Change to Program/Graduate Diploma Academic Requirements Proposal Form

*The following information is required for all proposals involving a minor modification to program/graduate diploma academic requirements. To facilitate the review/approval process, please use the headings below (and omit the italicized explanations below each heading).*

**1. Program/Graduate Diploma:** Diploma in Mathematics education

**2. Effective Session of Proposed Change(s):** September 2019

**3. Proposed Change(s) and Rationale**

**a) A description of the proposed modification(s) and rationale, including alignment with academic plans.**

**Summary of changes**

1) Changes in course requirements for stand-alone graduate diploma in mathematics education

Proposal: Reduce the number of courses required for the Type 3, stand-alone, diploma from 15 to 12.

Rationale: All other diplomas in the Graduate Program in Education only require 12 credits. The number of courses for the Diploma in Mathematics Education have not changed since the inception of the diploma in 2004. The 15 credits requirement is a remnant from the diploma’s inception and does not diminish the diploma in terms of achieving learning objectives.

2) Changes to accommodate coursework only students

Proposal: Remove the requirement of thesis, major research paper.

Rationale: All other diplomas in the Graduate Program in Education offer a course only option, do not require a separate written component and are able to meet the required learning objectives. The requirement of thesis and major research paper is a remnant from the inception of the Diploma in Mathematics Education and does not diminish the diploma because all learning objectives can be achieved.

3) Changes to admission requirements

Proposal: Remove the admission and continuation requirement for students with no postsecondary background in mathematics.

Rationale: Currently, admission and continuation is based upon successful completion of Mathematics 2590 3.0/2591 3.0. These courses no longer exist (and have not been offered in the last 4 years). The courses offered through the Graduate Program in Education to complete the diploma do not require a postsecondary background in mathematics. Students interested in pursuing a diploma in mathematics education are students interested in mathematics education, who are typically confident mathematics learners, and are teachers who have completed mathematics education courses through their undergraduate education programs. This admission requirement is a remnant from the inception of the Diploma in Mathematics Education and does not diminish the diploma because of the background of the students who are interested in completing the diploma.

4) Proposal: Change the language of admissions and requirements to align with other diplomas in the Graduate Program of Education.

Rationale: By unifying the structure of each of our diplomas, we are able to provide more consistent advising and support to students.

5) Proposal: Change the course title of “**Education 5845 3.0: Mathematics and Science Understanding”** to **“Education 5845 3.0: Mathematics Understanding in the Classroom”**.

Rationale: The title of the course has changed and the new title should be reflected in the diploma requirements.

**Background**

The Graduate Program in Education has four graduate diplomas and two joint diplomas with the Graduate Program in Mathematics & Statistics and Graduate program in Environmental Studies. Through the Graduate Program in Education, diplomas can be taken concurrently with the MEd or PhD (Type 2), or taken as a stand-alone diploma (Type 3).

**Categorization of Diplomas\*:**

|  |  |
| --- | --- |
| **Name of Diploma** | **Format** |
| Early Childhood Education | Type 2; Type 3  |
| Language and Literacy Learning | Type 2; Type 3  |
| Postsecondary Education: Community, Culture and Policy | Type 2; Type 3  |
| Education in Urban Environments | Type 2; Type 3  |
| Jointly offered diplomas |
| Mathematics Education | Type 2; Type 3  |
| [Environmental/Sustainability in Education](http://edu.yorku.ca/academic-programs/graduate-studies/degrees-diplomas/environmental-sustainability-education/)  | Type 2; Type 3  |

\* According to York University’s Graduate Diploma Definitions.

***All concurrent (Type 2) diplomas in the Graduate Program in Education except for the Diploma in Mathematics Education offer a “Course work only” option. All stand-alone graduate diploma (Type 3) diplomas in the Graduate Program in Education except Mathematics education require the completion of 12 credits.***

On November 18, 2018, the Graduate Program in Education and the Graduate Program in Mathematics & Statistics met to discuss aligning the diploma in mathematics education requirements with the other diploma requirements in Education. The following faculty members were present:

* Qiang Zha, Faculty of Education, GPD
* Tina Rapke, Faculty of Education, Diploma in Mathematics Education Coordinator
* Alexey Kuznetsov, Department of Mathematics and Statistics, GPD
* Neal Madras, Department of Mathematics and Statistics, Diploma in Mathematics Education coordinator
* Mike Zabrocki, Department of Mathematics and Statistics, Previous GPD

The Graduate Program in Mathematics & Statistics is in agreement with proposed changes to accommodate coursework only students and changes in course requirements for stand-alone graduate Diploma in Mathematics Education. After the meeting, the Graduate Program in Mathematics & Statistics informed the Graduate Program in Education that it intends to close the Mathematics for Teachers Master’s Program.

