Course Syllabus

A.	Course Number-Section Number, and Course Title:	MT118 – Mathematics for Elementary Education Teachers I

B.	Program Name:	Mathematics and Computer Science Department
	Instructor Name:	Betsy McCall, M.A., M.S.

C.	Contacting the Instructor –	Mathematics & Computer Science Department, South Campus Room 3201 **Chair:** (716) 270-5295, **South Campus General Number:** (716) 851-1322
	Department Information:	
	Instructor Phone:	**Home:** (614) 372-8042 (use wisely!)
	e-Mail:	**mccallb@ecc.edu**
	Office Hours:	**9:30-10:00 after class TR (and by appt), location TBA**

D.	Course Description:	This course is restricted to students ultimately seeking a degree in Elementary Education. Topics will include: problem-solving principles and strategies; models and interpretations of operations with whole numbers; integers; rational numbers and decimals; number theory; numeration and computation; introduction to functions; and problem solving. Emphasis on problem solving, understanding the concepts and procedures of elementary mathematics, mathematical modeling, the use of manipulatives, and effective communication of mathematical ideas. Prerequisites: MT 007 or MT 013 or appropriate college equivalent and/or appropriate mathematics level code.* F/S (C, N, S) *Level code is determined by Mathematics Department placement test and/or successful completion of math courses.

E.	Text / Course Materials: *Enter Title, edition, and publisher, year, and ISBN number.*	*Mathematics Activities for Elementary Teachers (6th ed.)*, Dolan, Williamson, Muri. 2012. Pearson. ISBN: 978-0-321-71539-5 *Mathematics for Elementary Teachers: A Contemporary Approach, 10th edition*. Musser, Peterson, Berger. 2014. Wiley. ISBN: 978-1-118-45744-3. Calculator: You will need a scientific calculator
	Affordable Instructional Material (AIM) or Open Educational Resource (OER) Option (if available):	See links in Blackboard or on my Archive Site

F.	Library Resources:
	The library may be used as part of the research project. In addition, the library contains computers with access to our online textbook.

1

G.	**Course Outcomes:**

Upon Completion of this course, the student will be able to:

Taken from: The Mathematical Education of Teachers from Conference Board of Mathematical Sciences in conjunction with the American Mathematical Society and the Mathematical Association of America.

1. Demonstrate an understanding of models and interpretations of operations with whole numbers:
   a. Demonstrate a large repertoire of interpretations of addition, subtraction, multiplication, and division, and of ways they can be applied.
   b. Demonstrate understanding of relationships among operations.
2. Demonstrate a strong sense of place value in the base-10 number system:
   a. Show understanding of how place value permits efficient representation of a number.
   b. Demonstrate recognition of the value of each place as ten times larger than the value of the next place to the right and the implications of this for ordering numbers and for estimation and approximation.
   c. Demonstrate how the operations of addition, multiplication, and exponentiation are used in representing numbers.
   d. Demonstrate the relative magnitude of numbers.
3. Demonstrate an understanding of multi-digit calculations, including standard algorithms, "mental math," and nonstandard methods commonly created by students:
   a. Demonstrate how the base-10 structure of a number is used in multi-digit computations.
   b. Demonstrate how decimal notation allows for approximation by "round numbers" (multiples of powers of 10).
   c. Demonstrate an understanding of the properties of commutativity, associativity, and distributivity as useful tools for organizing and thinking about computation.
   d. Demonstrate flexibility in mental computation and estimation.
4. Demonstrate an understanding of the concepts of integer and rational number and extend the operations to these larger domains:
   a. Demonstrate an understanding of what integers are and the meaning of sign and magnitude.
   b. Demonstrate an understanding of what rational numbers are, how fractions and decimals relate, different representations of rationals, and a sense of their relative size.
   c. Demonstrate knowledge of interpretations and for the arithmetic operations in the extended domains.
   d. Demonstrate understanding of the relationship between fractions and the operations of multiplication and division.
   e. Demonstrate an understanding of how whole number arithmetic extends to integers and rational numbers.
   f. Demonstrate an understanding of how any number represented by a finite repeating decimal is rational, and conversely.
   g. Demonstrate an understanding of how and why whole number decimal arithmetic extends to finite decimals and, in particular, how place value extends to decimal fractions.
5. Demonstrate an ability to generalize arithmetic and quantitative reasoning:
   a. Demonstrate an ability to use a variety of representations, including conventional algebraic notation, to articulate and justify generalizations.
   b. Demonstrate an understanding of algebraic expressions as shorthand for describing calculation; and demonstrate an understanding of algebraic identities as statements of equivalence of expressions.
   c. Demonstrate an ability to solve word problems via algebraic manipulation.
6. Demonstrate the ability to use manipulatives to understand the meaning of numbers and arithmetic operations throughout the course.
7. Technology Objectives:
   a. Demonstrate the ability to use the arithmetic operations on the scientific calculator to solve algebraic and real world algebraic problems.
   b. Demonstrate an understanding of the keys:

