Transforming Education. Transforming Lives.

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.
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

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<th>Type</th>
<th>Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>Reading</td>
<td>Week 1 Materials &amp; Readings</td>
<td>1. Gadanidis, G. (2012). Why can't I be a mathematician?</td>
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<td>2. Ontario Mathematics Curriculum</td>
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<td>Assignment</td>
<td>Week 1 Online Discussion</td>
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<td>Assignment</td>
<td>Week 2 Curriculum Scavenger Hunt - Part 2</td>
<td>1. Ontario Mathematics Curriculum</td>
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<td>2. The Affordances of Coding:</td>
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<td><a href="https://imaginethis.ca/educating-young-mathematicians-3-five-as-for-coding-math/">https://imaginethis.ca/educating-young-mathematicians-3-five-as-for-coding-math/</a></td>
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<td>3. Scratch Jr. App</td>
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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

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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**

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<tbody>
<tr>
<td>Reading</td>
<td>Week 3 Materials &amp; Readings</td>
<td>1. eeworkshop.on.ca/edu/core.cfm</td>
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<tr>
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<td>2. Ontario Math Curriculum - 47 to 49</td>
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<td>4. scratch.mit.edu</td>
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<tr>
<td>Assignment</td>
<td>Week 3 Online Discussion</td>
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**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**

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<td>Reading</td>
<td>Week 4 Materials &amp; Readings</td>
<td>1. scratch.mit.edu</td>
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<td>2. Ontario Math Curriculum</td>
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<td>5. <a href="https://ontariomath.support/?pg=results&amp;type=subject&amp;lang=EN&amp;subject=FinLit">https://ontariomath.support/?pg=results&amp;type=subject&amp;lang=EN&amp;subject=FinLit</a></td>
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<tr>
<td>Assignment</td>
<td>Week 4 Online Discussion</td>
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<td>Assignment</td>
<td>Week 4 Self-Assessment and Goal Setting- Class and On-line Participation</td>
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**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 Algebra
• Growing and Repeating Patterns
• Focus on Self-assessment and the Assessment Process
• Anticipating Student Responses
• Coding
• Math Congress

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<td>Reading</td>
<td>Week 5 Materials &amp; Readings</td>
<td>1. <a href="https://learnx.ca/growing-patterns/">https://learnx.ca/growing-patterns/</a></td>
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<tr>
<td></td>
<td></td>
<td>2. <a href="https://ontariomath.support/?pg=results&amp;type=subject&amp;liang=EN&amp;subject=FinLit">https://ontariomath.support/?pg=results&amp;type=subject&amp;liang=EN&amp;subject=FinLit</a></td>
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Week 6: Algebra

• 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

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<tr>
<td>Reading</td>
<td>Week 6 Materials &amp; Readings</td>
<td>1. Paying Attention to Algebraic Reasoning</td>
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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

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<tbody>
<tr>
<td>Reading</td>
<td>Week 7 Materials &amp; Readings</td>
<td>1. Good Questions: Great Ways to Differentiate Mathematics Instruction, Marian Small</td>
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<td>Assignment</td>
<td>Week 7 Online Discussion</td>
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**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

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<td>Reading</td>
<td>Week 8 Materials &amp; Readings</td>
<td>1. Ontario Mathematics Curriculum</td>
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<td>Assignment</td>
<td>Week 8 Self Assessment of Goal Setting and Participation</td>
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**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
### Week 10: Number

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

### 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**

### 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

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<td>Assignment</td>
<td>Week 12 Group Reflection of Mini Unit</td>
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<td>Assignment</td>
<td>Week 12 Online Discussion</td>
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### 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

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<tr>
<td>Assignment</td>
<td>Week 13 Group Reflection of Mini Unit</td>
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<tr>
<td>Assignment</td>
<td>Week 13 Online Discussion</td>
<td>2. <a href="https://imaginethis.ca/megumi-harada/">https://imaginethis.ca/megumi-harada/</a></td>
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</tbody>
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Week 14: Spatial Sense

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

### Learning Activities

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<tr>
<td>Reading</td>
<td>Week 14 Materials &amp; Readings</td>
<td>1. Paying Attention to Spatial Reasoning, K-12</td>
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<td>Assignment</td>
<td>Week 14 On-Line Discussion</td>
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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

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Week 17: Home and School Connections and Course Reflections

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

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<th>Type</th>
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<tr>
<td>Assignment</td>
<td>Due Wk 06: Lesson Consolidation</td>
<td>Prepare a lesson consolidation for the &quot;Working On It&quot; activity provided on the lesson plan template. You will complete the highlighted sections: &quot;curriculum expectations&quot;, &quot;anticipate student responses&quot;, and &quot;reflect and connect/consolidate&quot;.</td>
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<tr>
<td>Assignment</td>
<td>Due Wk 08: Detailed Lesson Plan and Rationale</td>
<td>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 &quot;knowledgeable others&quot; and classroom experiences. Your rationale will also include a reflection of creating a culturally reflective lesson.</td>
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| Assignment      | Due Wk 16: Integrative Mathematics Unit   | SMALL GROUP (2-3 STUDENTS) OR INDIVIDUAL  
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. |
| Assignment      | Due Wk 18: Choice Board Culminating Task  | 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. |

**Week 18: Final Class**

- Sharing Choice Board Assignment for Consolidation of Class Learning
### Assessment Activities

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