

EDUC 5180K

Teaching & Learning Mathematics (Junior/Intermediate)

Instructor:

Vera Sarina, PhD 001 (JI)
E: vsarina@uwo.ca
Office Hours: by appointment

Schedule:

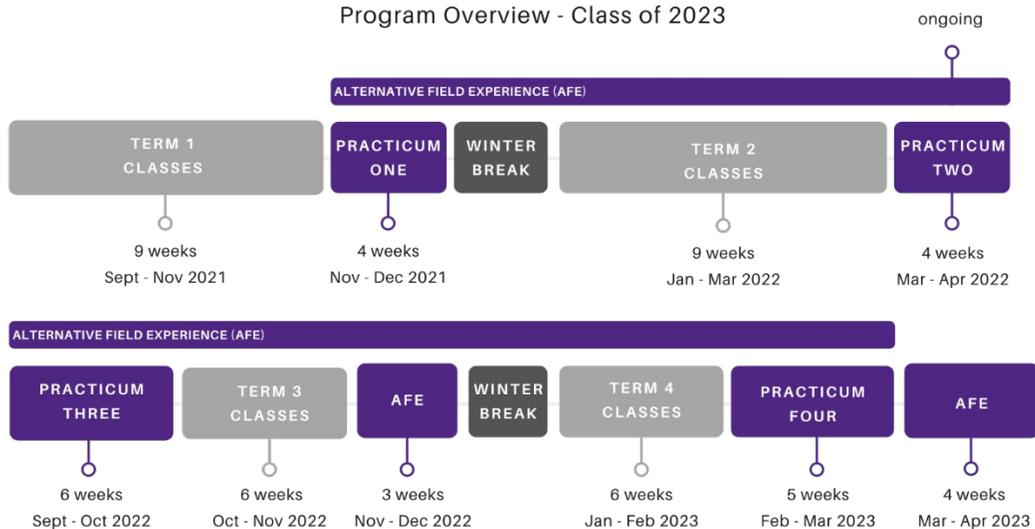
Section 001 (JI): Mon 11:30AM-2:30PM,
Room: 2051

Program Context:

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

BACHELOR OF EDUCATION

Program Overview - Class of 2023



Teaching & Learning Mathematics (Junior/Intermediate) (EDUC 5180K-JI)

Strategies for the teaching and learning of mathematics in elementary school grades with particular attention to the Ontario Mathematics Curriculum, Grades 1-8. Methodologies and materials specific to selected topics are highlighted with emphasis on contemporary reform mathematics pedagogies, including the integration of computational thinking. 3 hours per week, full year .75 credit

The underlying purpose of the course is to extend the skills and knowledge for teaching mathematics in the junior/intermediate divisions. The new and exciting elementary Ontario mathematics curriculum is coming to schools in September 2020. The course aims to give teacher candidates an opportunity to start building their pedagogical knowledge of teaching elementary mathematics curriculum which is based on subject matter knowledge and knowledge of general principles of pedagogy.

This course is focused on introducing the pre-service teachers to:

- deeper understanding of the key concepts of the elementary mathematics including the content of the Ontario Math Proficiency Test
- mathematics pedagogy and classroom practice including the instructional approaches in mathematics recommended by the Ontario mathematics curriculum, 2020
- use of technology to enhance student learning including coding

There are no required materials for this course. You will be provided with electronic/paper documents and links to various websites instead. You are strongly recommended to obtain grades 7 and 8 Mathematics textbooks. If you cannot borrow them from an elementary/middle school, many public libraries have copies of the textbooks. You usually cannot sign newer editions out, but the older versions will do.

""How mathematics is contextualized, positioned, promoted, discussed, taught, learned, evaluated, and applied affects all students. Mathematics must be appreciated for its innate beauty, as well as for its role in making sense of the world. Having a solid foundation in mathematics and a deep appreciation for and

excitement about mathematics will help ensure that all students are confident and capable as they step into the future.”, OMC 2020

Recommended books:

- "Elementary and Middle School Mathematics: Teaching Developmentally" by John Van Walle (any edition)
- "The Living Tree of Mathematics: Mathematics of Middle School Curriculum through the Lens of History" by Vera Sarina (<https://www.nctm.org/Store/>)

Number of Credits : 0.75

Number of Weeks: 18

Week 1: Course Orientation / Focuses (06-10/09/2021)

- Reading Course Syllabus
- Signing up for working groups

Week 2: Curriculum Content: Number strand Pedagogy content: Social-Emotional Learning (SEL) Skills (13/09/2021)

- Number strand, Part 1: Deepening understanding of numbers
- Social-Emotional Learning (SEL) Skills and the Mathematical Processes

Learning Activities

Type	Name	Description
Assignment	Week 2 Online participation in the Discussion Forum	

Week 3: Curriculum Content: Number strand Pedagogy content: Lesson planning (20/09/2021)

- Number strand, Part 2: The properties and order of operations
- Lesson planning, Part 1: The features of a good lesson plan

Learning Activities		
Type	Name	Description
Assignment	Week 3 Online participation in the Discussion Forum	

Week 4: Curriculum Content: Number strand Pedagogy content: Lesson planning (27/09/2021)

- Number strand, Part 3: Understanding negative numbers
- Lesson planning, Part 2: Inquiry-based activities

Learning Activities		
Type	Name	Description
Assignment	Week 4 Problem Set #1	

Week 5: Curriculum Content: Number strand Pedagogy content: Assessment and evaluation (04/10/2021)

- Number strand, Part 4: Understanding fractions
- Assessment and evaluation in teaching mathematics Part 1

Learning Activities		
Type	Name	Description
Assignment	Week 5 Online participation in Discussion Forum	

Week 6: Curriculum Content: Number strand Pedagogy content: Lesson planning (18/10/2021)

