Educational Testing Services (ETS) will be used to ensure our minimum requirement for the GRE are comparable to our minimum requirement for the GMAT.

Frequently Asked Questions and Technical Guide for the GRE® Comparison Tool for Business Schools, Version 4.0

Introduction

Developed and administered by Educational Testing Service (ETS), the GRE® General Test has been a valid predictor of graduate-level success for more than 60 years.

With its introduction in August 2011, the GRE® revised General Test continues to assess the verbal reasoning, quantitative reasoning, critical thinking and analytical writing skills that graduate and business schools value, provide a common measure for comparing applicants with differing educational and cultural backgrounds, and furnish independent information to supplement the evaluation of grades and recommendations. To learn more about the GRE revised General Test, visit <http://www.ets.org/gre/institutions/about/general/>.

The GMAT® exam was developed by ETS for the Graduate Management Admission Council® (GMAC®) in 1954 and was administered by ETS until 2005. Like the GRE revised General Test, the GMAT exam assesses verbal, quantitative and analytical writing skills and is used by business schools to compare applicants from a wide variety of backgrounds.

Frequently Asked Questions

How is the new GRE comparison tool different from the prior version?

When developing the GRE revised General Test, significant modifications were made to the Verbal Reasoning and Quantitative Reasoning measures. Although the test modifications did not change the skills being assessed, they were significant enough to require changing the score scales (as indicated by professional standards — American Educational Research Association, American Psychological Association and National Council on Measurement in Education). The scores for the Verbal Reasoning and Quantitative Reasoning measures of the GRE revised General Test are reported on 130–170 score scales, in one-point increments, rather than the prior 200–800 scales, in 10-point increments.

The GRE comparison tool has been updated so that score users can now predict a GMAT Total score using a test taker's GRE Verbal Reasoning and Quantitative Reasoning scores on the new 130–170 score scales or on the prior 200–800 score scales.

Why a prediction model?

The GMAT exam and the GRE General Test have a high correlation with each other, so it is reasonable to use the actual scores on one measure to predict the likely score range on the other for a given applicant. However, for several reasons, it was not appropriate to produce concordance tables stating that a total score on one measure is directly equivalent to a total score on the other, and vice versa.

One reason is that the programs governing the tests make different recommendations for score use. The GRE program recommends keeping the GRE Verbal Reasoning and Quantitative Reasoning scores separate when making admissions decisions and, therefore, does not provide a total score. On the contrary, a total score, which is based on both Verbal

and Quantitative results, is provided for the GMAT exam. Additionally, the GMAT Total score is commonly used for admissions decisions.

A second reason is that while the exams use many similar question types and cover similar domains, each uses a unique framework, which specifies the sub-domains covered in the test content, as well as the difficulty level and proportion of question types used on the test.

Finally, the populations from which the tests have been normed are also somewhat different.

So while the scores from one test are not perfectly interchangeable with the other, a prediction model permits a GMAT Total score to be predicted from separate GRE Verbal Reasoning and Quantitative Reasoning scores. Therefore, they can be compared using the prediction procedures found in the GRE Comparison Tool for Business Schools.

How are the predicted GMAT Total scores calculated?

The predicted GMAT scores were calculated using statistical analyses of the actual test scores of 893 persons who took both the GRE General Test and the GMAT exam under actual operational, high-stakes conditions, between January 2006 and June 2009.

Using the statistical procedure of multiple linear regression, the participants' GRE Verbal Reasoning and Quantitative Reasoning scores were used to predict their GMAT Total scores. Then the resulting prediction equation, which essentially summarizes the empirical relationship of the GRE and GMAT scores into a simple algebraic equation, was used to create predicted GMAT scores for all combinations of GRE Verbal Reasoning and Quantitative Reasoning scores. The regression analysis indicates that GRE Verbal Reasoning and Quantitative Reasoning scores are significantly able to predict GMAT Total scores. Not surprisingly, given the similar nature of the two tests, the correlation between the GRE scores and the GMAT score is quite high (.86). Correlations of about .85 are often reported when predicting how well a test taker will do if they repeat a test.

The data used in the analyses came from actual GRE and GMAT score reports provided by GRE examinees who took both exams under standard operational conditions. Since neither the GRE nor GMAT scores were obtained via an experimental setting, many of the issues that may impact comparisons of test results were minimized, such as unreliable scores due to self-reporting or errors due to lack of effort, motivation or unfamiliarity with the exams. As the number of persons who take both tests within a year is likely small, we believe this sample of 893 includes a large proportion of the population who actually took both tests during the time period stated.

As GRE score users transition from using scores on the prior GRE General Test to using scores on the GRE revised General Test, the GRE Program has made concordance information available to help facilitate score interpretation. The concordance tables show the relationship between the scores on the prior and revised General Tests. Each of the concordance tables includes information on the scale of the prior GRE General Test (200–800), the scale of the GRE revised General Test (130–170), as well as the associated percentile ranks.

During this transition period, the GRE Comparison Tool for Business Schools makes use of the concordance information until an adequate sample of examinees who took both the GMAT exam and the GRE revised General Test is obtained. Once empirical data is collected on the relationship between the GRE revised General Test and the GMAT exam, the Comparison Tool will be updated based on that data to directly predict the GMAT Total score from the GRE revised General Test. At that time the concordance information will no longer be used in the calculations.

What do the standard error and confidence intervals mean?

Standard error is the technical term for the lack of precision found with an individual test score. However, the term standard error can mean different things and is calculated in different ways under different situations. For test scores from a single test administration, the standard error is calculated using the internal reliability of the test (for instance Cronbach's Alpha). Both the GRE General Test and the GMAT exam have very high internal reliability (usually over .90) so the standard error tends to be low. This standard error of measurement is the most commonly reported standard error, but it is not the standard error used here.

A different standard error, the standard error of the estimate, is reported when using the score of one test to predict the score on a different test. That standard error is calculated using the correlation of the scores from the two tests in place of the internal reliability. This correlation is generally lower than single test (internal) reliability because the error associated with each of the tests individually is compounded. The standard error reported in the Comparison Tool is calculated using the correlation between the GRE Verbal Reasoning and Quantitative Reasoning scores and the GMAT Total score.

Confidence intervals use the standard error as the starting point to create a range of values around the estimated score that indicates how confident we can be that the score estimate is accurate. The magnitude of that range is based on the size of the standard error and the level of "confidence" desired. The level of confidence is stated as the percent of the time the actual score would fall within the specified range, and is based on a normal curve distribution. One standard error represents a confidence interval of approximately 68 percent, which is evenly distributed as 34 percent above and 34 percent below the estimated score.

Technical Guide to the Statistical Procedures

The predicted GMAT Total scores were calculated from a multiple linear regression equation. GRE Verbal Reasoning and Quantitative Reasoning scores were used as the predictor (independent) variables and the GMAT Total score was used as the predicted (dependent) variable.

The regression equation:

$$\text{GMAT Total} = -82.27 + 0.472 * \text{GRE Verbal Reasoning Score} + 0.623 * \text{GRE Quantitative Reasoning Score}$$

(Note that the regression equation was derived using the GRE General Test scale of 200 to 800. In order to use GRE revised General Test scores, the Comparison Tool converts scores on the 130 to 170 scale to the 200 to 800 scale via the concordance information. Due to the fact that the new scale has fewer points than the prior scale, the published concordance table at times concurs more than one score point on the 200 to 800 scales to a single score point on the 130 to 170 scales. However, the GMAT Comparison Tool uses single unrounded scores for Verbal Reasoning and Quantitative Reasoning on the 200 to 800 scales that concord to each score point on the 130 to 170 scales. These unrounded Verbal Reasoning and Quantitative Reasoning scores are used as the predictor variables in the regression equation which calculates the predicted GMAT Total scores. Consequently, for tests taken prior to August 1, 2011, entering estimated scores on the 130 to 170 range based on the published concordance tables might result in a different predicted GMAT Total score than if the original scores (200 to 800) are entered.)

The correlation of the GRE Verbal and Quantitative Reasoning scores with the GMAT Total score based on the above regression equation is .860.

The standard error of the predicted GMAT Total score is 66.0. The formula used to calculate the SE is $\sigma_{GMAT} \sqrt{1-r^2}$ or $129.3 \sqrt{1-(.860)^2}$

The magnitude of the standard error of the estimate is driven by the correlation between the measures and is not impacted by sample size. The correlation of .860 and the corresponding standard error is in line with typical test-retest correlations.

The size of the confidence interval (CI) is based on the percent used to set the range and the accuracy of the prediction model. The CI is calculated by multiplying the standard error of the estimate with the corresponding z-score of the level of precision desired in the CI. The resulting CI is added and subtracted from the predicted score. This gives the range of predicted scores that the actual score would be expected to fall between for the percent confidence required.

The predicted GMAT Total scores are rounded to 10-point increments reflecting the scale of the test. Scores predicted to be below 200 were changed to 200 to reflect the actual base of the scale. The highest predicted GMAT Total score was 793 — the highest observed GMAT Total score for the sample was 790.

The sample used in the analysis includes the test scores of 893 examinees who took both the GMAT exam and the GRE General Test between January 2006 and June 2009.

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SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|-------------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | Human Resources and Management Area/ DeGroote School of Business | | | | | | |
| NAME OF PROGRAM | | Ph.D. in Business Administration | | | | | | |
| PROGRAM DEGREE | Ph.D. (X) | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | X |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | | EXPLAIN: | | | | | | |
| DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Students are required to take the following 7 one-term courses. Additional courses may be required depending upon the background and interests of individual students.</p> <p>B778: Management Theory B779: Research Issues I B780: Research Methods and Design B781: Research Issues II B782: Applied Multivariate Statistics Plus Two other MBA or Ph.D. level courses</p> | | | | | | | | |

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (*Attach additional pages if space is not sufficient.*)

Students are required to take the following 9 one-term courses. Additional courses may be required depending upon the background and interests of individual students.

| | |
|-------|---|
| B790: | Management Theory |
| B791: | Field Survey: Organizational Behaviour and Organizational Theory |
| B792: | Field Survey: Human Resources and Industrial Relations |
| B793: | Applied Multivariate Statistics |
| B794: | Research Methods and Design |
| B795: | Research Issues: Organizational Behaviour and Organizational Theory |
| B796: | Research Issues: Human Resources and Industrial Relations |
| B797: | Research Project Course I |
| B798: | Research Project Course II |

RATIONALE FOR THE RECOMMENDED CHANGE:

It is the considered opinion of the Area that the proposed curriculum changes strengthen the quality of the MOBHR curriculum by providing enhanced opportunities to students for gaining breadth of knowledge in the two field survey courses and depth of knowledge in the two research issues courses. In addition, the two research project courses would provide first-hand experience to students in undertaking research and potentially producing peer-reviewed conference and journal papers. The proposed curriculum would also help to align the MOBHR program more closely to the emerging research strengths of the Area faculty.

PROVIDE IMPLEMENTATION DATE: (Implementation date should be at the beginning of the academic year)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Dr. Naresh Agarwal Email: agarwal

Extension: 23953

Date: January 19, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: espiritu@mcmaster.ca).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|-------------|--|--|------------|-------------|-------------------------------------|---------------------|--------------------------------------|
| DEPARTMENT | | Human Resources and Management Area/ DeGroote School of Business | | | | | | |
| NAME OF PROGRAM | | Ph.D. in Business Administration | | | | | | |
| PROGRAM DEGREE | Ph.D. (X) | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | <input checked="" type="checkbox"/> | | CHANGE IN COURSE REQUIREMENTS |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | | EXPLAIN: | | | | | | |
| DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE: | | | | | | | | |
| The current format of the comprehensive examination in the MOBHR field includes a written examination. | | | | | | | | |

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (*Attach additional pages if space is not sufficient.*)

The Area proposes to add an oral component to the comprehensive examination in the MOBHR field.

RATIONALE FOR THE RECOMMENDED CHANGE:

The oral component to the comprehensive examination would provide an opportunity to examine the breadth and depth of knowledge of students in an interactive setting. The Area believes that the proposed format of the comprehensive examination, written followed by oral, would be a more rigorous and reliable outcome measure of academic achievement of students.

PROVIDE IMPLEMENTATION DATE: *(Implementation date should be at the beginning of the academic year)*

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Dr. Naresh Agarwal Email: agarwal

Extension: 23953

Date: January 19, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



School of Graduate Studies

1280 Main Street West
Hamilton, Ontario, Canada
L8S 4L8

Phone 905.525.9140
Ext. 23679
<http://graduate.mcmaster.ca>

March 13, 2012

To : Graduate Council

From : Medy Espiritu
Assistant Secretary and SynApps System Administrator

Re : Report from the Faculty of Engineering Graduate Curriculum and Policy Committee

On February 16, 2012, the Faculty of Engineering Graduate Curriculum and Policy Committee approved the following graduate curriculum recommendations.

Note: Approval of Graduate Council is contingent upon approval of the report by the Faculty of Engineering which will meet on March 21, 2012.

FOR APPROVAL OF GRADUATE COUNCIL

Biomedical Engineering

- Change in admission requirements: Ph.D. and M.A.Sc. programs

FOR INFORMATION OF GRADUATE COUNCIL

Biomedical Engineering

- Request to cross-list courses:

ECE *6BD4 – Biomedical Instrumentation (to be cross-listed as BME *6BD4)

Mechanical Engineering *717 – Current Topics in Orthopedic Biomechanics- new course
(to be cross-listed as BME *717)

Computing and Software

*701 – Logic and Discrete Mathematics – change in title and description

*738 – Algebraic Methods in Software Engineering and Computer Science – change in title and description

Civil Engineering

*6CM4 – Advanced Construction Management – new course

*6G03 – Pavement Materials & Design – change course number to *6G04

*6SD4 – Structural Dynamics and Earthquake Engineering – new course

*6V04 – Biological Aspects of Wastewater Engineering – new course

- *738 – Seismic Behaviour, Analysis and Design of Masonry Structures – new course
- *758 – Introduction to Mechanics of Elastic/Inelastic Solids – new course

Course cancellations:

- *6C03 – Environmental Impact and Sustainability
- *6D04 – Geometric Highway Design
- *6H03 – Analysis of Transportation Systems
- *6U03 – Unit Operations and Processes in Environmental Engineering
- #791 – Municipal Solid Waste Management
- #792 – Hazardous Waste Management

Engineering Physics

- *777 – Advanced Photovoltaics – new course
- *783 – Nuclear Fuel Engineering – new course (to be cross-listed as UN 0806)
- *784 – Nuclear Fuel Management – new course
- UN 0902 – Fuel Management – change course number to UN 0501
- UN 0806 – Nuclear Fuel Engineering (to be cross-listed as *783)

Materials Science and Engineering

- #733 – Materials Characterization by Electron Microscopy – new course
- #756 – Deformation and Fracture of Crystalline and Amorphous Polymers – course cancellation
- #763 – Physical Behaviour of Amorphous Solids – course cancellation

Mechanical Engineering

- *6B03 – Topics in Product Development – new course
- *717 – Current Topics in Orthopaedic Biomechanics – new course (to be cross-listed as BME *717)

School of Engineering Practice

- *748 – Development of Local Sustainable Communities – new course
- *770 – Total Sustainability Management – new course



**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|------------------------|---|-----------------------------------|---|-------------------------------------|--------------------------------------|------------------------------------|--|-----------------|
| DEPARTMENT | | School of Biomedical Engineering | | | | | | |
| NAME OF PROGRAM | | Biomedical Engineering | | | | | | |
| PROGRAM DEGREE | Ph.D. (<input checked="" type="checkbox"/>) | M.A. (<input type="checkbox"/>) | M.A.Sc. (<input checked="" type="checkbox"/>) | M.B.A. (<input type="checkbox"/>) | M. Eng. (<input type="checkbox"/>) | M.Sc. (<input type="checkbox"/>) | Diploma Program (<input type="checkbox"/>) | Other (Specify) |

NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX)

| | | | | | |
|--|-------------------------------------|---|--------------------------|--------------------------------------|--------------------------|
| CHANGE IN ADMISSION REQUIREMENTS | <input checked="" type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | <input type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | <input type="checkbox"/> |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | <input checked="" type="checkbox"/> | EXPLAIN: Provide more detail on the degrees allowed for admission into the program. | | | |
| OTHER CHANGES | <input type="checkbox"/> | EXPLAIN: | | | |

DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE:

Current admission requirements:
<http://msbe.mcmaster.ca/graduate/entrance.html>

It says:
For students from engineering and physical science backgrounds:
• 4-year degree or equivalent: BSc, BEng, BASc, BHSc with B+ minimum average in their final 2 years of study

This is actually a mixture of biology and engineering based degrees. Engineers have BEng or BASc. Biologists have BSc or BHSc. Hence it is confusing.

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.)

Propose change to entrance requirements to add more detail on the various degrees allowed for entrance as per below.

For students from engineering and physical science backgrounds:
- 4-year degree or equivalent: BSc, BEng, BASc with B+ minimum average in their final 2 years of study
For students from biological science backgrounds:
- 4-year degree or equivalent: BSc, BHSc, DDS, MD with B+ minimum average in their final 2 years of study

RATIONALE FOR THE RECOMMENDED CHANGE:

To provide more details within the calendar, allow for the interdisciplinary nature of the program, applicants come from a wide variety of backgrounds

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

January 1, 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

The entrance requirements will read as follows:

For students from engineering and physical science backgrounds:

- 4-year degree or equivalent: BSc, BEng, BAsC with B+ minimum average in their final 2 years of study

For students from biological science backgrounds:

- 4-year degree or equivalent: BSc, BHSc, DDS, MD with B+ minimum average in their final 2 years of study

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Natalie Illingworth Email: illing@mcmaster.ca

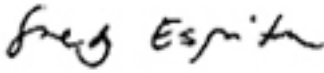
Extension: 23486

Date: January 10/12

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.

March 14, 2010

To : Graduate Council

From : 
Medy Espiritu
Assistant Secretary and SynApps System Administrator

Re : Report from the Faculty of Health Sciences Graduate Policy and
Curriculum Council

At its meeting on February 14, 2012, the Faculty of Health Sciences Graduate Policy and Curriculum Council approved the following graduate curriculum recommendations.

Note: Approval of Graduate Council is contingent upon approval of the report by the Faculty of Health Sciences Executive Committee which will meet on March 28, 2012.

