

EDUC 5236

Mathematics for Teachers

Instructors:

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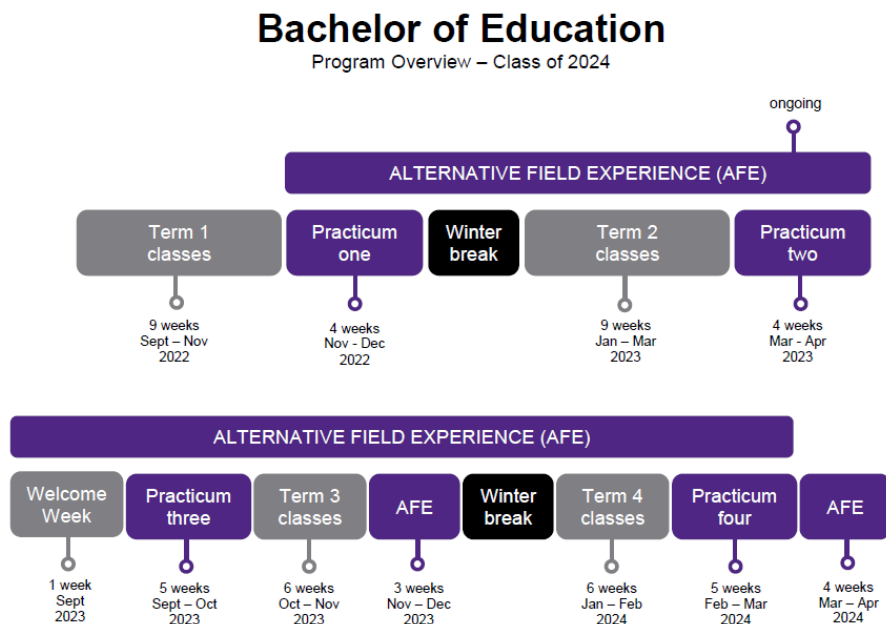
Office Hours: 10:00-11:15am

Schedule:

Mondays, 2:30-4:30pm

Program Context:

This is a **Curriculum Course** taken by Teacher Candidates in **Mathematics** during **Year 1, Full Year** of the Bachelor of Education.



Course Information:

“Effective teaching of mathematics requires that the teacher understand the mathematical concepts, procedures, and processes that students need to learn, and use a variety of instructional strategies to support meaningful learning.”
(The Ontario Curriculum, Mathematics. 2007)

The goal of the course is to develop pedagogical content knowledge for teaching intermediate/senior mathematics by putting emphasis on the conceptual content of the mathematics curriculum. The intermediate/senior mathematics concepts will be explored and presented in the historical context of their development, in the context of connections across the topics and different strands in mathematics. Teaching strategies will be developed based on conceptual understanding of the mathematics curriculum topics and the needs of intermediate/senior students.

This course provides an opportunity for students to explore in depth the key mathematical concepts necessary for successful teaching intermediate/senior mathematics in Ontario. The overview has a strong focus on the procedures and processes that best enable students to understand mathematical concepts and learn related skills. The curriculum expectations and their interconnections are explored with the focus of the big ideas of the intermediate/senior mathematics.

The focus of the first term is the key concepts of the intermediate curriculum. The focus of the second term is the key concepts of the senior curriculum. Course Materials: There are no required materials for this course. You will be provided with electronic/paper documents and links to various websites instead.

Number of Weeks: 18

Week 1: Pedagogical Content Knowledge for Math Educator

Teacher Candidates demonstrate an understanding of the professionalism required of them to teach and support pupil learning and achievement.

Teacher Candidates develop and understanding of how to develop an environment for learning that encourages pupils to be problem solvers, decision makers, lifelong learners, and contributing members of a changing society.

Assessment Activities

Type	Name	Description
Formative Assessment	Online	Reading Course Syllabus
	participation in the Discussion Forum	Posting reflections on the purposes of school mathematics

Week 2: Grades 9/10 Mathematics Curriculum: Number Sense. Part 1

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities.

