

Required Syllabus Information – all must be included in the course syllabus

MAT 120

Course Title: Math for Liberal Arts: MA1

Course Credits: 4

Course Description: Highlights connections between mathematics and the society in which we live and is intended for liberal arts majors. Topics include set theory and logic, mathematical modeling, probability and statistical methods, and consumer mathematics.

GT Pathways Requirements:

Guaranteed Transfer (GT) Pathways Course Statement:

The Colorado Commission on Higher Education has approved MAT 120 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT- MA1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to <http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html>.

MATHEMATICS CONTENT CRITERIA GT-MA1

- a) Demonstrate good problem-solving habits, including:
 - Estimating solutions and recognizing unreasonable results.
 - Considering a variety of approaches to a given problem, and selecting one that is appropriate.
 - Interpreting solutions correctly.
- b) Generate and interpret symbolic, graphical, numerical, and verbal (written or oral) representations of mathematical ideas.
- c) Communicate mathematical ideas in written and/or oral form using appropriate mathematical language, notation, and style.
- d) Apply mathematical concepts, procedures, and techniques appropriate to the course.
- e) Recognize and apply patterns or mathematical structure.
- f) Utilize and integrate appropriate technology.

COMPETENCIES & STUDENT LEARNING OUTCOMES FOR GT-MA1

Quantitative Literacy:

- 1. Interpret Information**
 - a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
- 2. Represent Information**
 - a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).
- 3. Perform Calculations**
 - a. Solve problems or equations at the appropriate course level.
 - b. Use appropriate mathematical notation.

- c. Solve a variety of different problem types that involve a multi-step solution and address the validity of the results.
- 4. Apply and Analyze Information**
 - a. Make use of graphical objects (such as graphs of equations in two or three variables, histograms, scatterplots of bivariate data, geometrical figures, etc.) to supplement a solution to a typical problem at the appropriate level.
 - b. Formulate, organize, and articulate solutions to theoretical and application problems at the appropriate course level.
 - c. Make judgments based on mathematical analysis appropriate to the course level.
- 5. Communicate Using Mathematical Forms**
 - a. Express mathematical analysis symbolically, graphically, and in written language that clarifies/justifies/summarizes reasoning (may also include oral communication).

SYSTEM REQUIREMENTS:

REQUIRED COURSE LEARNING OUTCOMES

- 1. Apply formal logic and sets to discriminate between valid and invalid arguments.
- 2. Apply mathematical modeling to real world applications.
- 3. Utilize appropriate models to solve real world financial problems.
- 4. Apply probability and statistics to discriminate between valid and invalid conclusions.

RECOMMENDED COURSE LEARNING OUTCOMES

- 1. Perform computations in other number systems.
- 2. Apply topics from graph theory.

REQUIRED TOPICAL OUTLINE

- I. Apply formal logic and sets to discriminate between valid and invalid arguments.
 - a. Inductive and deductive reasoning
 - b. Subset, Union, intersection and complement
 - c. Venn Diagrams
 - d. Introduction to Conjunction, Disjunction, & Negation
 - e. Introduction to Conditional & Biconditional
 - f. Introduction to Converse, Inverse, & Contrapositive
- II. Tests for validity
 - a. Apply mathematical modeling to real world applications.
 - b. Graph analysis in the context of an application
 - c. Appropriate use of linear and exponential models
 - d. Application of linear models
 - e. Construction of linear models

- f. Application of basic exponential models
- g. Direct and inverse variation
- III. Utilize appropriate models to solve real world financial problems.
 - a. Simple and compound interest
 - b. Loans with applications
 - c. Annuities with applications
 - d. Applications using percentages such as budgets, sales tax and discounts
 - e. Cost estimation using applied geometry
- IV. Apply probability and statistics to discriminate between valid and invalid conclusions.
 - a. Measures of Central Tendency
 - b. Measures of Variation
 - c. Table and chart analysis
 - d. Sources of potential bias within research
 - e. Sampling techniques
 - f. Normal distribution
 - g. Theoretical and empirical probability
 - h. Estimation and margin of error

RECOMMENDED TOPICAL OUTLINE

- I. Apply formal logic and sets to discriminate between valid and invalid arguments.
 - a. Truth tables
 - b. Euler diagrams
- II. Apply mathematical modeling to real world applications.
 - a. Construction of basic exponential models
- III. Utilize appropriate models to solve real world financial problems.
 - a. Amortization
- IV. Apply probability and statistics to discriminate between valid and invalid conclusions.
 - a. Likelihood of a false positive
 - b. Expected value in risk assessment
 - c. Perform computations in other number systems.
 - d. Numeration in other bases
 - e. Additive, multiplicative, and ciphered systems of numeration
 - f. Place-value positional value numeration systems
 - g. Apply topics from graph theory.
 - h. Traveling salesman
 - i. Min cut and max flow
 - j. Scheduling problems
 - k. Spanning trees

CCCOonline Course Policies: <http://www.cconline.org/ccconline-course-policies/>

Effective Spring 2018, 201830