FOR APPROVAL OF GRADUATE COUNCIL

Ph.D. Health Policy

- Change in course requirements

Health Research Methodology

- Change in course requirements – M.Sc. and Ph.D. programs

Occupational Therapy

- M.Sc. program – change to the calendar description of the “Program Requirements” – adding sentences regarding possible termination of clinical practicum

Physiotherapy

- Changes to the calendar description of the “Program Requirements” and “Admission Requirements”

FOR INFORMATION OF GRADUATE COUNCIL

Global Health

*715 – Independent Study Course – change in course title

Health Policy

*747 – Qualitative and Conceptual Methods for Health Policy – new course

Health Science Education

*701 – Cognition & Curriculum in Health Science Education – new course

*702 – Educational Research Methods in Health Science Education – new course

Medical Sciences

Course cancellations:

*706 – Topics in Cardiovascular Physiology

*729 - Molecular and Cellular Pathology

*744 – Functional Neuroanatomy of Selected Psychiatric Disease

*746 – Exercise Physiology in Health and Disease

Nursing

Graduate Diploma in Advanced Neonatal Nursing Program – addition of clinical practicum sites in
Edmonton and Calgary, Alberta

Course cancellations:

CHS *601 – Spiritual Worklife: Applied to Healthcare

CHS *700 – Spirituality and Health

CHS *701 – The Wounded Spirit in the Secular World

CHS *702 – The Impact of Spirituality & Religious Traditions on Suffering

CHS *703 – Suffering vs. Pain



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|-----------------|--|--|------------|--------------------------|--------------------------------------|---------------------|-------------------------------------|
| DEPARTMENT | | Cross-departmental interdisciplinary program | | | | | | |
| NAME OF PROGRAM | | Health Policy PhD Program | | | | | | |
| PROGRAM DEGREE | Ph.D. (x) | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | <input type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | <input type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | | <input checked="" type="checkbox"/> |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Students must complete between 15 and 36 units (5-12 half courses) of course work. Required coursework includes 3 terms of the Doctoral Seminar in Health Policy, 2-3 specialty field courses, 0-2 breadth field courses outside the student's specialty field, and 0-4 methodology courses, including both quantitative and qualitative or mixed methods.</p> <p>Students without prior graduate training in a given area are required to take the maximum number of required courses for that area. Students who have completed some relevant training prior to admission may have relevant course requirements waived at the time of admission to the Health Policy Ph.D. program. A minimum of 5 half-courses (3 doctoral seminar courses, 2 specialty field courses) may not be waived and must be completed while the student is enrolled in the Health Policy Ph.D. program.</p> | | | | | | | | |

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (*Attach additional pages if space is not sufficient.*)

Propose changing the last sentence in the above description to:

"A minimum of 5 half-courses (including the 3 doctoral seminar courses) may not be waived and must be completed while the student is enrolled in the Health Policy Ph.D. program."

That is, we are allowing students to waive specialty field courses if they have already taken relevant coursework in their Master's programs and these courses would be redundant.

We are preserving the requirement that Health Policy PhD students take no fewer than 5 of their required half-courses while enrolled at McMaster in the Health Policy PhD Program.

RATIONALE FOR THE RECOMMENDED CHANGE:

When the HP PhD curriculum was initially designed, we did not anticipate that some students might arrive with substantial specialty field coursework completed. However, we have now enrolled more than one student with adequate specialty field preparation from their Master's level training. We would like these students to be able to waive the specialty field requirements (as other students are currently allowed to do with breadth field and methodology course requirements), so that they can open up space in their curricula for methods, breadth, and elective courses that will benefit them more. All students will be required to take a minimum of 5 courses while at McMaster, regardless of waived requirements, to ensure that their doctoral preparation involves substantial post-Master's level training at McMaster University.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

The passage in the calendar copy that currently reads:

"A minimum of 5 half-courses (3 doctoral seminar courses, 2 specialty field courses) may not be waived and must be completed while the student is enrolled in the Health Policy Ph.D. program."

Should be changed to:

"A minimum of 5 half-courses (including the 3 doctoral seminar half-courses) may not be waived and must be completed while the student is enrolled in the Health Policy Ph.D. program."

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Lydia Garland Email: garlndl@mcmaster.ca Extension: 22952 Date: 3 November 2011

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|-----------------|--|--|---|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | Clinical Epidemiology & Biostatistics | | | | | | |
| NAME OF PROGRAM | | Health Research Methodology Graduate Program | | | | | | |
| PROGRAM DEGREE | Ph.D. (X) | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (X) | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | X |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | X | EXPLAIN: Pages 392-395 (MSc in HTA by thesis and course-work; possible additional make-up courses for Ph.D.; electives for HRM in Ph.D. in HTA. | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>#1. Pages 392-393: At the master's level, HRM students specializing in Health Technology Assessment are currently required to complete the following course requirements:</p> <p style="padding-left: 40px;">Current courses required for HRM MSc (thesis-based) specialization in HTA: Common courses: *721, *702 Field-specific courses: *737, *741 Electives: 1</p> <p style="padding-left: 40px;">Current courses required for HRM MSc (course-based), specialization in HTA: Common courses: *721, *702 Field -specific courses: *787, *737, *743, *741 Electives: 1</p> <p>#2. Page 394: Students who have not taken courses that represent an introduction to health research methods (HRM *730 or HRM *751 [or their equivalents]) and basic biostatistics (HRM *702 [or equivalent]), and theory and practice of measurement (HRM *727 [or its equivalent]) will be required to take these courses in addition to the regular course load.</p> <p>#3. Page 395: Electives for the Health Technology Assessment (HTA) field of specialization, currently listed as "2".</p> | | | | | | | | |

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (*Attach additional pages if space is not sufficient.*)

#1 CHANGE: Reduce the number of field-specific courses for HTA and include recommendation for the elective:

At the master's level, HRM students specializing in Health Technology Assessment are now required to complete the following course requirements:

courses required for HRM MSc (thesis-based), specialization in HTA:

Common courses: *721, *702

Field -specific courses: *737, *741

Electives: 1 (usually *787)

courses required for HRM MSc (course-based), specialization in HTA:

Common courses: *721, *702

Field-specific courses: *743, *737, *741

Electives: 2 (usually *787)

#2 CHANGE: Ph.D. Degree

Students who have not taken courses that represent an introduction to health research methods (HRM *730 or HRM *751 [or their equivalents]) and basic biostatistics (HRM *702 [or equivalent]), and theory and practice of measurement (HRM *727 [or its equivalent]) may be required to take these courses in addition to the regular course load. Students should consult program documentation for the specific requirements for the fields of specialization.

#3 CHANGE: clarification of electives for HTA field of specialization:

Health Technology Assessment, electives "2 (usually 787, 743)

RATIONALE FOR THE RECOMMENDED CHANGE:

Clarified courses for the HRM MSc degree, specialization in Health Technology Assessment; possible additional make-up courses for the Ph.D. degree; clarification of electives for the Health Technology Assessment field of specialization.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 1, 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

N/a

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

see attached

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Steve Hanna Email: hannas@mcmaster.ca Extension: 27851 Date: January 17, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
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3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | |
|-------------------|----------------------------------|
| DEPARTMENT | School of Rehabilitation Science |
|-------------------|----------------------------------|

| | |
|------------------------|----------------------|
| NAME OF PROGRAM | Occupational Therapy |
|------------------------|----------------------|

| | | | | | | | | |
|-----------------------|-----------|----------|-------------|------------|-------------|-------------|---------------------|-----------------|
| PROGRAM DEGREE | Ph.D. () | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (X) | Diploma Program () | Other (Specify) |
|-----------------------|-----------|----------|-------------|------------|-------------|-------------|---------------------|-----------------|

NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX)

| | | | | | |
|---|--------------------------|--|--------------------------|--------------------------------------|--------------------------|
| CHANGE IN ADMISSION REQUIREMENTS | <input type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | <input type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | <input type="checkbox"/> |
|---|--------------------------|--|--------------------------|--------------------------------------|--------------------------|

| | | |
|--|-------------------------------------|---|
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | <input checked="" type="checkbox"/> | EXPLAIN: Additions: Sentences added regarding possible termination of clinical practicum. |
|--|-------------------------------------|---|

| | | |
|----------------------|--------------------------|-----------------|
| OTHER CHANGES | <input type="checkbox"/> | EXPLAIN: |
|----------------------|--------------------------|-----------------|

DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE:

The procedure to address serious concerns of student behaviour and safety have been in place through other documents, but the information related to this has not been explicit in the Graduate Calendar. We have a clear statement in the Professional Practica Handbook: "If, at any time during a placement, the PPC or university faculty member believes that the student's English language proficiency, communication, knowledge, clinical skills, or professional behaviours present a risk to clients, the site or university has the right and responsibility to withdraw the placement." However, the consequences of that may not always be completely clear to students.

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.)

Safety issues in clinical practicum have occurred in which students have not demonstrated needed knowledge, skills or professional behaviours and this has resulted in some situations in which clients/patients, staff, or the student have been put at risk for injury. If this has persisted after feedback and support to the student, there have been some incidents in which a practicum has had to be terminated because of safety concerns. Adding information about the possibility of terminating placement and consequent course failure will provide students information at application and beyond, and can be referred to in case of appeal.

The new content is below, and is inserted into the program requirements in the section below:

The University reserves the right to cancel the academic privileges of a student at any time should the student's scholastic record or conduct warrant so doing. Serious deficits in matters pertaining to work in clinical settings, research ethics, or professionalism when interacting with human or other subjects may result in termination of the work in a clinical practicum or research project. Serious deficits include, but are not limited to: patient safety, professionalism, ethical behavior and technical skills, as articulated in the Essential Competencies of Practice for Occupational Therapists in Canada and Occupational Therapy Standards of Practice (available at www.coto.org). Such termination of work in a clinical rotation or on research project will result in the student receiving a grade of F in the course, or an unsatisfactory rating for research work, and may result in dismissal from the program. For Health Sciences Graduate programs with clinical courses, all clinical activities associated with such courses must be successfully achieved for attainment of a passing grade in the course.

RATIONALE FOR THE RECOMMENDED CHANGE:

Although performance issues in the OT program most frequently arise as safety issues in practicum, experiences of other graduate and undergraduate health sciences programs suggest that a broader description in the graduate calendar are warranted so that the program can respond to other possible issues that indicate serious performance deficits.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Program Requirements

The Master of Science in Occupational Therapy is a full time course-based accredited professional Master's program. It prepares students with knowledge, skills, and professional behaviours to practice as entry level occupational therapists. The program utilizes a problem-based self-directed learning philosophy. Students will complete course work, fieldwork, and an independent evidence-based practice project during their two extended study years, from September to July (Year 1) and September to September (Year 2). All courses are required. Students will receive a General Guide, a Curriculum Guide, and a Professional Practice handbook which provide more detail regarding procedures and requirements. Regulations described in the Graduate Calendar over-ride these documents in cases of discrepancy. The University reserves the right to cancel the academic privileges of a student at any time should the student's scholastic record or conduct warrant so doing. Serious deficits in matters pertaining to work in clinical settings, research ethics, or professionalism when interacting with human or other subjects may result in termination of the work in a clinical practicum or research project. Serious deficits include, but are not limited to: patient safety, professionalism, ethical behavior and technical skills, as articulated in the Essential Competencies of Practice for Occupational Therapists in Canada and Occupational Therapy Standards of Practice (available at www.coto.org). Such termination of work in a clinical rotation or on research project will result in the student receiving a grade of F in the course, or an unsatisfactory rating for research work, and may result in dismissal from the program. For Health Sciences Graduate programs with clinical courses, all clinical activities associated with such courses must be successfully achieved for attainment of a passing grade in the course

Admissions Requirements:

No change to this section.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Lori Letts

Email: lettsl@mcmaster.ca

Extension: 27816

Date: November 15, 2011

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|-----------|-----------------------------------|---|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | School of Rehabilitation Science | | | | | | |
| NAME OF PROGRAM | | Master of Science (Physiotherapy) | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (x) | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | <input checked="" type="checkbox"/> EXPLAIN: Add: 1. Program: a. "All courses required"; b. program handbooks/guides; c. placement termination 2. Admissions: police check policy | | | | | |
| OTHER CHANGES | | EXPLAIN: | | | | | | |
| DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>The current entry in the graduate calendar reads as follows:</p> <p>1. Program Requirements The Master of Science (PT) will meet professional accreditation and practice standards. Students will complete course work, clinical placements and an independent research project. All students will be required to complete the equivalent of 23 half-courses over 6 terms of full-time study across two extended study years.</p> <p>2. Admission Requirements To be eligible for admission to the M.Sc. (PT) program, applicants must have completed a four-year baccalaureate degree or the equivalent number of courses (120 units/credits), and have achieved a minimum grade-point average of "B" or 75% or 3.0/4.0 or 8.0/12.0 in their final 60 units of credit. Post-graduate coursework is also considered in this GPA calculation. Applicants may apply during the fourth year of their degree. In this case, the pre-admission GPA for eligibility purposes is calculated using the most recent 60 units of credit towards their degree. If an applicant in this category is subsequently offered admission to the program, the offer is "conditional" upon successful completion of their four-year degree by June 30 in that year, and maintenance of a B average in their final 60 units of credit. Additional requirements include: (a) a minimum of one biological or life science course at any level with a grade of at least B (75%) or higher (b) a minimum of one social science or humanities course at any level with a grade of at least B (75%) or higher Please see program website for more details regarding prerequisites.</p> <p>The information regarding "all courses required", program handbook/guides, placement termination and police check policy are found in other documents and the procedures related to the information have been in place within the program. However, this information is not explicitly stated in the Graduate Calendar.</p> | | | | | | | | |

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (*Attach additional pages if space is not sufficient.*)

The Master of Science (Physiotherapy) program is an entry-level professional masters program that prepares students for clinical practice as physiotherapists. The program is accredited by the Physiotherapy Education Accreditation Canada and accreditation standards must be maintained. Accreditation standards criteria include making information to potential and current students (and public) available and ensuring that the information is transparent. Providing additional information regarding the possibility of placement or research project termination and subsequent course failure and possible program dismissal will provide students with clear and transparent information at time of application and beyond.

RATIONALE FOR THE RECOMMENDED CHANGE:

- 1a. All courses are required to graduate. Currently, this is not explicitly stated in the calendar.
- 1b. The program has handbooks and guides that are provided to students. These documents provide information regarding guidelines and procedures the student is to follow. Currently, information regarding these documents is not stated in the calendar.
- 1c. As per the recommendation of Dr. Cathy Hayward, we have noted in the program requirements section that a student's clinical placement or research project may be terminated (and subsequent course failure and possible program dismissal) if the student demonstrates significant deficits related to patient safety, technical skills or professionalism.
- 2. While admissions policy and process will not change, the addition to the graduate calendar will inform students of the Police Check Policy (approved by Senate in December 2010,) which requires a clear police check as a condition of admission. Currently, this is not stated in the calendar.

PROVIDE IMPLEMENTATION DATE: (Implementation date should be at the beginning of the academic year)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

See attached - recommended changes do not fit in allotted space.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Vanina Dal Bello-Haas
January 19, 2012

Email: vdalbel@mcmaster.ca

Extension: 27822

Date:

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

1. Program Requirements

The Master of Science (PT) will meet professional accreditation and practice standards. Students will complete course work, clinical placements and an independent research project. All students will be required to complete the equivalent of 23 half-courses over 6 terms of full-time study across two extended study years. All courses are required.

Students will receive a Student General Guide, a Curriculum Guide, a Clinical Education Handbook and Unit Handbooks which provide additional information and details regarding procedures, guidelines and requirements. In the event of a discrepancy between these documents and the Graduate Calendar, the Graduate Calendar represents the official policy.

The University reserves the right to cancel academic privileges of a student at any time should the student's scholastic record or conduct warrant so doing. Serious deficits in matters pertaining to work in clinical settings, research ethics or professionalism when interacting with human or other subjects may result in termination of the work in a clinical placement or research project. Unsatisfactory standing or serious deficits in matters pertaining to professional skills, which include but are not limited to patient safety, professionalism, ethical behavior and technical skills, as described in the *Essential Competency Profile for Physiotherapists in Canada* (www.physiotherapy.ca), may result in a decision to terminate the clinical placement or research project. Termination of the clinical placement or research project constitutes a failure and will result in the student receiving a grade of F in the Clinical Practice course or the Research and Evidence-Based Practice course, and may result in dismissal from the program. For Health Sciences Graduate programs with clinical courses, all clinical activities associated with such courses must be successfully achieved for attainment of a passing grade in the course.

2. Admission Requirements

To be eligible for admission to the M.Sc. (PT) program, applicants must have completed a four-year baccalaureate degree or the equivalent number of courses (120 units/credits), and have achieved a minimum grade-point average of "B" or 75% or 3.0/4.0 or 8.0/12.0 in their final 60 units of credit. Post-graduate coursework is also considered in this GPA calculation.

Applicants may apply during the fourth year of their degree. In this case, the pre-admission GPA for eligibility purposes is calculated using the most recent 60 units of credit towards their degree. If an applicant in this category is subsequently offered admission to the program, the offer is "conditional" upon successful completion of their four-year degree by June 30 in that year, and maintenance of a B average in their final 60 units of credit.

Additional requirements include:

- (a) a minimum of one biological or life science course at any level with a grade of at least B (75%) or higher
 - (b) a minimum of one social science or humanities course at any level with a grade of at least B (75%) or higher
- Please see program website for more details regarding prerequisites.

An offer of admission is contingent upon a "clear" Police Check (including vulnerable-sector screening and a police record check) or approval by the Assistant Dean (as per the Police Records Check Policy approved by McMaster University Senate December 8, 2010). See http://www.srs-mcmaster.ca/Portals/20/pdf/admission/OT_PT_Student_Police_Records_Check.pdf for the full policy.

The item below is to be inserted under the header 2.5 in grad calendar, to apply to all graduate students

2.5 Graduate Course Work

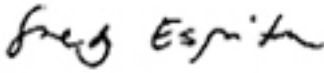
As a condition of enrolling in a graduate program or course, students must maintain current contact information with the University, including their address, phone numbers and emergency contact information), use the university provided e-mail address or a valid forwarding e-mail address and regularly check the official University communication channels. Messages from University are considered received by the student if sent by postal mail or fax to the student's current contact information on file, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.

The following text is to be inserted in graduate calendar at the end of section 2.6

Graduate students and supervisors are encouraged to familiarize themselves with the McMaster University **Graduate Work Supervision Guidelines for Faculty and Students**, which follow below and available on the School of Graduate Studies website (insert weblink)

March 2, 2012

To : Graduate Council

From : 
Medy Espiritu
Assistant Secretary and SynApps System Administrator

Re : Report from the Joint Faculties of Humanities and Social Sciences Graduate
Curriculum and Policy Committee

The Joint Faculties of Humanities and Social Sciences Graduate Curriculum and Policy Committee approved the following graduate curriculum recommendations.