The proposed changes to admission of and continuation of the diploma (student without a postsecondary background in math) does not affect the Department of Mathematics and Statistics and the Graduate Program in Mathematics & Statistics, as they have not offered the required courses in the past 4 years and the courses no longer exist.

It is anticipated that closing of program paperwork (completed by the Graduate Program in Mathematics & Statistics) will occur for the 2020-2021 calendar. The updates to the diploma, as related to the closing of the Mathematics for Teachers Master’s Program, will be addressed in the future through the Graduate Program in Mathematics & Statistics closure of program paperwork or a submission of minor changes form.

**Making the proposed changes promptly** will ensure current students and future students can follow requirements that are aligned with the other diplomas in the Graduate Program in Education.

Furthermore, aligning the requirements with other diplomas in the Graduate Program in Education will attract more students to the Diploma in Mathematics Education. There will not be an equity issue in terms of diploma requirements and admission.

The closing of the Mathematics for Teachers Master’s Program does not impact the Diploma in Mathematics Education in the Graduate Program in Education for the following reasons:

1. No resource implications: The Graduate Program in Education mounts their own courses to satisfy the requirements of the diploma.
2. Students completing the diploma ***through*** the Graduate Program in Education rarely take courses that are mounted by the Graduate Program in Mathematics & Statistics

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| --- | --- | --- | --- |
| **Cross listed courses** (Course code by the program that mounts the course) | **Term/year** | **# of Education students enrolled** | **# of MA for Teachers students enrolled** |
| **GS/MATH  5020:  Fundamentals of Math for Teachers** | Y 2017-2018 | 0 | 6 |
| **GS/MATH  5421:** **Algebra for Teachers**  | W 2017-2018 | 0 | 5 |
| **GS/MATH  5510**: **Topics in Mathematics for Teachers** | F 2017-2018 | 0 | 5 |
| **GS/MATH  5510**: **Topics in Mathematics for Teachers** | S1 2017-2018 | 1 | 4 |
| **GS/EDUC 5840:** **Mathematics Learning Environments** | F 2017-2018 | 9 | 0 |
| **GS/EDUC 5848:** **Technology and Mathematics Education** | SU 2017-2018 | 12 | 1 |
| **GS/EDUC 5841:** **Thinking about Teaching Mathematics** | F 2017-2018 | 18 | 1 |
| **GS/EDUC 5920: Research in Mathematics Education** | W 2017-2018 | 14 | 0 |
| **GS/MATH  5401:** **History of Math for Teachers** | W 2018-2019 | 1 | 1 |
| **GS/MATH  5510: Topics in Mathematics for Teachers** | F 2018-2019 | 0 | 4 |
| **GS/EDUC 5840:** **Mathematics Learning Environments** | F 2018-2019 | 9 | 1 |
| **G**S/EDUC 5840:**Mathematics Learning Environments** | SU 2018-2019 | 14 | 0 |
| **GS/EDUC 5848: Technology and Mathematics Education** | SU 2018-2019 | 10 | 0 |
| **GS/EDUC 5841:** **Thinking about Teaching Mathematics** | W 2018-2019 | 11 | 0 |
| GS/EDUC 5920: **Research in Mathematics Education** | W 2018-2019 | 9 | 1 |

1. The diploma is sustainable because it receives comparable applications for the stand-alone graduate diploma (even though there are extra requirements).

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| --- | --- | --- |
| **Name of Diploma** | **Applications to direct entry option 2019** | **Applications to direct entry option 2018** |
| Early Childhood Education | 5 | 11 |
| Language and Literacy Learning | 3 | 11 |
| Postsecondary Education: Community, Culture and Policy | 4 | 9 |
| Education in Urban Environments | 5 | 6 |
| Jointly offered diplomas |  |
| Mathematics Education | 7 | 9 |
| [Environmental/Sustainability in Education](http://edu.yorku.ca/academic-programs/graduate-studies/degrees-diplomas/environmental-sustainability-education/)  | 4 | 3 |

**b) An outline of the changes to requirements and the associated learning outcomes/objectives, including how the proposed requirements will support the achievement of program/graduate diploma learning objectives.**

Please see the attached chart for the full mapping of the diploma (**Appendix A**).

