Glendale College	**Course ID 010236**
# Course Outline of Record Report	**Revision - May 2023**

MATH110B : Precalculus II

General Information

Author:	• Suzanne Palermo
Course Code (CB01) :	MATH110B
Course Title (CB02) :	Precalculus II
Department:	MATH
Proposal Start:	Fall 2023
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) :	CCC000567881
Curriculum Committee Approval Date:	05/10/2023
Board of Trustees Approval Date:	06/20/2023
Last Cyclical Review Date:	07/01/2020
Course Description and Course Note:	MATH 110B is the second of two courses that prepares students for calculus. Topics include the study of trigonometric functions, their inverses and their graphs, identities and their proofs, trigonometric equations, and graphs of polar equations. Additional topics include complex numbers, graphs of parametric equations and conic sections, linear and nonlinear systems of equations, the binomial theorem, partial fraction decomposition, and introduction to vectors. Note: A maximum of 7 units may be earned from Math 110B with any combination of MATH 100 and MATH 110A.
Justification:	Coding/Category Change
Academic Career:	• Credit
Author:	• Suzanne Palermo

Academic Senate Discipline

Primary Discipline:	• Mathematics
Alternate Discipline:	No value
Alternate Discipline:	No value

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	08/31/2015	No Comparable Course defined.

CSU GE-Breadth Area	Area	Status	Approval Date	Comparable Course
B4-Mathematics/Quantitative Reasoning	Mathematics/Quantitative Reasoning	Approved	08/31/2015	No Comparable Course defined.

C-ID	Area	Status	Approval Date	Comparable Course
MATH	Mathematics	Approved	02/16/2016	MATH 955 - Precalculus & Trigonometry (must take MATH 110A and MATH 110B)

Units and Hours

Summary

Minimum Credit Units (CB07)	3.5
Maximum Credit Units (CB06)	3.5
Total Course In-Class (Contact) Hours	81
Total Course Out-of-Class Hours	108
Total Student Learning Hours	189

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.

☐ Variable Credit Course

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	3	6
Laboratory Hours	1.5	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	

Studio Hours	0	0	Lecture	54
			Laboratory	27
			Studio	0
			Total	81
			Course Out-of-Class Hours	
			Lecture	108
			Laboratory	0
			Studio	0
			Total	108

Time Commitment Notes for Students

No value

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

Prerequisite

MATH110A - Precalculus I (in-development)

Objectives
- solve equations including rational, linear, polynomial, exponential, absolute value, radical, and logarithmic;
- apply functions to model real world applications;
- solve linear, non-linear, and absolute value inequalities;
- graph the following types of functions and relations: polynomial, rational, exponential, and logarithm;
- apply transformations to the graphs of functions and relations;
- recognize the relationship between functions and their inverses graphically and algebraically;
- solve exponential and logarithmic equations;
- apply the Fundamental Theorem of Algebra and related theorems to find the roots of a polynomial;
- apply the basic definitions of trigonometry to solve right triangle application problems;
- evaluate a trigonometric function at an angle whose measure is given in degrees and radians;
- apply the laws of sines and cosines to solve application problems.

Entry Standards

Entry Standards	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction   Lecture

Methods of Instruction	Laboratory

Methods of Instruction	Discussion

Methods of Instruction	Collaborative Learning

Methods of Instruction	Demonstrations

Out of Class Assignments

- Homework (e.g. problem sets related to course content)
- Group assignments and projects (e.g. group project to solve a "challenging" application problem from the textbook)
- Graphing calculator and/or computer assignments (e.g. utilize graphing software to explore graphs in polar coordinates)

Methods of Evaluation	Rationale
Activity (answering journal prompt, group activity)	Participation in lab activities
Exam/Quiz/Test	Quizzes
Exam/Quiz/Test	Four to seven chapter examinations are required
Exam/Quiz/Test	A two hour and twenty minute comprehensive final examination is required

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Stewart, James	Precalculus, Custom Edition for Glendale College	Cengage Learning	2015	9780357958520

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

No Value

Learning Outcomes and Objectives

Course Objectives

Solve algebraic equations

Apply functions to model real world applications

Solve linear, non-linear, and absolute value inequalities

Graph the following types of functions and relations: polynomial, rational, exponential, logarithm, conic section, and trigonometric