FOR APPROVAL OF GRADUATE COUNCIL

Faculty of Humanities (*Note: These items were approved at the Faculty of Humanities meeting on February 28, 2012*)

Master of Communications Management

- Change in admission requirements

M.A. Communication and New Media

- change in program timetable
- change in course requirements
- change in description of Major Research Project
- change in the "Courses" calendar description

History

Ph.D. program – change in the calendar description to reflect the dropping of formal fields and substituting student-needs focused independent reading course for the formal field structure

Faculty of Social Sciences

(*Note: Approval of Graduate Council is contingent upon approval of this item by the Faculty of Social Sciences which will meet on March 29, 2012.*)

M.A Health and Aging

- Change in course requirements

FOR INFORMATION OF GRADUATE COUNCIL

Faculty of Humanities (*Note: These items were approved at the Faculty of Humanities meeting on February 28, 2012*)

Cognitive Science of Language

- *6CS3 – Clinical Sociolinguistics – new course, undergraduate course for graduate credit
- *749 – Laboratory Methods of Visual Language Research – new course

Communications Management

- *703 – Leadership, Persuasion and the Successful Executive – new course

Communication and New Media

- *700 – Communication Research Methods – change in course title
- *703 – New Media Studio Topics – change in course title and description
- *707 – Theoretical Issues in Media, Culture and Communication – change in course title and description
- *709 – Independent Study – change in course description
- *712 – New Media Methods – new course
- *731 – Crisis Management and Communication (cross-listed with Business P731)

English and Cultural Studies

M.A. Cultural Studies and Critical Theory

-Change in the calendar description of “Courses” section

M.A./Ph.D. English

- Change in the calendar description of “Courses” section

Cancellation of English/CSCT courses

- *734 – Gendered Authorship in Early Modern England
- *735 – Figuring the Nation in Early Modern England
- *768 – Modernism, Orientalism and the Representation of Post-War Japan in Cinema
- *775 – Gender, Modernism and Modernity: American Women Writers

New courses:

- English *707 – Northrop Frye and the Social Function of Literature
- English/CSCT *722 – Cosmopolitanism and Nationalism in the Eighteenth Century
- English/CSCT *725 – Romanticism, War, and Peace
- English/CSCT *730 – Indigenous Literature of North America
- English/CSCT *744 – Gender, Violence and Visual Culture
- English/CSCT *745 – Theorizing Care: Dependency, Representation, Ethics
- English/CSCT *755 – Neoliberalism and the Limits of the Social
- English/CSCT *756 – The Secret Life of Things in the Eighteenth Century
- English/CSCT *758 – Literature as Witness

French

- *703 - Monsters physical and moral during the Ancien Régime or Reproduction gone wrong
- *707 – Modern Lesbian and Gay French Writing
- *708 - Littératures francophones et théories postcoloniales
- *715 - L'Utopie littéraire au Canada français et au Québec
- *716 - Linguistic Prescriptivism in the Francophone World
- *718 - Représentations de l' exil dans la littérature francophone
- *728 - Romanticism, Realism and the Evolution of French Liberalism in the Early 19th Century

Gender Studies and Feminist Research

- *701 – Doing Research in Feminist and Gender Studies – will keep course as 3-unit but have it meet every other week over the course of Fall and Winter terms
- *703 – Topics in Gender Studies and Feminist Research – new course
- *704 – Independent Study in Gender Studies and Feminist Research – new course

History

- 798 – Ph.D. Specialized Reading Course – new course

Course cancellations:

- 790 – Major Field Seminar in Twentieth-Century European History
- 791 – Major Field Seminar in British History, 1485-1832
- 792 – Major Field Seminar in British History, 1688-2000
- 793 – Major Field Seminar in Canadian History, 1791-1980
- 794 – Major Field Seminar in Gender History
- 795 – Major Field Seminar in the History of Health & Medicine
- 796 – Major Fields Seminar in the History of War and Society

Faculty of Social Sciences (*Note: These items are for Faculty of Social Sciences approval which will meet on March 29, 2012*)

Anthropology

New courses:

- *703 – Writing the Field
- *741 – Sunbathing and Scurvy: Bioarchaeological Approaches to Metabolic Bone Diseases

Economics

- *752 – International Finance – change in prerequisite

M.A. Health and Aging

- Renumbering of graduate courses

- *6C03 – Representations of Illness & Aging – change in course title
- *701 – Social Science Perspectives on Health and Aging – change in course description
- *703 – Health and Aging in a Global and International Context – change in course description, course number change to *708
- *704 – Social Systems, Services and Policy: Critical Perspectives – change in course title and description, course number change to *703

- *705 – Socio-Cultural Aspects of Health and Aging – change in course description, course number change to *709
- *707 – Globalization and Health – change in course description, course number change to *712
- *708 – Health, Aging and the Media – change in course description, course number change to *710
- *709 – Special Topics in Aging – change in course description, course number change to *704
- *710 – Critical Perspectives on Aging – change in course title and description, course number change to *713
- *711 – The Health Care System and the Older Person – change in course description
- *712 – Special Topics in Health – change in course description, course number change to *705

Political Science

New courses:

- *708 – Major Research Paper (for students in the M.A. IR Program)
- *770 – Globalization and the Canadian State

Religious Studies

6X16 - Intermediate Sanskrit – new course

Sociology

- *703 – Sociology of Family – course cancellation
- *704 – Deviance and Social Problems – change in course title
- *706 – Sociology of Deviance – course cancellation
- *709 – Religion and Globalization – course cancellation

Revisions to admissions requirements for Master's of Communication Management program.

Current Calendar Description:

- A Bachelor's degree from an accredited university with at least B average and 5 years of fulltime professional experience in public relations or a related field, excluding time spent in internships. Non-degree applicants may also be considered for admission provided they have attained a senior level management position with at least 15 years of industry experience. No more than 5 non-degree students will be admitted per year.
- Graduate Record Examination (GRE) or Graduate Management Aptitude Test (GMAT) would be required for any applicants who do not hold a four-year university degree;
- Three letters of recommendation, including one from the current employer. (If the applicant is an independent consultant or counselor, this letter can be from a current client or business partner).
- A personal essay (typed; maximum 500 words) explaining interest and suitability for the program as well as potential for completing the program.
- A portfolio of samples of best work, particularly those which illustrate strategic management ability (e.g. public relations plans; marketing plans; crisis plans).
- Test of English as a Foreign Language (TOEFL) score for applicants whose native language is not English.
- A personal interview with the Academic Director or Admissions Committee, either in person or via teleconference. The purpose of this interview is to ensure that the applicant is fully aware of all aspects of the program and the commitment needed for successful completion.

Proposed revisions with explanation:

- * **An Honours Bachelor's degree or equivalent professional degree from an accredited university with at least a B+ average and three years of fulltime professional experience in public relations or a related field, excluding time spent in internships.** [NB This statement clearly specifies an Honours degree or equivalent. They are reducing the necessary work experience from five to three years, which is in line with many professional degrees. The GRE or GMAT is no longer necessary as an Hons degree is required.]
- * **Three letters of recommendation, including one from the current employer. (If the applicant is an independent consultant . . .)** [No change]
- * **A personal essay (maximum 500 words) explaining interest and suitability for the program . . .** [No change]
- * **A portfolio of samples of best work, particularly . . .** [No change]
- * **A personal interview with the Academic Director or Admissions Committee, either . . .** [No change]
- * **Prospective applicants who do not meet the normal admission requirements should consult the program Director to discuss how their work experience might be assessed to make up for insufficient standing in their undergraduate degree. Please refer to section 2.1.3 of the Calendar on this matter.** [NB This wording allows for somewhat more flexible admissions, on the approval of the Assoc Dean, SGS, for exceptional students.]



**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|------------------------|-----------|-----------------------------------|-------------|------------|-------------|-----------|---------------------|-----------------|
| DEPARTMENT | | CSMM | | | | | | |
| NAME OF PROGRAM | | MA in Communication and New Media | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. (x) | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |

NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX)

| | | | | | |
|--|-------------------------------------|--|--------------------------|--------------------------------------|--------------------------|
| CHANGE IN ADMISSION REQUIREMENTS | <input type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | <input type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | <input type="checkbox"/> |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | <input type="checkbox"/> | EXPLAIN: | | | |
| OTHER CHANGES | <input checked="" type="checkbox"/> | EXPLAIN: change in Program Timetable | | | |

DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE:

Program Timetable
 Students will normally be expected to take three courses in Term 1 and two courses in Term II, in addition to the pro seminar which runs through terms I and II. Preparation for the major research project will normally begin in Term II. Between May and July, students are expected to meet regularly with their faculty supervisor and make steady progress on their research and writing. A first draft of the project is due no later than 15 July, and the final draft of the project should be submitted to the department no later than 31 August.

Students are expected to complete all program requirements within 12 months of entry.

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.)

The changes include the following: an increase in the number of term II courses from two to three, a shift in deadlines for the submission of the MRP draft to supervisor from 15 July to 1 July, and the addition of a deadline of 1 August for submitting the final MRP draft to the second reader.

RATIONALE FOR THE RECOMMENDED CHANGE:

The increase in the number of recommended Term II courses reflects the increase in the number of courses required for the program. The alterations in the submission timeline reflects the addition of the second reader and the need for deadlines that give both the supervisor and second reader adequate time to read and comment upon the work, as well as time for the student to make any necessary revisions.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Program Timetable

Students will normally take three courses in Term 1 and three courses in Term II, in addition to the pro seminar, which runs through terms I and II. Preparation for the major research project will normally begin in Term II. Between May and July, students are expected to meet regularly with their faculty supervisor and make steady progress on their research and writing. A first complete draft of the project is due to the supervisor no later than 1 July, a final draft is due to the second reader by 1 August, and the approved version of the project must be submitted to the department no later than 31 August.

Students are expected to complete all program requirements within 12 months of entry.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Christina Baade Email: baadec@mcmaster.ca Extension: 23736 Date: 20 January 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

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| | | | | | | | | |
|------------------------|-----------|-----------------------------------|-------------|------------|-------------|-----------|---------------------|-----------------|
| DEPARTMENT | | CSMM | | | | | | |
| NAME OF PROGRAM | | MA in Communication and New Media | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. (x) | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |

NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX)

| | | | | | |
|---|--------------------------|--|--------------------------|--------------------------------------|-------------------------------------|
| CHANGE IN ADMISSION REQUIREMENTS | <input type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | <input type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | <input checked="" type="checkbox"/> |
|---|--------------------------|--|--------------------------|--------------------------------------|-------------------------------------|

| | | |
|--|--------------------------|-----------------|
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | <input type="checkbox"/> | EXPLAIN: |
|--|--------------------------|-----------------|

| | | |
|----------------------|--------------------------|-----------------|
| OTHER CHANGES | <input type="checkbox"/> | EXPLAIN: |
|----------------------|--------------------------|-----------------|

DESCRIBE THE EXISTING REQUIREMENT/PROCEDURE:

Degree Requirements

The M.A. in Communication and New Media will typically be completed within twelve months. Students will complete five 3-unit courses and year-long pro seminar, in addition to a major research project (either a 40-page research paper/project or a digital media project supported by a shorter paper).

Course Requirements

Course requirements consist of a required core course in research methods relevant to communication studies and new media (CSMM *700 and CSMM *799; see Course List) and four additional courses from Course List. Students must achieve a grade of at least a B- in all courses they take for credit in order to qualify for the degree.

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.)

The change involves the addition of a new required course, CSMM 712 New Media Methods, and an increase in the number of half-year courses from 5 to 6. Because with the new required course there would then be two required half-year courses and a required full-year pro seminar, we are changing our text to describe the non-required courses as electives.

RATIONALE FOR THE RECOMMENDED CHANGE:

This new course, CSMM 712, addresses a significant gap in the current program: methodological training in new media methods. Currently, the required methods course CSMM 700 focuses upon communication studies methodologies, leaving students with little preparation for new media seminars and lacking a crucial set of skills upon graduation. During the three years that this degree has been offered, students from all backgrounds (communication studies, multimedia, and other fields) have expressed a strong desire for a course of this nature. As can be seen in the course proposal, CSMM 712 will be taught with innovative pedagogical approaches that will flexibly meet the learning needs and interests of students from a wide range of backgrounds. The course will help us better deliver on what the degree title promises, will equip our students with a range of skills and knowledges that will be useful in a range of academic and non-academic contexts after graduation, and will serve as a valuable recruiting tool.

Rather than reduce the number of elective courses, we are raising the number of required courses from five 3-unit courses and year-long pro seminar to six 3-unit courses and year-long pro seminar. This puts our offerings in line with other one-year MAs in the Humanities, including GSFR and CSCT.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

"Degree Requirements

The M.A. in Communication and New Media will typically be completed within twelve months. Students will complete six 3-unit courses and year-long pro seminar, in addition to a major research project (either a 40-page research paper/project or a digital media project supported by a shorter paper).

Course Requirements

Course requirements consist of required core courses in methodologies relevant to communication studies and new media (CSMM *700, CSMM *712 and CSMM *799; see Course List) and four elective courses from the Course List. Students must achieve a grade of at least a B- in all courses they take for credit in order to qualify for the degree."

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Christina Baade Email: baadec@mcmaster.ca Extension: 23736 Date: 20 January 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

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3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|-----------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | CSMM | | | | | | |
| NAME OF PROGRAM | | MA in Communication and New Media | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. (x) | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | x | EXPLAIN: change in description of Major Research Project | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Major Research Project</p> <p>In addition to the course requirements, students will complete a major research project under the supervision of a core faculty member. The major research project will be evaluated on a Pass/Fail basis by the project supervisor.</p> <p>There are two options for the major research project:</p> <p>1. A paper (approximately 40 pages) based on original research.</p> <p>The paper will provide an opportunity to apply methodological skills acquired in the research methods courses (CSMM *700) to theoretical and substantive issues taken up in other courses.</p> <p>2. A digital media project (e.g., a work of art, performance, or installation; methodological tool; a software application; an educational application, or a digital game) together with a shorter paper (approximately 15-20 pages) explaining the conception and development of the project.</p> <p>The digital media project may reflect expertise and knowledge acquired during course work.</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| The change involves the addition of a second reader, who will evaluate the major research project with the project supervisor. | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

The CSMM faculty and program students believe that having the MRP supervisor serve as an MRP's sole evaluator is not sufficiently rigorous. We believe that assigning a second reader to each MRP will make the process more rigorous, provide more feedback to students, and increase the value of the degree.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Major Research Project

In addition to the course requirements, students will complete a major research project under the supervision of a core faculty member. The major research project will be evaluated on a Pass/Fail basis by the project supervisor and second reader.

There are two options for the major research project:

1. A paper (approximately 40 pages) based on original research.

The paper will provide an opportunity to apply methodological skills acquired in the research methods courses (CSMM *700) to theoretical and substantive issues taken up in other courses.

2. A digital media project (e.g., a work of art, performance, or installation; methodological tool; a software application; an educational application, or a digital game) together with a shorter paper (approximately 15-20 pages) explaining the conception and development of the project.

The digital media project may reflect expertise and knowledge acquired during course work.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Christina Baade Email: baadec@mcmaster.ca Extension: 23736 Date: 20 January 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
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| | | | | | | | | |
|---|-----------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | CSMM | | | | | | |
| NAME OF PROGRAM | | MA in Communication and New Media | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. (x) | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | x | EXPLAIN: Change in preliminary text for course listing | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Courses With the exception of CSMM *700, which will be offered every year, other 700-level course offerings will vary from year to year depending on student and faculty interest. All courses listed below run for one term. {followed by the full course list}</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>The deletion of the general description for Courses and its replacement with preliminary text for Required Courses and Elective Courses.</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

With the addition of the new required course CSMM 712, the layout of the course listings is more intelligible if required and elective courses are listed separately.

PROVIDE IMPLEMENTATION DATE: (Implementation date should be at the beginning of the academic year)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Required Courses

All students are required to take CSMM *700, CSMM *712, and CSMM 799. CSMM *700 and CSMM *712 are half-year courses, both of which are offered in Term I. CSMM 799 is a full-year course.

{followed by listings for CSMM 700, 712, and 799}

Elective Courses

All students are required to take four elective courses from the list below. Offerings will vary from year to year depending on student and faculty interest. All courses listed below run for one term.

{followed by elective course listings}

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Christina Baade Email: baadec@mcmaster.ca Extension: 23736 Date: 20 January 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|---|--|--|-------------------------------------|--------------------------------------|---|--|-----------------|
| DEPARTMENT | | HISTORY | | | | | | |
| NAME OF PROGRAM | | History | | | | | | |
| PROGRAM DEGREE | Ph.D. (<input checked="" type="checkbox"/>) | M.A. (<input type="checkbox"/>) | M.A.Sc. (<input type="checkbox"/>) | M.B.A. (<input type="checkbox"/>) | M. Eng. (<input type="checkbox"/>) | M.Sc. (<input type="checkbox"/>) | Diploma Program (<input type="checkbox"/>) | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | x | | | EXPLAIN: We are revising our calendar language to reflect the dropping of formal fields from our PhD program. | | |
| OTHER CHANGES | | x EXPLAIN: We are substituting a student-needs focused independent reading course for the traditional formal field structure of our PhD program. The related course change form is attached to this curriculum form. | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Currently PhD candidates take two 3 unit graduate seminars as their minor fields in their first term of study (with approximately 50% more reading required of them than the MAs in the seminar). This will remain unchanged. In the second term PhDs take a 6 unit reading course covering one of the six approved 'major fields' that the department offers. The course covers approximately 25,000 pages of reading, from monographs, collections and articles. At the conclusion of the course (which includes written assignments and a participation mark), the students undertake a stand alone comprehensive exam covering the material in the course. It is the major field courses we are seeking to replace.</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>In place of the major field courses we are substituting a 6 unit major specialized reading course, the formal parameters of which will remain consistent with the old field structure (the course will cover approx. 25,000 to 30,000 pages of reading, will include historiographical assignments and a participation mark), but which will be tailored to the individual research focus of each PhD candidate by their prospective supervisor, under the supervision of the department's graduate committee. The comprehensive exam will remain in its current format and, although a stand-alone requirement, will cover the material covered in the specialized reading course. The syllabi and bibliography for each reading course will be submitted to the graduate committee prior to the commencement of the course in order that they can be assessed for appropriate breadth and extent of material. A second instructor will be assigned to the course by the committee or the graduate chair once the course bibliography is approved. We are recommending a single course title, 'PhD Specialized Reading Course' be used as the replacement for the deleted courses.</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

Traditionally, history fields have been organized by national or regional boundaries and by temporal periodization. Such designations are increasingly out of date and no longer reflect either the way in which history is being conceptualized and researched, nor adequately meet the needs of our PhD candidates who are increasingly doing transnational, comparative or thematic topics. Moreover, because we only have one national area with multiple faculty members, the old field designations have limited the number of available faculty in our department who could supervise PhD students. And faculty who, due to their professional reputations, have drawn increasing numbers of PhD candidates but who work in fields other than those previously approved by OCGS have had to shoehorn those students into thematic fields which don't accurately reflect the student's research interests or, at best, are far too broad for their needs.

The replacement of the old, static, and increasingly unworkable major fields by the proposed specialization reading course allows for 1) a PhD course experience that is better tailored to the individual needs of the candidate, 2) better use of our existing faculty resources -- potentially drawing more faculty into PhD primary supervision and spreading the burden of supervision more equally across the department, 3) the ability to mold our offerings according to our faculty complement more creatively and without the long delays associated with seeking OCGS approval of fields, 4) more accurate advertising of our areas of expertise and the potential to attract more, high quality, PhD candidates to our program. 5) no diminishment of our requirements or expectations and more (rather than the existing minimal) departmental oversight of course requirements.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

Sept. 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

We have edited and attached the entire calendar copy to reflect this change and also to represent the new direction of this PhD candidate-centred approach. We have also attached a rough draft of how we would advertise our PhD supervisory expertise on the Dept's website and promotional materials.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Please see attached for complete new calendar copy for the PhD program.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Stephen Heathorn Email: heaths@mcmaster.ca Extension: 24150 Date: 6 Jan. 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.

Ph.D. Degree

The Department supervises doctoral research in a variety of areas of specialization. Prospective applicants are directed to consult the Department's website which details research specializations. Candidates must contact individual faculty for guidance on appropriate thesis topics.

When admission to Ph.D. work has been granted a candidate will, in consultation with his or her prospective supervisor and the Graduate Studies Chair of the Department, select two Minor Fields and one Major Specialization. Minor Fields and Major Specialization will cover the principal literature in the areas of concentration.

Minor fields normally consist of two half-year 700-level graduate reading seminars (offered in the first term) in each of which a major historiographical essay and a written course examination are required. The grade for a minor field will consist of the grades for the in-course requirements, the examination, and the historiographical essay, in combination as indicated by the minor field supervisor.

While some overlap may be deemed beneficial, the Minor Fields should not duplicate Major Specialization reading. All doctoral candidates must have a minimum of three, and usually four, instructors supervising the combination of their Minor Fields and Major Specialization.

Major Specialization preparation begins in January and takes the form of a reading course. The reading for the course will be determined by the course instructors with oversight from the department's Graduate Studies Committee to ensure appropriate breadth and depth of the reading list. As part of the reading course candidates will complete a significant historiographical paper or papers. The Comprehensive Examination, comprised of written and oral components, will be held in the month preceding September 15 of the second year of the program. It will test the candidate's knowledge of the area of concentration and ability to deal with broad historiographic questions.