The learning outcomes for the diploma can be articulated as\*\*:

The Diploma in Mathematics education is awarded to students who have demonstrated the following:

**1. DEPTH AND BREADTH OF KNOWLEDGE**

A systematic understanding of mathematics education, including a critical awareness of current problems and/or new insights informed by current mathematics education research, and/or area of professional practice.

**2. RESEARCH AND SCHOLARSHIP**

A critical evaluation of current research and scholarship; and the ability to explore and/or address complex issues and judgments based on established principles and techniques.

**3. LEVEL OF APPLICATION OF KNOWLEDGE**

The capacity to translate research to investigate academic or professional skills, techniques, tools, practices, ideas, approaches, and/or materials.

**4. PROFESSIONAL CAPACITY/AUTONOMY**

* The ability to appreciate broader implications of applying knowledge to particular mathematics education contexts.
* The intellectual independence required for continuing professional development in mathematics education.

**5. LEVEL OF COMMUNICATIONS SKILLS**

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

**6. AWARENESS OF LIMITS OF KNOWLEDGE**

Cognizance of the complexity of mathematics education knowledge and of the potential contributions of other interpretations, methods, and disciplines.

\*\* Source for wording: <http://gradstudies.yorku.ca/current-students/regulations/degree-types/#mastersexpectations>

The proposed changes support students’ achievement of graduate diploma learning objectives by:

1. **Supporting the alignment of academic requirements across diplomas:** By unifying the structure of each of our diplomas, we are able to provide more consistent advising and support to students**.** The Diploma in Mathematics Education will also become more attractive to students who want to complete a diploma and are choosing amongst diplomas in education. Students will no longer have to complete a written component as part of the requirements. Written components are embedded in course assignments to satisfy learning objectives.
2. **Supporting the timely completion of both degree and diploma requirements:** The proposed changes allow students to enroll in enough required and elective diploma courses that they will be able to finish in three terms (full-time) or five terms (part-time) if they choose.

**c) An overview of the consultation undertaken with relevant academic units and an assessment of the impact of the modifications on other programs/graduate diplomas.**

The Graduate Program in Mathematics & Statistics was consulted. They agreed to the changes and their program is being closed (no impact on them). Please see email.

**d) A summary of any resource implications and how they are being addressed.**

No new resources are required. The Graduate Program in Education currently offers courses that can be used to satisfy the diploma requirements.

**e) A summary of how students currently enrolled in the program/graduate diploma will be accommodated.**

Student currently enrolled in degree programs/graduate diploma can use the previous diploma requirements or the new proposed requirements.

**4. Calendar Copy**

*Using the following two-column format, provide a copy of the relevant program/graduate diploma requirements as they will appear in the FGS Calendar -* [*http://gradstudies.yorku.ca/current-students/regulations/program-requirements/*](http://gradstudies.yorku.ca/current-students/regulations/program-requirements/)*.*

*Please note: Senate requires that FULL Calendar copy be provided. Please include the* entire *graduate program/diploma section, not just text that is being revised.
Please clearly and visibly indicate how graduate program/graduate diploma information has been changed using strikethrough (left column), bold, underlining, colours,* etc*. (right column).*

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| Please note that the proposed changes to the calendar description are temporary and the calendar text will be much more clear and concise, once all the text regarding the joint diploma with the Graduate Program in Mathematics & Statistics is removed/deleted. The proposed text is consistent with the text from the other diplomas in the Graduate Program in Education. |

