Calendar Description:
The professional and theoretical perspectives associated with learning and pedagogy in mathematics will be explored. Participants will be expected to reflect critically on both theory and practice, based on psychological, epistemological, mathematical, and current pedagogical and curricular approaches, in light of how mathematics is taught in schools. Two hours per week, .5 credit, Full Year course.

Learning Outcomes:
“Effective teaching requires the use of a range of teaching styles and techniques, in order to make choices, accommodate change and meet student needs” (OCT - Standards of Practice). Rather than transmit information, teachers must transform knowledge so as to make it accessible to others. Children learn in a variety of ways; therefore, teachers must have multiple pedagogical strategies to assist Ontario’s diverse and changing society.

Pre-service candidates will:

- review, discuss, and reflect on theory and research on teaching and learning mathematics;
- prepare for teaching mathematics in the primary, junior and intermediate grades in accordance with OCT Standards of Practice;
- discuss points of view on mathematics education and refine individual philosophies with regard to teaching and learning mathematics;
- actively engage in mathematics activities and share learning and teaching experiences;
- explore, share, and reflect on emerging technologies in mathematics education;
- and actively engage in and reflect on lesson planning and sequencing which enable teachers to create optimal classroom environments in which children of all ability ranges might attain a high level of success.
Through active sharing of experiences and active engagement in mathematics activities pre-service candidates will achieve the following course-level learning outcomes:

**Course-Level Learning Outcomes**

**Knowledge**
- Develop knowledge of major mathematical, pedagogical and instructional concepts and strategies.
- Develop a critical understanding of changes in and theories of learning and teaching mathematics, and the application of these changes and theories to the current Ontario curriculum and provincial policy documents.
- Refine the ability to: i) critically gather, review, discuss, and reflect on points of view, theory and research on teaching and learning mathematics; and ii) select the most appropriate and creative options relevant to a teaching and learning situation.

**Knowledge of Methodologies**
- Develop a solid understanding of major aspects, a range of strategies and varied methods of teaching, assessment and evaluation of learning mathematics; and refine individual points of views and philosophies with regard to learning, teaching, assessing and evaluating of learning.
- Ability to use technology as a teaching tool, and to understand how mathematics-specific technological tools are changing how mathematics is taught.

**Application of Knowledge**
- Develop the ability to make critical use of teaching resources, research summaries and policy documents relevant to student leaning of mathematics in Ontario elementary schools.
- Develop the ability to adapt and design lesson and unit plans which enable teachers to create optimal classroom environments in which children of all ability ranges might attain a high level of success.

**Communication Skills**
- Develop the ability to interact, to communicate and to collaborate effectively with learners, school staff, members of other professions, learner’s parents/guardians, and the community using language, representations, and reasoning about mathematics learning that is appropriate to the context.
- Develop skills for organizing and managing various classroom styles including skills for managing learning in groups, and learning with physical and digital tools.

**Awareness of Limits of Knowledge**
- Develop the ability to recognize, consult, research, reason and solve problems of practice from a range of contexts, including but not limited to the context of diversity among learners.
- Develop an awareness of how teaching and learning of mathematics changes with changes in society and with advances in technology.

**Autonomy and Professional Capacity**
- Prepare for teaching mathematics in the primary and junior grades in accordance to The Ontario College of Teacher’s “Standards of Practice for the Teaching Profession” and “Ethical Standards for the Teaching Profession.”
- Demonstrate interest and take an active role in one’s own professional journey in learning to teach mathematics as well articulate an understanding that one’s own knowledge, abilities, skills, values, beliefs, and attitudes influence their decision making in the profession of teaching.
- Demonstrate an understanding that teaching mathematics in ways that develop learners’ conceptual understanding and procedural proficiency is an ethical and compassionate act.
**Course Content:**
This course will focus on introducing the pre-service teachers to:

- research and theory of mathematics education;
- mathematics curriculum for the primary, junior and intermediate grades;
- mathematics pedagogy and classroom practice;
- rich mathematics contexts to engage students;
- differentiated instruction and Universal Design for Learning;
- technology to enhance student learning;
- resources for lesson planning and professional, life-long learning.

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Course Reading Requirements: All required readings are available online

- The Ontario Curriculum, grades 1-8: Mathematics
- A Guide to Effective Instruction in Mathematics, K-6: Volumes 1 - 5
- A Guide to Effective Instruction in Mathematics, K-3 and 4-6 (strand specific guides)
- Paying Attention to Algebraic Reasoning
- Paying Attention to Proportional Reasoning
- Paying Attention to Fractions
- Paying Attention to Spatial Reasoning
- Growing Success: Assessment, Evaluation and Reporting (Grades 1-12)

Other useful readings:


Small, M. (2010). *Big Ideas from Dr. Small, Creating a Comfort Zone for Teaching Mathematics, K-3 and 4-8*, Nelson: USA.


