GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: MATH 11 DIVISION: 10 ALSO LISTED AS:

TERM EFFECTIVE: Spring 2021 CURRICULUM APPROVAL DATE: 11/10/2020

SHORT TITLE: Precalculus

LONG TITLE: Integrated Precalculus

Units	Number of Weeks	Type	Contact Hours/Week	Total Contact Hours
8	18	Lecture:	8	144
		Lab:	0	0
		Other:	0	0
		Total:	8	144

Out of Class Hrs:	288.00
Total Learning Hrs:	432.00

COURSE DESCRIPTION:

Math 11 is a blend of Math 8A and 8B Precalculus classes. Math 11 prepares students for the study of calculus by providing important skills in algebraic manipulation, interpretation, and problem solving at the college level. Topics will include basic algebraic concepts, complex numbers, equations and inequalities of the first and second degree, functions and graphs, linear and quadratic equations, polynomial functions, exponential and logarithmic functions, systems of equations, matrices and determinants, trigonometric functions, identities, inverse trigonometric functions, applications of trigonometry, vectors, polar and parametric equations, sequences, series, conic sections, and mathematical induction. PREREQUISITE. Mathematics 240 with a grade of 'C' or better, or appropriate placement.

PREREQUISITES:

Completion of MATH 240, as UG, with a grade of C or better.
OR
Score of 33 on Intermediate Algebra
OR
Score of 13 on Pre-Calculus
OR
Score of 2800 on Accuplacer Math
OR
Score of 2600 on MM CCCApply Math
OR
Score of 2600 on MM Placement Tool Math

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion
05 - Hybrid
71 - Dist. Ed Internet Simultaneous
72 - Dist. Ed Internet Delayed

STUDENT LEARNING OUTCOMES:

1. Identify and perform transformations on the graphs of elementary (radical, absolute value, etc.), polynomial (linear, quadratic, cubic), rational, exponential, and logarithmic functions.

Measure of assessment: Homework, Quiz, Exam, Project

Year assessed, or planned year of assessment: 2019

Semester: Spring

2. Solve a wide variety of equations and inequalities including absolute value, radical, rational, exponential, logarithmic and polynomial.

Measure of assessment: Homework, Quiz, Exam, Project

Year assessed, or planned year of assessment: 2019

Semester: Spring

3. Solve systems of equations and inequalities using graphing, elimination, substitution techniques, matrix algebra, and determinants.

Measure of assessment: Homework, Quiz, Exam, Project

4. Explain the concept of a function, perform the arithmetic operations of functions, identify the domain of a function, and analyze graphs of functions.

Measure of assessment: Homework, Quiz, Exam, Project

5. Recognize the relationship between inverse functions graphically and through composition.

Measure of assessment: Homework, Quiz, Exam, Project

6. Recognize functional patterns in data and apply functions to model real world applications.

Measure of assessment: Homework, Quiz, Exam, Project

7. Graph polynomial functions and characterize the real and complex zeroes of polynomials.

Measure of assessment: Homework, Quiz, Exam, Project

8. Locate the asymptotes and zeroes of rational functions analytically and graph a rational function.

Measure of assessment: Homework, Quiz, Exam, Project

9. Find the trigonometric values of any angle or real number and the inverse trigonometric values of real numbers.

Measure of assessment: Homework, Quiz, Exam, Project

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

Measure of assessment: Homework, Quiz, Exam, Project

Year assessed, or planned year of assessment: 2019

Semester: Spring

11. Solve trigonometric equations, triangles, and applications, including application of the Law of Sines and the Law of Cosines.

Measure of assessment: Homework, Quiz, Exam, Project

Year assessed, or planned year of assessment: 2019

Semester: Spring

12. Manipulate trigonometric expressions and verify trigonometric identities.

Measure of assessment: Homework, Quiz, Exam, Project

13. Calculate powers and roots of complex numbers using DeMoivre's Theorem.

Measure of assessment: Homework, Quiz, Exam, Project

14. Model physical problems using vectors. Decompose vectors into components, add and subtract vectors, multiply vectors using the dot and cross products.

Measure of assessment: Homework, Quiz, Exam, Project

15. Convert between polar and rectangular coordinates. Graph polar and parametric equations.

Measure of assessment: Homework, Quiz, Exam, Project

16. Identify, manipulate, graph, and apply conic sections.

Measure of assessment: Homework, Quiz, Exam, Project

COURSE CONTENT:

Curriculum Approval Date: 11/10/2020

DE MODIFICATION ONLY

HOURS: 16

Equations, Inequalities, and Modeling

Performance Objectives: Students will review solving and graphing linear equations with one or two variables, quadratic equations, absolute value equations and inequalities, radical equations, and rational equations. Students will perform algebraic manipulations on expressions encountered in a first semester calculus course. Students will use calculator to construct scatter diagrams and perform linear and quadratic regressions.

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a linear regression project using a graphing calculator.

HOURS: 16

Functions and Graphs

Performance Objectives: Students will study functions and their graphs. They will investigate function notation, domain and range, transformations and symmetry, operations with functions including composition, inverse functions, even/odd functions, and piecewise functions. Students will perform transformations on the graphs of elementary functions (radical, absolute values, etc.).

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a computer lab project in which they investigate function transformations and symmetry.