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| --- | --- |
| Existing Program/Graduate Diploma Information(change from) | Proposed Program/Graduate Diploma Information(change to) |
| The Graduate Diplomas in Mathematics Education focus on mathematics education as an area of study grounded in critical examination of teaching practice, learning theories, and curriculum, and supported by analyses of sociocultural, equity, and gender issues in the teaching and learning of mathematics. The graduate diplomas are designed to provide opportunities for graduate study of theories and research in mathematics education, as well as enriched mathematical experiences, to practising teachers and administrators and to people in the community whose work involves developing mathematical literacies. The Graduate Diplomas in Mathematics Education are jointly offered by the Graduate Program in Education and the Graduate Program in Mathematics & Statistics. The degree concurrent option is earned in conjunction with masters or Doctoral studies; the direct entry option is offered as a stand-alone graduate diploma.~~DEGREE CONCURRENT OPTION The degree concurrent option allows students in the appropriate graduate programs at York University to specialize formally in the area of Mathematics Education. For those students who successfully complete both the graduate diploma and the masters or Doctoral degree for which they are registered, the diploma is noted on the student’s transcript and awarded at the convocation at which the degree is awarded or at the subsequent convocation.~~ ~~ADMISSION REQUIREMENTS~~ ~~Registration for the graduate diploma occurs after the candidate has been admitted to the Master of Education, the Master of Arts in Mathematics for Teachers, or the Doctoral program in Education. Applications are assessed on the basis of a statement of interest together with the information contained within the file as a whole. Consideration is given to the combined profile of demonstrated academic standing, background and experience, including professional background and experience, and potential to pursue and benefit from graduate studies. In addition, students should have a strong interest in mathematics education as a component of their plan of study. Successful completion of at least 12 university level credits in mathematics is strongly recommended as preparation for some of the courses offered within the program; however, the graduate diploma may be satisfied by taking other listed courses. Admission to and continuation in the diploma program for students with no postsecondary background in mathematics will be conditional upon successful completion of Mathematics 2590 3.0/2591 3.0 or equivalent within the first twelve months of graduate study. These six credits will be in addition to the normal requirements for the diploma~~.~~DIPLOMA REQUIREMENTS~~~~All students must successfully complete:~~~~1. 12 credits (three credits of which are in addition to their degree requirements) as follows:~~~~a) Six core credits:~~~~Either Education 5840 3.0/Mathematics & Statistics 5840 3.0:~~~~Mathematics Learning Environments, OR Education 5841 3.0/~~~~Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics, and Either Education 5210/Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education OR Education 5200 3.0: Qualitative Research Methods in Education.~~ ~~b) An additional six credits from the approved course list (see below).~~2. ~~A thesis, major research paper, or survey paper, (as part of their degree), on a mathematics education topic as outlined below: a) All diploma students in the MEd or Doctoral program in Education must write a major research project, major paper, major project, thesis or dissertation, supervised by a member of the Graduate Program in Education on a topic in mathematics education, as approved by the Graduate Diploma Coordinator. b)~~ All diploma students in the MA Program in Mathematics for Teachers must write a survey paper, supervised by a member of the MA program in Mathematics for teachers on a topic in mathematics education, as approved by the Graduate Diploma Coordinator.Approved course list Group 1 Education 5840 3.0/Mathematics & Statistics 5840 3.0: Mathematics Learning Environments; Education 5841 3.0/Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics; Education 5215 3.0: Research in Mathematics Education; Education 5845 3.0: ~~Mathematics and Science Understanding in Early Childhood~~; Education 5848 3.0: Technology and Mathematics Education 5900 3.0: Directed Reading (related to mathematics education); Education 5860 3.0: Issues in Digital Technology in Education. Group 2 Mathematics & Statistics 5020 6.0/Education 5830 3.0: Fundamentals of Mathematics for Teachers; Mathematics & Statistics 5100 6.0/Education 5831 6.0: Mathematical Literature Seminar for Teachers; Mathematics & Statistics 5400 6.0/Education 5833 6.0: History of Mathematics for Teachers; Mathematics & Statistics 5410 6.0/Education 5834 6.0: Analysis for Teachers; Mathematics & Statistics 5420 6.0/Education 5836 6.0: Algebra for Teachers; Mathematics & Statistics 5200 6.0/Education 5835 6.0: Problem Solving; Mathematics & Statistics 5300 6.0/Education 5839 6.0: Computation in Mathematics for Teachers; Mathematics & Statistics 5430 6.0/Education 5838 6.0: Statistics and Probability for Teachers; Mathematics & Statistics 5450 6.0/Education 5837 6.0: Geometry for Teachers; Mathematics & Statistics 5500 6.0/Education 5832 6.0: Topics in Mathematics for Teachers.Note: To enrol in any Group 2 course:1. Students require permission of the instructor unless a) they have a degree in mathematics, or b) they are enrolled in the MA program in Mathematics for Teachers. 2. It is strongly recommended that students have completed at least 12 university level credits (two full courses) in mathematics. For students without this background, the following two undergraduate half courses are suggested as preparation: ϖArts/Science Mathematics 2221 3.0: Linear Algebra with Applications I;, and, ϖArts/Science Mathematics 2222 3.0: Linear Algebra with Applications II. With the permission of the Graduate Diploma Coordinator, students may substitute up to two other elective half courses not on the list above but relevant to mathematics education offered in the Graduate Program in Education or the Graduate Program in Mathematics & Statistics, or other Faculty of Graduate Studies courses at York University. For additional information contact the Graduate Diploma Coordinator.