Assessment Activities

Type	Name	Description
Formative Assessment	Group work in the thinking classroom format	The focuses of the course
		The Tree of Mathematics - which branches are included in the school curriculum
		The Language of Mathematics

Week 3: Grades 9/10 Mathematics Curriculum: Number Sense, Part 2

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities

Assessment Activities

Type	Name	Description
Formative Assessment	Group work in the thinking classroom format	Number Sense: foundation for success in mathematics Student misconceptions and difficulties

Week 4: Grades 9/10 Mathematics Curriculum: Number Sense, Part 3

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates create and refine their process of pedagogical documentation of

- a variety of effective teaching and assessment practices.
- a variety of effective classroom management strategies.
- how pupils learn and the factors that influence pupil learning and achievement.

Assessment Activities

Type	Name	Description
Formative Assessment	Math Task # 1	Number Sense: Why fractions are so hard to understand and operate on?

Week 5: Grades 9/10 Mathematics Curriculum: Measurement

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities.

Assessment Activities

Type	Name	Description
Formative Assessment	Group work in the thinking classroom format	Number Sense: Negative numbers and their role in expanding number systems

Week 6: Grades 9/10 Mathematics Curriculum: Algebra Part 1

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Assessment Activities

Type	Name	Description
Formative Assessment	Math Task # 2	Geometry and Measurement: Is the formula sheet that students use a help or hindrance?

Week 7: Grades 9/10 Mathematics Curriculum: Algebra Part 2

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed

by the Ontario curriculum, and education related legislation.

Assessment Activities

Type	Name	Description
Formative Assessment	Expert Groups	Algebra: What is the central concept of algebra? Algebra as extended arithmetic

Week 8: Grades 9/10 Mathematics Curriculum: Analytic Geometry

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Assessment Activities

Type	Name	Description
Formative Assessment	Hands-on Exploration	Algebra: Manipulatives for algebra

Week 9: Grades 9/10 Mathematics Curriculum: Trigonometry

Teacher Candidates engage in ongoing professional learning and apply it to improve their teaching practices

Assessment Activities

Type	Name	Description
Formative Assessment	Math Task # 3	Analytic or coordinate geometry - origins and initial purposes

Week 10: Grades 11/12 Mathematics Curriculum: Functions Part 1

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities.

Assessment Activities

Type	Name	Description
Formative Assessment	Group work in the thinking classroom format	Functions: the central concept of the senior math curriculum. Main difficulties students experience while conceptualizing the concept of functions

Week 11: Grades 11/12 Mathematics Curriculum. Functions Part 2

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Assessment Activities

Type	Name	Description
Formative Assessment	Math Task # 4	Transformations of functions - teaching through investigation

Week 12: Grades 11/12 Mathematics Curriculum: Functions Part 3

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities.

Assessment Activities

Type	Name	Description
Formative Assessment	Individual Exploration	Calculus: what is so hard about calculus?

Week 13: Grades 11/12 Mathematics Curriculum: Functions Part 4

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates create and refine their process of pedagogical documentation of

- a variety of effective teaching and assessment practices.
- a variety of effective classroom management strategies.
- how pupils learn and the factors that influence pupil learning and achievement.

Assessment Activities

Type	Name	Description
Formative Assessment	Group work in the thinking classroom format	Data management and probability strand Probability for real life

Week 14: Grades 11/12 Mathematics Curriculum: T: Calculus:

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities.

Assessment Activities

Type	Name	Description
Formative Assessment	Math Task # 5	Data Science: a new focus of upcoming curriculum

Week 15: Grade 12 Mathematics Curriculum: Data management and probability

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Teacher Candidates use appropriate technology in their teaching practices and related professional responsibilities.

Assessment Activities

Type	Name	Description
Formative Assessment	Paired activities shared with class	Mathematical Modeling: a new focus of upcoming curriculum

Week 16: Grade 9/10/11/12 Mathematics Curriculum: Financial Literacy

Teacher Candidates demonstrate knowledge of their subject matter, and an awareness of how their work is governed by the Ontario curriculum, and education related legislation.

Learning Activities

Type	Name	Description
Reading	Weekly Reading	http://www.edugains.ca/newsite/Financial/it/secondaryresources/math.html

Assessment Activities

Type	Name	Description
Formative Assessment	Weekly Activity	Exploring under-explored topics of the course

Week 17: Grade 9/10/11/12 Mathematics Curriculum: Mathematical Literacy, Part 2

Teacher Candidates develop and understanding of how to develop an environment for learning that encourages pupils to be problem solvers, decision makers, lifelong learners, and contributing members of a changing society.

