

**2015-2016**

<b>COURSE TITLE:</b>	<b>Curriculum and Instruction in Mathematics ( Primary/Junior)</b>
<b>Instructor:</b>	<b>Sharon Malyczewsky</b>
<b>Office</b>	
<b>Office Hrs:</b>	<b>By Appointment</b>
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Please use my email to contact me. I will check my email regularly and will endeavor to respond to your questions within 24 hours. Or, we can set up an appointment to arrange to meet.

### **COURSE DESCRIPTION**

This course investigates current teaching approaches in an attempt to link mathematical understanding to child development at the Primary and Junior levels.

### **FOUNDATIONS OF PROFESSIONAL PRACTICE**

A commitment to a clear vision of what it means to be a teacher is at the core of teacher professionalism. The principles of the Ontario College of Teachers' (OCT) *Professional Standards* have been embedded in the learning expectations for this course. Visit <http://www.oct.ca/public/professional-standards>

### **COURSE OBJECTIVES**

#### **Course Goals and Learning Outcomes:**

Participants in this course engage in building a community of mathematics learners that inquires into mathematics by; **doing math, thinking and talking about math and learning to teach math** in researched effective ways. The teaching and learning of mathematics will be highly interconnected for teacher candidates. Emphasis will be on listening to and observing children as they make sense of math concepts with an eye to determining ways to further their understanding. Current theories related to teaching and learning mathematics will be examined within the context of rich mathematical investigations. In addition, a variety of manipulatives will be explored.

The goals of this course are that students will:

- gain an overview of the mathematics curriculum from K-6; the content and underpinning theories of instruction
- develop a deeper conceptual understanding of fundamental principles of mathematics( e.g. familiarization with the Big Ideas in mathematics and the Ontario Curriculum)
- develop an understanding of children's mathematical development from K to Gr.6
- develop a repertoire of resources, both instructional and theoretical
- develop effective pedagogical strategies in mathematics
- engage in innovative teaching strategies that support student learning
- learn about assessment strategies that assist in making instructional decisions; help pupils succeed and inform parents

### **TEXTS/READINGS**

#### **Required:**

- Van de Walle, J.A., Karp, K., Bay-Williams, J.M. (2016). *Elementary and Middle School Mathematics: Teaching Developmentally* (9th Ed.) Pearson Education Inc.
- **Course Readings:** Copies of course readings will be available in the library on short term loan.
- Ontario Ministry of Education. (2005) *The Ontario Curriculum Grades 1-8: Mathematics ( Revised )*. Toronto, ON: Queen's Printer. (available online: <http://www.edu.gov.on.ca/eng/curriculum/elementary/math.html>)

#### **Related Ontario Ministry of Education Documents:**

Expert Panel on Mathematics in Grades 4 to 6 in Ontario. (2004) *Teaching and Learning Mathematics. The Report of the Expert Panel on Mathematics in Grades 4-6 in Ontario*. Toronto: Ontario Ministry of Education. (available online: <http://www.edu.gov.on.ca/eng/document/reports/numeracy/panel/index.html>)

**ATTENDANCE:**

**Full attendance is required in order to pass this course.** Therefore, if you miss a class **you must contact the instructor before class** and make arrangements to attend an alternative class, or, having missed more than one class, to complete an alternative assignment.

**Email:** Class emails will be sent out periodically through the Lakehead system. Students are responsible for reading and acting on these messages.