$$\sqrt{n}, x^2, y^x, \pi, \pm, \%, \;(\;\;)\;\mathbf{2}^{nd} \text{ inv key}$$
c. Demonstrate an understanding of order of operations on the scientific calculator.

H.	**SUNY Erie Institutional Learning Outcomes (ILOs):**

Learning Outcome 5.   Quantitative Reasoning-LV3   Related Course Outcomes: 1-7

I.	**Testing / Means of Evaluation:**

<u>Grade</u>: out of 1000 points

A	930+
A-	900-929
B+	870-899
B	830-869
B-	800-829
C+	770-799
C	730-769
C-	700-729
D+	670-699
D	630-669
D-	600-629
F	0-599

J. Grading Determination:

Evaluation of Student Learning –

Course is graded out of 1000 points

Method	Points/Weight	Quantity or Delivery Notes
Homework/In-Class Activities	200	
Quizzes	100	10-12, roughly weekly
Midterms/Exams	300	Two midterms, 150 points each
Projects	100	
Final Exam	300	comprehensive

K. Attendance Requirements:

Students are expected to attend class every day. There will be in-class activities done most days and your attendance will be recorded by participating in those activities. If you miss class, it is your responsibility to make up any missed work.

L. Classroom Expectations:

Students should come to class prepared, having read the material for the class listed on the syllabus *before* class. Students are expected to be engaged, as you would expect your own students to be engaged and treat each other with respect. Some quizzes and tests will be conducted with the use of a calculator, and some will be calculator-free. Students are expected to bring any required materials with them to every class.

If you need extra help, please seek help from the tutoring lab (Room 4228), and please speak with me after class or contact me by email/phone.

Incomplete grades will only be given in extreme circumstances. To be considered, students must have completed 75% of the course material (or everything but the final exam). A valid explanation and documentation will be required.

Last Updated: September 1, 2019

Important dates: ECC Academic Calendar https://www.ecc.edu/academic-calendar/

Withdrawal: The last day for you to withdraw from this class is listed above. Students can withdraw by going to the Registrar Office in person. In the event that you have to withdraw, the grade that appears on your transcript will be a "W". *If you stop going to classes, and you do not withdraw, the grade that appears on your transcript will be an "F".*

M. Students with Disabilities:

SUNY Erie Community College recognizes the right of qualified individuals with disabilities to access an education through appropriate accommodations. Disabilities can be but are not limited to physical limitations and chronic health conditions, to mental health and learning disorders. A Student with a documented disability may be eligible to receive reasonable accommodations through the Student Access Centers located at each campus to access education. SUNY Erie looks to help eliminate barriers and disadvantages that may exist to all students pursuing an education to the best of their ability. If you would like to speak with a Counselor to determine eligibility, please contact your campus Student Access Center:

City Campus	Student Access Center: 121 Ellicott St. Susan McLaughlin	Room 266	851-1189
North Campus	Spring Center Aaron Garmon	Room 213	851-1495
South Campus	Counseling Center: Building 3 Fran Moyer	Room 3120	851-1933

N. Topical Outline:

I. Thinking Critically   2.5 weeks
  a. An Introduction to Problem Solving
  b. Problem Solving Principles/Strategies
  c. Applications

II. Models and Interpretations of Operations with   2.5 weeks
  Whole Numbers
  a. Arithmetic of Whole Numbers
  b. Introduction to Functions

III. Numeration and Computation   2 weeks
  a. Numeration Systems Past and Present
  b. Non-decimal Positional Systems
  c. Algorithms for Adding and Subtracting Whole Numbers
  d. Algorithms for Multiplication and Division of Whole Numbers
  e. Mental Arithmetic and Estimation
  f. Using and Understanding the Calculator