Assessment Activities

Type	Name	Description
Formative Assessment	Math Task # 6	The big questions of teaching and learning math today What constitutes mathematical literacy in 21st century - looking ahead for a new math curriculum

Week 18: Collaboration Session

Teacher Candidates engage in ongoing professional learning and apply it to improve their teaching practices.

Assessment Activities

Type	Name	Description
Formative Assessment	Resource Scrapbook	Wrap-up session Discussing next steps

This course meets the following Competencies:

Assessment
Differentiated Instruction
Lesson Plans
Ministry of Education Curriculum
Rubrics
Technology in the Classroom
University Design for Learning

Assessment and Course-Specific Grading Policies:

6 Math Tasks

The parallel tasks that are aimed for students to dig deeper into the concepts of the Ontario Mathematics Curriculum
The due dates are indicated in the course outline.

Resource Scrapbook

Resource Scrapbook is your collection of professional useful information acquired during the course.
Due: 04/03/202

Class Work/Participation (Ongoing)

Class work/Participation: Attendance is a major but not only factor. Students are expected to

- actively participate in class discussions and problem-solving
- share their knowledge of mathematics
- pose relevant and meaningful questions

How to Protect Your Professional Integrity:

The Bachelor of Education is an intense and demanding program of professional preparation. Teacher Candidates are expected to demonstrate high levels of academic commitment and professional integrity that align with both Western University's Academic Rights and Responsibilities and the Professional Standards and Ethical Standards set by the Ontario College of Teachers. These expectations govern your time in class, in your Practicum, in your Alternative Field Experiences, and include the appropriate use of technology and social media.

The Teacher Education Office will only recommend teacher candidates for Ontario College of Teachers certification when candidates have demonstrated the knowledge of, and adherence to, the faculty policies throughout the two-year program.

To review the policies and practices that govern the Teacher Education program, including attendance, plagiarism, progression requirements, safe campus and more, visit: edu.uwo.ca/CSW/my-program/BEd/policies.html

Faculty of Education Pass/Fail Policy:

All courses and assignments in the Bachelor of Education are assessed as Pass/Fail.

Instructors will make the Success Criteria of the assignments clear, and refinements of the criteria may take place in class as a means of co-constructing details of the assignments in the first two weeks of a course. This will allow for differentiation of process, product and timeline depending upon student needs.

Success Criteria will

- Articulate what needs to occur to demonstrate learning outcomes for a course/assignment;
- Inform the instructional process so that teaching can be adapted to ensure students continue to remain on track to meet the criteria as needed and appropriate.
- Align with the assignments created to provide opportunities for students to demonstrate the knowledge, skills and abilities they are working toward;
- Establish clear descriptive language that allows Teacher Candidates to identify, clarify and apply the criteria to their work and to their engagement in peer feedback;
- Focus the feedback on progress toward meeting the overall and specific tasks/assignment goals for the course.

Participation

Participation is essential to success in the Teacher Education program. As a professional school, you need to treat coming to class as showing up for work in the profession. If you are not in class, you cannot participate. Actively participating in discussions, peer reviews/feedback, group work and activities is integral to the development of your own learning and to the learning within your classroom community.

Given the varied experiences of Teacher Candidates in the program, you may engage with ideas/concepts or skills that are familiar or unfamiliar to you.

A Professional Teacher Candidate is one who:

- Arrives in class (virtual or on-site) on time, and prepared. This includes completing any readings, viewing assignments or tasks in advance of class as requested.
- Listens to others and contributes thoughtfully to discussions;
- Models respectful dialogue and openness to learn, monitors, self-assesses and reformulates one's prior beliefs and understandings in light of new information;
- Monitors and addresses their wellness, practices self-care, and seeks appropriate support when necessary.

Ontario Curriculum & Supplementary Resources:



**Curriculum &
Resources**

dcp.edu.gov.on.ca/en

Campus Services & Resources:



**Health and
Wellness**

uwo.ca/health



Peer Support

westernusc.ca



Learning Skills

uwo.ca/sdc/learning



**Indigenous
Services**

Indigenous.uwo.ca



**Student Accessibility
Services**

sdc/uwo.ca/ssd



Writing Support

writing.uwo.ca



**Financial
Assistance**

registrar.uwo.ca



Not sure who to ask?

Contact the Teacher Education Office at
eduwo@uwo.ca