Assignments and Other Course Requirements:

35% - On-line Discussions/Journals/Lesson Consolidation and Participation:

Weeks 2, 4, 6, 12

You will participate in online discussions in OWL and other online platforms. You will be posting and responding to classmates about assigned readings, classwork, Math4Teacher activities, and personal experiences. Assignments will be submitted through “ASSIGNMENTS” in OWL for assessment and feedback. In addition, you will also be assessed on the quality of your in-class participation. REGULAR ONLINE AND IN CLASS ATTENDANCE IS REQUIRED.

20% Analysis of Mathematics Teaching Approach (Lesson Plan and Rationale):

Week 8

Select a Mathematics teaching idea and adapt it to create a detailed lesson plan with rationale. Choose a specific strand, grade, and cluster of expectations, using the 3-part lesson plan template provided. Discuss your rationale based on “knowledgeable others” and classroom experiences.

**What will you teach?** – Choose an overall expectation and supporting specific and process expectations from the mathematics curriculum that address your selected mathematics teaching idea.

**How will you teach it?** – Prepare a 3-part problem solving lesson plan that addresses the expectations. Include math materials, questions and prompts.

**What will you see?** - Anticipate student responses – How will the students solve this problem? What might be common misconceptions? Use diagrams when needed.
How will you know the expected learning took place? – Create a follow-up task. Based on observation and the consolidation, consider the lesson follow-up/task and the opportunities they present to evaluate student competency.

Why did you create the lesson plan this way? – Prepare a rationale based on research of the best practices for teaching this specific topic in mathematics.

30% Learning In Depth Group Collaboration Project:

Week 16

20% - Group Component: Working in groups of 4-5, research a Mathematics teaching idea and write a report about the topic. Become experts in the topic both mathematically and pedagogically. Based on your research, prepare a sequence of Mathematics lessons (a 5-day continuum), develop a home-school connection task that continues the learning at home and provides students with an engaging answer to the question, What did you learn in math class today? and develop assessment strategies for the activities in your lessons. Lastly, share key findings from your research through an interactive task as you present to the class.

10% - Individual Component: As part of the 5-day continuum, create a lesson plan. Include all components of a 3-part lesson and demonstrate progression from one lesson to the next.

15% - Mathematics In-class Assignment:

Week 18

During the final class you will be asked to respond to some of the Mathematics encountered during Math4Teacher activities, problem-solving, and other pedagogy of mathematical situations explored in class. This will be an "open book" assignment, using the format of a 3-part lesson plan. You will be given a set of curriculum expectations with choice as to the grade level you would prefer. You will develop a lesson plan, including an activation, investigation and consolidation. The consolidation will include anticipated student responses, questions and prompts to encourage and extend the learning. You will also consider big ideas, differentiated instruction and accommodations to meet the needs of a variety of learners. You are encouraged to use words, pictures, symbols, diagrams and/or tables. Finally, you will include a rationale explaining the value of the components of your lesson plan in relation to the expectations, strand, and grade, as well as exemplary pedagogy for teaching mathematics today connecting to course readings, activities, and on-line discussions.

The major assignments of this course are intended to be of a most practical nature – they are what we as teachers, do every day. Be sure to use the rubrics to help plan, monitor, and self-assess as you complete each assignment. All assignments will be explained and discussed in class but will also be posted along with rubrics in online platform for this course, OWL.
Policy Statements:

Accessibility: The University of Western Ontario is committed to recognizing the dignity and independence of all students and seeks to ensure that persons with disabilities have genuine, open and unhindered access to academic services. Please contact the course instructor if you require course materials in an alternative format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for information about requesting academic accommodation, or go to the following website: http://www.edu.uwo.ca/programs/preservice-education/documents/policies/Accessibility_Western.pdf

Attendance: The B.Ed. program is an intense and demanding programs of professional preparation. You are expected to demonstrate high levels of both academic and professional integrity. Such integrity is demonstrated in part by your commitment to and attendance at all classes, workshops, tutorials, and practicum activities. Read more about the Faculty’s attendance policy on-line: http://www.edu.uwo.ca/programs/preservice-education/Attendance2016.pdf

Excused Absences: If you are ill, require compassionate leave, or must miss classes for religious observance, your absence is excused; you will not be penalized but you are responsible for work missed.

