

Prepared by the Department of Mathematics

Date of Departmental Approval: December 4, 2017

Date approved by Curriculum and Programs: January 31, 2018

Effective: Fall 2018

**1. Course Number: MAT140**

**Course Title: Survey of Mathematics**

**2. Description:** Designed for liberal arts students. Emphasis is on mathematics as the study of patterns and on mathematical thinking as the making and proving of conjectures. Topics: logic, number sequences, functions and graphs, large numbers and logarithms, geometry, symmetry and regular figures, methods of counting, probability, introductory statistics, finance, and topology. The history, philosophy, and applications of mathematics are interwoven. (4 contact hours)

**3. Student Learning Outcomes (instructional objectives, intellectual skills):**

Upon successful completion of the course, the student shall be able to do the following.

- Discuss use of contemporary mathematics in real world applications.
- Pose questions, organize information, draw diagrams, analyze situations through trial and error, graph, model, draw conclusions, communicate, and interpret results.
- Develop mathematical models of situations from the world around them and apply models to make predictions and informed decisions.
- Identify and construct valid deductive arguments.
- Research sources other than standard mathematics textbooks and illustrate how mathematics provides a language for the study of other disciplines.
- Communicate mathematical ideas and procedures using appropriate mathematical vocabulary and notation both orally and in writing.
- Solve realistic mathematical problems with aid of technology
- Use abstract concepts to solve problems.
- Represent mathematical situations symbolically.
- Apply a combination of appropriate algebraic, graphical, and numerical methods to analyze and solve problems and to express functions.
- Visualize, compare, and transform objects.
- Solve problems of finite character via discrete mathematical algorithms and develop combinatorial abilities in order to enumerate sets without direct counting.
- Trace history of mathematics and its linkage with the world.
- Analyze data and use probability and statistical models to make inferences about real-world situations.

**4. Credit(s):** 3 credits

**5. Satisfies General Education Requirement:** Mathematics/Quantitative Reasoning

**6. Prerequisite(s):** MAT035 (Algebra for Non-STEM) or MAT045 (Intermediate Algebra for STEM) or satisfactory basic skills assessment score.

**7. Semester(s) Offered:** Fall, Spring, Summer

**8. Suggested General Guidelines of Evaluation:** Comprehensive final examination, hour tests, homework problems, quizzes, and papers.

**9. General Topical Outline:**

- I. Numbers, Old and New System of Numeration, Systems with Other Bases
- II. Mathematical Models
  - A. Linear Models
  - B. Quadratic Models
  - C. Exponential Models
  - D. Logarithmic Models
- III. Geometry
  - A. Euclidean/Non-Euclidean
  - B. Perspective
  - C. Golden Ratios
  - D. Tessellations
  - E. Fractals
- IV. Pythagorean Theorem and Right Angle Trigonometry
- V. Sets and Symbolic Logic
- VI. Inductive and Deductive Reasoning
- VII. Counting and Probability
- VIII. Statistics
  - A. Measures of Central Tendency
  - B. Measures of Dispersion
  - C. Normal Distribution
- IX. Mathematics of Finance
  - A. Interest
  - B. Annuities