HOURS: 16

Polynomial and Rational Functions

Performance Objectives: Students will analyze and learn to graph linear, quadratic, polynomial, and rational functions. Students will identify end behavior, asymptotic behavior, intercepts, and vertices. They will characterize real and complex zeroes of polynomials and apply Fundamental Theorem of Algebra. Students will perform transformations on the graphs of polynomial and rational functions. They will solve polynomial and rational inequalities using sign charts and graphs.

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class.

HOURS: 16

Exponential and Logarithmic functions

Performance Objectives: Students will study and analyze exponential functions. Emphasis will be placed on the number e, and on using exponential functions in the modeling of growth and decay. Students will study logarithms, learning their uses and applications. Students will learn to recognize the distinguishing characteristics of exponential functions from appropriate raw data. Students will perform transformations on the graphs of logarithmical and exponential functions. They will solve logarithmic and exponential equations.

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a project involving Newton's Law of Cooling.

HOURS: 8

Systems of Equations and Inequalities

Performance Objectives: Students will learn methods for solving linear systems of equations in two or three variables, and nonlinear systems. Students will investigate methods for solving linear systems using matrices. They will also learn partial decomposition, systems of inequalities in two variables, linear programming.

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class.

COURSE CONTENT(CONTINUED):

HOURS: 16

Trigonometric Functions

Performance Objectives: Students will learn the concepts of angle measure, radian measure, and the unit circle. Students will learn the definitions of six trigonometric functions according to the right triangle, the unit circle, and the rectangular coordinate system. They will examine sine and cosine functions and become proficient at graphing these functions under transformation, including changes in period, amplitude, and phase shift. Students will investigate the other trigonometric functions and their graphs. They will also learn about inverse trigonometric functions, the composition of inverse trigonometric functions, identities involving inverse trigonometric functions, graphs of inverse trigonometric functions. Students will apply right triangle trigonometry to problem solving.

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a project which demonstrates their ability to utilize right triangle trigonometry in a real world application.

HOURS: 16

Trigonometric Identities and Conditional Equations

Performance Objectives: Students will learn about basic trigonometric identities. They will utilize the basic identities to verify identities. Students will study other identities including sum and difference, double-angle and half-angle, and product identities. They will investigate methods for simplifying trigonometric expressions and solving trigonometric equations.

Out-of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a project which investigates the relationship between a trigonometric identity and its geometric interpretation.

HOURS: 16

Applications of Trigonometry

Performance Objectives: Students will study the Law of Sines and the Law of Cosines and their applications to problem solving. Students will investigate the trigonometric form of complex numbers and use DeMoivres Theorem to find nth roots of complex numbers. They will analyze polar and parametric equations and become proficient in graphing functions of these forms.

Out-of-Class Assignments: Students will complete homework assignments which require them to explain, apply, and explore concepts taught in class. Students will complete a project which utilizes trigonometry to optimize a physical situation.

HOURS: 8

Vectors

Students will investigate vectors and their applications, including vector representation (a quantity with magnitude and direction) in the form <a,b> and ai+bj. They will perform algebraic operations on vectors including addition, subtraction, and scalar multiplication. Students will calculate the dot product and cross product.

Out-of-Class Assignments: Students will complete homework assignments which require them to explain, apply, and explore concepts taught in class.

HOURS: 8

Analytic Geometry, Conic Sections

Performance Objectives: Derive basic results from analytic geometry including distance and midpoint formulas and equations of lines and circles. Students will learn to graph parabolas, ellipses, circles, and hyperbolas.

Out-of-Class Assignments: Students will complete homework assignments which require them to explain, apply, and explore concepts taught in class.

COURSE CONTENT(CONTINUED):

HOURS: 6

Sequences, Series, and Mathematical Induction

Students will investigate band analyze mathematical sequences and series, and utilize these conceptions to solve applications. Students will also study proof by mathematical induction.

Out-of-Class Assignments: Students will complete homework assignments which require them to explain, apply, and explore concepts taught in class.

HOURS: 2

Final Exam

METHODS OF INSTRUCTION:

Instruction will follow a standard lecture/discussion format. Extensive homework will be assigned in order to assure mastery of the concepts covered in class. Students will also be required to utilize technology, both calculators and computer software, to enhance their understanding of the material. Students will be given opportunities to work together on problems given in-class and group projects.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 288

Assignment Description:

1. Analyze and study pertinent text material, solved examples and lecture notes.
2. Apply principles and skills covered in class by solving regularly-assigned homework problems.
3. Regularly synthesize course materials in preparation for exams.
4. Projects to apply concepts learned in class.

METHODS OF EVALUATION:

Writing assignments

Percent of total grade: 10.00 %

Out-of-class projects.

Problem-solving assignments

Percent of total grade: 10.00 %

Homework, quizzes.

Objective examinations

Percent of total grade: 80.00 %

In-class written exams.

REPRESENTATIVE TEXTBOOKS:

Required Representative Textbooks

Sullivan & Sullivan. Precalculus: Concepts Through Functions, A Unit Circle Approach to Trigonometry. Pearson,2015.

ISBN: ISBN-10: 0321930347 ISBN-13: 9780321930347

Reading Level of Text, Grade: 12 Verified by: Ken Wagman

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

GAV B4

GAV Area 2 = Math Con & Q Reas

CSU GE:

CSU B4

IGETC:

IGETC 2A

CSU TRANSFER:

Transferable CSU

UC TRANSFER:

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Course Control Number: CCC000596247
Sports/Physical Education Course: N
Taxonomy of Program: 170100