

## **MA-118 Mathematics I**

### ***Catalog Description (including prerequisites)***

Introduction to problem solving strategies, sets, whole numbers and their operations and properties, number theory, numeration systems, computer usage, and the historical significance and applications of these topics in the K-9 mathematics curriculum. Prerequisites: Credit for MA101/102 and a passing score on the Intermediate Algebra Assessment, MA 095 with a grade of 'C' or higher, or ACT Math subscore of 18-20 with MA 095 placement score of 14 or higher, or ACT Math subscore of 21 or higher. Declared education major in elementary, early childhood, exceptional child, middle school, or secondary mathematics or human environmental studies: child development option major. (3)

### ***Course Content***

- Mathematical Reasoning
- Pre-number Concepts, Numeration, Number Systems
- Whole Number Computation
- Number Theory
- Geometric Shapes
- Review and Assessment

### ***Nature of Course***

The primary purpose of Mathematics I is to develop in a logical, patterned approach, the elements, properties and operations of the number systems taught in elementary/middle school (grades K-9). The essentials of problem solving and the logic of mathematics are introduced, followed by a development of number concept. Relations, operations and fundamental properties of various number systems are examined. These number systems are the counting numbers and whole numbers. Attention is paid to applications of these systems as practiced today in the elementary/middle school curriculum including the use of appropriate manipulatives and computer software. In addition, some historical applications and informal geometrical relationships are explored. Many instances of the concepts are cited as an elementary/middle school teacher would encounter them.

Mathematics I is taught in a lecture-discussion and/or small group setting with many applications and problems being the focus of the discussion. The problems in the textbook will be the main source of assignments the students will be expected to complete outside of class. Some assignments including library and internet research, laboratory "hands on" projects and individual writing may be made. These assignments should promote a better understanding of the elementary/middle school curriculum.

### ***Student Expectations***

Students will be expected to contribute to class discussions, to work problems in and out of class, to take all quizzes and tests and to do the outside assignments.

**MA-123      Survey of Mathematics*****Catalog Description (including prerequisites)***

MA 123. Survey of Mathematics. A sampling of topics which mixes mathematics history, its mathematicians, and its problems with a variety of real-life applications. Prerequisites: Credit for MA101/102 and a passing score on the Intermediate Algebra Assessment, MA 095 with a grade of 'C' or higher, or ACT Math subscore of 18-20 with MA 095 placement score of 14 or higher, or ACT Math subscore of 21 or higher. (3)

***Course Content***

- Hand Calculators
- Set Theory
- Logic and Proofs
- Computers and Systems of Numeration
- The Real Number System
- Algebraic Models
- Geometry and Trigonometry
- Consumer Mathematics
- Counting Methods and Probability
- Statistics

***Nature of Course***

The course will attempt to make mathematics informative and practical and will stimulate the creativity of the liberal arts student. While the topics will be presented in a straightforward and interesting manner, thought and activity on the part of the student will be necessary. The course is designed for liberal arts students, not for students planning to study advanced mathematics.

The course is taught in a lecture-discussion setting with topics, applications, and problems being the focus of the discussion. Problems from the textbook will be assigned. Reading and written assignments will also be made.

***Student Expectations***

Students are expected to attend all class meetings, participate in discussions, complete reading and written assignments, solve assigned problems, and perform satisfactorily on quizzes and examinations.

There will be at least three one-hour examinations and a final examination. A number of shorter quizzes may also be given.

**MA-134 College Algebra*****Catalog Description (including prerequisites)***

Functions and graphs, polynomial and rational functions, exponential and logarithmic functions, systems of equations and inequalities, binomial theorem. Prerequisite: Credit for MA101/102 and a passing score on the Intermediate Algebra Assessment, MA 095 with a grade of 'C' or higher, or ACT Math subscore of 18-20 with MA 095 placement score of 14 or higher, or ACT Math subscore of 21 or higher. (3)

***Course Content***

Functions and Graphs  
Polynomial and Rational Functions  
Exponential and Logarithmic Functions  
The Conics  
Sequences and Series

***Nature of Course***

The primary purposes of College Algebra are to develop problem-solving capabilities that follow logical patterns and to provide the essential algebraic background for work in other fields or courses. The main mathematical topics in this course are functions and graphs, polynomial and rational functions, exponential and logarithmic functions, conic sections, sequences, and series. The historical development of these topics, as well as applications to life and culture, will receive emphasis where appropriate.