Unexcused Absences: Any absence that is not a result of illness, bereavement, or religious observance is an unexcused absence. Three unexcused absences will result in you being referred to the Associate Dean and placed on academic probation. Any further unexcused absence will result in failure of the course and withdrawal from the program.

Language Proficiency: In accordance with regulations established by the Senate of the University, you must demonstrate the ability to write clearly and correctly. Work which lacks proficiency in the language of instruction is unacceptable for academic credit, and will either be failed or, at the discretion of the instructor, returned to you for revision to an acceptable level.

Late Penalties: Normally, the only acceptable reasons for late or missed assignments are illness (which you must report to the Teacher Education Office) or extreme compassionate circumstances. Unexcused late assignments may be penalized.

Academic Offences: Scholastic offences are taken very seriously in this professional Faculty. You are, after all, going to be a teacher. Read about what constitutes a Scholastic Offence at the following Web site: http://www.edu.uwo.ca/programs/preservice-education/documents/policies/WEB_ScholasticDiscipline.pdf

Plagiarism: Plagiarism means presenting someone else’s words or ideas as your own. The concept applies to all assignments, including lesson and unit plans, laboratory reports, diagrams, and computer projects. For further information, consult your instructors, the Associate Dean’s Office, and current style manuals. Advice about plagiarism and how to avoid it can also be found here: http://www.edu.uwo.ca/programs/preservice-education/documents/policies/WEB_PlagiarismPolicy.pdf

Plagiarism-Checking:

a. All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com)
Use of Laptops & Notebooks in Class: As a courtesy to members of the class, please put your cell phone on ‘vibrate’ or turn it off during class. Laptops and other electronic devices may be used in a professional manner to facilitate your activities in the course, but out of courtesy to colleagues and the instructor, please do not engage in personal networking and non-course communication during class time – save it for before or after class, or for the break.

SUPPORT SERVICES
A variety of support services are available at Western.
If you need advice or assistance, do not hesitate to get in touch with any of these services.

FINANCIAL ASSISTANCE: Registrarial Services (http://www.registrar.uwo.ca)

WRITING SUPPORT: Student Development Centre (http://www.sdc.uwo.ca/)

LEARNING SKILLS SUPPORT: Student Development Centre (http://www.sdc.uwo.ca/)

INTERNATIONAL STUDENTS: Student Development Centre (http://www.sdc.uwo.ca/)

ABORIGINAL STUDENTS: Student Development Centre (http://www.sdc.uwo.ca/)

STUDENTS with DISABILITIES: Student Development Centre (http://www.sdc.uwo.ca/)

SOCIAL & CULTURAL ISSUES: University Students’ Council (http://westernusc.ca/services/).

EMOTIONAL or MENTAL DISTRESS: Students who are in emotional or mental distress should refer to Mental Health @ Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

B.Ed. PROGRAM ISSUES: zouber@uwo.ca, Teacher Education Office, room 1166

NEED HELP but not sure what to do: zouber@uwo.ca, Teacher Education Office, room 1166
**Additional Information:**

**About the Course:**

The course should ‘stretch’ you in new ways:

- to see mathematics for the beauty that it explores
- to develop strategies that enable learners to establish a mathematical basis on which to build and extend their world
- to integrate mathematics with other subjects

**About the Instructor:**

I have been a teacher for 24 years. For the past seven years, I have worked as a Learning Coordinator for Mathematics, K-8 for the Thames Valley District School Board. In this role I coordinate and facilitate Ministry math initiatives at the system and provincial level. I work with teachers – facilitating their professional learning in mathematics, co-planning, co-teaching and supporting them in developing their mathematics programs. I have been seconded to the Ministry of Education and will be starting a new role this fall, as a Student Achievement Officer, supporting student achievement in mathematics in different school boards in South Western Ontario.

I believe that students must construct their own understanding of mathematics. As teachers, our role is to provide opportunities, to question, to model and to offer different representations to support students in constructing this understanding. I am passionate about teaching and learning and I believe that all students can learn mathematics. With concrete models, hands-on explorations and open questions – strategies that are good for all, but necessary for some – we as teachers can make mathematics accessible to all students.

I have taught Additional Qualifications in Mathematics and Mathematics for Teachers as part of the Masters program here at Western University. This will be my second year as an instructor for Teaching and Learning Mathematics Today – Primary/Junior/Intermediate. It is my goal to provide you with a solid foundation for teaching mathematics. We will explore different representations and strategies to engage students and to help them and you, enjoy and understand mathematics.

**Assignment Guidelines:**

The rubrics that will be used to assess all assignments are posted in OWL. You are encouraged to use these rubrics as a guide when completing assignments. Assignments will be submitted using the ‘Assignments’ tab in OWL.