**ASSESSMENT AND EVALUATION:**

ASSIGNMENTS AND EVALUATION	See: Lakehead Assessment Rubric	Due	% Final Mark
<p><b>Math Autobiography :</b></p> <p>One page position paper that should include a reflection on your personal experiences in math learning, a discussion of different kinds of math teaching you have experienced or observed and a reflection on how the assigned readings for week 1 are aligned with or are different from these experiences. The paper could end with goals for your own preparation for teaching math.</p>		Week 3	5%
<p><b>Math Learning/Teaching Logs:</b></p> <p>Two to three page papers will document your views, philosophies , experiences and teaching ideas. Your logs will provide thoughtful responses to the readings; both the assigned articles and the text.</p> <p>Week 9 or 18 logs must <b>also</b> address math across the curriculum eg. Math <b>and</b> use of: children’s literature, science, phys ed, drama etc (select one). A direct reference to Curriculum Expectations for both Mathematics and the subject you are incorporating are required. A full lesson plan is not expected, a descriptive summary is .</p> <p>* For each submission, your entries must relate to our readings <u>and</u> other concepts and ideas discussed in class, or, from your practicum experience (do not write a summary of the readings–I have read them-I want to know <i>your</i> understanding of the concepts and how you are making sense of the materials) Direct reference to the readings will help to support your position.</p> <p>* Logs may take many forms: written prose, points, diagrams, images, designs etc., however they should be detailed enough to allow me to see how you are thinking about the ideas we discuss in class and that are outlined in all our readings.</p> <p><b>Criteria:</b></p> <p><i>Clearly identified issues and ideas from the course:</i> Log refers to issues and ideas that have come forward during classes, in readings, and identifies how you ‘make sense’ of the issues; your math problem solving from class is also included. Select at least 2 activities that you have read about or created yourself. Explain how these tasks would support a child’s learning with regard to the topic you are exploring. Be sure to make references to the course readings AND in-class activities and discussions.</p> <p><i>Self Inquiry:</i> Log shows that you have questioned: activities during class; how children learn math; your teaching of math; your learning of math and/or specific mathematical ideas and concepts addressed in class.</p> <p><i>Shifts/refinements in understanding of mathematics teaching and learning:</i> Each log is a chronicle of your understanding about mathematics that indicates a process of refining your thinking (either by changing, deepening or shifting your understanding) of the teaching/learning processes related to mathematics.</p>		Week 5,  Week 13,  Week 9 or 18	10%  10%  10%
<p><b>Test on Invented Methods and Alternative Algorithms:</b></p> <p>You will be asked to recognize, use and describe a variety of student generated strategies or alternative algorithms and mathematical models to solve specific calculations. For example, you could be asked to use and describe the <i>partial products</i> alternative algorithm, (outlined in your readings), to solve <math>24 \times 36</math>.</p>		Week 7	15%

<p><b>Math Manipulative Fair: Presentation and Brochure</b></p> <p>Students will work in pairs to prepare minimally: two activities, (one primary, one junior), a fair-like booth and an accompanying brochure based on a math manipulative. You must include a task involving a <b>virtual manipulative</b>. You must include references to the Van de Walle text/research articles. You must demonstrate how learners can make meaning through the manipulative (where's the math?). Presentations can be up to 10 minutes in length.</p> <p>Criteria:</p> <p><i>Outline of Chosen Manipulative:</i> *Manipulative is well described  *Clear connection is made to the Ontario Curriculum</p> <p><i>Making Meaning:</i> * Clear description of how the manipulative supports student learning in a tangible way, how is it used as a thinking tool?</p> <p><i>Connection to Research:</i> *Presentation and brochure clearly identify related mathematical theories/research and how these are connected to practice (3 references)</p> <p><i>Organization of Thinking:</i> *Presentation and brochure are organized for effective understanding</p> <p><i>Communication:</i> *Presentation and brochure are clearly thought out, easy to follow and present a variety of ideas. Presentation engages the audience.</p>	<p>Week 9 or 18</p>	<p>20%</p>
<p><b>Assessment Task: (1 Child)</b></p> <p>During your first practicum placement you will assess one child.</p> <p>Kindergarten or Grade 1 Placement: Administer the 'Number Knowledge Test' (see <a href="http://www.clark.edu">www.clark.edu</a>)</p> <p>Grade 2-6 Placement: You will use the Digit Correspondence Task from the text. See page 237. You will also administer at least 2 other assessment tasks appropriate for your student's level. Write a brief (2-3 page) paper that:</p> <ol style="list-style-type: none"> <li>1] outlines the assessment</li> <li>2] describes your initial expectations ( using curriculum documents, text , readings and observations) to support your expectations</li> <li>3] illustrates the child's reasoning</li> <li>4] provides your interpretation of how they understand place value</li> </ol> <p>Examples of student work will strengthen your position.</p>	<p>Week 10</p>	<p>15%</p>
<p><b>Professionalism and Course-related Responsibilities:</b></p> <p>Program participation is an extremely important component of your work in this class. Active contribution to discussions and activities, on-going communication with the instructor, punctuality and professional deportment are considered in this mark. Numerous in-class tasks/activities and 2 self-evaluations will also be considered.</p>	<p>Ongoing</p>	<p>15%</p>