- Number strand, Part 5: Operations with fractions
- Lesson planning, Part 3: Equity in math classrooms: low floor, high ceiling problems

Learning Activities

Type	Name	Description
Assignment	Week 6 Online participation in Discussion Forum	

Week 7: Curriculum Content: Spatial Sense strand Pedagogy content: Lesson planning (25/10/2021)

- Spatial Sense strand, Part 1: Developing geometric reasoning
- Lesson planning, Part 4: Bringing it all together

Learning Activities

Type	Name	Description
Assignment	Week 7 Online participation in Discussion Forum	

Week 8: Curriculum Content: Spatial Sense strand Pedagogy content: Assessment and evaluation (01/11/2021)

- Spatial Sense strand, Part 2:
Exploring measurement formulas
- Assessment and evaluation in teaching mathematics Part 2

Learning Activities

Type	Name	Description
Assignment	Week 8 Problem Set #2	

Week 9: Curriculum Content: Algebra strand Pedagogy content: Lesson planning (08/11/2021)

- Algebra strand Part 1: Deepening an understanding of variables and expressions
- Lesson plans discussion

Learning Activities

Type	Name	Description
Assignment	Week 9 Lesson Plan	

Week 10: Curriculum Content: Algebra strand Pedagogy content: Unit Planning (03/01/2022)

- Algebra strand Part 2: Deepening an understanding of equalities and inequalities
- Unit Planning Part 1: The basics of the backward design

Learning Activities

Type	Name	Description
Assignment	Week 10 Online participation in Discussion Forum	

Week 11: Curriculum Content: Algebra strand Pedagogy content: Unit Planning (10/01/2022)

- Algebra strand Part 3: Mathematical modeling
- Unit Planning Part 2: Culminating Activity

Learning Activities

Type	Name	Description
Assignment	Week 11 Online participation in Discussion Forum	

Week 12: Curriculum Content: Algebra strand Pedagogy content: Unit Planning (17/01/2022)

- Algebra strand Part 4: Coding
- Unit Planning Part 3: Cross-curricular approach

Learning Activities

Type	Name	Description
Assignment	Week 12 Coding Assignment	
Assignment	Week 12 Problem Set #3	

Week 13: Curriculum Content: Algebra strand Pedagogy content: Unit Planning (24/01/2022)

- Algebra strand Part 5: Coding continued
- Unit Planning Part 4: Technology based activities

Learning Activities

Type	Name	Description
Assignment	Week 13 Coding Assignment	

Week 14: Curriculum Content: Data strand Pedagogy content: Unit Planning (31/01/2022)

- Data strand Part 1: Data Literacy
- Data collection, organization and analysis
Unit Planning Part 5: Bringing it all together

Learning Activities

Type	Name	Description
Assignment	Week 14 Online participation in Discussion Forum	

Week 15: Curriculum Content: Data strand Pedagogy content: Curriculum mapping (07/02/2022)

- Data strand Part 2: Probability Curriculum mapping basics

Learning Activities

Type	Name	Description
Assignment	Week 15 Online participation in Discussion Forum	

Week 16: Curriculum Content: Linear relations (14/02/2022)

- Grade 9-10: Representations of linear relations

Learning Activities

Type	Name	Description
Assignment	Week 16 Problem Set #4	

Week 17: Curriculum Content: Financial Literacy (28/02/2022)

- Financial Literacy strand: Sharing activities

Week 18: Wrap-up (07/03/2022)

- Unit Plans Discussion
- Wrap-Up. Q&A
- Next steps: professional development

Learning Activities

Type	Name	Description
Assignment	Week 18 Unit Plan	

Assessment Activities

Type	Name	Description
Assignment	Due 07/03/2021: Unit Plan	<p>There are three components of the task:</p> <ul style="list-style-type: none"> • A balanced unit plan, for a topic in the grade 4-8 mathematics curriculum that incorporates a reasonable variety of teaching strategies and assessment strategies. You do not have to include fully developed lesson plans but brief description of each lesson is required. • Fully developed cumulative task (cannot be a test) • A brief presentation of your unit and cumulative assessment
Assignment	Due 08/11/2020: Lesson PLaN	<p>Your Lesson Plan is to be created individually or in pairs It will:</p> <ul style="list-style-type: none"> • Demonstrate a clear understanding of the key concept throughout the lesson • Be original work and not a copy from another source or person • Require students to participate in activity that develops a new concept or skill in the area of financial literacy
Assignment	Due In Class: Coding Assignments	Coding assignments will be done in class during the Coding sessions.

Assessment Activities

Type	Name	Description
Assignment	Ongoing: Class Work/Participation	Class work/Participation is assessed on on-going basis. Attendance is a major but not only factor. Students are expected to <ul style="list-style-type: none">- actively participate in class discussions and problem-solving- share their knowledge of mathematics- pose relevant and meaningful questions
Assignment	Various Due Dates: 4 Problem Sets/Math Tasks	The due dates are indicated in the course outline.

This course meets the following Course Outcomes:

Mathematics Education Research & Theory: research and theory of mathematics education

Primary & Junior Grades Curriculum: the mathematics curriculum for the primary and junior grades, including content and processes

Mathematics Pedagogy & Classroom Action: mathematics pedagogy and classroom practice including communication, teaching through problem solving, computational thinking, and teaching through student work

Rich & Integrative Mathematics Contexts: creating rich and integrative mathematics contexts to engage students

Learning Instruction, Assessment, Design: differentiated instruction, assessment, and Universal Design for Learning

Technology To Enhance Student Learning: technology to enhance student learning, including computer code

Resources For Lesson & Unit Planning: resources for lesson and unit planning and professional, life-long learning

Cross-Curricular Connection

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 online) 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.

Support 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