IV. Number Theory   2 weeks
  a. Prime Numbers and Prime Factorization
  b. Tests for Divisibility
  c. Greatest Common Divisors and Least Common Multiples

d. Clock Arithmetic

    V. Models and Interpretations of Operations with Integers   1.5 weeks
     a. Representations of Integers
     b. The Arithmetic of Integers

    VI. Models and Interpretations of Operations with   1.5 weeks
     Rational Numbers
     a. The Basic Concepts of Rational Numbers
     b. The Arithmetic of Rational Numbers
     c. Properties of the Rational Number System

    VII. Models and Interpretations of Operations with Decimals   2 weeks
     And Real Numbers
     a. Decimals
     b. Computations with Decimals
     c. Ratio and Proportion
     d. Percent

    VIII. Evaluation
                             1 week

O. **Starfish® Integrated Course:**	SUNY Erie Community College has partnered with Starfish® Retention Solutions as a continual effort to enable student success, both in the classroom and in meeting overall educational goals. The Starfish® system may be used to provide feedback on course progress. Throughout the semester, emails may be sent via Starfish® regarding grades, performance in the classroom, and access to supplemental services, such as library resources and skills labs. This information will be shared with student support professionals on campus who will reach out to help ensure your success at SUNY Erie. Starfish® is also a way to receive kudos, designed to encourage progress. Please be sure to read your SUNY Erie email on a timely basis, so you are aware of your progress in this course.

P. **Academic Integrity:**	SUNY Erie Community College assumes that students will behave with integrity. Academic dishonesty, as defined in the Student Code of Conduct, will be actionable by the department and faculty, working within the procedures defined by the college. Academic dishonesty accusations must be documented and investigated. Students have the right to dispute accusations of academic dishonesty through the student academic grievance policy.

Q. **Syllabus Prepared By:** **Last Updated Date:**	Betsy McCall September 2019

R.		Tentative Calendar	
Week	Dates	Material to be covered	Notes/Due Dates
1	9.3	Introduction to the course, Models and	B2.1, B2.3, W2.1-6, sets handout

		Interpretations of Operations with Whole Numbers	
	9.5	Adding and Subtracting with Whole Numbers	B3.1, W2.1-6
2	9.10	Multiplying and Dividing with Whole Numbers	B3.2, W2.1-6
	9.12	Exponents and Other Operations with Whole Numbers	B3.3, W2.7-8
3	9.17	Thinking Critically	B1.1, W1.1-10
	9.19	Introduction to Problem Solving	B1.1, W1.1-10
4	9.24	Problem Solving Principles, Problem Solving Strategies	B1.1-2, W1.1-10
	9.26	Applications of Problem Solving	B1.2, W1.1-10
5	10.1	Introduction to Functions	B9.3, W8.3-4
	10.3	Numeration and Computation	W3.1-9
6	10.8	Numeration Systems Past and Present, Non-decimal Positional Systems	B2.2-3, B4.3, MinS chapter
	10.10	Algorithms for Adding and Subtracting Whole Numbers, Algorithms for Multiplication and Division of Whole Numbers	B4.2
7	10.15	Mental Arithmetic and Estimation, Using and Understanding the Calculator	B4.1
	10.17	*Review for Exam #1*	
8	10.22	**Exam #1**	
	10.24	Number Theory, Prime Numbers and Factorization	B5.1, W4.1-6
9	10.29	Tests for Divisibility	B5.1, W4.1-6
	10.31	Greatest Common Divisors and Least Common Multiples, Clock Arithmetic	B5.2+Appendix, W4.1-6
10	11.5	**Election Day, no classes**	
	11.7	Models and Interpretations of Operations with Integers	11.08 Last day to Withdraw
11	11.12	Representations of Integers	B8.1
	11.14	The Arithmetic of Integers	B8.1, W5.1-6
12	11.19	Models and Interpretations of Operations with Rational Numbers, The Basic Concepts of Rational Numbers	B8.2, W5.1-6
	11.21	The Arithmetic of Rational Numbers, Properties of the Rational Number System	9.1, W6.1-6
13	11.26	*Review for Exam #2*	
	11.28	**Thanksgiving Recess, no classes**	
14	12.3	**Exam #2**	
	12.5	Models and Interpretations of Operations with Decimals and Real Numbers, Decimals, Computations with Decimals	B7.1-2, B9.2, W7.1-9
15	12.10	Ratio and Proportion, Percent	B7.3, W7.10
	12.12	Evaluation, Review for the Final Exam	
16	12.17?	**Final Exam**	