Successful completion of 6 units of Minor-Field coursework and 6 units of Major Specialization coursework, and the Comprehensive Examination, fulfill the course requirements of the School of Graduate Studies for doctoral candidates. Satisfactory performance in doctoral Minor Field and Major Specialization courses is a minimum grade of B-. A single grade of F on any course in the Ph.D. program, or two B- grades, entails automatic withdrawal from the program. The Comprehensive Examination in History requires a minimum grade of P (Pass) for successful completion.

Following successful completion of their Comprehensive Exam, doctoral candidates will present the supervisory committee with their thesis proposal. This should be about 10 pages in length, and should indicate the scope and structure of the thesis, the theoretical and research perspectives involved, and the principal archival sources to be used (along with brief mention of major secondary sources). The thesis proposal must be approved by the supervisory committee

by early October, so that the candidate has a completed proposal ready for the OGS application deadline (normally mid-October). Length of thesis: 300 pages (75,000 words), exclusive of footnotes and bibliography.

Language requirement for doctoral candidates: competence in English and one other language is the minimum requirement of the Department of History. For candidates working in Canadian, British, or thematic areas, the other language will normally be French, although utility in the candidate's proposed field of research will be the governing consideration. Candidates researching in European History must demonstrate competence in two appropriate languages. Competence in a modern non-English language is deemed to mean the ability to translate standard historical prose with the aid of a dictionary. Specific expectations for translation competency are explained in the Ph.D. regulations which are available on the department website. Written tests are administered by the Department for Ph.D. candidates at intervals throughout the academic year. In particular cases the Supervisory Committee may recommend that a candidate demonstrate proficiency in an additional language or in special methodological skills, such as statistics or advanced cartography, in preparation for her or his research. All such recommendations must be approved by the Graduate Studies Committee. One language requirement for the Ph.D. must be cleared by the time the Comprehensive Examination is completed. Candidates requiring two or more languages should complete the language requirement most relevant to their dissertation topic before completion of their Comprehensive Examination; the other language requirements may be completed while working on the dissertation but must be cleared prior to the dissertation defense.

In certain cases, applicants with a B.A. (Honours) or the equivalent may be admitted directly to Ph.D. studies if their previous academic record shows sufficient promise, including at least an A average. Within one calendar year, the progress of students admitted to Ph.D. studies directly from a bachelor's degree will be reviewed by their supervisory committee and the Graduate Studies Committee. The Graduate Studies Committee will then recommend to the School of Graduate Studies one of the following:

- (a) proceed with Ph.D. studies
- (b) not proceed with Ph.D. studies but re-register as a Master's candidate
- (c) withdraw from the University

The Ph.D. coursework required for candidates admitted directly with a B.A. (Honours) or the equivalent will be 15 units, comprising successful completion of two Minor Fields; completion of the Major Field; and successful completion of History *741 (Historiography).

Our new PhD structure pairs prospective candidates with supervisors based on research interests, thematically defined, rather than through teaching-focused 'fields'. Our program will be advertised on our web page and promotional material using the theme and geographic charts (excel files attached) and with the following breakdown of faculty supervisory interests.

Dept of History Faculty Specific Supervisory Interests

Virginia Aksan

- Ottoman Empire
- Globalization 1750-1850
- Early modern European and Eurasian history
- War and society
- Muslim/Christian encounters pre-modern world
- Cultural transfers & intermediaries east/west
- Violence in early modern Europe and Eurasia
- Comparative empires: Russia/Austria/Ottomans/Chinese/Mughal
- Orientalism
- Crimea War
- Britain & France in the Mediterranean 18th-19th c.

Karen Balcom

- US Women's and Gender
- Canadian Women's and Gender
- Social Policy
- History of Childhood

Juanita De Barros

- Caribbean; British empire (18th to 20th c.)
- African diaspora (18th to 20th c.)
- Social history of health and medicine
- Gender (Caribbean and African diaspora)
- Urban

Nancy Bouchier

- Canadian
 - Social
 - Health & Medicine
 - Sport
 - Environmental
 - Gender
 - Urban

Ken Cruikshank

Canada
U.S. since 1877
Canadian-American Relations
War and Society in Canada
North American:
 Environmental
 Environmental Health
 Urban
 Political
 Political Economy
 Business and Society

Michael Egan

Environmental -- Global/American/Scandinavian
History of sustainability
Chemical history/history of toxicity
Global environmental governance
History of science & technology
20th C. World

Ruth Frager

Canadian
North American (19th & 20th c.)
 Gender
 Human Rights
 Immigration, ethnicity and race
 Labour and Working Class

Michael Gauvreau

Canada & Atlantic world
 Cultural
 Intellectual
 Political
 Religious

Richard Harris (Geography)

20th c. Canadian, US , British and colonial Urban
Social

Martin Horn

European international relations 1870-1945
France 1870-1958
Economic History 1914-45
World Wars

Stephen Heathorn

Britain and its Empire
 Cultural
 Political
 Social
European Gender
Memory
European Political Culture
Urban

Bonny Ibhawoh

Africa
African Diaspora (US, British Caribbean)
Britain (Colonial)
Canada (Comparative Aboriginal)
Human Rights
Law
Imperial/Colonial
Peace and Conflict
Public History
Political/Constitutional
Intellectual
Social Identities
Oral History
Political Science

Bernice Kaczynski

Late Antiquity
Early Middle Ages
Monasticism, from late Antiquity to the present
History of the book, especially medieval manuscript studies
Gender, the body (& health) in the pre-modern world
Religion in the pre-modern world

Tracy McDonald

Russia & Soviet Union
 Culture
 Social

Environmental
Film and Visual Culture
Agrarian
Animal Studies
Violence

Alison McQueen

19th c. France
Visual Culture
Material Culture
Women
Urban

H.V. Nelles

Canadian
Business
Cultural
Economic
Environmental
Political
Social
Urban

Jaeyoon Song

China
East Asian history (post-1600s),
Empire Studies (China)
Chinese intellectual history (Neo-Confucian studies)
War and society in modern East Asia.

Pamela Swett

Modern Germany
Twentieth Century Europe
Consumer Culture
Every-day Life
Political Culture
Gender
Urban

Steve Streeter

20th c. US
US Foreign Relations
Latin America
War and Society
Globalization

Thematic Specializations of History Department Faculty

| Faculty | Global Imperial, Diasporic, Migration | Political, Legal, Rights | Diplomatic, Warfare, Violence | Business, Economic, Labour | Social | Urban | Gender, Women, The Body | Environment Science, Technology | Cultural, Intellectual, Religious | Health, Medicine, Welfare | Visual & Material Culture | Modern* | Medieval, Early Modern |
|------------|---------------------------------------|--------------------------|-------------------------------|----------------------------|--------|-------|-------------------------|---------------------------------|-----------------------------------|---------------------------|---------------------------|---------|------------------------|
| Aksan | X | X | X | | X | | | | X | | | | X |
| Armstrong | | | | | | | | | X | | X | | X |
| Balcom | X | | | | X | | X | | X | X | | X | |
| Bouchier | | | | | X | X | X | X | X | X | | X | |
| Cruikshank | | X | X | X | X | X | X | X | | | | X | |
| DeBarros | X | | | | X | X | X | | | X | | X | |
| Egan | X | | | | | | | X | | X | | X | |
| Frager | X | X | | X | | | X | | | | | X | |
| Gauvreau | | X | | | | | | | X | | | X | |
| Harris | | | | X | X | X | | | | | | X | |
| Heathorn | X | X | X | | X | X | X | | X | | X | X | |
| Horn | | | X | X | | | | | | | | X | |
| Ibhawoh | X | X | X | | X | | | | X | | | X | |
| Kaczinski | | | | | X | | X | | X | X | | | X |
| McDonald | | X | X | | X | | X | X | X | | X | X | |
| McQueen | | | | | | X | | | X | | X | X | |
| Nelles | | X | | X | X | | | X | X | | | X | |
| Song | X | X | X | | | | | | X | | | | X |
| Streeter | X | | X | | | | | | | | | X | |
| Swett | | X | | X | X | X | X | | X | | X | X | |
| Weaver | X | X | | | X | X | | | | X | | X | |

*post c.1900



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|-----------------|--------------------------|--|------------|--------------------------|--------------------------------------|---------------------|-------------------------------------|
| DEPARTMENT | | Health, Aging & Society | | | | | | |
| NAME OF PROGRAM | | Health & Aging | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. (X) | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | <input type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | <input type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | | <input checked="" type="checkbox"/> |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| Degree Requirements | | | | | | | | |
| Students will have two options for completing their M.A. | | | | | | | | |
| A. Course Work and Research Paper Option (one year) | | | | | | | | |
| Students will be required to complete six (6) half courses, including: | | | | | | | | |
| (i) *701/ Social Science Perspectives on Health and Aging and *702/ Research Methods & Design in Studies of Health & Aging | | | | | | | | |
| (ii) Any one of the following courses: *703/ Health & Aging in a Global and International Context; *704/ Systems Services and Policy; *705/ Socio-Cultural Aspects of Health and Aging. | | | | | | | | |
| (iii) Three elective courses offered by Health Aging and Society or by another department or academic unit (provided that permission has been obtained from those departments or academic units). One of the three courses can be taken as an independent study with a faculty member (*706/ Independent Study). Only two of the three elective courses may be taken in a department or academic unit other than Health, Aging and Society. | | | | | | | | |
| (iv) A research paper (7500-8500 words, excluding endnotes and bibliography) supervised by a core or associate faculty member. | | | | | | | | |
| The research paper will be read by the supervisor and another faculty member. (If the supervisor is an associate member, then the second reader must be a core faculty member selected by the supervisor in consultation with the student). | | | | | | | | |
| B. Course Work and Thesis Option (two years) | | | | | | | | |
| Students will be required to complete four (4) half courses, including: | | | | | | | | |
| (i) *701/ Social Science Perspectives on Health and Aging and *702/ Research Methods and Design in Studies of Health and Aging. | | | | | | | | |

(ii) Any one of the following courses: *703/ Health & Aging in a Global and International Context; *704/ Systems Services and Policy; *705/ Socio-Cultural Aspects of Health and Aging.

(iii) One elective course offered by Health, Aging and Society or by another department or academic unit (provided that permission has been obtained from those departments or academic units). This elective course may be taken as an independent study with a faculty member (*706 / Independent Study).

(iv) A thesis that involves original and independent research (20,000-25,000 words excluding endnotes and bibliography) supervised by a core faculty member or an associate member if approved by the graduate committee. The thesis will be orally examined by a committee including the supervisor and two other faculty selected by the thesis supervisor in consultation with the student.

PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (*Attach additional pages if space is not sufficient.*)

please see attached page

RATIONALE FOR THE RECOMMENDED CHANGE:

Previously students were permitted to select between three courses (703, 704, 705) to fulfill the requirements for a third required course. Given that we are currently able to offer 5 courses, we were unable to offer any of the other graduate courses in the calendar. The Department decided to continue to offer 704 (now 703) on an annual basis and to offer 703 and 705 (now 708 and 709 respectively) on an occasional basis, thereby allowing us the opportunity to offer alternative courses. Social Systems, Services and Policy (704 now 703) is a course that several of our faculty are able to teach, whereas 703 and 705 (now 708 and 709) can be covered by only one or two faculty members, who may not be available to teach these courses on an annual basis.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Please see attached page

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Margaret Denton Email: mdenton

Extension: 23923

Date: January 27, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.

DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE COURSE REQUIREMENTS – Health & Aging

Degree Requirements

Students will have two options for completing their M.A.

A. Course Work and Research Paper Option (one year)

Students will be required to complete six (6) half courses, including:

- (i) *701/ Social Science Perspectives on Health and Aging and *702/ Research Methods & Design in Studies of Health & Aging, ***703/ Social Systems, Services and Policy: Critical Perspectives**
- ~~(ii) Any one of the following courses: *703/ Health & Aging in a Global and International Context; *704/ Systems Services and Policy; *705/ Socio-Cultural Aspects of Health and Aging.~~
- (iii) Three elective courses offered by Health Aging and Society or by another department or academic unit (provided that permission has been obtained from those departments or academic units). One of the three courses can be taken as an independent study with a faculty member (*706/ Independent Study). Only two of the three elective courses may be taken in a department or academic unit other than Health, Aging and Society.
- (iv) A research paper (7500-8500 words, excluding endnotes and bibliography) supervised by a core or associate faculty member.

The research paper will be read by the supervisor and another faculty member. (If the supervisor is an associate member, then the second reader must be a core faculty member selected by the supervisor in consultation with the student).

B. Course Work and Thesis Option (two years)

Students will be required to complete four (4) half courses, including:

- (i) *701/ Social Science Perspectives on Health and Aging and *702/ Research Methods and Design in Studies of Health and Aging, ***703/ Social Systems, Services and Policy: Critical Perspectives**
- ~~(ii) Any one of the following courses: *703/ Health & Aging in a Global and International Context; **705/ Socio-Cultural Aspects of Health and Aging.~~
- (iii) One elective course offered by Health, Aging and Society or by another department or academic unit (provided that permission has been obtained from those departments or

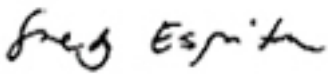
DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE
COURSE REQUIREMENTS – Health & Aging

academic units). This elective course may be taken as an independent study with a faculty member (*706 / Independent Study).

- (iv) A thesis that involves original and independent research (20,000-25,000 words excluding endnotes and bibliography) supervised by a core faculty member or an associate member if approved by the graduate committee. The thesis will be orally examined by a committee including the supervisor and two other faculty selected by the thesis supervisor in consultation with the student.

March 2, 2012

To : Graduate Council

From : 
Medy Espiritu
Assistant Secretary and SynApps System Administrator

Re : Report from the Faculty of Science Graduate Curriculum, Policy, Admissions
and Study Committee

On February 13, 2012, the Faculty of Science Graduate Curriculum, Policy, Admissions and Study Committee approved the following graduate curriculum recommendations.

FOR APPROVAL OF GRADUATE COUNCIL

(Note: Approval of Graduate Council is contingent upon approval of the report by the Faculty of Science, which will meet on March 29, 2012.)

Chemistry

- Ph.D. program – change in calendar description of the comprehensive examination procedure

Computational Engineering and Science

- Ph.D. and M.Sc. – changes to the program requirements

Medical Physics and Applied Radiation Sciences

- Change in course requirements

- M.Sc. Radiation Sciences (Medical Physics)
- M.Sc. Radiation Sciences (Radiation Biology)
- M.Sc. Health and Radiation Physics

Psychology

- Ph.D. program – change in admission requirements

FOR INFORMATION OF GRADUATE COUNCIL

Chemistry

#734 – Applications of Mass Spectrometry – course cancellation

#737 – Mass Spectrometry Theory – change in course title

#740 – Basic Theory of NMR – change in course title

#741 – Two Dimensional NMR Spectroscopy – course cancellation

Geography and Earth Sciences

*6CC3 – Environmental Reconstruction Using Stable Isotopes – new course (undergraduate course for graduate credit)

*6EA3 – Environmental Assessment – new course (undergraduate course for graduate credit)

Kinesiology

*706 – Cardiac Rehabilitation – course cancellation

*710 – Exercise and Skeletal Development: A Lifespan Perspective – course cancellation

Mathematics

New courses (undergraduate courses for graduate credit):

*6FM3 – Financial Markets and Derivatives

*6FT3 – Topics in Differential Equations

*6MB3 – Mathematical Biology

Course cancellations:

*6G03 – Dynamical Systems

*6K03 – Mathematics of Finance

Statistics

*6U03 – Nonparametric Methods in Statistics – course cancellation

Medical Physics and Applied Radiation Sciences

*6U03 – Radiation Biology – course cancellation

Physics and Astronomy

Change in course description:

#715 – Mathematical Introduction to Fluid Mechanics

#716 – Incompressible Computational Fluid Dynamics



**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

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1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|-----------------|--------------------------------|--|---|-------------------------------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | Chemistry and Chemical Biology | | | | | | |
| NAME OF PROGRAM | | Chemistry | | | | | | |
| PROGRAM DEGREE | Ph.D. (X) | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. () | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | <input type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | <input checked="" type="checkbox"/> | CHANGE IN COURSE REQUIREMENTS | | |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | <input checked="" type="checkbox"/> | EXPLAIN: Some text clarifying what is required from students as part of their comprehensive examination has been inserted into the calendar copy. | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>The new text is as follows:</p> <p>All Ph.D. candidates must pass a Comprehensive Examination, taken within the first 20 months after beginning Ph.D. work, that tests breadth of knowledge within the student's major field of study. The Comprehensive Examination will require the submission of a document that provides a review of a relevant, current field of research, along with an original proposal for research. The defence will consist of a brief presentation, followed by an oral examination.</p> <p>The original text was:</p> <p>All Ph.D. candidates must pass a Comprehensive Examination that tests breadth of knowledge within the studentcs major field of study.</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

Clarification of the process

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

Sept., 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

See above

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Alex Adronov Email: adronov@mcmaster.ca Extension: 23514 Date: Feb. 6, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|-------------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | | | | | | | |
| NAME OF PROGRAM | | School of Computational Engineering and Science | | | | | | |
| PROGRAM DEGREE | Ph.D. (X) | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (X) | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | X |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: Changes to the program requirements (Section 10 of the Graduate Calendar, page 216) | | | | | |
| OTHER CHANGES | | EXPLAIN: New names of the program and the degrees offered will be proposed separately. | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Thesis-based Master's: 4 courses [two of the four half courses have to be chosen from the three core courses offered by the School; the remaining two half courses are normally chosen from the list of the courses approved by the School. One of the courses may be at the 600 level where appropriate]</p> <p>- Course-and-project Master's: 6 courses [of the six half courses, three must be the core courses, at least two modules (=one half course) must be chosen from the Parallel Programming modules, and at least two modules (=one half course) must be chosen from the Computational Techniques modules; the remaining half course may be chosen from those listed by the School, in consultation with the project supervisor; up to two half-courses may be at the 600 level].</p> <p>- Coursework-only Master's: 8 courses [of the eight courses, three must be the core courses, at least two modules (=one half course) must be chosen from the Parallel Programming modules, and at least two modules (=one half course) must be chosen from the Computational Techniques modules; the remaining courses may be chosen from any of those listed by the School, in consultation with the Director; up to two of the half courses may be at the 600 level.]</p> <p>- Ph.D.: 4 courses [at least three of which must be at the 700 level]</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>- Thesis-based Master's: 4 courses (2 core + 2 elective) [unchanged]</p> <p>- Course-and-project Master's: 6 courses (3 core with no further constraints + 3 elective) [number of courses is unchanged, but fewer constraints on their choice]</p> <p>- Coursework-only Master's: 8 courses (4 core with no further constraints + 4 elective) [number of courses is unchanged, but fewer constraints on their choice]</p> <p>- Ph.D. (students with CES-equivalent Master's degree): 2 courses, both at 700 level [down from 4 courses];</p> <p>- Ph.D. (students with only a Bachelor's degree): 6 courses, with 5 at the 700 level</p> <p>- Ph.D. (students with a previous Masters degree who are transferring from the Masters program): 4 courses, all at the 700 level</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

Since its inception the Program has significantly evolved and is now reaching out to faculty in disciplines, such as life sciences, which previously did not have a strong participation. In view of the School's transfer to the Faculty of Science planned for the next academic years, we feel it is important to align the coursework requirements for the different degrees offered with the typical requirements in other graduate programs in Science. Initially conceived with strong Engineering participation, the CES program has coursework requirements typical for engineering disciplines with a relatively large number of courses and significant constraints on their choice. It is recognized that such program requirements were on several occasions perceived as a disincentive by well-qualified candidates.

