

## Request for Calendar Change Form

Tracking No:  
 (Senate Secretary's Office  
 use only)  
 Date:  
 09/02/2009

To	Secretary of Senate	
From	Name(Dean):	Faculty
	Dr. Andrew Paul Dean	Science & Environmental Studies
	Department the change relates to	
	Mathematical Sciences	
	Contact Person	
	Dr. Greg Lee	

Is the proposed calendar change Graduate

**Instructions:**

1. In all cases please complete and attach section 1 and 2
2. If the calendar change affect other departments/schools/faculties complete and attach section 3
3. If the answer to any of the questions below is yes, explain. Attach separate sheets with reference to the question

- |  |                                 |   |
|--|---------------------------------|---|
| 1. Do the proposed changes affect other departments/ schools/faculties in terms of their calendar change?                                | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 2. Is a transition plan needed for student in progress?  | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 3. Are the proposed changes likely to affect student enrollment in your department/school/faculty?                                       | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 4. Are the proposed changes likely to affect student enrollment in other departments/schools/faculties at Lakehead University?           | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 5. Will the proposed changes require additional teaching space and/or teaching staff and/or equipment and/or other resources?            | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 6. Will the proposed changes affect existing teaching loads within your department/school/faculty?                                       | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 7. Will the proposed changes increase demand for teaching support services such as the library, computing services and technical staff ? | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 8. Will the proposed change require direct or in-kind support from outside the academic unit?  | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 9. Do the proposed changes include change in course(s) which is/are required core course(s) for a major?                                 | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 10. Do the proposed changes include a change in course which is service/required course(s) in another program?                           | Yes                             | No  |

- |  |                                 |   |
|--|---------------------------------|---|
|  | <input type="checkbox"/>        | <input checked="" type="checkbox"/>       |
| 11. Do the proposed changes include change in course(s) which is/are open elective available to any student in any program?      | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 12. Do the proposed changes include change in course(s) which is/are elective in a major i.e. restricted to students in a major? | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |

Signatures: \_\_\_\_\_ Date approved by faculty council  
10/02/2009

Section 1
Description of the Proposed Calendar Change: Remove Computer Science from the Mathematical Sciences Graduate Program.
Rationale of the Proposed Calendar Change(s): (Corresponding to Section 2 where required)
1 Computer Science will now have its own Graduate Program, separate from Mathematical Sciences.

Section 2	
Existing Calendar Entries: (Page reference based on hard copy or URL based on electronic version of calendar)	Proposed Calendar Entries/Addition/ Deletion -If only addition, specify page number and placement in university calendar -If only deletion, write Deleted
<p>1 353</p> <p>Department of Mathematical Sciences</p> <p>Professor and Chair T. Miao Professor and Dean of Science and Environmental Studies A.P. Dean</p> <p>MA and MSC (MATHEMATICAL SCIENCES)</p> <p>Graduate Co-ordinator G. Lee Core: Master's Thesis Supervisory</p> <p>F. Allaire (Computer Science), R. Anisca, M.W. Benson (Computer Science), Y. Chen, A.J. Dean, J.A.W. Fiaidhi (Computer Science), W. Huang, M. Ilie, G. Lee, D. Li, L. Liu, P. Mah (Emeritus), T. Miao, S.M.A. Mohammed (Computer Science), R. Wei (Computer Science), A. Van Tuyl</p>	<p>Department of Mathematical Sciences</p> <p>Professor and Chair T. Miao Professor and Dean of Science and Environmental Studies A.P. Dean</p> <p>MA and MSC (MATHEMATICAL SCIENCES)</p> <p>Graduate Co-ordinator G. Lee Core: Master's Thesis Supervisory</p> <p>R. Anisca, Y. Chen, A.J. Dean, W. Huang, M. Ilie, G. Lee, D. Li, L. Liu, T. Miao, A. Van Tuyl</p> <p>Core: Master's Non-Thesis Supervisory F. Ting</p> <p><b>MASTER OF ARTS OR SCIENCE DEGREE IN MATHEMATICAL SCIENCES</b> Candidates are accepted under the regulations governing the Master's degree (see page 267-269) providing they also satisfy the requirements of the department as stated below: A student entering the Master's program is expected to have at least a B grade average in an honours mathematics or computer science program from an accredited university and have had the necessary undergraduate prerequisites for the graduate courses he/she intends to take. None of the graduate courses are prerequisites for other graduate courses. Application deadline is February 1. Late applications may be considered for admission, but</p>

Core: Master's Non-Thesis Supervisory

F. Ting

#### MASTER OF ARTS OR SCIENCE DEGREE IN MATHEMATICAL SCIENCES

Candidates are accepted under the regulations governing the Master's degree (see page 267-269) providing they also satisfy the requirements of the department as stated below:

A student entering the Master's program is expected to have at least a B grade average in an honours mathematics or computer science program from an accredited university and have had the necessary undergraduate prerequisites for the graduate courses he/she intends to take. None of the graduate courses are prerequisites for other graduate courses. Students who plan to obtain a Ph.D. degree in mathematics should enrol in the thesis program.

