DEPARTMENT: Mathematics and Statistics

COURSE PREFIX: MAT   **COURSE NUMBER:** 115   **CREDIT HOURS:** 3

I. TITLE:
Mathematics for Middle and Elementary Teachers I

II. COURSE DESCRIPTION AND PREREQUISITE(S):
Development of the real number system with arithmetic and basic ideas of algebra. A course specifically designed for the needs of future elementary and middle school teachers. Cannot be used for university studies requirements.
Prerequisite(s): Math ACT score of at least 20 or KYOTE score of at least 22 or a COMPASS algebra score of at least 41 or MAT 097.

III. COURSE OBJECTIVES:
The student will be able to:
A. Demonstrate utility with relevant mathematical vocabulary by correctly interpreting and using that vocabulary.
B. Evaluate mathematical expressions symbolically.
C. Construct meaningful representations of numbers, and use these representations to model solutions to problems.
D. Assess reasonableness of alternative representations and solution methods.
E. Explain mathematical concepts by relating them to prerequisite concepts.

IV. CONTENT OUTLINE:
A. Use set notation and perform set operations
B. Define the whole number system with respect to sets
C. Distinguish between the following number systems:
   1. Natural numbers
   2. Whole numbers
   3. Integers
   4. Fractions
   5. Rational numbers
   6. Decimals
   7. Irrational numbers / Real numbers
D. Do the following for each of the number systems:
   1. Use different representations to describe numerals/numbers
   2. Model, solve, and approximate solutions to problems using the four basic operations
   3. Write word problems that relate to a given expression
   4. Explain the connections between the four basic operations
   5. Justify the ordering (e.g. least to greatest) of numbers
   6. Use and justify algorithms for the four basic functions
   7. Justify the properties of the four basic operations (commutative, associative, etc.)
E. Explain and apply the following fraction concepts:
   1. Equivalent fractions
   2. Common denominators / Least common denominators
   3. Improper fractions
   4. Mixed numbers
   5. Multiplicative inverse
F. Apply the concepts of ratio and proportion to solve problems
G. Make connections between ratio, fraction, decimal, and percent
H. Describe techniques for efficient mental math
I. Number theory
   1. Apply divisibility rules
   2. Determine if a number is prime or composite
   3. Determine the greatest common divisor or least common multiple for a set of whole numbers

V. INSTRUCTIONAL ACTIVITIES:
A significant portion of the course will be taught by lecture. Occasional group learning activities will be provided during class time to introduce new topics. Group activities and homework will serve to clarify demonstration of learning objectives and reinforce course content.

VI. FIELD, CLINICAL, AND/OR LABORATORY EXPERIENCES:
None.

VII. TEXT(S) AND RESOURCES:
Mathematical Reasoning for Elementary Teachers, 6th edition, 2012, Long, DeTemple & Millman; Pearson Education, Inc.

Calculators may be used for homework exercises, but **cannot** be used on any quizzes or exams.

VIII. EVALUATION AND GRADING PROCEDURES:
Homework (10%): Homework will be assigned daily and graded regularly. Selected problems will be presented by students during the following class. Lack of participation may result in loss of points on the assignment. Group activities may or may not be assigned a homework grade.

Writing Assignment (5-10%): A writing assignment will be assigned during the semester. A handout outlining details of the project will be provided. Potential assignments include: analysis of an elementary school mathematics textbook and a discussion of selected methods used in the book, analysis of the Kentucky Core Academic Standards (KCAS) and a discussion of selected standards, review of a children's book involving some aspect of mathematics, or some other assignment as deemed appropriate by the instructor.

Exams (60-70%): There will be 3-4 mid-term exams throughout the semester, and each will be announced at least one (1) week prior to the exam date. Unexcused absences from an exam will result in a grade of zero (0) for that exam.

Final Exam (15-20%): A comprehensive final exam will be given during Finals Week.

Letter grades will be assigned by the following scale:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
Below 60%	E

IX. ATTENDANCE POLICY:
Students are expected to adhere to the MSU Attendance Policy outlined in the current MSU Bulletins.
Click here to enter additional attendance policy if necessary.

X. ACADEMIC HONESTY POLICY:
Murray State University takes seriously its moral and educational obligation to maintain high standards of academic honesty and ethical behavior. Instructors are expected to evaluate students' academic achievements accurately, as well as ascertain that work submitted by students is authentic and the result of their own efforts, and consistent with established academic standards. Students are obligated to respect and abide by the basic standards of personal and professional integrity.

Violations of Academic Honesty include:
Cheating - Intentionally using or attempting to use unauthorized information such as books, notes, study aids, or other electronic, online, or digital devices in any academic exercise; as well as unauthorized communication of information by any means to or from others during any academic exercise.
Fabrication and Falsification - Intentional alteration or invention of any information or citation in an academic exercise. Falsification involves changing information whereas fabrication involves inventing or counterfeiting information.
Multiple Submission - The submission of substantial portions of the same academic work, including oral reports, for credit more than once without authorization from the instructor.
Plagiarism - Intentionally or knowingly representing the words, ideas, creative work, or data of someone else as one's own in any academic exercise, without due and proper acknowledgement.

Instructors should outline their expectations that may go beyond the scope of this policy at the beginning of each course and identify such expectations and restrictions in the course syllabus. When an instructor receives evidence, either directly or

indirectly, of academic dishonesty, he or she should investigate the instance. The faculty member should then take appropriate disciplinary action.

Disciplinary action may include, but is not limited to the following:
1) Requiring the student(s) to repeat the exercise or do additional related exercise(s).
2) Lowering the grade or failing the student(s) on the particular exercise(s) involved.
3) Lowering the grade or failing the student(s) in the course.
If the disciplinary action results in the awarding of a grade of E in the course, the student(s) may not drop the course.

Faculty reserve the right to invalidate any exercise or other evaluative measures if substantial evidence exists that the integrity of the exercise has been compromised. Faculty also reserve the right to document in the course syllabi further academic honesty policy elements related to the individual disciplines.

A student may appeal the decision of the faculty member with the department chair in writing within five working days. Note: If, at any point in this process, the student alleges that actions have taken place that may be in violation of the Murray State University Non-Discrimination Statement, this process must be suspended and the matter be directed to the Office of Equal Opportunity. Any appeal will be forwarded to the appropriate university committee as determined by the Provost.

XI. NON-DISCRIMINATION POLICY AND STUDENTS WITH DISABILITIES:

Policy Statement
Murray State University endorses the intent of all federal and state laws created to prohibit discrimination. Murray State University does not discriminate on the basis of race, color, national origin, gender, sexual orientation, religion, age, veteran status, or disability in employment, admissions, or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities. For more information, contact the Executive Director of Institutional Diversity, Equity and Access, 103 Wells Hall, (270) 809-3155 (voice), (270) 809-3361 (TDD).

Students with Disabilities
Students requiring special assistance due to a disability should visit the Office of Student Disability Services immediately for assistance with accommodations. For more information, students should contact the Office of Student Disability Services, 423 Wells Hall, Murray, KY 42017. 270-809-2018 (voice) 270-809-5889 (TTD).

XII. Other required departmental or collegiate committee information
Click here to enter text.