As regards the proposed reduction of the number of courses required in the Ph.D. Program, it has been our experience with incoming students in this Program that they already possess sufficient background, and a requirement of 4 courses is in fact an impediment to the early acquisition of skills in the research environment.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 1, 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

The proposed changes are related to the transfer of the Program to the Faculty of Science (effective July 1, 2012). Proposals for the new name of the Program and new names of the degrees offered will be submitted separately.

Some clarifications of the procedures of the Comprehensive Exam are included in the text for the Graduate Calendar (see Appendix A).

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

See attached Appendix A

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Bartosz Protas Email: bprotas@mcmaster.ca Extension: 24116 Date: February 8, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

1. This form must be completed for **ALL** changes involving degree program requirements/procedures. **All** sections of this form **must** be completed.
2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|-----------------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | Medical Physics and Applied Radiation Sciences | | | | | | |
| NAME OF PROGRAM | | Radiation Sciences (Medical Physics) | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (X) | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | X |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Students entering the program are required to take Medical Physics 6U03. This course covers Radiation Biology and is a core topic in the program. Students who have taken Medical Physics 4U03 during their undergraduate career are not required to repeat this course.</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>Students will be required to take Medical Physics 773 to satisfy the Radiation Biology content of the program rather than Medical Physics *6U03. The program change will consist of replacing Medical Physics 6U03 with Medical Physics *773. For the next one or two years there will still be students who have taken Medical Physics 4U03, and they will not be required to take Medical Physics 773.</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

Recent changes to the undergraduate program have changed Medical Physics *4U03/*6U03 to Medical Physics *4U03. Since Medical Physics *773 covers the same material as the Medical Physics *6U03 but is delivered at a higher level it is more appropriate that graduate students take the 700 level course that the 600 level course. This also allows Medical Physics *4U03 to be delivered exclusively as an upper level undergraduate course and may appeal to a wider group of students..

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

The M.Sc. in Radiation Sciences (Medical Physics) requires that a candidate complete satisfactorily the courses Medical Physics *775, Medical Physics *773 and one other half course at the 700-level. Students who have not satisfactorily completed Medical Physics *6R03 must also complete this course satisfactorily. Candidates for this M.Sc. are also required to present and defend a thesis, which shall embody the results of original research.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Tom Farrell

Email: tom.farrell@jcc.hhsc.ca

Extension: 67014

Date: Jan 6, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

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2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|-----------------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | Medical Physics and Applied Radiation Sciences | | | | | | |
| NAME OF PROGRAM | | Radiation Sciences (Radiation Biology) | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (X) | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | X |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Students entering the program are required to take Medical Physics 6U03. This course covers Radiation Biology and is a core topic in the program. Students who have taken Medical Physics 4U03 during their undergraduate career are not required to repeat this course.</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>Students will be required to take Medical Physics 773 to satisfy the Radiation Biology content of the program rather than Medical Physics *6U03. The program change will consist of replacing Medical Physics 6U03 with Medical Physics *773. For the next one or two years there will still be students who have taken Medical Physics 4U03/6U03, and they will not be required to take Medical Physics 773.</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

Recent changes to the undergraduate program have changed Medical Physics *4U03/*6U03 to Medical Physics *4U03. Since Medical Physics *773 covers the same material as the Medical Physics *6U03 but is delivered at a higher level it is more appropriate that graduate students take the 700 level course that the 600 level course. This also allows Medical Physics *4U03 to be delivered exclusively as an upper level undergraduate course and may appeal to a wider group of students..

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

The M.Sc. in Radiation Sciences (Radiation Biology) requires that a candidate complete satisfactorily the course Medical Physics *773, and one other half course at the 700 level with can be either Medical Physics *779 or Medical Physics *780. Students who have not satisfactorily completed Medical Physics *6B03 must also complete this course satisfactorily. Candidates for this M.Sc. are also required to present and defend a thesis, which shall embody the results of original research.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Tom Farrell

Email: tom.farrell@jcc.hhsc.ca

Extension: 67014

Date: Jan 6, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

PLEASE READ THE FOLLOWING NOTES BEFORE COMPLETING THIS FORM:

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2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|--|-----------------|--|--|------------|-------------|--------------------------------------|---------------------|-----------------|
| DEPARTMENT | | Medical Physics and Applied Radiation Sciences | | | | | | |
| NAME OF PROGRAM | | Health and Radiation Physics | | | | | | |
| PROGRAM DEGREE | Ph.D. () | M.A. () | M.A.Sc. () | M.B.A. () | M. Eng. () | M.Sc. (X) | Diploma Program () | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | X |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | EXPLAIN: | | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: | | | | | | | | |
| <p>Students entering the program are required to take Medical Physics 6U03. This course covers Radiation Biology and is a core topic in the program. Students who have taken Medical Physics 4U03 during their undergraduate career are not required to repeat this course.</p> | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) | | | | | | | | |
| <p>Students will be required to take Medical Physics 773 to satisfy the Radiation Biology content of the program rather than Medical Physics *6U03. The program change will consist of replacing Medical Physics 6U03 with Medical Physics *773. For the next one or two years there will still be students who have taken Medical Physics 4U03/6U03, and they will not be required to take Medical Physics 773.</p> | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

Recent changes to the undergraduate program have changed Medical Physics *4U03/*6U03 to Medical Physics *4U03. Since Medical Physics *773 covers the same material as the Medical Physics *6U03 but is delivered at a higher level it is more appropriate that graduate students take the 700 level course that the 600 level course. This also allows Medical Physics *4U03 to be delivered exclusively as an upper level undergraduate course and may appeal to a wider group of students..

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

September 2012

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

No

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Complete satisfactorily the courses: Medical Physics *772, Medical Physics *773, Medical Physics *775, and Medical Physics *776. Students must complete satisfactorily one additional *700-level course from the following list: Medical Physics *770, Medical Physics *771 or Medical Physics *778. Students who have not satisfactorily completed Medical Physics *6R03 must also complete this course satisfactorily.

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Tom Farrell Email: tom.farrell@jcc.hhsc.ca Extension: 67014 Date: Jan 6, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



SCHOOL OF GRADUATE STUDIES

**RECOMMENDATION FOR CHANGE IN GRADUATE CURRICULUM
- FOR CHANGE(S) INVOLVING DEGREE PROGRAM REQUIREMENTS /
PROCEDURES**

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2. An electronic version of this form must be emailed to the Assistant Secretary and SynApps System Administrator (Email: *espiritu@mcmaster.ca*).
3. A representative from the department is required to attend the Faculty Curriculum and Policy Committee meeting during which this recommendation for change in graduate curriculum will be discussed.

| | | | | | | | | |
|---|---|--|--|-------------------------------------|--------------------------------------|--------------------------------------|--|-----------------|
| DEPARTMENT | | Psychology, Neuroscience & Behaviour | | | | | | |
| NAME OF PROGRAM | | Psychology, Neuroscience & Behaviour | | | | | | |
| PROGRAM DEGREE | Ph.D. (<input checked="" type="checkbox"/>) | M.A. (<input type="checkbox"/>) | M.A.Sc. (<input type="checkbox"/>) | M.B.A. (<input type="checkbox"/>) | M. Eng. (<input type="checkbox"/>) | M.Sc. (<input type="checkbox"/>) | Diploma Program (<input type="checkbox"/>) | Other (Specify) |
| NATURE OF RECOMMENDATION (PLEASE CHECK APPROPRIATE BOX) | | | | | | | | |
| CHANGE IN ADMISSION REQUIREMENTS | | <input checked="" type="checkbox"/> | CHANGE IN COMPREHENSIVE EXAMINATION PROCEDURE | | | CHANGE IN COURSE REQUIREMENTS | | |
| CHANGE IN THE DESCRIPTION OF A SECTION IN THE GRADUATE CALENDAR | | | EXPLAIN: | | | | | |
| OTHER CHANGES | <input checked="" type="checkbox"/> | EXPLAIN: Simply delete the sentence in the Graduate Calendar (currently page 553) that states that "Applicants are required to submit the results of the Graduate Record Examination (verbal and quantitative)." | | | | | | |
| DESCRIBE THE <u>EXISTING</u> REQUIREMENT/PROCEDURE: Students are required to submit the results of the GRE exam (verbal and quantitative) with their application to the program. | | | | | | | | |
| PROVIDE A DETAILED DESCRIPTION OF THE RECOMMENDED CHANGE (Attach additional pages if space is not sufficient.) Eliminate the requirement that applicants to our graduate program are required to submit the results of the Graduate Record Examination (verbal and quantitative). | | | | | | | | |

RATIONALE FOR THE RECOMMENDED CHANGE:

For many years we have required applicants to submit results from the GRE with their application. However, over the past several years a significant number of our faculty (principally those in more biologically oriented areas of psychology) have found that the number of qualified applicants has been dropping steadily. They have noted that they are competing for applicants with many other programs that do not have a GRE requirement, and have indeed first-hand knowledge of having lost potentially good applicants to those programs, at least in part because of the GRE requirement. Although some of our faculty continue to believe that the GRE offers useful information about applicants, all of our faculty felt that retaining it as a firm requirement of all applicants is untenable given the harm it is doing to some research programs.

PROVIDE IMPLEMENTATION DATE: (*Implementation date should be at the beginning of the academic year*)

Beginning of the academic year, 2012-13

ARE THERE ANY OTHER DETAILS OF THE RECOMMENDED CHANGE THAT THE CURRICULUM AND POLICY COMMITTEE SHOULD BE AWARE OF? IF YES, EXPLAIN.

PROVIDE A DESCRIPTION OF THE RECOMMENDED CHANGE TO BE INCLUDED IN THE CALENDAR:

Simply delete the sentence in the Graduate Calendar (currently page 553) that states that "Applicants are required to submit the results of the Graduate Record Examination (verbal and quantitative).

CONTACT INFORMATION FOR THE RECOMMENDED CHANGE:

Name: Bruce Milliken Email: millike@mcmaster.ca Extension: x24361 Date: January 20, 2012

If you have any questions regarding this form, please contact Medy Espiritu, Assistant Secretary and SynApps System Administrator, School of Graduate Studies, extension 24204.



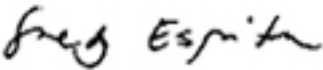
School of Graduate Studies

1280 Main Street West
Hamilton, Ontario, Canada
L8S 4L8

Phone 905.525.9140
Ext. 23679
<http://graduate.mcmaster.ca>

March 23, 2012

To : Graduate Council

From : 
Medy Espiritu
Assistant Secretary and SynApps System Administrator

At the meeting of the Faculty of Science Graduate Curriculum, Policy, Admissions and Study Committee on March 22, 2012, the following proposals were approved:

- 1) Collaborative Program (M.Sc. and Ph.D.) in Astrobiology
- 2) Name change for the School of Computational Engineering and Science

These items are now forwarded to Graduate Council for approval.

Please note that Graduate Council approval is contingent upon approval of the documents by the Faculty of Science which will meet on March 29, 2012.

McMASTER UNIVERSITY
GRADUATE PROGRAM PROPOSAL BRIEF
FOR THE PROGRAM
THE MSC AND PHD IN COLLABORATIVE PROGRAM IN
ASTROBIOLOGY

Date: March 15, 2012

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PROGRAM PROPOSAL BRIEF GUIDE

1. PROGRAM

1.1 Discuss the consistency of the program with the University's mission and academic goals.

Are we alone in the cosmos? This is one of the deepest and most enduring questions in human experience. While generations of thinkers have struggled in trying to answer this question, the frontiers in late 20th and early 21st century science have advanced to the point that this question now drives an enormous scientific effort. The search for life beyond Earth, which is one goal of the emerging new science of astrobiology, is intrinsically interdisciplinary.

Astrobiology is rooted in three major scientific revolutions that have, over the last 25 years, lead to the explosive growth of this field. First, astronomers discovered the first planet around another star (*i.e.*, an extrasolar planet, or 'exoplanet') in 1995. Since that time, over 700 exoplanets are now known and more than 1200 new candidates have been found by the Kepler observatory. While most of these are gas-giant planets like our own Jupiter and inhospitable to life, an entirely new class of planets known as SuperEarths – rocky planets from a few to ten-times the mass of our Earth – has been detected. Of fundamental significance to Astrobiology is the discovery of Kepler 22b, an Earth-like planet approximately 2.4 times the radius of the Earth, discovered recently by the Kepler mission to be orbiting in the 'habitable zone' (*i.e.*, region in which water is liquid on a planet surface) around its host, Sun-like star, which is not too distant from our own Sun (600 light years). Second, microbiologists have, since the mid-1980s, uncovered an entirely new domain of life (as well as other groups) containing organisms known as extremophiles, which can exist on the Earth in conditions that are as extreme as we are likely to find on other planets in our solar system and on exoplanets. This discovery suggests that life may have developed even on planets such as Mars. Third, space and planetary scientists have launched the exploration of planets and moons in our own solar system. The enormous effort to land robotic vehicles on Mars is driven mainly by the questions of whether water exists or existed on that planet and whether we can find 'biosignatures' for life on that planet. The latest in the series of Mars rovers – the Mars Science Laboratory aboard the rover known as Curiosity was launched recently (2011 November). It is a well-equipped, robust, car-sized vehicle, that will collect many rock and soil samples over a large area (12 miles in radius) to ascertain the habitability of Mars for present or early microbial life. Another important scientific advance related to astrobiology is in the area of the prebiotic chemistry, wherein researchers test hypotheses about how the first cells and earliest genetic code arose. This research area is related to the new, practical realm of synthetic biology, which is a top-down approach to create 'minimum' cells that perform specific functions. All of these subjects currently are 'hot' areas of research that combine a wide range of science, all made possible by several major technological breakthroughs.

Astrobiology, including the related research area 'the origins of life,' therefore is an intrinsically interdisciplinary, or perhaps more appropriately 'transdisciplinary,' science. Researchers must possess expertise in specific fields such as astrophysics, planetary science, microbiology, *etc.* but also must possess the training that allows them to work effectively within multidisciplinary teams. The Origins Institute (OI) at McMaster University already has established an excellent research and education environment in astrobiology

that dates to 2005, with its first international conference-workshop, "Astrobiology and the Origins of Life." Most OI members who are interested in astrobiology already have close contact with one another, through collaboration in research and education. Faculty listed in this proposal as either core or adjunct members stem from 5 different departments in the Faculty of Science as well as the Faculty of Health Sciences at McMaster University. This group has considerable experience in teaching astrobiology at the undergraduate level.

The OI now proposes to create and establish a collaborative program in astrobiology. This is a natural step in the growth of astrobiology at OI. The OI already is an important partner in a NSERC-funded CREATE program (2009-2015), "The Canadian Astrobiology Training Program," with the intent to train 70 HQP (postdoctoral researchers and graduate students) in this field. Creating a permanent collaborative program at this time is an obvious and important extension of research activity in astrobiology at the OI. The proposed collaborative program will allow McMaster University and the Province of Ontario to tap into the ever-increasing interest from potential graduate students in this field. It will be the first of its kind in Canada.

Researchers must possess expertise in specific fields such as astrophysics, planetary science, microbiology, *etc.* but also must possess the training that allows them to work effectively within multidisciplinary teams.

The Collaborative Program in Astrobiology will involve 5 participating graduate programs at McMaster University. These are (in alphabetical order):

Department of Biochemistry and Biomedical Sciences, Faculty of Health Sciences
Department of Biology, Faculty of Science
Department of Chemistry and Chemical Biology, Faculty of Science
Department of Physics and Astronomy, Faculty of Science
School of Geography and Earth Sciences, Faculty of Science

Students entering the Collaborative Program (at either the Master or PhD level) must complete requirements for the appropriate graduate degree in their 'home' department or school. Required courses will be defined according to prescriptions for each home program. Additionally, students will be required to take the one-term Survey of Astrobiology course and participate in the bi-monthly Astrobiology Journal Club. Doctoral students choose courses from the ASTROBIOLOGY COURSE LIST (equivalent to one, one-term course from outside their research area). Comprehensive examinations will take place according to prescriptions for each home program, with slight extensions to assess Astrobiology knowledge and skill of the candidates.

1.1.1 The need for such a program in Ontario

Several universities in the province of Ontario have invested in areas related to Astrobiology through support for faculty positions. The major institutions involved include McMaster University, the University of Toronto, and the University of Western Ontario. Faculty in these institutions train students in aspects of Astrobiology (*e.g.*, geochemistry, microbiology, astrophysics related to exoplanets, planetary science, *etc.*), but without the benefit of a larger graduate program in Astrobiology. In addition, Ontario has made substantial investments in the development of technologies related to the space program and space exploration. Advances in

these applied fields also require the involvement of highly trained, interdisciplinary scientists who can chart the overall direction for the most fruitful kinds of research and technology development. Astrobiology is a natural scientific background for such efforts. Unfortunately, there has been no formal graduate training program in Astrobiology in Ontario or, indeed, in Canada. This forces Canadian students interested in this field to leave for graduate work, typically to the U.S.A. At the OI, we have already seen a steady flow of students make inquiries who then apply to the U.S.A. in the absence of a formal graduate program here.

To give the broader international context for the proposed graduate training in Astrobiology in Ontario, we note that, in the U.S.A., the National Aeronautic and Space Administration (NASA) hosts the National Astrobiology Institute (NAI) which plays a co-ordinating role for research centres across that nation (14 of them – including the NASA Ames Research Centre as well as the Goddard Research Centre). A number of universities in the U.S.A. have developed graduate programs. The two leaders, University of Washington (Seattle) and Penn State, have well established collaborative-style programs that graduate roughly 5 Ph.D.s per year. Other universities that have started programs include University of Arizona, Montana State University, and Arizona State University. Harvard University has an “Origins of Life Initiative” that focuses more specifically on understanding the biochemical aspects of the origins of life, but that also involves the search for life on exoplanets. Europe has also invested significantly in this field of research through satellites launched by the European Space Agency. Finally, Australia is developing several graduate training programs, including one at the University of New South Wales.

A collaborative program here at McMaster University will attract both students in Ontario, as well as across Canada. Given the highly international nature of the field (*e.g.*, collaborations between American and Canadian researchers are very common), we expect to be able to draw international students here as well – eventually reversing the Canadian “brain drain” in this subject. Our program will help put Ontario on the international map in this field.

We have designed our program to capitalize on the experience of the two leading graduate programs in the U.S.A. – at the University of Washington as well as at Penn State. Both of these programs use a ‘collaborative’ type of framework in which the students are enrolled in a home department for their primary degree and offer ‘certificates’ in Astrobiology.

1.2 Discuss the clarity and appropriateness of the program’s requirements and associated learning outcomes in meeting the University’s Graduate Degree Level Expectations (GDLEs) – Appendix A.

1.2.1: Depth and Breadth of Knowledge: The program is designed to provide the student with a deep training in their field through their home department and also the opportunity to acquire the skills and knowledge to conduct interdisciplinary research. Astrobiology is one of the broadest intellectual disciplines in science and its most successful practitioners are those who bring their discipline’s techniques to tackle these broader problems. Thus, the depth in the student’s training will typically arise from the skills that they receive in their home departments, while the breadth comes from their application to Astrobiological research problems. Students will learn a variety of techniques from outside of their home field in the collaborative element of the program and will benefit from taking courses outside of their home department. We also emphasize that the Origins Institute – through its involvement in an NSERC CREATE program (“Canadian Astrobiology Training Program” – CATP) and international collaborators (*e.g.*, Chris McKay – NASA Ames Research Centre, David Deamer – U.C. Santa Cruz) provides a

competitive, international framework for student training. It provides intellectual contact with research centres beyond Ontario and Canada.