~~DIRECT ENTRY~~ ~~The Direct Entry option allows students to pursue a Graduate Diploma in Mathematics Education independent of a degree program. It is noted on the student’s transcript and awarded at convocation following completion of requirements.~~ ~~ADMISSION REQUIREMENTS~~ ~~Admissions requirements for the direct-entry Graduate Diploma in Mathematics Education are the same as requirements for entry into the Masters of Education program with one exception: the statement of interest must address issues in mathematics education. Normally, applicants are required to have an honours degree OR a bachelors degree plus a Bachelor of Education; and a B average over the final two years of study. Admission to and continuation in the diploma program for students with no postsecondary background in mathematics will be conditional upon successful completion of Mathematics 2590 3.0/2591 3.0 or equivalent within the first twelve months of graduate study. These six credits will be in addition to the normal requirements for the diploma.~~ ~~DIPLOMA REQUIREMENTS~~ ~~All students must successfully complete 15 credits (5 half courses) as follows:~~ 1. As a core requirement, either Education 5840 3.0/Mathematics & Statistics 5840 3.0: Mathematics Learning Environments, or Education 5841 3.0: Thinking about Teaching Mathematics. 2. ~~12 additional credits~~ from the approved course ~~listing (see~~ below). Note: Students may count for credit only one of Education 5210 3.0/Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education OR Education 5200 3.0: Qualitative Research Methods in Education.Approved course list Group 1 Education 5840 3.0/Mathematics & Statistics 5840 3.0: Mathematics Learning Environments;Education 5841 3.0/Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics; Education 5215 3.0: Research in Mathematics Education; Education 5845 3.0: ~~Mathematics and Science Understanding in Early Childhood~~; Education 5900 3.0: Directed Reading (related to mathematics education); Education 5860 3.0: Issues in Digital Technology in Education. Group 2 Mathematics & Statistics 5450 6.0/Education 5837 6.0: Geometry for Teachers; Mathematics & Statistics 5100 6.0: Mathematical Literature Seminar for Teachers; Mathematics & Statistics 5200 6.0: Problem Solving; Mathematics & Statistics 5300 6.0: Microcomputers for Teachers; Mathematics & Statistics 5500 6.0: Topics in Mathematics for Teachers; Mathematics & Statistics 5020 6.0: Fundamentals of Mathematics for Teachers; Mathematics & Statistics 5400 6.0: History of Mathematics for Teachers; Mathematics & Statistics 5410 6.0: Analysis for Teachers; Mathematics & Statistics 5420 6.0: Algebra for Teachers; Mathematics & Statistics 5430 6.0: Probability, Statistics and Computing for Teachers.Note: To enrol in any Group 2 course: 1. Students will require permission of the instructor unless they have a degree in mathematics. 2. It is strongly recommended that students have completed at least 12 university level credits (two full courses) in mathematics. For students without this background, the following two undergraduate half courses are suggested as preparation: ϖArts/Science Mathematics 2221 3.0: Linear Algebra with Applications I, and ϖArts/Science Mathematics 2222 3.0: Linear Algebra with Applications II. ~~With the permission of the Graduate Diploma Coordinator, students may substitute up to two other elective half courses not on the list above but relevant to mathematics education offered in the Graduate Program in Education or the Graduate Program in Mathematics & Statistics, or other Faculty of Graduate Studies courses at York University.~~~~For additional information, contact the Graduate Diploma Coordinator: Professor Tina Rapke, Graduate Program in Education, 257 Winters College, York University, 4700 Keele Street, Toronto, Ontario, M3J 1P3; (416) 736 2100, extension 88780.~~ | The Graduate Diplomas in Mathematics Education focus on mathematics education as an area of study grounded in critical examination of teaching practice, learning theories, and curriculum, and supported by analyses of sociocultural, equity, and gender issues in the teaching and learning of mathematics. The graduate diplomas are designed to provide opportunities for graduate study of theories and research in mathematics education, as well as enriched mathematical experiences, to practising teachers and administrators and to people in the community whose work involves developing mathematical literacies. The Graduate Diplomas in Mathematics Education are jointly offered by the Graduate Program in Education and the Graduate Program in Mathematics & Statistics. The degree concurrent option is earned in conjunction with masters or Doctoral studies; the direct entry option is offered as a stand-alone graduate diploma.The graduate diploma is offered in two ways through the Graduate Program in Education:Concurrent (Option A): The requirements for the Graduate Diploma in Mathematics Education are completed concurrently with a Master’s or Doctoral degree. This is referred to as a “type 2” diploma.Direct-entry (Option B): The Graduate Diploma in Mathematics Education can be completed as a stand-alone non-degree diploma. This is referred to as a “type 3” diploma.ADMISSION REQUIREMENTS Both concurrent (type 2) and direct-entry (type 3) graduate diploma candidates must apply to and be accepted as students in the Graduate Program in Education: Language, Culture and Teaching. Admission requirements are the same as for the MEd and PhD programs.The graduate diploma is offered in two ways through the through the MA Program in Mathematics for Teachers:Concurrent (Option A): The requirements for the Graduate Diploma in Mathematics Education are completed concurrently with the MA Program in Mathematics for Teachers. This is referred to as a “type 2” diploma.ADMISSION REQUIREMENTSThe concurrent (type 2) graduate diploma candidates must apply to and be accepted as students in the MA Program in Mathematics for Teachers. Admission requirements are the same as for the MA Program in Mathematics for Teachers.For application deadlines, please consult the Graduate Admissions website:http://futurestudents.yorku.ca/graduate/programs/DIPLOMA REQUIREMENTS**Concurrent (Option A) – Type 2****One three-credit course** must be taken in addition to those required for the completion of an MEd or PhD.MEd course-only students must complete **27 credits** in total:* **two three-credit core courses**:

Either **Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments** or **Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics**, and **Either** **Education 5210 / Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education** or **Education 5200 3.0: Qualitative Research Methods in Education*** **two three-credit courses** from the approved course list (below)
* plus **15 additional graduate credits selected by the student, as required for the degree program.**

MEd major research project students must complete **21 credits** in total:* **two three-credit core courses**:

Either **Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments** or **Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics**, and **Either Education 5210 / Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education** or **Education 5200 3.0: Qualitative Research Methods in Education*** **two three-credit courses** from the approved course list (below)
* plus **9 additional graduate credits selected by the student, as required for the degree program.**

MEd thesis students must complete **15 credits** in total:* **two three-credit core courses**:

Either **Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments** or **Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics**, and **Either Education 5210 / Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education** or **Education 5200 3.0: Qualitative Research Methods in Education*** **two three-credit courses** from the approved course list (below)
* plus **3 additional graduate credits selected by the student, as required for the degree program.**

PhD dissertation students must complete **24 credits** in total:* **two three-credit core courses**:

Either **Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments** or **Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics**, and **Either Education 5210 / Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education** or **Education 5200 3.0: Qualitative Research Methods in Education*** **two three-credit courses** from the approved course list (below)
* plus **12 additional graduate credits selected by the student, as required for the degree program.**

MA Program in Mathematics for Teachers students must:1. Successfully complete: 12 credits (three credits of which are in addition to their degree requirements) as follows:

a) Six core credits:**Either Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments OR Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics, and Either Education 5210 / Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education** OR **Education 5200 3.0: Qualitative Research Methods in Education.** b) An additional six credits from the approved course list (see below).1. Write a survey paper, supervised by a member of the MA program in Mathematics for teachers on a topic in mathematics education, as approved by the Graduate Diploma Coordinator.

