Instructor Personal Information

DEPARTMENT: MATHEMATICS AND STATISTICS

COURSE PREFIX: MAT **COURSE NUMBER: 399** **CREDIT HOURS:** 3

I. TITLE:

Sets, Logic and Functions

II. COURSE DESCRIPTION AND PREREQUISITE(S):

An investigation of mathematical reasoning including techniques of mathematical exploration, problem-solving and proof. Intended for students seeking Middle School Certification. Does not count toward a major or minor in mathematics and credit cannot be received for both MAT 312 (299) and MAT 399.

Prerequisite(s): MAT 250 or consent of instructor.

III. COURSE OBJECTIVES:

The student will be able to:

A. Demonstrate utility with relevant mathematical language and notation
B. Make connections between arithmetic and algebraic concepts
C. Model algebraic equations using manipulatives, patterns and sequences, and graphs in the Cartesian plane
D. Write algebraic equations that describe patterns, sequences, or graphs in the Cartesian plane
E. Solve problems involving linear and quadratic equations
F. Sketch graphs of basic functions, and demonstrate understanding of transformations of graphs
G. Demonstrate understanding of the connections between a function and its graph
H. Use technology to explore algebra

IV. CONTENT OUTLINE:

A. Pre-Algebraic Concepts
    a. Number systems overview
    b. Basic properties and arithmetic operations
    c. Variables, and operations with variables
    d. Expressions and equations
    e. Patterns, sequences and change
B. Algebraic Concepts
    a. Linear Equations
        i. Solving linear equations
        ii. Graphing and analyzing graphs of linear equations
        iii. Writing linear equations (given a graph, information about the graph, or a word problem)
    b. Quadratic Equations
        i. Factoring quadratic equations
        ii. Solving quadratic equations
        iii. Graphing and analyzing graphs of quadratic equations
        iv. Writing quadratic equations (given a graph, information about the graph, or a word problem)
    c. Polynomial Equations
C. Functions
    a. Correspondences
    b. Domain and co-domain (range)
    c. Functions / function notation
    d. Evaluating functions
    e. Graphing basic functions (e.g. linear, quadratic, exponential, absolute value and step functions)
    f. Transformations of graphs of functions
    g. Writing functions for a given situation (given a graph, information about the graph, or a word problem)
    h. Composite and inverse functions

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:

Reconceptualizing Mathematics for Elementary School Teachers, 2010, Sowder, Sowder & Nickerson; W.H. Freeman and Company.

A graphing calculator is recommended for use during group activities and homework. Calculators **cannot** be used during exams.

Kentucky Core Academic Standards

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.

Presentation (10%): Students will develop an inquiry based lesson plan for one of the topics in the Kentucky Core Academic Standards (for middle school or Algebra 1), and anticipate student responses to the prompt. Students will teach a short lesson to the class that incorporates their prompt. Students will be graded on their submitted lesson plan, anticipated student responses, and reflections from their lesson.

Exams (60%): There will be 3 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 (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.

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