1.2.2: Research and Scholarship: This program will provide a far more varied experience in research and scholarship than found in a traditional degree from students' home departments. The training will complement the knowledge that students gain from their home departments in several important respects. Interdisciplinary research requires a very special environment to be successful – involving joint seminars, course work, presentations to a wide scientific audience, and the development of communication skills that emphasize the essence of problems rather than the heavy use of jargon. Interactions with faculty and visiting speakers that go beyond that found in the home department are another feature of the program. Our collaborative program will train students in how to use their discipline-based training to define and advance research in Astrobiology. Through the presentations that they will make to their peers in Journal Club and their Astrobiology courses, students will learn to communicate their ideas and results. They will learn how to design research programs that allow them to take their specific skills and target Astrobiology problems that can be advanced through the application. Most importantly, students will be taught to think about the 'Big Questions' and to adopt an approach wherein their science is driven by an informed, deep, and broad scholarly knowledge of the field.

1.2.3 Level of Application of Knowledge: Students will be prepared and expected to use their skills to a wide framework of questions and problems. Astrobiology is a topic that requires that students be able to apply their problem solving skills to topics that are often significantly beyond the 'comfort zone' of their immediate home field. Students will be trained to apply their skills to work in various NASA or Canadian Space Agency (CSA) supported labs, robotics and remote sensing industries, academia, as well as in various kinds of field work in the extreme places in Canada and elsewhere on Earth. It is not that the students will have detailed expert knowledge of all of these fields but, rather, that they will be trained to identify who and what is needed and brought to bear in the solution of pure and applied scientific problems that constantly arise in the subject.

1.2.4 Professional Capacity/Autonomy: Graduates of our Astrobiology program will find employment in a wide variety of fields, many of which lie outside the academies. Science in the 21st century has been characterized as emphasizing complexity and interdisciplinary thinking and problem solving – this describes Astrobiology perfectly. Students will be typically working in situations where several distinct areas of science need to be engaged and understood within a project. As an example, microbiologists would need to know about biochemistry and applications of their searches for identifying 'biosignatures of life' to assist in designing better robotic exploration rovers on Mars or in extreme environments here on Earth (*e.g.*, deep subsurface, deep oceans, *etc.*). Astrophysicists, in their search for habitable planets around other stars (now identified by the Kepler observatory), will need to understand the origin and types of biogenic gases in planetary atmospheres, to assess whether planets support life. Biochemists working on the origins of life on the early Earth may need to use elaborate computer programs to model early cells and membranes – to help them locate the conditions under which life began. Thus, students will be taught to understand how the broad interdisciplinary problems that dominate the field can be broken down to the use of specific disciplines and techniques to find solutions. These kinds of thinking skills will be of broad importance in industry and finance, as these areas require disciplined but broad thinkers.

1.2.5 Level of Communication Skills: Interdisciplinary science depends upon communication between scientists who are not typically collaborators. The ability to express important concepts in one's own home field and convey them in a meaningful way to people outside of it needs to be

carefully built up. Our collaborative program will focus quite strongly on ensuring that these skills are developed. Our vehicles for this include participation in our Astrobiology Journal Club, which features student presentations to their peers and faculty across the program, meetings and discussions with visiting astrobiologists for OI colloquia, coffee with our visiting Astrobiologists, presentations in Astrobiology classes (particularly in the Survey course), and joint supervision of students by members across our program, *etc.* As the numbers of our students grows, there will be ever more opportunity made for students to exchange ideas.

1.2.6 Awareness of Limits of Knowledge: There are two important aspects of Astrobiological training that students need to become aware of during their work and development. The first is that, in order to make progress, one must possess an excellent set of skills in one's field. Having students exposed to interdisciplinary ideas without simultaneously training them deeply in some relevant area may leave them without the ability to accomplish and solve concrete problems. The second is that many areas of Astrobiology are fascinating. One could spend one's life absorbing different areas. The point here is that Astrobiology progress often involves the ability to collaborate with groups that can be quite diverse in their intellectual make-up. Students need to learn how to strike up effective collaborations that bring in the combination of expertise that can lead to novel problem solutions. A collaborative graduate program such as that outlined here is constructed to address these issues. By design, students must learn to operate outside of their home fields and work with other faculty and students outside of their comfort zones. At the same time, their deep training in a home field will provide them the confidence of how to proceed and to obtain concrete research results.

1.3 Appropriateness of degree nomenclature: The degree conferred upon our students will have designation of their home department, with an added specialization in the area of "Astrobiology". This nomenclature properly describes that fact the student can function in a professional way in the field designated by their home department's degree - but that it also emphasizes their breadth and their ability to work as practicing Astrobiologists.

2. ADMISSION REQUIREMENTS

2.1 Discuss the appropriateness of the program's admission requirements for the learning outcomes established for completion of the program.

This program will be offered on a full-time basis. Part-time enrolment will be possible only in exceptional circumstances.

Prospective graduate students will apply directly to the home graduate program of their choice in any of the five participating programs. In addition, applicants must also provide a written, one-page statement regarding the interest of the student in astrobiology and the kinds of areas that they would be interested in pursuing. The home department will conduct its standard review process for acceptance into the home program. The home department will also forward the files to the Astrobiology Program Committee for review. Approval for entry into the home department will be made by that department, while entry into the collaborative program will be given by OI's Astrobiology Program Committee once the home department entry has been established. It is critical that files move between the department and collaborative program administration in an effective manner so that both the collaborative program director and the home department can act effectively, and in concert, to identify and recruit excellent collaborative program applicants.

If the home program changes their admissions requirements for either the Masters or Doctoral programs, the admissions requirements below will not change for entry into the Collaborative Program.

Admission Requirements for Master's Degree (summary)

- Honours bachelor's degree with at least a B+ average (equivalent to a McMaster 8.5 GPA out of 12) in the final year in all courses in the relevant discipline
- all students should have a minimum of 3 units in EACH of the following disciplines: Biology, Mathematics, Chemistry, and Physics; students also should have a minimum of 3 units in ONE of the following subjects: Biochemistry, Astronomy, or Geology
- one- to two-page written statement of interest in the Collaborative Program

Students from other Honours programs will be evaluated to determine if they meet one among the sets of requirements listed above. Students who do not meet one of the sets may be accepted conditional upon completion of the necessary undergraduate courses.

International applicants whose native language is not English will be required to submit an official statement of English language test results.

Admission Requirements for Ph.D. Degree (summary)

- Successful completion of a M.Sc. Degree or equivalent in Astronomy, Biochemistry, Biology, Geology, or other astrobiologically related field of study.
- One to two page written statement of interest in the Collaborative Program

Students lacking a M.Sc. Degree must have the same background in astrobiology as entering Master's students.

Students showing outstanding potential and high academic standing may be accepted directly to the Ph.D. program or may transfer to the Ph.D. program without completing the M.Sc. degree after finishing a minimum of 12 months in the M.Sc. program, satisfying requirements. Transfer requires a written report and oral presentation of the report describing the M.Sc. Research. The oral report will be presented to a committee of 3 faculty members appointed by the Associate Director for the OI.

2.2 Describe alternative requirements, if any, for admission into the program, such as minimum grade point average, additional languages or portfolios, along with how the program recognizes prior work or learning experiences.

None

3. STRUCTURE

3.1 Discuss appropriateness of the administrative, governance, and communication processes proposed in support of the program.

The collaborative program will be administrated by an Associate Director who will be appointed by the Dean of the Faculty of Science in consultation with the OI Director. The Associate

Director will be responsible for composing the Astrobiology Program Committee. This Committee will be comprised on one member from each of the participating departments.

The scheduling of committee meetings, comprehensive exams, *etc.*, will take place according to usual practice for a student in the home department. We encourage co-supervision of students, where this is practical and natural, among members of the collaborative graduate program.

The thesis defense will be carried out in the manner conducted by the home department. The examination committee will consist of at least one other member of the collaborative program beyond the supervising professor and the home department. External examiners for collaborative program theses usually will be experts in the candidate's home program as well as astrobiological research.

This is an inter-faculty and inter-departmental-and-school collaborative program. Involvement among the many participating Departments is evident in the included faculty members and courses.

We estimate that, eventually (after the first or second year of operation), a ¼ FTE position will be needed to provide the necessary administrative support for this program. This position would support the administration of the collaborative program in all aspects of recruitment, coordinating student programs and courses with the Associate Chairs or Graduate Secretaries of the students' home departments, scheduling collaborative program graduate courses, ensuring that supervisory committee meetings take place, *etc.* The person in this position also will be a natural resource for collaborative program students. It is very important to establish a collegial and stimulating atmosphere for the students in the collaborative program so that they interact and work as an extended family beyond that of their home departments. This sense of cohesion is necessary to develop interdisciplinary training, and a collaborative program coordinator will be absolutely necessary for this.

Enrolment and Graduation

The collaborative program would be new, so no students currently are enrolled. However, three students who enrolled in home programs in autumn 2011 at McMaster University, including two through the Canadian Astrobiology Training Program, already are conducting astrobiology related research and could be 'grandparented' into enrolment if this were permissible.

Additionally, the Joseph & Joanne Lee Scholarship (see Section 8.2) will assist the OI in attracting, recruiting, and selecting candidates for the Collaborative Program in Astrobiology, starting in the 2012-2013 academic year.

Projected Graduate Intake and Enrolments

Astrobiology is a highly desired graduate degree, and, during the initial stages of the collaborative program, we anticipate enrolment from 4 M.Sc. students and 8 Ph.D. students per year. The collaborative program will be able to accommodate these projected enrolments; however, we anticipate that it will take 3 years to achieve these levels.

Projected Intake and Enrolment in Full-time Master's and Doctoral Programs

| Year | Intake | | Enrolment | |
|-----------|--------|-------|-----------|-------|
| | M.Sc. | Ph.D. | M.Sc. | Ph.D. |
| 2012-2013 | 2 | 4 | 2 | 4 |
| 2013-2014 | 2 | 6 | 4 | 10 |
| 2014-2015 | 4 | 6 | 6 | 16 |
| 2015-2016 | 4 | 6 | 8 | 22 |
| 2016-2017 | 4 | 8 | 8 | 26 |

3.2 Discuss appropriateness of the program's structure and regulations to meet specified program learning outcomes and Degree Level Expectations.

We propose the following structure for the Collaborative Program. All students will take the Survey course in Astrobiology as noted. The course described in the Astrobiology Course list cover the broad range of themes that comprise Astrobiology. The courses are already being taught by the home departments, so that our program taps into a well established reservoir of experience.

Progress Through the Collaborative Program in Astrobiology

| Level | Expected Progress |
|--------------|---|
| M.Sc. Year 1 | <i>Survey of Astrobiology (Origins 701)</i> course - Term 1, participation in Astrobiology Journal Club, research |
| M.Sc. Year 2 | participation in <i>Astrobiology Journal Club (Origins 705)</i> , research, defense |
| PhD Year 1 | Equivalent of a 1/2 course (or two 1/4 courses) from the ASTROBIOLOGY COURSE LIST (see Appendix 11.1), participation in Astrobiology Journal Club, Research |
| PhD Year 2 | participation in Astrobiology Journal Club, research, comprehensive |
| PhD Year 3 | participation in Astrobiology Journal Club, research |
| PhD Year 4 | participation in Astrobiology Journal Club, research, defense |

3.3 Provide a clear rationale for program length that ensures that the program requirements can be reasonably completed within the proposed time period.

The program is structured to fit in with the length of grad programs of individual home departments very well. The requirements of the collaborative component of the program are not onerous. While the number of courses taken by students varies quite markedly from department

to department, we have worked with the home departments and our instructors, and have found that the program will not unduly tax the graduate students. With the permission of the graduate advisory committees in each department, the program courses (the survey and courses on Astrobiology course list) could be taken as part of the normal course requirements in any home program. Ongoing participation in the Journal Club is an “extra” course in some sense, but with a one hour format, typically scheduled at lunch time, this course too should not bog down the progress of students through the program.

4. PROGRAM CONTENT

4.1 Outline ways in which the curriculum addresses the current state of the discipline or area of study.

Astrobiology is rooted in three major scientific revolutions that have, over the last 25 years, lead to the explosive growth of this field.

Core faculty members will organize research topics courses that have a distinct astrobiological perspective, in subjects in which they possess expertise. The emphasis in these courses will involve students in performing small-scale research projects on topics that are on the cutting edge of the field. They will present the results of their research in seminars within the course.

Topics of the research topic courses are

- (i) three fundamental areas of astrobiology – astronomical and planetary; biochemical and biological; and geochemical and geological
– and
- (ii) applied areas – human-exploration, remote robotics, and biotechnology.

All courses in the collaborative program will be open for participation by other graduate students except for earning credit in the Astrobiology Journal Club, which will be reserved for collaborative program students only. The participating departments or school may consider the possibility of allowing some of these courses (including the introductory course) to be part of the normal course offerings for the home programs. This, however, is a decision to be taken by the graduate committees of each participating body on a case-by-case basis.

4.1.1 Course Listing:

Two new Origins courses are required:

| | |
|-------------|---------------------------|
| Origins 701 | Survey of Astrobiology |
| Origins 705 | Astrobiology Journal Club |

The nine elective courses, presently offered by the home departments, are (students must take equivalent of one, ½ course outside of their “home field” for their PhD.):

| | |
|--------------|--|
| Biochem 711 | Special Topics in Microbiology and Biomolecular Sciences |
| Biology 6DD3 | Molecular Evolution |
| Biology 720 | Bioinformatics |

| | |
|---------------|--------------------------------------|
| Chemistry 799 | Pre-biotic Chemistry |
| Earthsci 753 | Advanced Environmental Geochemistry |
| Earthsci 761 | Advanced Glacial Sedimentology |
| Physics 6S03 | Introduction to Molecular Biophysics |
| Physics 756 | Special Topics in Biophysics |
| Physics 775 | Planetary Astronomy |

4.2 Identify any unique curriculum or program innovations or creative components.

The collaborative program will incorporate a variety of opportunities for facilitating interactions between students and faculty, to ensure a collegial environment. The Astrobiology Journal Club already meets biweekly and provides a setting within which students and faculty discuss current scientific journal articles or original research. The weekly Origins Institute Colloquium series involves world-class, invited speakers and McMaster University faculty and is attended by OI students and members. An annual retreat for students and faculty will be arranged to include oral and poster presentations. A travel fund could be established to help support graduate student attendance at international meetings, to present their research. The OI hosts conference-workshops at McMaster University, which provide additional venues for student presentations. In addition to these formal academic activities, a cohesive environment will be facilitated through participation in student-initiated events, such as focused reading groups.

4.3 For research-focused graduate programs, provide clear indication of the nature and suitability of the major research requirements for degree completion.

Astrobiology, as we have already noted, progresses by combining the skills of individuals that are acknowledged experts in specific disciplines, with collaborations and through teams or networks that have identified astrobiology problems as a focus. It is not uncommon to have teams consisting of astrophysicists, earth science specialists, and microbiologists working together – as an example, in designing rover missions for Mars or working out the properties for early Earth. A collaborative program in astrobiology would benefit a participating home program in several important ways.

First, no single department in a research university can provide the full range of skills and knowledge required to train an Astrobiologist. The required training takes place when students, schooled within disciplines in specific departments, are exposed to the wider field of astrobiology. This is accomplished by having students take a survey course in astrobiology, interacting with other researchers and fellow astrobiology students from other fields (as in a common seminar), and by giving them some additional exposure to research projects or studies in fields other than their home program and within the area of astrobiology. In this way, students gain a broad perspective and sense of belonging to a multidisciplinary community beyond that of their immediate department. Departmental membership in this collaborative program allows each department to extend its reach and attract students who bring connections to other areas into their home programs.

The collaborative program will be organised by members of the OI, who will be responsible for developing the relevant astrobiology courses and seminars that comprise the collaborative aspect of the program. The OI seeks students who are willing and excited to ‘go the extra distance’ – to accomplish all of the requirements of a graduate degree at the M.Sc. or Ph.D. level in a home program and to go on and bring these skills into an astrobiology setting and research thesis. Our intention is not to add on a large load of extra courses and requirements but rather just the appropriate mixture of course work and participation in research seminars and projects. The thesis

must meet the requirements of the home program but be focused on an important aspect of astrobiology. The intellectual focus of the collaborative program will be to train astrobiologists who are specialists in their home fields and whose research is relevant to astrobiology.

Publications

Students in the collaborative program will compose Master's and Doctoral thesis research of publishable quality. Students will be encouraged to prepare peer-review publications for inclusion in their theses. Additionally, the strong culture of transdisciplinary collaboration at MU will provide students with opportunities for publications beyond their thesis research.

4.4 Provide verification that the courses included meet university requirements in terms of the minimum number of courses required, the level of courses requires, and the appropriate inclusion of other required elements appropriate for the degree level (e.g., transfer exams, comprehensive exams). At least two thirds of the course requirements must be at the graduate level.

Students must complete requirements for a home program (*i.e.*, graduate program in the Department of Biochemistry and Biomedical Sciences, Department of Biology, Department of Chemistry and Chemical Biology, Department of Physics and Astronomy, or School of Geography and Earth Sciences). Proposed coursework and seminars beyond the requirements of the home program are described below. Supervising professors must be core faculty in the Collaborative Program in Astrobiology.

The degree requirements for each of the 5 home programs vary quite widely in the amount of course work required for the Ph.D. The course requirements for each home department are (note, a half course is a one term course):

Department of Biochemistry and Biomedical Sciences: 2 half graduate courses for Ph.D. (2 half courses for M.Sc.)

Department of Biology: 2 half graduate courses for Ph.D (which may have been taken for a M.Sc.).

Department of Chemistry and Chemical Biology: equivalent of 2 or 3 graduate half courses (equivalent of 2 half courses for M.Sc., and depending on area, 0 or 1 additional half courses for Ph.D.)

Department of Physics and Astronomy: 6 half courses for Ph.D. (4 half courses for the M.Sc., 2 additional half courses for the Ph.D.; of the total, 2 half courses must be 'core courses').

School of Geography and Earth Sciences: 5 half courses for Ph.D. (2 half courses for M.Sc., 3 additional half courses for the Ph.D.)

The Astrobiology Course List (described in Appendix 11) contains existing courses offered by the graduate programs of the home departments. It capitalizes on the fact that our member departments already teach graduate courses whose content is directly relevant to astrobiology. Given that students will be required to take a survey course in astrobiology and must complete

course work that falls outside of their ‘home field,’ there is significant value added to the training of the student in the collaborative graduate program.

M.Sc. Program

Completion of a one-term, core, survey course for the collaborative program – Survey of Astrobiology, which will be taught at the graduate level, is required. All students in the collaborative program will be required to take this course. The course will involve a review of the basic elements of astrobiology across the entire suite of relevant fields, from astrophysics and astronomy, to biochemistry and microbiology, to geology and planetary science. This course will be co-taught by 2 or 3 OI members in the Collaborative Program in Astrobiology, each year. The course will build on experience that we already have gained in teaching the Origins of Life and Astrobiology (ORIGINS 3D03) for our undergraduate Origins Research Specialization at McMaster University. The course will bring students from different home programs to the same level in their astrobiology background and also act as a way of binding together these students through shared experience.

Regular participation in a bimonthly Astrobiology Journal Club. This ‘course’ will be taken for credit. Students will be required to read current papers for discussion at the seminar and, once per term, present a paper from recent literature or a summary of their own research. The Astrobiology Journal Club will be active for 2 of the 3 terms in the academic year (Fall and Winter). The seminar will establish the working, long-term links between students and faculty in the collaborative program, through discussion of the literature and recent research results. We already have initiated the Astrobiology Journal Club, currently organised by an OI astrobiology postdoctoral researcher in consultation with the OI Director. Outside speakers that deliver astrobiology lectures to the Origins Institute Colloquium series are invited to stay over an extra night to lead the discussion in the Astrobiology Journal Club.