Application deadline is February 1. Late applications may be considered for admission, but may not be eligible for funding.

#### PROGRAMS

(a) The Thesis Program:

A candidate admitted to the MA or MSc program will normally be expected to complete three full courses, including either Computer Science 5400 or Mathematics 5301, and one other 5000 level course designated by the Department. In addition, the candidate will be required to pursue a research program and complete a thesis which is normally considered the equivalent of two courses. A student may be required to undertake an oral examination near the completion of the program.

(b) The Course Program:

This program consists of five full graduate courses, including either Computer Science 5400 or Mathematics 5301, and either Computer Science 5800 or Mathematics 5801.

(c) The MA/MSc Co-operative Option:

A graduate student normally will be admitted to this option after completion of three full graduate courses for a starting date in May. Co-op employment for a minimum of 8 months must be successfully completed to satisfy co-op requirements for the degree; however students may be employed on co-op for up to a maximum of 16 months as part of the program.

Students interested in a co-op placement should inform the Department's Co-op Advisor

may not be eligible for funding.

#### PROGRAMS

(a) The Thesis Program: A candidate admitted to the MA or MSc program will normally be expected to complete three full courses, including Mathematics 5301 and one other 5000 level course designated by the Department. In addition, the candidate will be required to pursue a research program and complete a thesis which is normally considered the equivalent of two courses. A student may be required to undertake an oral examination near the completion of the program.

(b) The Course Program: This program consists of five full graduate courses, including Mathematics 5301 and Mathematics 5801.

Suggested Course Concentrations: Students may choose to concentrate courses in one of the following disciplines: (a) Pure Mathematics: Mathematics 5101, 5221, 5273, 5281, 5311, 5351, 5371 (b) Statistics: Mathematics 5331, 5333, 5335, 5337 (c) Applied Mathematics: Mathematics 5273, 5311, 5331, 5333, 5337, 5351, 5371

Research Areas: The research areas of the faculty of the Department of Mathematical Sciences are: Commutative Algebra/Algebraic Geometry: Professor Van Tuyl

Noncommutative Algebra: Professor Lee

Functional Analysis: Professors Anisca, Chen

Abstract Harmonic Analysis: Professors Miao, Ilie

Numerical Analysis: Professor Liu

Operator Algebras: Professor Dean

Optimization/Operations Research/Management

Science: Professors Huang, Liu

Partial Differential Equations/Mathematical

Physics: Professor Ting

Probability and Statistics: Professors Huang, Li

#### GRADUATE COURSES

Courses not offered this academic year (fall/winter terms) are indicated by the words "NOT OFFERED THIS YEAR" below the course description.

Nevertheless, students should refer to the Timetable as a final check.

The following courses are offered for Master's programs.

Because the content of courses may vary from year to year, students may take certain courses more than once, with departmental permission.

(Information about Course Numbering System)

at least four months in advance of the proposed date of the placement (e.g., by late December for placements beginning in May). The Department's decision as to the suitability of each candidate will be based primarily on academic performance. Successful candidates will work with the Co-op office and the university Co-op Co-ordinator in their search for suitable employment. Upon completion of the co-op placement, the student will either complete a thesis (Thesis Program option) or take two additional full graduate courses, including either Computer Science 5800 or Mathematics 5801 (Course Program option).

**Suggested Course Concentrations:**

Students will take either Computer Science 5400 or Mathematics 5301; either Mathematics 5901 or one of Computer Science 5800, Mathematics 5801; and, if the co-operative option is selected, Mathematics 5992. As well students may choose to concentrate courses in one of the following disciplines:

(a) Computing: Computer Science 5401, 5410, 5411, 5413, 5415, 5417, 5435, 5437, 5471

Mathematics 5273, 5351, 5371

(b) Mathematics: Mathematics 5101, 5221, 5241, 5273, 5281, 5311, 5351, 5371

(c) Statistics: Mathematics 5331, 5333, 5335, 5337

(d) Applied Mathematics: Mathematics 5273, 5311, 5331, 5333, 5337, 5351, 5371

**Research Areas:**

The research areas of the faculty of the Departments of Mathematical Sciences and Computer Science are:

**Artificial Intelligence:**

Professors Fiaidhi, Mohammed, Noroozi

**Combinatorics:**

Professor Wei

**Commutative Algebra/Algebraic Geometry:**

Professor Van Tuyl

**Computational Graph Theory/Combinatorial**

**Computing:**

Professor Allaire

**Computer Networks/Communications:**

Professor El Ocla

**Computer Security:**

Professor Wei

**Functional Analysis:**

Professors Chen, Dean, Mah, Miao

**Internet Computing:**

Professor Mohammed

**Numerical Analysis:**

Professors Benson, Liu

**Mathematics 5101 (ST) Advanced Analysis 3-0;3-0**

May be a full course in any of the following: advanced measure theory, functional analysis, complex analysis; or a selection of topics from some or all of the preceding subjects. Content varied.

**Mathematics 5201 (ST) Reading Course 3-0; 3-0**

An examination of one or more aspects of modern mathematics.

**Mathematics 5211 (ST) Reading Course 3-0; or 3-0**

An examination of one or more aspects of modern mathematics.

**Mathematics 5213 (ST) Reading Course 3-0; or 3-0**

Directed studies in some area of Mathematical Sciences

**Mathematics 5221 (ST) Advanced Topics In**

Topology 3-0; 3-0 Prerequisite: Permission of the Department Topics from point set, algebraic and differential topology. Content varied.

**Mathematics 5281 (ST) Advanced Topics in Algebra**

3-0; 3-0 Prerequisite: Permission of the Department Topics from category theory, universal algebra, group theory, ring theory. Content varied.

**Mathematics 5301 Graduate Seminar 3-0; 3-0**

Seminars are normally presented by the instructor (s), and by students who are asked to prepare and present a number of papers. There may be separate course sections for students studying mathematics, statistics, or applied mathematics.

**Mathematics 5331 (ST) Advanced Topics in**

Statistics 3-0; or 3-0 Topics in statistics.

**Mathematics 5333 (ST) Advanced Topics in**

Probability 3-0; or 3-0 Topics in probability.

**Mathematics 5335 Statistical Consulting 1-3; or 1-3**

Students will review recent research articles pertaining to the role of the statistical consultant and to the operation of a statistical consulting laboratory, and will present short seminars on the content of these articles. Students will also be expected to engage in statistical consulting (under

Optimization/Operations  
Research/Management Science:  
Professors Huang, Liu  
Probability and Statistics:  
Professors Huang, Li  
Programming Languages:  
Professor Fiaidhi

#### GRADUATE COURSES

Courses not offered this academic year (fall/winter terms) are indicated by the words "NOT OFFERED THIS YEAR" below the course description. Nevertheless, students should refer to the Timetable as a final check.

The following courses are offered for Master's programs.

Because the content of courses may vary from year to year, students may take certain courses more than once, with departmental permission.

(Information about Course Numbering System)

Mathematics 5101 (ST)

Advanced Analysis

3-0; 3-0

May be a full course in any of the following: advanced measure theory, functional analysis, complex analysis; or a selection of topics from some or all of the preceding subjects. Content varied.

Mathematics 5201 (ST)

Reading Course

3-0; 3-0

An examination of one or more aspects of modern mathematics.

Mathematics 5211 (ST)

Reading Course

3-0; or 3-0

An examination of one or more aspects of modern mathematics.

Mathematics 5213 (ST)

Reading Course

3-0; or 3-0

Directed studies in some area of

Mathematical Sciences

Mathematics 5221 (ST)

Advanced Topics in Topology

3-0; 3-0

Prerequisite: Permission of the Department

Topics from point set, algebraic and differential topology. Content varied.

Mathematics 5281 (ST)

Advanced Topics in Algebra

3-0; 3-0

Prerequisite: Permission of the Department

Topics from category theory, universal algebra, group theory, ring theory. Content varied.

Mathematics 5301

supervision) and to provide a written summary of their activities.

Mathematics 5351 Advanced Numerical Analysis I

3-0; or 3-0 Content will vary. Advanced topics in numerical analysis may include: computational linear algebra, solution of ordinary and partial differential equations, approximation of functions, optimization, iterative methods, and problems of current research interest. Topics will be picked to complement those in Mathematics 5371.