Apply transformations to the graphs of functions and relations

Solve exponential and logarithmic equations

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

Solve linear and non-linear systems of equations and inequalities

Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs

Evaluate and graph inverse trigonometric functions

Apply the method of partial fraction decomposition

Apply the Binomial Theorem

Prove various trigonometric identities

Evaluate a trigonometric function at an angle whose measure is given in degrees and radians

Simplify trigonometric expressions

Solve trigonometric equations

Apply the basic definitions of trigonometry to solve right triangle application problems

Apply the laws of sines and cosines to solve application problems

Graph both polar and parametric equations

Convert between polar and rectangular coordinates

Use De Moivre's Theorem to find powers and roots of complex numbers

Use mathematical induction to prove formulas

Represent a vector in in the form < a , b > and ai+bj

Solve applications using vectors

SLOs

Solve systems of equations and inequalities using a variety of methods.   Expected Outcome Performance: 70.0

ILOs General Education	apply techniques of analysis and critical thinking to critique real world and theoretical topics and issues
MATH Mathematics - A.A. Degree Major	solve applications in math and science using derivatives, integrals, differential equations and linear algebra.

Use trigonometric identities as well as solve and graph trigonometric equations that may involve vectors, complex numbers, and/or polar coordinates.   Expected Outcome Performance: 70.0

ILOs General Education	apply techniques of analysis and critical thinking to critique real world and theoretical topics and issues
MATH Mathematics - A.A. Degree Major	solve applications in math and science using derivatives, integrals, differential equations and linear algebra.

Additional SLO Information

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

No Value
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Is this proposal submitted in response to learning outcomes assessment data?

No Value
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If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value
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SLO Evidence

No Value

Course Content

Lecture Content

The Unit Circle and Graphs of Trigonometric Functions (10)
- Define the six trigonometric functions on the unit circle
- Graphs of functions involving sin x, cos x, tan x, cot x, csc x, and sec x
- Graphs of the trigonometric functions: period, amplitude, phase shift, and asymptotes
- Other graphs involving trigonometric functions

Trigonometric Identities (10)
- Simplifying trigonometric expressions
- Identities involving sums and differences of two angles
- Double-angle identities
- Half-angle identities
- Sum-to-product and product-to-sum identities
- Proofs of trigonometric identities

Trigonometric Equations and Inverse Trigonometric Functions (10)
- Solving trigonometric equations
- Inverse trigonometric functions
- Graphs of inverse trigonometric functions

Vectors in Two Dimensions (5)
- The algebra of vectors
- The dot product
- Applications

Complex Numbers and Polar Coordinates (10)
- Complex numbers and their graphs
- Trigonometric form of a complex number
- De Moivre's Theorem and applications
- Polar coordinates
- Polar equations and their graphs
- Parametric equations

Systems of Equations (5)
- Systems of linear equations and inequalities in two variables
- Systems of linear equations (including Guassian Elimination) in more than 2 variables
- Determinants and Cramer's Rule
- Non-linear systems of equations in 2 variables

Other Topics (4)
- Conic sections – analytic geometry
- Partial fraction decomposition
- Summation notation
- Sequences and series

Total Hours=54

Laboratory/Studio Content

The Unit Circle and Graphs of Trigonometric Functions (5)
- Define the six trigonometric functions on the unit circle
- Graphs of functions involving sin x, cos x, tan x, cot x, csc x, and sec x
- Graphs of the trigonometric functions: period, amplitude, phase shift, and asymptotes
- Other graphs involving trigonometric functions

Trigonometric Identities (5)
- Simplifying trigonometric expressions
- Identities involving sums and differences of two angles
- Double-angle identities
- Half-angle identities
- Sum-to-product and product-to-sum identities
- Proofs of trigonometric identities

Trigonometric Equations and Inverse Trigonometric Functions (4)
- Solving trigonometric equations
- Inverse trigonometric functions
- Graphs of inverse trigonometric functions

Vectors in Two Dimensions (3)
- The algebra of vectors
- The dot product
- Applications

Complex Numbers and Polar Coordinates (5)
- Complex numbers and their graphs
- Trigonometric form of a complex number
- De Moivre's Theorem and applications
- Polar coordinates
- Polar equations and their graphs
- Parametric equations

Systems of Equations (3)
- Systems of linear equations and inequalities in two variables
- Systems of linear equations (including Guassian Elimination) in more than 2 variables
- Determinants and Cramer's Rule
- Non-linear systems of equations in 2 variables

Other Topics (2)
- Conic sections – analytic geometry
- Partial fraction decomposition
- Summation notation
- Sequences and series

Total Hours=27