Completion of a M.Sc. thesis in a home department on a topic that is focused on astrobiology is required. One member of the student’s supervisory committee should be from outside the home program. The M.Sc. thesis work often will involve transdisciplinary elements, which constitute a significant extension of thesis work that usually would be completed for the home program.

Students usually will enter the collaborative M.Sc. program and complete it before applying for entry into the collaborative Ph.D. program. Students who wish to enter the collaborative program at the Ph.D. level and who do not have a M.Sc. will be required to take the *Survey of Astrobiology* course in the first year of their Ph.D. and then to proceed with the outline prescribed in the following section.

Ph.D. Program

Completion of a minimum of 2 modules (2 quarter courses – 6 weeks in duration; or one ½ course of 12 weeks in duration) from the ASTROBIOLOGY COURSE LIST is required. These modules must be outside the student’s research area in the home program. This requirement is designed to widen the student’s knowledge and research skills in astrobiology beyond those in their immediate research area. The courses will be focused on undertaking small-scale research projects and typically will involve areas of expertise of the core faculty. In each year, two quarter courses will be given – one each in the Fall and Winter terms.

Course rotation: as students typically complete a Ph.D. in 4 years, we will establish a complete rotation of the research course topics every three years. Each core faculty member would be able to offer one quarter course, which they would teach, on average, once every five years for a complement of 10 core faculty members.

Regular participation in the bi-monthly Astrobiology Journal Club is required.

Completion of a Ph.D. thesis in a home department on a topic that is focused on astrobiology is required. At least one member of the student's supervisory committee should be from outside the home program. The Ph.D. thesis work often will involve interdisciplinary elements, which constitute a significant extension of thesis work that usually would be completed for the home program. Where natural, co-supervisors of students drawn from outside of the home department will be encouraged to further transdisciplinary research. The thesis will prepare the student to pursue research in the home field as well as to be highly sought after in fields relevant to astrobiology, from exoplanetary searches and design of spacecraft, to the exploration of analogue conditions for life in extreme environments on Earth.

Seminar Requirement

In addition to participating in the Astrobiology Journal Club, all students (M.Sc. and Ph.D.) in the collaborative program will be required to attend regularly the weekly Origins Institute Colloquium series. These colloquia have been bringing outstanding scientists to the OI since its inception in 2004. The OI regularly invites outstanding Astrobiologists to deliver colloquia (details are provided at the URI <http://origins.mcmaster.ca/colloq.php>) and public lectures (<http://origins.mcmaster.ca/lectures.php>), which account for approximately 1/4 of our talks and visitors. This will be a major resource for graduate students, as they will have the opportunity to interact directly with distinguished leaders and scientists in the field. This is an important extension of the education of students in the proposed collaborative program that goes far beyond what is available in their home department seminar series.

Ph.D. Comprehensive Requirement

The Ph.D. comprehensive requirement must be completed within 2 years of entering the Ph.D. program. The student will take the comprehensive exam in their home department, as prescribed by the rules of that department. In order to carry out the students' Astrobiology part of the exam, the "in area" component of the comprehensive will be conducted by members of the OI collaborative program that are attached to the home department's examining committee. The examining committee should therefore have at least two additional members - drawn from the collaborative program faculty. In order to monitor the performance of all of the program students undergoing their comprehensives in given year, at least one examiner from the program committee should be involved in all of the collaborative program examinations. At least one of the program examiners should be a member of the student's supervisory committee. Student performance is judged as Pass with Distinction, Pass, or Fail. Students who fail may be granted a second opportunity to take the comprehensive examination.

5. MODE OF DELIVERY

5.1 Discuss appropriateness of the proposed mode(s) of delivery to meet the intended Program Learning Outcomes and Degree Level Expectations and availability of the necessary physical resources.

The program will feature a variety of interactions and approaches to teaching and research. The Survey of Astrobiology course (Origins 701), offered by the OI at the M.Sc. level, will serve as the “core course” of the program. It will create a common intellectual meeting ground for the entry class in each year that will be essential to create the network of links between our Astrobiology students. It will be given primarily in lecture style, but with student term papers and presentations, and hopefully, some fieldwork. The course work involves seminars (the Journal Club – Origins 705) that students both at the M.Sc. and Ph.D. levels will take throughout their entire time in the program. This ongoing journal club format will also serve as the strong “glue” between students, and with our diverse faculty. The Ph.D. level courses from the Astrobiology Course List are, as already noted, normally taught as part of the offerings given by the 5 departments in our program. Instructors will be aware that they have Astrobiology program students in their course in addition to their regular “home department” students. Instructors will ensure that the program students receive the extra attention that is needed to make the subject approachable for out of field students – by extra readings, different problem sets, more care in definition of terms during lectures, *etc.* These courses offer a variety of lectures, informal seminars, lab work, and presentations. Courses will typically be co-taught between 2 or 3 faculty members, which once again, will have the effect of broadening the experience that students will get in our program.

Finally, as noted elsewhere, the physical space requirements for the students will be arranged by the home departments. Normally students will be seated in their home department areas, grouped together as Astrobiology students where possible. Lab work will be carried out as normal in their supervisor’s labs. Computing is a very important part of the program as many of the researchers involved are experts in various aspects of computational science. Resources to carry out simulations, *etc.* will be provided as normal to students in their home programs.

6. ASSESSMENT OF TEACHING AND LEARNING

6.1 Discuss appropriateness of the proposed methods for the instruction and assessment of student achievement of the intended Program Learning Outcomes. The Program Learning Outcomes must meet the University’s Degree Level Expectations.

The methods we have outlined have already proven to be very effective in the OI’s undergraduate program. The OI teaches a one term Astrobiology course (ORI 3D03), taken by about 40 students per year (capped value of the enrolment). We have given this course 3 times, and this has helped solidify our ideas of what works and what doesn’t in terms of course material and approach to teaching. We have developed teaching methods (the course is co-taught by 3 instructors in astrophysics, geology, and biology) that utilize a mix of lectures, problem sets, and student presentations of term research papers. A field trip was offered in one of those years – and we intend to include field trips here. The ORI 3D03 course has been very successful and we will apply this knowledge and experience to our graduate program. Given a steady state enrollment of 25 students, we anticipate that there will be 5 – 8 grad students per year needing to take our survey course, ORIGINS 701. The modest class size will be highly conducive for student training – with the possibility of close interactions with the instructors.

6.2 Describe the completeness of plans for documenting and demonstrating the level of performance of students, consistent with the University’s statement of its Degree Level Expectations.

Progress Reports

Each year, all students enrolled in the collaborative program are required to submit a progress report to their supervisory committee outlining their achievements for the current year and objectives for the next year. Permission to continue in the collaborative program depends on a satisfactory report. The report includes forms standardized by the School of Graduate Studies.

Supervisory Committee

Each student enrolled in the collaborative program is required to have a supervisory committee that assists in directing student research. The committee comprises the supervising professor and at least two additional faculty members from the collaborative program. The committee will meet at least once a year to review progress and objectives.

Thesis Evaluation Procedure

Theses will be evaluated according to School of Graduate Studies regulations.

7. RESOURCES FOR ALL PROGRAMS

7.1 Discuss the adequacy of the administrative unit's planned utilization of existing human, physical and financial resources, and any institutional commitment to supplement those resources, to support the program.

Much of the heavy work in administering the program will be mainly carried by the home departments. Students will register with a home department, and much of the paperwork, TA assignments, *etc.* will be carried out there. The Astrobiology part of the program will provide strengths from the 5 member departments in terms of faculty support, physical space and research infrastructure, and some limited financial support (*e.g.*, Lee Scholarships). The program will be using the OI Centre as a focal point for meetings and informal seminars and journal clubs with the students. A classroom will need to be allocated to teach the ORI 701 Survey course. The program director will receive student grades from the various departments in order to track the progress of students. In case of problems, the program director will interact with the Graduate secretary of a home department in order to help the students.

As noted elsewhere, the program as it grows, will eventually need to have a dedicated $\frac{1}{4}$ FTE – who will work with the program director. Some financial support for this level of administrative support will be sought from the 5 member departments (at a buy-in of 5K per year).

7.2 Outline the participation of a sufficient number and quality of faculty who are competent to teach and/or supervise in the program.

Faculty listed in this proposal as either core or adjunct members stem from 5 different departments in the Faculty of Science as well as the Faculty of Health Sciences at McMaster University. This group has considerable experience in teaching astrobiology at the undergraduate level – as in the teaching of our ORIGINS 3D03 course on “Origins of Life and Astrobiology,” for instance.

Core Faculty Members (by department)

Biochemistry and Biomedical Sciences:

- Radhey Gupta: genomics
- Ying-fu Li: RNA world
- Gerry Wright: microbiology

Biology:

- Jonathon Stone (Associate Director, OI): extremophiles, computational biology
- J.P. Xu: microbiology

Chemistry and Chemical Biology:

- Paul Harrison: prebiotic chemistry and organic chemistry

Physics and Astronomy:

- Paul Higgs: molecular evolution and the origin of life
- Ralph Pudritz (Director, OI): exoplanet migration and formation, exogenous formation and delivery of amino acids, prebiotic states on young planets
- Maikel Rheinstadter: soft matter physics, experiments
- James Wadsley: Jovian exoplanet formation, computational studies

Geography and Earth Sciences:

- Carolyn Eyles: environmental geology and sedimentology
- Greg Slater: geochemistry, analogue environments
- Lesley Warren: microbial geochemistry, biomineralisation

Adjunct Faculty Members

These are faculty members who will participate in the collaborative program by serving as members of student supervisory committees, participating in some of the teaching of the courses, or contributing seminars of interest to the collaborative program.

- Ben Evans (Biology): molecular biology
- Brian Golding (Biology): bioinformatics
- Sang-Tae Kim (School of Geography and Earth Sciences): stable isotope geochemistry
- Christine Wilson (Physics and Astronomy): galactic star formation

List of Faculty by Field

| Name & Rank | Gender | Home Unit | Supervisory Privileges |
|-----------------------------|--------|-----------|------------------------|
| Gupta, R – Professor | M | BBS | Full |
| Li, Y – Professor | M | BBS | Full |
| Wright, G – Professor | M | BBS | Full |
| Stone, J – Associate | M | B | Full |
| Xu, JP – Associate | M | B | Full |
| Harrison, P – Associate | M | C | Full |
| Higgs, P – Professor | M | PA | Full |
| Pudritz, R – Professor | M | PA | Full |
| Rheinstadter, M – Assistant | M | PA | Full |

| | | | |
|------------------------|---|-----|------|
| Wadsley, J – Associate | M | PA | Full |
| Eyles, C – Professor | F | GES | Full |
| Slater, G – Associate | M | GES | Full |
| Warren, L – Professor | F | GES | Full |

All core faculty members are appointed at McMaster University and involved with supervising and teaching graduate students in existing home programs. The collaborative program has been designed to attract new students to McMaster and, so, will help to ensure desired quotas for graduate student expansion.

The resources for the collaborative program will be shared following a plan designed to ensure that Departments, Schools, and Faculties are compensated proportionately for contributions to the collaborative program by faculty members. Department and school Chairs and Deans for the participating Faculties have committed to the continued success of the collaborative program. We anticipate contributions such as cross listing of courses and support for new Graduate courses.

7.3 Provide evidence that there are adequate resources to sustain the quality of scholarship produced by undergraduate students as well as graduate students’ scholarship and research activities, including library support, information technology support, and laboratory access.

Students as members of home departments will have access to offices and laboratory spaces assigned, as normally would occur in those departments. However, the astrobiology dimension of students’ programs also must be accommodated. As noted previously, students need to bond together in the in their astrobiology community and among their peers. This cannot be achieved effectively by Internet connections and seminars and course work. Interdisciplinary programs need to have their own physical space as well, a physical meeting ground for students to meet with one another on a regular basis, where they can interact with other faculty of the OI as well as the scientific visitors to the OI - who are often astrobiologists. Such a space acts as an incubator, where ideas are exchanged and new ideas are hatched. Daily interaction is the essence of interdisciplinary research, and this must be an integral part of the research environment that we need to create for our students.

The laboratories for many of the participating faculty are situated on campus within a few minutes walking distance from each other. Thus, students will have access to a wide range of techniques and expertise, thereby facilitating the opportunity to incorporate multiple approaches into their graduate research. Students will be encouraged to undertake laboratory rotations, so that they gain hands-on experience with the research in more than one experimental setting. This will foster a collaborative environment between the participating laboratories that will help to instil a transdisciplinary approach to the research and to introduce a strong team focus to the training. This approach will help students gain expertise in aspects of astrobiology that reside outside of their background training.

These ideas are being recognized in a report undertaken by the School of Graduate Studies at McMaster University on Interdisciplinary Programs. To demonstrate our commitment to developing the first Canadian graduate program in astrobiology, we have used OI funds to create, on a ‘shoestring,’ budget, an excellent OI Centre that has visitor offices, a space for students and postdoctoral researchers to interact. This became possible after a proposal to provide temporary space for the OI was accepted in principle by the Dean of Science, and a cleared, 1000 square foot, former undergraduate lab in ABB 245 was offered on loan in principle by the Department of

Physics and Astronomy. In the short run, this space will serve the needs of our collaborative program well. As the collaborative program grows, we will revisit the issue as student demand grows.

Laboratories

Students in the collaborative program will utilise the facilities and equipment available in the laboratories of the participating faculty members. On site facilities potentially include the Biointerfaces Institute, Centre of Excellence in the study of surfaces and colloids, and SHARCNET. Off-site facilities (*e.g.*, observatories) also would be available. On site equipment potentially includes chromatographs and spectrometers, polymerase chain reaction and paraphernalia associated with test tube selection experiments.

We note that the OI now is interested in developing its own unique proposal for an experimental facility in prebiotic chemistry. If that were to be funded in a future competition, this facility would serve as a superb attractor of graduate students into the proposed collaborative graduate program. Part of the planning of the proposal involves research personnel that would be graduate students we attract through our collaborative astrobiology program.

Library Resources

The collaborative program will take advantage of existing facilities that currently support home programs in the participating faculties, and no additional resources are required.

Computer Facilities

Participating faculty members can provide access to extensive computer resources, which would be available for students in the collaborative program. In addition, students will have access to the aforementioned SHARCNET supercluster of high performance computers.

Space

Space for students in the collaborative program will be provided by supervising professors, within the home department's existing research space. Currently, the faculty to student ratio is planned to start at approximately 1:4, but this is expected to change to approximately 1:5 with the anticipated new students. Sufficient space is available to accommodate the projected new students.

In addition, the newly created **Origins Institute Centre** (located in a renovated lab in the Department of Physics and Astronomy, Arthur Bourns Building, ABB 245) provides a vital interaction space, lounge, and conference table and 60 inch electronic screen that is designed to promote transdisciplinary research. It is the OI's "Think Tank". This space contains offices for visiting speakers in the Origins Institute Colloquium and Public Lecture series as well as postdoctoral researchers. It will be open for students in the collaborative program. It also serves as a home base where graduate students in the Canadian Astrobiology Training Program can meet with postdocs and visitors and participate in Astrobiology Journal Club. The space also serves as a meeting space for undergraduate students in the Origins Research Specialization and Origins Institute Undergraduate Society. The potential for constructive interactions in this resource cannot be overestimated.

8. RESOURCES FOR GRADUATE PROGRAMS

8.1 **Provide evidence that full-time tenured/tenure-track/CAWAR faculty have the recent research and/or professional/clinical expertise needed to sustain the program, promote innovation, foster an appropriate intellectual climate, and provide excellent supervision of students in academic and research components of the program.**

The faculty in our program all have vigorous research programs in their home fields, and in many cases are acknowledged international leaders in their fields. All members have supervised a significant number of graduate students and hold grants that would allow graduate students to be supported. Our program faculty members can cover the teaching requirements of the program, and should be able to maintain this for the foreseeable future. As an example, because each graduate course in the Research in Astrobiology Course List will be taught in alternative years, we will be able to work around sabbatical leaves *etc.*

Many of our Faculty already teach in interdisciplinary settings and so have a good practical understanding of the way that such classes and research need to be conducted. In addition, most of the faculty have published outside of their home field in research relating directly to Astrobiology. So the program can be well launched with our existing faculty.

8.2 **Where appropriate to the program, provide evidence that financial assistance for students will be sufficient to ensure adequate quality and numbers of students.**

Student funding will be provided according to current practices in existing home programs. Stipends will derive from supervising professor grants; teaching assistant funding; and School of Graduate Studies Scholarship funding. Full-time students will be eligible for external scholarships (*e.g.*, NSERC, CIHR, OGS). Minimum stipends will be determined according to values established by each home program.

At the time of writing of this document, the OI received funds from private donors and will be able to offer two Joseph & Joanne Lee Scholarships to help launch the Collaborative Program in Astrobiology, starting in the 2012-2013 academic year. This donation will allow the OI to fund the equivalent of 2 OCGS scholarships at any time. These funds will be available over the first five years of the program.

McMaster University also will support the start of the collaborative program with a one-time input of funds from the School of Graduate Studies, which will be matched with funds from the Faculty of Science. The combined amount from these sources totals \$20,000. These funds will be used to help recruit students into the collaborative program in the first year or two of operation, by providing some scholarship support as well as extensive advertising.

The teaching assistantships (TAs) for collaborative program students would be forthcoming from the funds that normally follow graduate students. Thus, from the point-of-view of a home department, these TAs will be in addition to those that normally are allotted to students in the home program. No extra-departmental funds would be required to provide TAs.

The research fellowship portion of a graduate student’s financial package is normally provided by his or her supervisor’s grant. The core faculty members of the collaborative program are active researchers in their home departments who already support a cohort of graduate students. In many instances, these researchers already have most, if not all, of their research funds tied up in the support of students. The intellectual capacity for core members to take on new supervisory commitments is at hand. However in many instances, it is only possible if these students come with some funding that would alleviate the amount that the supervisor would need to provide.

It is therefore very important to provide some pool of additional, one-time financial support that could help reduce the supervisor’s portion of the financial burden, for the collaborative program to ‘take off.’ As noted previously, the Lee scholarships - as well as matched, one-time funds from the School of Grad Studies and the Faculty of Science, will help alleviate some of the funding issues until the collaborative program becomes better established.

Astrobiology is a rapidly emerging field. Supervisors could apply to support astrobiology students through NSERC Discovery grants. In this regard, we note that some OI members are part of the NSERC CREATE program, “The Canadian Astrobiology Training Program (CATP).” However, this is insufficient to fund more than two or three graduate students at any time, at McMaster University. We will make it a point to draw the top graduate students – necessary because they will be required to “go the extra distance”, and, so, we anticipate that our students will be able to win NSERC scholarships. However, this cannot cover all the students we would need to recruit. Hence the need for the start-up funds and the Lee scholarships.

As the field grows and matures, we anticipate that it will be possible to attract graduate funding for supervisors through normal grant competitions (hopefully such a collaborative program will be forthcoming from the Canadian Space Agency, CSA).

The allocation of these funds to students will be made on a competitive basis, with applications to be submitted to the Astrobiology Program committee.

8.3 For programs with a research component, provide evidence that faculty research supervisors have current and ongoing research programs and funding, and space and relevant research infrastructure appropriate to support students’ research in the program.

The core faculty in the Collaborative Program in Astrobiology are primary investigators or co-investigators on research grants totaling \$124,517,278 since 2007 (Table 2). The members in the collaborative program have participated in a number of large equipment and infrastructure grants that provide resources for astrobiology research, leaving the OI poised to catapult to the lead role in astrobiological research in Canada.

