

EDUC 5180K

Teaching & Learning Mathematics (Primary/Junior)

Instructor:

Penny Gordon 002-005 (PJ)
E: jhall27@uwo.ca
Office Hours: by appointment

Schedule:

Section 002 (PJ): Tues 3:30PM-6:30PM,
Room: 2051
Section 004 (PJ): Wed 3:30PM-6:30PM,
Room: 2051

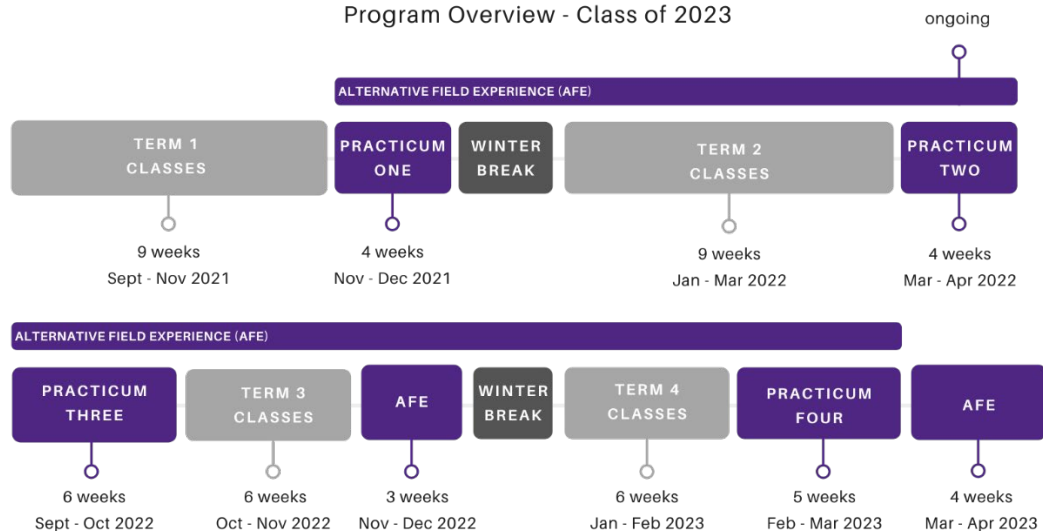
Section 003 (PJ): Wed 8:30AM-11:30AM,
Room: 2051
Section 005 (PJ): Tues 9:30AM-12:30PM,
Room: 2051

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 (Primary/Junior) (EDUC 5180K-PJ)

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

This course will focus on introducing the teacher candidates to:

- research and theory of mathematics education
- the mathematics curriculum for the primary and junior grades, including content and processes
- mathematics pedagogy and classroom practice including communication, teaching through problem solving, computational thinking, and teaching through student work
- creating rich and integrative mathematics contexts to engage students
- application of Growth Mindset in the Mathematics classroom
- creating a culturally responsive Mathematics classroom
- differentiated instruction, assessment, and Universal Design for Learning
- technology to enhance student learning, including computer code
- resources for lesson and unit planning and professional, life-long learning

Required Course Text:

Understanding MATH + Coding + Making, 1-8: Teacher Licence at <https://learnx.ca/math/> \$19

Number of Credits : 0.75

Number of Weeks: 18

Week 1: Welcome To Loving Mathematics!

- Being Mathematicians! Equity in the Study of Mathematics
- Teaching Mathematics in Ontario
- Strand A Social-Emotional Learning Skills
- 3-Part Lesson and High Impact Instructional Strategies
- Coding in the Classroom
- Develop Classroom Norms
- Padlet
- Mathematics Inventory

Learning Activities		
Type	Name	Description
Reading	Week 1 Materials & Readings	1. Gadanidis, G. (2012). Why can't I be a mathematician? https://imaginethis.ca/wp-content/uploads/2021/06/mathematician-2012-Gadanidis.pdf
		2. Ontario Mathematics Curriculum
Assignment	Week 1 Online Discussion	

Week 2: Number

- Ontario Mathematics Curriculum - 6 Strands Including Strand A Math Processes
- Strand A SEL Skills and Growth Mindset
- Strand B Number
- Introduction to Math Manipulatives and Concrete Models - Differentiation
- Collaborative Learning in the Math Classroom
- 5 Affordances of Coding - Differentiation, Including Social Justice Applications
- Scratch Jr
- Gallery Walk
- Self and Peer Assessment and Mathematics Inventory

Learning Activities		
Type	Name	Description
Assignment	Week 2 Curriculum Scavenger Hunt - Part 2	1. Ontario Mathematics Curriculum
Reading	Week 2 Materials & Readings	2. The Affordances of Coding: https://imaginethis.ca/educating-young-mathematicians-3-five-as-for-coding-math/
		3. Scratch Jr. App
Assignment	Week 2 Online Discussion	

Week 3: Number

- Strand A SEL Skills and Growth Mindset
- Strand B Number
- Operational Sense
- How to Plan a 3-Part Lesson
- Scratch Exploration
- CRA - Differentiation
- Music and Math -Differentiation and Cultural Influence

