Course Acronym:	MATH
Course Number:	120
Descriptive Title:	Nature of Mathematics
Division:	Mathematical Sciences
Department:	Mathematics
Course Disciplines:	Mathematics
Catalog Description:	This course surveys general ideas and concepts of mathematics, including mathematics of finance, set theory, combinatorics, probability, statistics, voting systems, logic and applications of Euclidean geometry.
Prerequisite:	Proficient in intermediate algebra skills
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	3
Hours Laboratory (per week):	0
Outside Study Hours:	6
Total Course Hours:	54
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Prior to July 1992
Transfer UC:	Yes
Effective Date:	Prior to July 1992
General Education: ECC	Area 4B - Language and Rationality: Communication and Analytical Thinking, Area 6 - Mathematics Competency
Term:	
Other:	
CSU GE:	Area B4 - Physical Universe and its Life Forms: Mathematics/Quantitative Reasoning
Term:	
Other:	

IGETC:	Area 2A - Mathematical Concepts and Quantitative Reasoning
Term:	
Other:	
CalGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Solve Loan Problems** Apply techniques of simple and compound interest to solve loan and annuity problems. **SLO #2 Solve Application Problems Using Graphical Methods** Solve application problems using graphical methods such as: 3-ring Venn diagrams, truth tables, Euclidean, Riemannian and Lobachevskian geometries. **SLO #3 Analyze Voting System** Analyze voting systems, methods of apportionment and representation to further the understanding of the political process. **SLO #4 Solve Application Problems** Solve application problems using basic counting principles, permutations, combinations, probability, expected value and frequency distribution.
Course Objectives:	1. Calculate simple and compound interest and apply these techniques to loan and annuity problems. 2. Construct 3-ring Venn diagrams to solve application problems. 3. Distinguish between basic counting principles, permutations and combinations. 4. Solve practical problems using probability and expected value. 5. Construct a frequency distribution and calculate the mean, median, mode and standard deviation of ungrouped and grouped data. 6. Construct truth tables to determine the validity of a real life argument. 7. Examine voting systems, methods of apportionment and representation to further understanding of the political process. 8. Understand the basics of Euclidean geometry, and apply them to Golden Ratios and Golden Rectangles.
Major Topics:	**I. MATHEMATICS OF FINANCE (9 hours, lecture)** A. Consumer Mathematics B. Algebra Modeling of Percent Increase and Decrease C. Applications of Simple Interest D. Applications of Compound Interest E. Future and Present Value F. Annuities and Retirement Investment

G. Loans, Refinancing and Mortgages

II. SET THEORY (6 hours, lecture)

A. Notations - Sets, Elements, Subsets

B. Infinite Sets

C. Set Equality

D. Operations of Sets - Union, Intersection, Complement

E. Applications Using Venn Diagrams

III. TOPICS IN COMBINATORICS (4 hours, lecture)

A. Fundamental Principle of Counting

B. Permutations

C. Combinations

IV. PROBABILITY (8 hours, lecture)

A. History

B. Basics of Probability

C. Complement and Union of Events

D. Probability Using Counting Techniques

E. Genetics and Odds

F. Expected Value

V. STATISTICS (7 hours, lecture)

A. Organizing Data and Visualizing Data

B. Frequency Distributions

C. Histograms

D. Bar Graphs, Circle Graphs, Line Graphs

E. Measures of Central Tendency - Mean, Median, Mode

F. Measures of Dispersion - Range and Standard Deviation

G. Normal Distributions

VI. LOGIC (7 hours, lecture)

	A. Intro to Logic B. Statements and Logical Connectives C. Inductive Reasoning D. Deductive Reasoning E. Symbolic Logic - Negation, Conjunction, Disjunction, Conditional, Biconditional F. Converse, Inverse, Contrapositive G. Tautologies, Contradictions, Equivalent Statements H. Truth Tables I. Analyzing Arguments Using Truth Tables **VII. VOTING SYSTEMS (9 hours, lecture)** A. Types of Voting Systems - Plurality, Borda Count, Plurality with Elimination, Pairwise Comparison B. Flaws of Voting Methods C. Preference Tables D. Standard Quotas and Standard Divisors E. Apportionment Methods - Hamilton's, Jefferson's and Webster's Method F. Flaws of Apportionment Methods - Alabama Paradox and Population Paradox **VIII. Euclidean Geometry and Its Applications (4 hours, lecture)** A. Euclidean Geometry - Points, Lines, Planes, Angles B. Golden Ratios and Their Applications C. Golden Rectangles and Their Applications D. Types of Polygons and Their Angles
Total Lecture Hours:	54
Total Laboratory Hours:	0
Total Hours:	54
A.1. Primary Methods of Evaluation (Part 1 - CCN courses only):	

A.2. Primary Method of Evaluation (Part 2 - all courses; choose one):	2) Problem solving demonstrations (computational or non-computational)
Typical Assignment Using Primary Method of Evaluation:	The Hopkins family is purchasing a yacht priced at $75,000. If the down payment is $15,000, find the monthly payments of their ten-year loan with an APR of 8%, compounded monthly.
Critical Thinking Assignment 1:	Translate the following argument into symbolic form and determine whether it is logically correct by constructing a truth table: Money causes all the world's troubles or money helps the poor. If money helps the poor, it is not the cause of all the world's troubles. Money is the cause of all the world's troubles. Therefore, money does not help the poor.
Critical Thinking Assignment 2:	An insurance company has agreed to insure a customer's art collection for $250,000 against fire loss. The company estimates that there is a 1% chance that the art will be destroyed by fire. Find the cost of the premiums to the customer if the company tries to maintain an expected value for the profit of $2000 on each policy.
Other Evaluation Methods:	Homework Problems, Other Exams, Quizzes
Instructional Methods:	Lecture
If other:	
Work Outside of Class:	Problem solving activity, Required reading, Study
If Other:	
Up-To-Date Representative Texts:	Allen Angel, A Survey of Mathematics with Applications, 11th ed., Pearson, 2021.
Alternative Texts:	Ronald Stazskow and Robert Bradshaw, The Mathematical Palette, 3rd ed., Brooks/Cole Publishing Company, 2005.
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	qualification by appropriate assessment
Requisite Skill and Matching Skill(s): Bold	

the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Allen Bollinger
Date:	01/15/1988
Original Board Approval Date:	02/16/1999
Last Reviewed and/or Revised by:	Benjamin Mitchell
Date:	10/28/2025
Last Board Approval Date:	01/21/2026
Effective Term:	FA 2026