Operating Research Funding by Source and Year

| Year | Granting Councils |
|-------------|---------------------------|
| 2007 | 17,327,774 ^a |
| 2008 | 25,738,564 ^a |
| 2009 | 23,930,533 ^b |
| 2010 | 39,403,801 ^{b,c} |
| 2011 | 18,116,606 ^b |

- a = tabulated for 10 members
- b = tabulated for 11 members
- c = excluding CATP fellowship to Y. Hasegawa (Pudritz)

8.4 Provide evidence of how supervisory loads will be distributed, and the qualifications and appointment status of faculty who will provide instruction and supervision.

The teaching loads are designed so as not to unduly tax the faculty, who already have substantial commitments to their home departments and programs. We plan to rotate through the list of 6 Research Topics in Astrobiology courses drawn from our set of 9 - every three years or so—within the span of a graduate student’s training. The exact courses that are offered will depend somewhat on student backgrounds and demand from year to year. For a core membership of 13 faculty members, each will be required to teach a Research Topics in Astrophysics quarter course once every 4-5 years on average. Because these courses are being taught anyway by faculty as part of their home programs, this should present no obstacles. We also would like to rotate core members through the Survey of Astrobiology course, although we do expect that “ownership” of this course will be taken by a subset of the faculty. For a minimum of 13 core members, regular rotation would involve teaching one month of this course (assuming 3 profs co-teach the course each year), once every 5 years or so. Thus, the teaching commitments that we propose amount to a total commitment which is the equivalent of teaching a one semester graduate course every 4-5 years.

8.5 Provide evidence of prior experience in graduate teaching and research supervision for faculty participating in the program.

All thesis supervisions (career and current) listed below contributed to degree programs other than the proposed new Collaborative Program in Astrobiology.

Career and Current Numbers of Thesis Supervisions by Faculty Member

| Member | Career | | | Current | | |
|-----------------|--------|-----|-----|---------|-----|-----|
| | MSc | PhD | PDF | MSc | PhD | PDF |
| Eyles, C | 9 | 2 | 0 | 2 | 2 | 0 |
| Gupta, R | 15 | 8 | 8 | 1 | 1 | 0 |
| Harrison, P | 8 | 10 | 2 | 0 | 2 | 0 |
| Higgs, P | 5 | 8 | 9 | 0 | 1 | 1 |
| Li, Y | 9 | 5 | 10 | 7 | 6 | 4 |
| Pudritz, R | 9 | 9 | 8 | 1 | 3 | 1 |
| Rheinstadter, M | 3 | 2 | 2 | 2 | 1 | 0 |
| Slater, G | 7 | 3 | 5 | 3 | 1 | 1 |
| Stone, J | 4 | 1 | 0 | 2 | 0 | 0 |
| Warren, L | 5 | 8 | 3 | 2 | 4 | 2 |
| Wadsley, J | 10 | 4 | 2 | 3 | 2 | 0 |
| Wright, G | 13 | 13 | 7 | 4 | 5 | 6 |
| Xu, JP | 11 | 2 | 2 | 0 | 1 | 0 |

Teaching Assignments 2010-2011

| Faculty | Rank | Undergraduate | Graduate |
|-----------------|-----------|--|----------------------|
| Eyles, C | Professor | ENVIRO SCI 1G03 (1/2) EARTH SCI 4G03 (1/2) ISCI 1A24 (1/9), 2A18 (1/6) | NA |
| Gupta, R | Professor | NA | NA |
| Harrison, P | Associate | CHEM BIO 30A3, 40A3 | NA |
| Higgs, P | Professor | ORIGINS 3SS3, 4RS3 PHYSICS 4S03 | PHYSICS 756 |
| Li, Y | Professor | NA | NA |
| Pudritz, R | Professor | ORIGINS 3A03, 3D03 | PHYSICS 775 |
| Rheinstadter, M | Assistant | PHYSICS 1B03 | NA |
| Slater, G | Associate | ENVIRO SCI 3003 | EARTHSCI 749, 753 |
| Stone, J | Associate | BIOLOGY 1M03, 3FF3 ORIGINS 2LU3, 3D03 | NA |
| Warren, L | Professor | ENVIRO/EARTH SCI 2Q03, 3L03, 4L03, 4FE3 | EARTHSCI 750, 753 |
| Wadsley, J | Associate | PHYSICS 2G03 ASTRON 1F03 | PHYSICS 788 |
| Wright, G | Professor | NA | NA |
| Xu, JP | Associate | BIOLOGY 2EE3 MOLBIOL 4P03 | BIOLOGY 724 |

Teaching Assignments 2011-2012

| Faculty | Rank | Undergraduate | Graduate |
|-----------------|-----------|---|---------------------|
| Eyles, C | Professor | ENVIRO SCI 1G03 ISCI 1A24 (1/9), 2A18 (1/6) ISCI 3A12 (1/6) | NA |
| Gupta, R | Professor | NA | NA |
| Harrison, P | Associate | CHEM BIO 30A3 CHEM 2OD3 | CHEM 758 |
| Higgs, P | Associate | ORIGINS 3SS3, 4RS3 PHYSICS 4S03 BIOCHEM 4Y03 | NA |
| Li, Y | Professor | BIOCHEM 2B03 | NA |
| Pudritz, R | Professor | NA | PHYSICS 716, 781 |
| Rheinstadter, M | Assistant | PHYSICS 1B03, 2B06 | NA |
| Slater, G | Associate | ENVIRO SCI 3003, 4N03 | EARTH SCI 753 |
| Stone, J | Associate | BIOLOGY 1M03, 3FF3 | NA |

| | | | |
|------------|-----------|---|--------------------|
| Wadsley, J | Associate | ORIGINS 2LU3, 3E03 PHYSICS 2G03 ASTRON 1F03 | PHYSICS 746 |
| Warren, L | Professor | ENVIRO/EARTH SCI 2Q03, 3L03, 4L03, 4FE3 | EARTH SCI 750, 753 |
| Wright, G | Professor | NA | NA |
| Xu, JP | Associate | BIOLOGY 2EE3 MOLBIOL 4P03 | MOLBIOL 6P03 |

Only one new seminar course will be mounted, and that course will be team taught, which means that the new, collaborative program will impart very little impact on the teaching loads of the participating faculty members.

The normal teaching loads vary for the participating faculty because the proposed collaborative program is an interdisciplinary endeavour that includes members from 2 Faculties and 5 home programs.

9. QUALITY AND OTHER INDICATORS

9.1 Discuss the definition and use of indicators that provide evidence of quality of the faculty (*e.g.*, qualifications, research, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed program).

All 13 full-time and 4 adjuncts members of the Faculty of the Collaborative Program in Astrobiology are tenure stream, or tenured professors (Assistant to Full) in their home departments. All of the participating Faculty have Ph.D.'s and are full-time members of McMaster University. The distribution in ranks among the full-time members is: 7 Professors, 5 Associate Professors, and 1 Assistant Professor. Their teaching activity over the last 3 years is indicated in Table 3. Their impact in research can be judged by the size of the collective research funding, as well as by the numbers of graduate students they have trained (see Tables 2 and 3).

9.2 Provide evidence of a program structure and faculty research that will ensure the intellectual quality of the student experience.

The expected progress of students from M.Sc. through to Ph.D. in the program was outlined in section 3.2.1. Students who enter the program at the M.Sc. level will come from a wide variety of backgrounds and will be integrated into the program through the Survey of Astrobiology course – given in Term 1 of each year. This will give them a common set of ideas, language, and orientation towards the major problems in Astrobiology. The journal club will introduce them to the habit of reading papers over a variety of fields, and how to discuss problems with their peers.

The supervisory committee of the students will have a member of the program from outside of the student's home department. This committee therefore will be a bit larger than supervisory committees of non-program students in their home department.

In the doctoral part of the program, students will be experienced and mature enough to know how to master material from well outside their home field. Thus, taking the equivalent of a one term

course at the Ph.D. level will arrive at just the right time in their development. This course should normally be taken in the first year of their graduate studies.

For doctoral students entering into our program without having had the Collaborative Program M.Sc., they will have to take the Survey course and journal club in their first year. In this instance, the upper level course requirement can be deferred to the 2nd year of Ph.D. studies.

Graduate students in the program will be required to attend OI colloquia. Their home departments also normally feature a weekly colloquium, but it is important that students participate in the OI colloquia because it is here that they will see a broad range of Astrobiology in action.

The program director will ensure that mentoring of students takes place, so that problems they may face in adjusting to the collaborative style of approach to graduate work, can be identified and dealt with early.

10. CONSULTATION PROCESS

10.1 Please provide a description of the consultation process undertaken during the development of the proposal.

The early drafts of this proposal prepared by Drs. Ralph Pudritz and Jonathon Stone, closely followed criteria that are listed by OCGS By-Laws and Procedures, in the document "Guidelines for Collaborative Programs", as well as by an earlier version of Master's own guidelines.

Planning and discussions about the development of this program began in the Fall of 2010. The first formal meetings regarding the program were held between Dr. Pudritz and Dean of Science, Dr. John Capone. These were followed by meetings between the organizer – Ralph Pudritz - with the Dean of Graduate Studies, Dr. Allison Sekuler. At the first of these meetings, it was suggested by Dean Sekuler that the ideal type of program that met the requirements we were looking for was the Collaborative program. We followed up on this excellent suggestion, and designed our program following guidelines laid out by the OCGS By –Laws and Procedures for collaborative graduate programs.

Over the subsequent months, meetings were held with the chairs of the departments involved – including Dr. David Venus (Physics and Astronomy), Dr. Pat Chow-Fraser (Biology), Dr. Pavlos Kanaroglou (School of Geography and Earth Sciences), Dr. Eric Brown (Biochemistry and Biomedical Sciences), and Dr. Brian McCarry (Chemistry and Chemical Biology). Early drafts of the proposal were provided to all for comment. All of the chairs were highly supportive of the proposed graduate program. Their only concern had to do with the extent of resource allocation from their department to support the financing of the students. The plan presented here addresses all of their concerns in that it indicates that no extra resources are required from their departments to launch and develop the program.

Ralph Pudritz presented the case for the program to Faculty Council on May 12, 2011, where it met with strong approval and support. It was too late in the season to get the approval of other university committees and bodies, so progress was renewed in Fall of 2011. The organizer has consulted with the Dean of Graduate Studies a total of 3 times during this process, as well as with the Assoc. Dean of Graduate Studies (2 times), Dr. Douglas Welch. These meetings have been essential in helping us to align the goals of our program with the standards of graduate programs

in the university. We also met with the VP Research, Dr. Mo Elbestawi who was enthusiastic as his office provides partial financial support for research operations of the OI. The Dean of Science has been very supportive of a graduate program in Astrobiology, and we have had 3 or more meetings in which various aspects of the program were discussed (*e.g.*, resource allocation). Finally, the creation of the final document was greatly assisted by the work of the Associate Registrar and Graduate Secretary, Ms. Stephanie Baschiera.

We also held a number of meetings with the faculty members of the program. These are too numerous to reproduce here. These meetings were crucial in identifying the members of the program, and to get a good idea of what their teaching commitments and courses would be. Pudritz also consulted with Drs. Woody Sullivan and Jim Kasting – prominent organizers and participants in the Astrobiology programs at U.Washington and Penn State, respectively. Their insights and experience were invaluable in helping us think through the structure and philosophy of our own program.

Appendix 1 ASTROBIOLOGY COURSE LIST

The following list of courses starts with 2 grad courses that will be organized by the Origins Institute – Origins 701 and 705. The remaining list of 9 courses constitute the Ph.D. level Research Topics in Astrobiology courses that already are offered regularly by the home departments: Biochem 711; Biology 6DD3 and 720; Chem 799; Earth Sci 753 and 761; and Physics 6S03, 756, and 775.

ORIGINS 701 / Survey of Astrobiology / Ralph Pudritz, Jonathon Stone: A current survey of the major components of astrobiology including planetary systems and Earth-like planets; geochemistry/geology and early planetary evolution; molecular biology and early cells; and the Origins of Life.

ORIGINS 705 / Astrobiology Journal Club / Staff: A biweekly seminar focused on readings of the current Astrobiology literature, presentations on papers, guest seminars given by OI visitors, *etc.* Students are expected to present one paper per term for informal seminar discussion.

BIOCHEM 711 / Special Topics in Microbiology and Biomolecular Sciences / Herb Schellhorn, Michael Surette, and Radhey Gupta: This course will consist of three modules covering Microbial Evolution, System biology and Metagenomics. The first of these modules will examine the evolutionary relationships among Bacteria and Archaea, Origin of photosynthesis, and the branching order and interrelationships among different phyla of Gram-positive and Gram-negative bacteria. The other two modules on Microbial Metagenomics and System Biology should also be of interest to the graduate students in the Origin program.

BIOLOGY 6DD3 / Molecular Evolution / Brian Golding, Ben Evans, and Jonathon Stone: The study of how molecules change over time within and between species. The experimental data, techniques, and theories will be examined.

BIOLOGY 720 / Bioinformatics (cross-listed as Computational Engineering & Science 720) / Brian Golding: This course will introduce students to the basics of elementary sequence analysis. This will include DNA/protein database design and access; homology detection; sequence alignment; phylogeny reconstruction; pattern analysis and other topics in computational biology.

CHEMISTRY 799 / Pre-biotic Chemistry / Paul Harrison: This course focuses on how the principles of organic chemistry apply to pre-biotic synthesis. The assembly of RNAzymes from simple precursors (HCN, formaldehyde) and the nature of catalysis by these ribozymes will be described. Pre-biotic assembly of peptides via Urey-Miller type processes and condensation of the resulting amino acids will also be covered, as will organocatalytic processes that use amino acids and peptides and that are of relevance to the origin of life. Emphasis will be on how the rules of organic chemistry determine the types of structures that can form in origin-of-life experiments.

EARTHSCI 753 / Advanced Environmental Geochemistry / Lesley Warren, Sang-Tae Kim, and Greg Slater: This course will focus on an advanced treatment of the underlying concepts in environmental geochemistry of equilibria, kinetics and partitioning. In addition, it will discuss available and emerging techniques for investigating past and modern environmental geochemical processes. Selected primary literature references drawn from each of the instructors individual areas of geochemistry research expertise (Warren, microbial inorganic geochemistry; Slater, organic geochemistry, Kim isotope geochemistry) will be used as case study examples to foster a broader understanding of how fundamental principles apply in environmental geochemical processes of interest. Astrobiology is included in the focus on past environmental processes.

EARTHSCI 761 / Advanced Glacial Sedimentology / Carolyn Eyles: Current issues in glacial sedimentology including examination of glacial processes, environments and sediments in terrestrial and marine settings, and the application of terrestrial analogues to interpret glacial environments and features on extraterrestrial bodies.

PHYSICS 6S03 / Introduction to Molecular Biophysics / Paul Higgs: Overview of the field of biophysics and its influence on molecular biology. Topics include: structure, elasticity and mobility of biomolecules; molecular motors; mechanical properties of cells; mobility of bacteria; cell adhesion. We will discuss both theoretical aspects (statistical mechanics models for structure and folding of DNA, RNA and proteins) and experimental techniques (optical tweezers, AFM, fluorescence, *etc.*)

PHYSICS 756 / Special Topics in Biophysics / Paul Higgs: The course will emphasize the links between statistical physics and biology, focusing on the design and use of computational models. Students will learn to design and simulate their own models. Topics will include: rugged fitness landscapes in molecular evolution; autocatalytic chemical reactions; self-organized criticality; evolutionary game theory; cellular automata.

PHYSICS 775 / Planetary Astronomy / Ralph Pudritz and James Wadsley: Properties of planets in the solar system and around other stars, emphasizing exoplanetary systems. Key processes in substellar objects and their role solar system evolution are also examined. Topics include planetary dynamics and orbital evolution; energy transport; planetary atmospheres; an overview of geology and tectonics; impact cratering; planetary interior structure; meteorites, asteroids, comets and dust; moons, tides and rings; planet formation; extra solar planets; and habitability.



School of Computational Engineering & Science

Information Technology Building Phone: 905.525.9140 ext.23486
1280 Main Street West Fax: 905.528.1054
Hamilton, Ontario L8S 4K1

<http://computational.mcmaster.ca/>

Hamilton; February 8, 2012

Graduate Curriculum Committee, Science
School of Graduate Studies

Re: Change of the Name of Graduate Program and of the Degrees Offered

Dear Members of the Committee,

Following the decision to move the *School of Computational Engineering and Science* to the Faculty of Science, I would like to propose that the name of the unit be changed to

School of Computational Science and Engineering.

~~I would also like to propose that the names of the degrees offered be changed to~~

~~*Ph.D. / M.Sc. in Mathematical Modelling and Scientific Computing.*~~

~~It is felt that the proposed names, which represent a consensus among the core faculty affiliated with the Program, reflect more accurately the nature of training offered to students in the Program.~~

Yours sincerely,

A handwritten signature in blue ink that reads "Bartosz Protas".

Dr. Bartosz Protas

Director, School of Computational Engineering and Science



Walter G. Booth School of
Engineering Practice

Samir Chidiac, Director

1280 Main Street West
Hamilton, Ontario, Canada
L8S 4K1

905.525.9140, Ext. 26566
Fax: 905.528.7901
Email: msep@mcmaster.ca
<http://msep.mcmaster.ca>

February 28, 2012

Graduate Council
c/o Graduate Registrar
School of Graduate Studies
GH-212
McMaster University

To Whom It May Concern:

I am writing to request the formal approval of the degree designation:

Master of Technology Entrepreneurship and Innovation

For our new program, Master of Technology Entrepreneurship and Innovation which was formally approved by the Ontario Council on Graduate Studies.

Thank you for your consideration of this request.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Chidiac".

Samir Chidiac, Ph.D.
Director

ONTARIO COUNCIL ON
GRADUATE STUDIES

CONSEIL ONTARIEN DES
ÉTUDES SUPÉRIEURES

June 17, 2011

Dr. Allison B. Sekuler
Associate Vice-President and Dean of Graduate Studies
School of Graduate Studies
McMaster University
Gilmore Hall 212
1280 Main Street West
Hamilton, ON L8S 4M2

Dear Dr. Sekuler:

This is to indicate that the recommendation for the following program has been approved by the Executive Committee of the Ontario Council on Graduate Studies at its meeting on June 17, 2011:

- MTEI, Master of Technology Entrepreneurship and Innovation

Sincerely,



Donna M. Woolcott, PhD
Executive Director, Quality Assurance

DW/sd

An affiliate of the Council of Ontario Universities

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ONTARIO COUNCIL ON
GRADUATE STUDIES

CONSEIL ONTARIEN DES
ÉTUDES SUPÉRIEURES

REPORT OF THE APPRAISAL COMMITTEE

to the

ONTARIO COUNCIL ON GRADUATE STUDIES

June 17, 2011

STANDARD APPRAISAL

McMASTER UNIVERSITY - MTEI, MASTER OF TECHNOLOGY ENTREPRENEURSHIP AND
INNOVATION

At its meeting of June 6, 2011, the Appraisal Committee decided to recommend to Council that:

- (a) The proposed MTEI program in Master of Technology Entrepreneurship and Innovation at McMaster University be APPROVED TO COMMENCE.
- (b) The following fields be approved: NONE

The above recommendation is based on the Committee's consideration of the University's written submission, the consultants' reports and the University response.

Consultants:

Dr. Eileen Fisher
Schulich School of Business
York University
Toronto, Ontario

Dr. A. Bakr Ibrahim
John Molson School of Business
Concordia University
Montreal, Quebec

Ronald Barron
Chair

DW/sd

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