MATH100 : College Algebra for STEM

General Information

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Course Code (CB01) :	MATH100
Course Title (CB02) :	College Algebra for STEM
Department:	MATH
Proposal Start:	Fall 2024
TOP Code (CB03) :	(1701.00) Mathematics, General
CIP Code:	(27.0101) Mathematics, General.
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	Yes
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000576875
Curriculum Committee Approval Date:	12/13/2023
Board of Trustees Approval Date:	01/09/2024
Last Cyclical Review Date:	06/01/2020
Course Description and Course Note:	MATH 100 is a college (transfer) level course in algebra. We cover many topics, including functions and their inverses, transformations of functions, first and second degree equations and inequalities, logarithmic and exponential equations, graphs of linear and quadratic functions, conic sections, polynomial functions, exponential functions, logarithmic functions, real world Science, Technology, Engineering, and Mathematics (STEM) applications, remainder and factor theorems, properties and applications of complex numbers, systems of equations, matrix solutions, and sequences and series. When appropriate, we will discuss the cultural and historical context for these concepts. Note: You will receive no credit for Math 100 if you have completed Math 110 or Math 110A AND Math 110B. You will receive a total of 5 units of credit for completion of Math 100 and Math 110A.
Justification:	Content Change
Academic Career:	• Credit

Academic Senate Discipline

Primary Discipline:	• Mathematics
Alternate Discipline:	
Alternate Discipline:	

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

Transferability & Gen. Ed. Options

General Education Status (CB25)

GE Status (CSU) B4, (UC) 2

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

IGETC Area	Area	Status	Approval Date	Comparable Course
2-Math	Mathematical Concepts and Quantitative Reasoning	Approved	09/09/1991	No Comparable Course defined.

CSU GE-Breadth Area	Area	Status	Approval Date	Comparable Course
B4-Mathematics/Quantitative Reasoning	Mathematics/Quantitative Reasoning	Approved	No value	No Comparable Course defined.

C-ID	Area	Status	Approval Date	Comparable Course
MATH	Mathematics	Approved	08/27/2018	MATH 151 - College Algebra for STEM

Units and Hours

Summary

Minimum Credit Units (CB07)	4
Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	72
Total Course Out-of-Class Hours	144
Total Student Learning Hours	216

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	4	8
Laboratory Hours	0	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	72
Laboratory	0
Studio	0
Total	72
Course Out-of-Class Hours	
Lecture	144
Laboratory	0
Studio	0
Total	144

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

MATH90 - Intermediate Algebra for BSTEM

Objectives

- Solve absolute value equations and inequalities.
- Solve linear equations and compound inequalities.
- Perform operations with polynomials.
- Perform operations with radical expressions.
- Simplify expressions with rational exponents.
- Solve rational equations.

- Solve equations with radicals.
- Find the equation of a line parallel or perpendicular to a given line.
- Solve a system of linear equations using elimination substitution.
- Solve quadratic equations with real and complex solutions.
- Find the inverse of a function.
- Use the properties of logarithms to simplify and expand expressions.
- Solve logarithmic and exponential equations.
- Graph parabolas and circles centered at any point.
- Graph functions (linear, quadratic, exponential, logarithmic).

OR

Prerequisite

Placement is based on academic background or satisfactory completion of MATH 90.

Entry Standards

Entry Standards

No value

Course Limitations

Cross Listed or Equivalent Course

MATH 100+ College Algebra for STEM with Support

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Discussion
Methods of Instruction	Demonstrations
Methods of Instruction	Presentations

Out of Class Assignments

- Homework (eg. problem sets related to course content.)

- Group assignments and projects (e.g. determine the shape and dimensions of maximum area using a string of fixed length, determine if the shoe size and height of a group of students form a linear relationship)
- Graphing calculator and/or computer assignments

Methods of Evaluation	Rationale
Exam/Quiz/Test	Quizzes
Exam/Quiz/Test	Four to six chapter examinations are required
Exam/Quiz/Test	A comprehensive final examination is required

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Blitzer, Bob	College Algebra	Pearson	2019	9780136165774

Other Instructional Materials (i.e. OER, handouts)

No Value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Analyze the following functions: polynomial, rational, radical, absolute value, exponential and logarithmic (including definitions, evaluation, and domain and range).

Graph functions, including asymptotic behavior, intercepts, vertices and transformations.

Perform operations on functions.

Find inverses of functions.

Solve equations including: linear, polynomial, radical, rational, absolute value, exponential and logarithmic.

Solve linear, absolute value, and non-linear inequalities.

Solve linear and non-linear systems of equations and inequalities.

Apply the Fundamental Theorem of Algebra and related theorems to find the roots of a polynomial.

Model and solve STEM application problems.

Graph and algebraically analyze conic sections.

Use formulas to find sums of finite and infinite series.

SLOs

Solve and graph various functions, equations, and inequalities at the college algebra level. Expected Outcome Performance: 70.0

ILOs Core ILOs	Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims.

Critically analyze mathematical formulas, models, and graphs and be able to explain solutions clearly and effectively.
Expected Outcome Performance: 70.0

ILOs Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
	Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims.
MATH Mathematics - A.A. Degree Major	Analyze, synthesize and evaluate theorems in Linear Algebra.
	solve applications in math and science using derivatives, integrals, differential equations and linear algebra.
ILOs General Education	apply techniques of analysis and critical thinking to critique real world and theoretical topics and issues

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

Basic Concepts (9 hours)

- Real numbers
- Exponents and radicals
- Algebraic expressions
- Rational expressions

Equations and Inequalities (12 hours)

- First degree equations
- Quadratic equations
- Complex numbers
- Other types of equations
- Linear inequalities
- Quadratic and other non-linear inequalities
- Applications to STEM problems (uniform motion, geometry, mixture)

Functions and Their Graphs (13 hours)

- Cartesian Coordinate System
- Graphs and equations
- Graphs of functions and relations including transformations
- Quadratic functions
- Operations on functions
- One-to-one functions and inverses

Polynomial Functions (13 hours)

- The Remainder Theorem and the Factor Theorem
- Synthetic division
- The Fundamental Theorem of Algebra
- Rational roots
- Graphing polynomial functions
- Rational functions
- STEM optimization applications

Exponential and Logarithmic Functions (12 hours)

- Exponential functions
- Logarithmic functions
- Properties of logarithms
- Exponential and logarithmic equations
- Common and natural logarithms
- Applications to population growth and decay

Systems of Equations (8 hours)

- Systems of linear equations in 2 variables
- Systems of linear equations in more than 2 variables
- Non-linear systems of equations in 2 variables
- Modeling STEM problems using systems

Other Topics (5 hours)

- Conic sections – analytic geometry
- Sequences and series

Total Hours: 72