Approved course list Group 1:**Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments;** **Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics;** **Education 5215 3.0: Research in Mathematics Education;** **Education 5845 3.0: Mathematics Understanding in the Classroom;** **Education 5848 3.0: Technology and Mathematics** **Education 5900 3.0: Directed Reading (related to mathematics education);** **Education 5860 3.0: Issues in Digital Technology in Education**. Group 2 **Mathematics & Statistics 5020 6.0 / Education 5830 3.0: Fundamentals of Mathematics for Teachers;** **Mathematics & Statistics 5100 6.0 / Education 5831 6.0: Mathematical Literature Seminar for Teachers; Mathematics & Statistics 5400 6.0 / Education 5833 6.0: History of Mathematics for Teachers;** **Mathematics & Statistics 5410 6.0 / Education 5834 6.0: Analysis for Teachers;** **Mathematics & Statistics 5420 6.0 / Education 5836 6.0: Algebra for Teachers;** **Mathematics & Statistics 5200 6.0 / Education 5835 6.0: Problem Solving;** **Mathematics & Statistics 5300 6.0/Education 5839 6.0: Computation in Mathematics for Teachers;** **Mathematics & Statistics 5430 6.0/Education 5838 6.0: Statistics and Probability for Teachers;** **Mathematics & Statistics 5450 6.0/Education 5837 6.0: Geometry for Teachers;** **Mathematics & Statistics 5500 6.0/Education 5832 6.0: Topics in Mathematics for Teachers.**Note: To enrol in any Group 2 course:1. Students require permission of the instructor unless a) they have a degree in mathematics, or b) they are enrolled in the MA program in Mathematics for Teachers.
2. It is strongly recommended that students have completed at least 12 university-level credits (two full courses) in mathematics. For students without this background, the following two undergraduate half courses are suggested as preparation:
* Arts/Science Mathematics 2221 3.0: Linear Algebra with Applications, and,
* Arts/Science Mathematics 2222 3.0: Linear Algebra with Applications II.

With the permission of the Graduate Diploma Coordinator, students may substitute up to two other elective half courses not on the list above but relevant to mathematics education offered in the Graduate Program in Education or the Graduate Program in Mathematics & Statistics, or other Faculty of Graduate Studies courses at York University. For additional information contact the Graduate Diploma Coordinator.DIPLOMA REQUIREMENTS**Direct Entry (Option B) – Type 3**Students must complete 12 credits in total: 1. As a core requirement, either **Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments** or **Education 5841 3.0: Thinking about Teaching Mathematics.** 2. Three three-credit courses from the approved course list (below). Note: Students may count for credit only one of **Education 5210 3.0 / Mathematics & Statistics 5910 3.0: Quantitative Research Methods in Education** or **Education 5200 3.0: Qualitative Research Methods in Education.**Approved course list Group 1 **Education 5840 3.0 / Mathematics & Statistics 5840 3.0: Mathematics Learning Environments;****Education 5841 3.0 / Mathematics & Statistics 5900 3.0: Thinking about Teaching Mathematics;** **Education 5215 3.0: Research in Mathematics Education;** **Education 5845 3.0: Mathematics Understanding in the Classroom;** **Education 5900 3.0: Directed Reading (related to mathematics education);** **Education 5860 3.0: Issues in Digital Technology in Education**.Group 2 **Mathematics & Statistics 5450 6.0 / Education 5837 6.0: Geometry for Teachers;** **Mathematics & Statistics 5100 6.0: Mathematical Literature Seminar for Teachers;** **Mathematics & Statistics 5200 6.0: Problem Solving; Mathematics & Statistics 5300 6.0: Microcomputers for Teachers;** **Mathematics & Statistics 5500 6.0: Topics in Mathematics for Teachers;** **Mathematics & Statistics 5020 6.0: Fundamentals of Mathematics for Teachers;** **Mathematics & Statistics 5400 6.0: History of Mathematics for Teachers;** **Mathematics & Statistics 5410 6.0: Analysis for Teachers; Mathematics & Statistics 5420 6.0: Algebra for Teachers; Mathematics & Statistics 5430 6.0: Probability, Statistics and Computing for Teachers.**Note: To enrol in any Group 2 courses: 1. Students will require permission of the instructor unless they have a degree in mathematics. 2. It is strongly recommended that students have completed at least 12 university-level credits (two full courses) in mathematics. For students without this background, the following two undergraduate half courses are suggested as preparation: * **Arts/Science Mathematics 2221 3.0: Linear Algebra with Applications I**, and
* **Arts/Science Mathematics 2222 3.0: Linear Algebra with Applications II**.

With the permission of the Graduate Diploma Coordinator, students may substitute up to one three-credit course relevant to early childhood education offered in graduate programs at York or other universities.For more information, contact the Graduate Program in Education, 282 Winters College, York University, 4700 Keele Street, Toronto, Ontario, M3J 1P3. gradprogram@edu.yorku.ca . |
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Please submit completed forms and required supporting documentation by email to the Coordinator, Faculty Governance– fgsgovrn@yorku.ca