COLLEGE OF
THE ROCKIES

MATH-105 – Mathematics for Teachers I

University Arts and Science

Effective Term & Year: Fall 2022
Course Outline Review Date: 2027-04-01

Program Area: Math and Sciences

Description:

Mathematics for Elementary Teachers I is a math course that covers the important concepts, mathematical methods, and ideas required to teach the elementary mathematics curriculum. It emphasizes the foundational concepts needed to support abstract calculation and it broadens students' understanding of mathematics. The course blends theory, teaching models, and the use of a variety of manipulatives which are appropriate for teaching mathematics in the elementary grades. This course emphasizes the foundational topics taught in the early elementary grades including problem solving strategies; whole number operations such as addition, subtraction, multiplication, and division; fractions and decimals; and incorporates local Indigenous knowledge, content, ways of knowing, and perspectives into each unit of study.

Program Information:

This course is intended for university studies students planning to enter a Bachelor of Education program. It is not an eligible math course for credit in the Associate of Arts degree or Associate of Science degree. This course is not accepted by some universities as transfer credit towards a BA or BSc degree; please check with the receiving institution.

Delivery Methods: On-campus (Face-to-Face)

Credit Type: College of the Rockies Credits

Credits: 3

Course type/s: Sciences

Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	
Laboratory/Studio	
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	45

Course Requisites:

- Complete 1 of the following
    - Earned a minimum grade of C (60%) in at least 1 of the following:
        - MATH080 – Mathematics – Advanced Level
        - MATH101 – Finite Mathematics 1 (3)
        - PREC 11 – Pre-Calculus 11
        - FOM 11 – Foundations of Mathematics 11
        - PREC 12 – Pre-Calculus 12
        - CALC 12 – Calculus 12
        - MATH100 – Pre-Calculus (3)
    - Earned a minimum grade of B- (70%) in at least 1 of the following:
        - GEO 12 – Geometry 12
        - STAT 12 – Statistics 12
    - Or any grade in Foundations of Math 11 and 70% or higher in Foundations of Math 12.

Flexible Assessment: Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see https://www.bctransferguide.ca/ or https://transferalberta.alberta.ca . For more transfer credit information, please visit https://www.cotr.bc.ca/Transfer

All requests for course transfer credit from institutions in British Columba or elsewhere should go to the College of the Rockies Enrolment Services office.

Textbook Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Musser, Burger, Peterson. *Mathematics for Elementary Teachers.* 10th Edition. New Jersey: Wiley, 2010.

Sowder, Sowder & Nickerson. *Reconceptualizing Mathematics*. W.H. Freeman & Company, 2008.

Wheeler, Ruric E. & Ed R. Wheeler. *Modern Mathematics for Elementary Educators.* 12th edition. Kendall/Hunt Publishing, 2009.

Bennett Jr., A. and L. Nelson. *Mathematics for Elementary Teachers: A Conceptual Approach.* 8th edition. McGraw Hill Higher Education, 2010.

Please see the instructor's syllabus or check COTR's online text calculator https://textbook.cotr.bc.ca/ for a complete list of the currently required textbooks.

Learning Outcomes:

Upon the successful completion of this course, students will be able to:

Mathematical Content

- develop and implement a plan for solving a problem;
- describe and perform fundamental relations (greater than, less than, equal to) and operations (addition, subtraction, multiplication, division) on whole numbers, integers, fractions, and decimals.
- apply the techniques of elementary formal logic to solve problems and interpret mathematical proofs.
- perform and explain a variety of symbolic calculations at a level which is appropriate for the elementary grades;
- create word problems on whole numbers, integers, fractions, and decimals and their operations, and solve those problems through manipulation of two- and three dimensional objects, graphical representations, and a variety of appropriate algorithms.
- identify properties such as commutativity, associativity, and distributivity and use them to

compute with whole numbers, integers, fractions, and decimals.
- describe the structure of base counting systems (base 10 and other bases), and represent numbers, count, and perform operations within these systems.
- justify and apply basic divisibility tests with an understanding of the role of prime numbers, composite numbers, greatest common divisors, and least common multiples.

Mathematical Understanding

- perform mental calculations for all the operations studied. Calculators will not be permitted;
- use pedagogical theory to develop computational strategies, explain concepts, and give feedback to students learning mathematics;
- create and solve a variety of word problems connected to place, stories, and cultural practices by using manipulatives, graphical representations, and symbolic calculations;
- explain how local Indigenous Peoples, past and present, envision, represent and use specific mathematical processes in their lifestyles and worldview, and incorporate those worldviews to make connections to mathematical concepts;
- develop an understanding of mathematics as a way of knowing the world that all humans are capable of achieving with respect to their personal experiences and needs.
- address their fears and apprehensions towards mathematics, and develop and understanding that mistakes and failure are an important part of the mathematical process.

Course Topics:

1. Introduction to Problem Solving
2. Sets, Whole Numbers, and Numeration
3. Elementary Logic
4. Whole Numbers: Operations and Properties
5. Whole Number Computation – Mental and Written
6. Number Theory
7. Integers
8. Fractions
9. Decimals

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

Evaluation and Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Assignments	20%

Term Project and Presentation	20%
Midterms	25%
Final Exam	35%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

Pass requirements: None

Evaluation Notes: A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a "0" on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at https://cotr.bc.ca/about-us/college-policies/ and include the following:

- Policy 2.4.3 Students with Documented Disabilities
- Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
- Policy 2.5.8 Academic Performance
- Policy 2.5.3 Grade Appeal
- Policy 2.4.9 Student Concerns Re Faculty

Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.