College Algebra is taught in a lecture setting. However, there is much interaction between students and the teacher through examples and problems, worked and presented in class. The teacher presents situations to the students that require reasoning intended to produce better problem-solving skills. Problem sets in the textbook constitute the main source of assignments to be completed outside of class, but the students may be asked to complete reading assignments from sources other than the textbook, write on topics of a mathematical nature related to the history of the solution of a particular problem, or use computer based programs to develop solutions to problems.

***Student Expectations***

Students are expected to provide and use a graphing calculator (similar to the TI83), to participate in class discussions, and to work problems both in and out of class. Normally at least 2 hours of work is needed to complete each class assignment. Performance on scheduled tests constitutes the major part of the course grade.

## **MA-155      Statistical Reasoning**

### ***Catalog Description (including prerequisites)***

Course will introduce statistical ideas to students. The student will reach an understanding of these statistical ideas, be able to deal critically with statistical arguments, and gain an understanding of the impact of statistical ideas on public policy and in other areas of academic study. Prerequisite: Credit for MA101/102 and a passing score on the Intermediate Algebra Assessment, MA 095 with a grade of 'C' or higher, or ACT Math subscore of 18-20 with MA 095 placement score of 14 or higher, or ACT Math subscore of 21 or higher. (3)

### ***Course Content***

- Producing and Organizing Data through Sampling
- Designing an Experiment
- Describing Distributions
- Understanding Relationships
- Probability: Language of Randomness
- Statistical Inference

### ***Nature of Course***

The primary objective of this course is to make students statistically literate. By developing the ability to identify the various representations and misrepresentations of statistical data, a student should be able to distinguish between valid and invalid arguments in order to arrive at an informed judgment. After completing this course, students should be able to read critically and understand reports of experiments and surveys that are published in newspapers, magazines, academic journals, and the Internet. The constant focus of this course is for students to understand the importance of statistical data analysis and decision-making.

The course is taught in a lecture-discussion setting. Newspaper and magazine articles with considerable information on how methods of statistics are used or misused will be provided to the students to facilitate classroom discussion. Projects may be assigned in which the students carry out small-scale surveys, experiments or data analysis.

### ***Student Expectations***

Students are expected to attend all class meetings, participate in class discussions, work exercise problems in and out of class, perform satisfactorily on all quizzes and exams, and complete projects. Projects may require a written proposal, an oral presentation or a written report.

## **PL-120      Symbolic Logic I**

### ***Catalog Description (including prerequisites)***

A formal study of argument and inference, emphasizing the application of symbolic techniques to ordinary language. (3)

### ***Course Content***

Logic is the science of argument and inference. Logic allows one to distinguish good inferences (those that reasonable people ought to accept) from bad inferences (those that reasonable people ought to reject). This course focuses on one important subset of inferences, deductive inferences. The course introduces the concept of deductive validity and then develops techniques for determining whether a particular argument is valid. A good deal of time is spent developing a formal machinery for argument analysis. Techniques for translating ordinary language arguments into the formal machinery are developed at length.

Some of the topics to be covered include:

1. Language, Logic and Argument
  - a. Recognizing arguments
  - b. Analyzing arguments
2. Deductive Validity
  - a. Propositional logic
  - b. Syllogistic logic
  - c. Predicate (relational) logic
3. Inductive Reasoning
  - a. Probabilistic reasoning
  - b. Analogical reasoning
4. Deontic Reasoning
  - a. History of moral reasoning
  - b. Moral reasoning formalized
  - c. Legal reasoning

### ***Nature of Course***

This course is geared toward the development of formal techniques and methods for the application of those techniques to ordinary language. Heavy emphasis is placed on skill development and on understanding central logical concepts. Accordingly, class sessions are a mix of lecture-discussions and Socratic examination of students. Exercises are frequently completed in class, with students being called upon both for answers and for explanations of their answers. Students should be prepared to devote 5 (five) hours per week of study time to this course.

### ***Student Expectations***

1. Regular class attendance (be prepared to be called on in class).
2. Maintain a Logic notebook.
3. Complete routine homework assignments (25% of class grade).
4. Three hourly examinations (objective, problem-solving, short essay).  
(50% of class grade to be determined on basis of exam performance).
5. Comprehensive final examination (25% of class grade).