Mathematics 5371 Advanced Numerical Analysis II

3-0; or 3-0 Content will vary. Advanced topics in numerical analysis may include: computational linear algebra, solution of ordinary and partial differential equations, approximation of functions, optimization, iterative methods, and problems of current research interest. Topics will be picked to complement those in Mathematics 5351.

Mathematics 5801 (9801) Project

Mathematics 5901 (9901) Master's Thesis

Mathematics 5991 Co-op Work Term I

Mathematics 5992 Co-op Work Term II

Mathematics 5993 Co-op Work Term III

Mathematics 5994 Co-op Work Term IV

Graduate Seminar

3-0; 3-0

Seminars are normally presented by the instructor(s), and by students who are asked to prepare and present a number of papers. There may be separate course sections for students studying mathematics, statistics, or applied mathematics.

Mathematics 5331 (ST)

Advanced Topics in Statistics

3-0; or 3-0

Topics in statistics.

Mathematics 5333 (ST)

Advanced Topics in Probability

3-0; or 3-0

Topics in probability.

Mathematics 5335

Statistical Consulting

1-3; or 1-3

Students will review recent research articles pertaining to the role of the statistical consultant and to the operation of a statistical consulting laboratory, and will present short seminars on the content of these articles. Students will also be expected to engage in statistical consulting (under supervision) and to provide a written summary of their activities.

Mathematics 5351

Advanced Numerical Analysis I

3-0; or 3-0

Content will vary. Advanced topics in numerical analysis may include: computational linear algebra, solution of ordinary and partial differential equations, approximation of functions, optimization, iterative methods, and problems of current research interest. Topics will be picked to complement those in Mathematics 5371.

Mathematics 5371

Advanced Numerical Analysis II

3-0; or 3-0

Content will vary. Advanced topics in numerical analysis may include: computational linear algebra, solution of ordinary and partial differential equations, approximation of functions, optimization, iterative methods, and problems of current research interest. Topics will be picked to complement those in Mathematics 5351.

Computer Science 5400

Computer Science Graduate Seminar

3-0; 3-0

Seminars covering areas of computer science are normally presented by the instructor(s), and by students who are asked to prepare and present a number of papers.

Computer Science 5401

Object-Oriented Programming

3-0; 3-0

This course examines the concept of object-oriented design, surveys different object-oriented programming techniques, and explores the potential of parallel execution of object-oriented programs.

Computer Science 5410

Advanced Topics in Programming Languages

3-0; or 3-0

An examination of one or more of the following topics at an advanced level: logic programming, functional programming, abstract machines, declarative semantics, design and implementation issues.

Computer Science 5411 (ST)

Advanced Topics in Computer Science

3-0; or 3-0

Topics in computer science.

Computer Science 5413 (ST)

Advanced Topics in Computer Science

3-0; or 3-0

Topics in computer science.

Computer Science 5415

Advanced Topics in Artificial Intelligence

3-0; or 3-0

This course may contain several of the following topics: logics, logic programming, natural language processing, knowledge representation, uncertain reasoning, machine learning and knowledge discovery, expert systems, and neural networks.

Computer Science 5417

Information Storage and Retrieval

3-0; or 3-0

This course focuses on the principles of information storage and retrieval and includes the following topics: indexing theory, information theory, basic retrieval models, multimedia retrieval, hypertext, and information networks.

Computer Science 5435 (ST)

Reading Course

3-0; or 3-0

Directed studies in one or more areas of computer science.

Computer Science 5437 (ST)

Reading Course

3-0; or 3-0

Directed studies in an area of computer science.

Computer Science 5471

Advanced Topics in Computer Graphics

3-0; or 3-0

An examination of one or more of the following topics at an advanced level; surface representation, solid modeling, colour, rendering, image processing, animation.

NOT OFFERED THIS YEAR

Computer Science 5800 (9800)



Project

Under the direction of a faculty member, the student will undertake a research project in an area of computer science. A significant portion of the work will involve the preparation of a written report on the research.

Mathematics 5801 (9801)

Project

Mathematics 5901 (9901)

Master's Thesis

Mathematics 5991

Co-op Work Term I

Mathematics 5992

Co-op Work Term II

Mathematics 5993

Co-op Work Term III

(Optional)

Mathematics 5994

Co-op Work Term IV

(Optional)

Section 3

The Faculty(ies) affected by the proposed calendar change

Science & Environmental Studies

**I have been consulted regarding the attached calendar change and understand the academic and budgetary implication on my Dept./School/Faculty.**

I agree to this calendar change proposal

Yes

No

Name:

Dr. Andrew Paul Dean

Faculty:

Science & Environmental Studies

Date:

11/02/2009

Signature of Dean