**Late Assignments:** Assignments are due at the beginning of class. Late submissions are strongly discouraged. Any exceptional circumstances causing late submission of assignments must be presented to the instructor **prior** to the due date. Communication with the instructor well before the due date is mandatory.

COURSE CONTENT/TOPICS

Ed 4050 Tentative Schedule 2015/16: Term 1

Week:	Topic:	Required Reading:	Assignment Due:
1	<b>Background and theory of the course.</b> Introduction to the: course, syllabus, text and assignments. Introduction to "Reform" mathematics	*Van de Walle, Chapter 3  *Lessons from the TIMSS videotape study, Geist *Strategies for advancing children's mathematical thinking, Fravilig	
2	<i>Practice and Theory</i> <b>Introduction to Number Sense:</b>  - Number Sense - Place Value	*Van de Walle, Chapters 8 and 11  One of: *Place Value: Problem solving, Ross *Ten is the Magic Number, Barker *Early Number and Numeration, Payne & Huinker *Fostering flexibility with number in the primary grades, Sisul	
3	<i>Practice and Theory</i> <b>Introduction to Number Sense:</b>  - Addition and Subtraction	*Van de Walle, Chapter 9 (pp. 167-179)  *Promoting meaningful mastery of addition and subtraction, Postelwait, Adams, Shih *Students' explanation of place value in addition and subtraction, Nagel & Swigen	<b>Math Autobiography</b>
4	<i>Practice and Theory</i> <b>Introduction to Number Sense:</b>  - Multiplication and Division	*Van de Walle, Chapter 9 (pp. 1179-193)  *Developing mathematical models, Fosnot & Dolk	
5	<i>Foundations</i> <b>Math Lesson Design – 3 Part Lesson</b>   <b>Assessment OF and FOR learning:</b> Listening and Observing, Informal and Formal assessment, the role of testing in math	*Van de Walle, Chapter 4  *The tools of classroom talk, Chapin et al *Communication in the Classroom: LNS Capacity Building Series  *Van de Walle, Chapter 5	<b>Math Learning Log</b>
7	<i>Foundations</i> <b>Computational Fluency</b>	*Van de Walle, Chapter 10  One of:  *Discussion as a vehicle for demonstrating computational fluency, Wicket *Toward computational fluency, Fuson *Laying the foundation for computational fluency, Griffin *Developing computational fluency with whole numbers, Russell	<b>Test; Invented Methods and Alternative Algorithms</b>
9	<b>Manipulatives Fair</b>  *Review of Place Value Assessment *Self Evaluation	*Van de Walle, Chapter 5	<b>Manipulatives Fair #1 or Math Learning Log</b>

