



COURSE OUTLINE OF RECORD

Number: MATH A100

TITLE: Liberal Arts Mathematics

ORIGINATOR: Tab Livingston

EFF TERM: Fall 2014

FORMERLY KNOWN AS:

DATE OF

OUTLINE/REVIEW: 04-27-2016

CROSS LISTED COURSE:

TOP NO: 1701.00

CID:

SEMESTER UNITS: 3.0

HRS LEC: 54.0

HRS LAB: 0.0

HRS OTHER: 0.0

CONTACT HRS TOTAL: 54.0

STUDY/NON-CONTACT HRS RECOMMENDED: 108.0

CATALOG DESCRIPTION:

Designed for students whose majors do not require calculus, this applications-oriented course emphasizes management science optimization techniques, introductory descriptive and inferential statistics, weighted voting systems analysis, game theory principles, decision-making strategies, growth trends, and pattern analysis. May be taken for grades or on a pass-no pass basis. **PREREQUISITE:** Math A030 or higher or equivalent placement exam. Transfer Credit: CSU, UC.

JUSTIFICATION FOR COURSE:

There is demonstrated need for a strong applications-oriented mathematics course for non-science majors. Math A100 is designed to provide these students with the analytical tools essential in employing sound decision-making practices for lower division transfer math courses.

PREREQUISITES:

- MATH A030: Intermediate Algebra with a minimum grade of C or better
or
- Appropriate OCC Math Placement Score

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:

MATERIAL FEE: Yes [] No [X] Amount: \$0.00

CREDIT STATUS: Noncredit [] Credit - Degree Applicable [X] Credit - Not Degree Applicable []

GRADING POLICY: Pass/No Pass [X] Standard Letter [X] Not Graded []

OPEN ENTRY/OPEN EXIT: Yes [] No [X]

TRANSFER STATUS: CSU Transferable [] UC/CSU Transferable[X] Not Transferable []

BASIC SKILLS STATUS: Yes [] No [X]

LEVELS BELOW TRANSFER: Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [] **NUMBER REPEATS:**

REQUIRED FOR DEGREE OR CERTIFICATE: No [X] Yes []

GE AND TRANSFER REQUIREMENTS MET:

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

2A: Mathematic

CSU GE Area B: Scientific Inquiry and Quantitative Reasoning

B4 - Mathematics/Quantitative Thinking

OCC AA Gen Ed

AREA A2: LANGUAGE AND RATIONALITY - Communication and Analytical Thinking

OCC AS Gen Ed

AREA A2 – ENGLISH COMMUNICATION - Communication and Analytical Thinking

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Apply basic principles of statistics to solve problems.
2. Analyze voting procedures and structures.
3. Identify the consequences of financial decisions using investment and borrowing models.
4. Use algorithms to determine approximate optimal solutions to scheduling and resource allocation problems, and to analyze game theory problems.

COURSE OBJECTIVES:

1. Approximate optimal solutions to scheduling, routing, and resource allocation problems by applying management science techniques.
2. Interpret and apply algorithms to solve problems.
3. Evaluate the soundness of an elementary statistical design.
4. Calculate mean, median, mode, range, variance, and standard deviation for a data set.
5. Apply principles of a normal distribution to the description of confidence intervals.
6. Analyze the power structure of a weighted voting system.
7. Discuss the inadequacies of apportionment methods.
8. Determine whether the solution to a game matrix consists of pure or mixed strategies.
9. Differentiate growth patterns by observation.
10. Verbalize conclusions arising from the recognition and exploration of mathematical patterns.

COURSE CONTENT:

LECTURE CONTENT:

Each of these topics is presented with a view toward its mathematical structure and the application of that structure to the solution of contemporary realistic problems from a wide variety of disciplines. The instructor is encouraged to choose at least four of the following topics:

- A. Management Science Applications
 1. Euler circuits (efficient routing)
 2. Hamiltonian circuits (traveling salesman problem)
 3. Minimum cost spanning tree (communication networks)
 4. Critical path schedules (directed graphs)
 5. Bin packing (algorithmic approach)
 6. Linear programming (resource allocation)
- B. Statistical Applications
 1. Sampling techniques
 2. Randomized comparative experiments
 3. Descriptive statistics (mean, median, mode, range, standard deviation)
 4. Least-squares regression line
 5. Probability models
 6. Normal distributions
 7. Confidence intervals
 8. Statistical process control (SPC)
- C. Social Choice Applications
 1. Voting methods
 2. Borda count
 3. Weighted voting systems

4. Banzhaf power index
5. Fair division procedures
6. Apportionment methods
- D. Decision Making
 1. Zero-sum game matrices
 2. Total conflict games (pure and mixed strategies)
 3. Partial-conflict games (Prisoners' Dilemma)
- E. Size and Shape
 1. Growth (arithmetic, geometric, allometric, biological)
 2. Reproduction curves (sustained-yield harvesting)
 3. Pattern analysis (geometric transformations and symmetry groups)
 4. Tessellations
- F. The Digital Revolution
 1. Identification numbers
 2. Transmitting information
 3. The Internet, the web, and logic
- G. Modeling in Mathematics
 1. Consumer finance models: saving
 2. Consumer finance models: borrowing
 3. The economics of resources

LABORATORY CONTENT:

METHODS OF INSTRUCTION:

- A. Lecture:
- B. Independent Study:

INSTRUCTIONAL TECHNIQUES:

Although the primary instructional mode is the lecture/demonstration method emphasizing approaches to problem solving, significant class time is reserved for student questions and class discussion. Lectures are enhanced by video, film, audio, and slide presentations.

COURSE ASSIGNMENTS:

Reading Assignments

As assigned from textbook selection

Out-of-class Assignments

Writing is required on homework assignments and quizzes; however, the applications nature of the course requires proficiency demonstration of problem-solving skills.

Writing Assignments

Writing is required on homework assignments and quizzes

METHODS OF STUDENT EVALUATION:

- Midterm Exam
- Final Exam
- Short Quizzes
- Written Assignments
- Essay Examinations
- Objective Examinations
- Problem Solving Exercises

Demonstration of Critical Thinking:

Grades are determined by student performance on unit tests which evaluate problem-solving techniques and understanding of appropriate specialized vocabulary; a comprehensive final exam whose structure is similar to that of the unit test; written homework assignments involving problem solving, diagram sketching, and written explanation and/or analysis; and quizzes on which detailed work is demonstrated

Required Writing, Problem Solving, Skills Demonstration:

Writing is required on homework assignments and quizzes

TEXTS, READINGS, AND RESOURCES:

TextBooks:

1. The Consortium for Mathematics and Its Applications. *For All Practical Purposes: Mathematical Literacy In Today's World* , 9TH ed. New York: W.H. Freeman & Company Publishers, 2013

Other:

1. Other appropriate textbooks as chosen by faculty.

LIBRARY:

Adequate library resources include: Print Materials

Non-Print Materials

Online Materials

Services

Comments:

Attachments:

[Attached Files](#)