Learning Activities		
Type	Name	Description
Reading	Week 3 Materials & Readings	1. eworkshop.on.ca/edu/core.cfm
		2. Ontario Math Curriculum - 47 to 49
		3. https://www.dcp.edu.gov.on.ca/en/program-planning/considerations-for-program-planning/human-rights-equity-and-inclusive-education
		4. scratch.mit.edu
Assignment	Week 3 Online Discussion	

Week 4: Number and Algebra

- SEL Skills and Coding with Scratch
- Strand B Number and Strand F Financial Literacy
- Mental Math
- Math Talks
- Math and Picture Books - Cultural Influence in Math
- Content and Process Expectations
- Repeating Patterns - Algebra

Learning Activities		
Type	Name	Description
Reading	Week 4 Materials & Readings	1. scratch.mit.edu
		2. Ontario Math Curriculum
		3. http://mkn-rcm.ca/repeating-patterns/
		4. https://wordpress.oise.utoronto.ca/robertson/files/2018/04/repeating-patterns-tutorial.pdf
		5. https://ontariomath.support/?pg=results&type=subject&lang=EN&subject=FinLit
Assignment	Week 4 Online Discussion	
Assignment	Week 4 Self-Assessment and Goal Setting- Class and On-line Participation	

Week 5: Number and Algebra

- Strand B Number and Strand F Financial Literacy
- Developing Standard and Alternative Algorithms - Differentiation
- Number Talks

- Teaching Through Problem-Solving - Social Justice/Indigenous Word Problems with self and peer assessment
- Strand C Alegbra
- Growing and Repeating Patterns
- Focus on Self-assessment and the Assessment Process
- Anticipating Student Responses
- Coding
- Math Congress

Learning Activities

Type	Name	Description
Reading	Week 5 Materials & Readings	1. https://learnx.ca/growing-patterns/
		2. https://ontariomath.support/?pg=results&type=subject&lang=EN&subject=FinLit
Assignment	Week 5 Online Discussion	

Week 6: Alegbra

- CRA
- Role of the Teacher in the 3-Part Lesson
- Teaching About Problem-solving - UDL
- Strand C Algebra
- Repeating and Growing Patterns and Algebraic Reasoning
- Multiple Representations to Foster Algebraic Thinking - UDL
- Continuum of Algebraic Reasoning and Representations - UDL

Learning Activities

Type	Name	Description
Reading	Week 6 Materials & Readings	1. Paying Attention to Algebraic Reasoning 2. https://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_ExploringPower.pdf

Week 7: Number and Algebra

- Focus on Differentiated Instruction and Assessment - Cultural Considerations
- Number Talks
- Growth Mindset in the Math Classroom
- Coding-Social Justice and Cultural Considerations
- Communication in the Math Classroom - UDL

Learning Activities

Type	Name	Description
Reading	Week 7 Materials & Readings	1. Good Questions: Great Ways to Differentiate Mathematics Instruction, Marian Small
		2. Mindset Mathematics: Visualizing and Investigating Big Ideas. Boaler, Munson & Williams
		3. MaththatMatters: A Teacher Resource Linking Math and Social Justice. D. Stocker
Assignment	Week 7 Online Discussion	

Week 8: Assessment and Evaluation in Mathematics

- Growing Success
- Assessment For, As and Of Learning
- Provincial Achievement Chart in Mathematics
- Accommodations and Modifications
- Diverse Assessment Strategies and Rich Assessment Talks - UDL and Cultural Consideration

Learning Activities

Type	Name	Description
Reading	Week 8 Materials & Readings	1. Ontario Mathematics Curriculum
		2. Growing Success Document: Assessment, Evaluation, and Reporting in Ontario Schools, 2013
Assignment	Week 8 Self Assessment of Goal Setting and Participation	

Week 9: Assessment, Evaluation, and Reporting in Mathematics

- Standardized Testing - EQAO
- Assessment Processes
- Assessment and Evaluation for Reporting
- Math and QDPA - Differentiation
- Practicum Preparation and Scavenger Hunt
- Rubric Analysis and Creation

Learning Activities		
Type	Name	Description
		1. Ontario Mathematics Curriculum
Reading	Week 9 Materials & Readings	2. Growing Success Document: Assessment, Evaluation, and Reporting in Ontario Schools, 2010
		3. http://www.eqao.com/en
Assignment	Week 9 Practicum Scavenger Hunt	

Week 10: Number

- Strand B Number
- Division
- Coding
- Decimals and Fractions
- Focus on STEAM
- Practicum Consolidation

Learning Activities		
Type	Name	Description
Reading	Week 10 Materials & Readings	1. Paying Attention to Fractions, K-12
Assignment	Week 10 Reflection for Mini Unit - Math, Coding and Integrative Topics	

Week 11: Number

- Strand B Number and Strand C Algebra
- Fractions, Decimals, Percents, and Ratio
- UBD
- Focus on STEAM
- Scratch: Fractions and Repeating Patterns
- Math Congress

Learning Activities		
Type	Name	Description
Reading	Week 11 Materials & Readings	1. http://www.edu.gov.on.ca/eng/literacynumeracy/LNSAttentionFractions.pdf
Assignment	Week 11 Online Discussion	