## Ed 4050 Tentative Schedule 2015/16: Term 2

Week:	Topic:	Required Reading:	Assignment Due:
10	<i>Practice and Theory</i> <b>Practicum Debrief</b> -general -lesson		<b>Place Value Assessment</b>
11	<i>Practice and Theory</i> Strand Focus: <b>Fractions ( Models, Adding and Subtracting)</b>	*Van de Walle, Chapters 15 & 16  * <i>Children's development of meaningful fraction algorithms</i> , Sharp, Garofalo and Adams * <i>Connections in Fractions</i> , Flores and Klein  NLS webcast: Coaching for student success <a href="http://www.curriculum.org/secretariat/june28.shtml">http://www.curriculum.org/secretariat/june28.shtml</a>	
12	<i>Practice and Theory</i> Strand Focus: <b>Fractions ( Multiplication ) Decimals and Percents</b>	*Van de Walle, Chapter 17  * <i>Connections in Fractions</i> , Flores and Klein	
13	<i>Practice and Theory</i> Strand Focus: <b>Decimals, Percents, and Proportional Reasoning</b>	*Van de Walle, Chapter 18	<b>Math Learning Log</b>
14	<i>Practice and Theory</i> Strand Focus: <b>Measurement</b>	*Van de Walle, Chapter 19  * <i>Creating numerical scales for measuring tools</i> , Young and O'Leary	
15	<i>Practice and Theory</i> Strand Focus: <b>Geometry</b>	*Van de Walle, Chapter 20	
16	<i>Practice and Theory</i> Strand Focus: <b>Probability and Data Management</b>	*Van de Walle, Chapters 21 and 22  <b>For Jigsaw</b> One of: * <i>Helping English-language learners develop computational fluency</i> , Bresser * <i>Creating cultural relevance in teaching and learning mathematics</i> , Leonard and Guha * <i>Problem-solving and at-risk students</i> , Robert * <i>Food for thought-and talk</i> , Signet	
17	<b>Mathematics for All</b> –a focus on equity issues -Differentiated Instruction (including teaching combined grades) -Technology and Mathematics Teaching	*Van de Walle, Chapter 6  * <i>Introduction to Maththatmatters</i> , Stocker  <b>For Jigsaw</b> One of: * <i>Helping English-language learners develop computational fluency</i> , Bresser * <i>Creating cultural relevance in teaching and learning mathematics</i> , Leonard and Guha * <i>Problem-solving and at-risk students</i> , Robert * <i>Food for thought-and talk</i> , Signet	
18	<b>Manipulatives Fair</b>  * Self Evaluation		<b>Manipulatives Fair #2 or Math Learning Log</b>

## **LAKEHEAD UNIVERSITY and/or FACULTY OF EDUCATION REGULATIONS/POLICIES**

### **INCOMPLETE STANDING** (University Regulation, V Standing)

<http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=21&chapterid=3506&loaduserredits=False>

### **TIMELY FEEDBACK** (University Regulation XII)

<http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=21&chapterid=3506&loaduserredits=False>

25% feedback for term courses

→ Fall term = October 9, 2015

→ Winter term = February 12, 2016

30% feedback for year courses

→ Yearlong = January 22, 2016

### **ACADEMIC MISCONDUCT** (University Regulation, IX Academic Misconduct)

<http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=21&chapterid=3506&loaduserredits=False>

### **THE FACULTY OF EDUCATION ASSESSMENT RUBRIC**

<http://education.lakeheadu.ca/undergraduate/uploads/Microsoft%20Word%20-%20Professional%20Grading%20Policy-1.pdf>

#### **Expectations**

The ability to learn, understand, and retain knowledge has been demonstrated through the undergraduate degree required for entry into the Professional Year. The focus of the Professional Year is on building understanding of the issues and complexities of the teaching and learning process, and on gaining the skills necessary for becoming a successful teacher. To that end:

1. Attendance is an expectation. Courses are based on reflection, discussion, and interaction, much of which takes place in class. Courses may have a set limit on the number of sessions that can be missed for ANY reason. These permissible absences should be saved for *emergencies*. Students who do not attend regularly will be removed from the program.
2. Requirements on the course outline will be used for assessment. The course outline and assessment rubric make expectations and deadlines explicit. Late assignments are accepted only under rare, documentable circumstances. Students cannot redo assignments, rewrite exams, or make additional submissions to boost a mark once a *summative* assessment has taken place.
3. Assessment is a reflection of academic rigour. Only in instances where there is unusual disparity among marks or abnormal inconsistency in outcomes will an instructor re-examine a final assessment.

### **EDUCATION ACADEMIC REGULATIONS**

<http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=21&chapterid=3497&topicgroupid=11173&loaduserredits=False>