Week 12: Number and Spatial Sense

- Strand B Number
- Fraction Number Talks
- Strand E Spatial Sense
- Developing Understanding of Line, Mass, Capacity, Time and Temperature
- Real-life Applications, Including Estimations and Indigenous Ways of Knowing
- Measurement Relationships
- Math and Readers Theatre - Differentiation
- Coding
- Bansho

Learning Activities		
Type	Name	Description
Assignment	Week 12 Group Reflection of Mini Unit	
Reading	Week 12 Materials & Readings	1. https://wordpress.oise.utoronto.ca/robertson/2021/03/02/bryan-bellefeuille-shares-with-educators-how-he-includes-traditional-indigenous-mathematics-in-the-ontario-classroom/
Assignment	Week 12 Online Discussion	

Week 13: Spatial Sense

- Strand E Spatial Sense
- Measurement Relationships
- "Reflect and Connect" Consolidation
- Spatial Visualization and Orientation
- 2D Shapes and 3D Figures
- Geometric Relationships
- Location and Movement
- Coding and Maker Education

Learning Activities		
Type	Name	Description
Assignment	Week 13 Group Reflection of Mini Unit	
Reading	Week 13 Materials & Readings	1. https://researchideas.ca/sidebyside/parallel.html 2. https://imaginethis.ca/megumi-harada/
Assignment	Week 13 Online Discussion	

Week 14: Spatial Sense

- Strand E Spatial Sense
- Spatial Reasoning
- Math and Visual Arts - Differentiation
- Math and Dance - Differentiation
- Resources Consolidation

Learning Activities

Type	Name	Description
Reading	Week 14 Materials & Readings	1. Paying Attention to Spatial Reasoning, K-12
Assignment	Week 14 On-Line Discussion	

Week 15: Data

- Strand D Data
- Various Data Management Representations
- Conceptual Development of Probability
- Studying Chance and Strategy
- Coding

Week 16: Data

- Strand D Data
- Collecting, Organizing, and Displaying Data
- Data Sense and Literacy - UDL
- Data Management and Social Justice Themes
- Choice Board for Final Assignment

Learning Activities

Type	Name	Description
Reading	Week 16 Materials & Readings	1.MaththatMatters: A Teacher Resource Linking Math and Social Justice. D. Stocker

Week 17: Home and School Connections and Course Reflections

- Encouraging Real-Life Mathematics at Home
- Communication with Home About Math
- Computational Thinking Consolidation

- Rubric Creation for Choice Board Assignment
- Tribes Grafitti
- Inside-Outside Circle

Week 18: Final Class

- Sharing Choice Board Assignment for Consolidation of Class Learning

Assessment Activities		
Type	Name	Description
Assignment	Due Wk 06: Lesson Consolidation	Prepare a lesson consolidation for the "Working On It" activity provided on the lesson plan template. You will complete the highlighted sections: "curriculum expectations", "anticipate student responses" , and "reflect and connect/consolidate".
		<p>Details will be discussed in class and through OWL. This assignment will be submitted through "ASSIGNMENTS" in OWL for assessment and feedback.</p> <p>The focus of this assignment is twofold. One, is to practise and then incorporate learning in all subsequent 3-part lesson plans, the key components of contemporary lesson planning. Two, is to use the feedback from the instructor to develop subsequent full lesson plans, including the rationale for lesson composition.</p>
Assignment	Due Wk 08: Detailed Lesson Plan and Rationale	Choose the grade and cluster of expectations from the division not used in the Lesson Consolidation assignment, for Strand C ALGEBRA CODING OVERALL EXPECTATION or Strand F FINANCIAL LITERACY. Use the 3-part lesson plan template provided. Discuss your rationale based on "knowledgeable others" and classroom experiences. Your rationale will also include a reflection of creating a culturally reflective lesson.
		<p>Details will be discussed in class and through OWL. This assignment will be submitted through "ASSIGNMENTS" in OWL for assessment and feedback.</p>
Assignment	Due Wk 16: Integrative Mathematics Unit	SMALL GROUP (2-3 STUDENTS) OR INDIVIDUAL
		<p>This is an integrative mini-unit that includes an introduction with a reflection of creating a culturally responsive classroom in the unit, a 5-day plan (full lesson plans with Math, Coding, and at least one other subject area), a home-school connection activity with parent letter/video and a culminating task with rubric.</p> <p>Details will be discussed in class and through OWL. This assignment will be posted on-line in OWL and through "ASSIGNMENTS" for sharing.</p>
Assignment	Due Wk 18: Choice Board Culminating Task	<p>During the final class, you will be asked to share your culminating task with group mates. You will give and receive feedback for further understanding and subsequent implementation of the key components of the course.</p> <p>Details will be available in class and through OWL. This assignment will be submitted through OWL.</p>

Assessment Activities

Type	Name	Description
Assignment	Ongoing: Participation	Class Participation On-line Discussion Group: Social Justice Word Problem and Reflection
		Throughout the course, self and peer assessment will be completed as part of the learning and assessment process. The focus will be on feedback for growth and application to a variety of learning experiences and sharing sessions and applications.

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