GAVILAN ✈ COLLEGE

5055 Santa Teresa Blvd
Gilroy, CA 95020

Course Outline

Course: MATH 10   Division: 10   Also Listed As:

Term Effective: 200930, INACTIVE COURSE

Short Title: FUNCTIONAL ANALYSIS

Full Title: Functional Analysis and Modeling

Contact Hours/Week	Units	Number of Weeks	Total Contact Hours
Lecture: 3	3	17.34	Lecture: 52.02
Lab: 0			Lab: 0
Other: 0			Other: 0
Total: 3			Total: 52.02

Credit Status: D - Credit - Degree Applicable

Grading Modes: L - Standard Letter Grade

Repeatability: Repeatability: N - Course may not be repeated

Schedule Types: 02 - Lecture and/or discussion

Course Description:
Math 10 prepares students for the study of calculus by
providing important critical thinking and problem solving
skills. The central theme of the course is the analysis of
mathematical functions as models of change. Families of
functions - linear, exponential, logarithmic, power,
periodic, polynomial, rational - will be introduced,
compared and contrasted. Course content will include an
introduction to functions and functional notation;
transformation of functions; composite, inverse and
combinations of functions; vectors and polar coordinates;
series; parametric equations; complex numbers. Hand-held
graphing calculators will be used extensively to highlight
their strengths and their limitations as a problem-solving
tool. Real world applications will be numerous.
PREREQUISITE: Mathematics 9 with a grade of 'C' or better
and proficiency with the TI-83 graphing calculator as
gained from, for instance, Math 209.

ARTICULATION and CERTIFICATE INFORMATION
    Associate Degree:
        GAV B4, effective 199870
    CSU GE:
        CSU B4, effective 199870
    IGETC:
        IGETC 2A, effective 199870
    CSU TRANSFER:
        Transferable CSU, effective 199870
    UC TRANSFER:
        Transferable UC, effective 199870

PREREQUISITES:
    Completion of MATH 9, as UG, with a grade of C or better.
    OR
    Completion of MATH 209, as UG, with a grade of C or better.
    OR
    Score of 40 on Intermediate Algebra
    OR
    Score of 13 on Pre-Calculus

COREQUISITES:

STUDENT LEARNING OUTCOMES:
1. Goals expected of the student at the end of the course are mastery
of the student performance objectives listed in the chronological
description of content.
2. The primary objective of this course is to
elevate the intellectual sophistication of the students and provide
them with the critical thinking skills and deeper understanding of
functions that is required for the mastery of calculus.

TOPICS AND SCOPE:
Inactive Course: 12/08/2008
WEEK   HOURS CONTENT:
1   4   Introduction to and definition of mathematical
functions and functional notation.
Reading from textbook. Homework problems from
text and instructor.
Students will gain an appreciation of functions,
functional notation and domain and range.
2   4   Rates of Change. Introduction to linear functions.
Reading from textbook. Homework problems from text
and instructor. Assignment of group project #1.
Students will analyze the nature of rates of change,
a central idea from calculus. Students will compare
and contrast the equations of many different lines
(linear functions) and analyze their first important
"family" of functions.
3   4   Continued analysis of linear functions. Reading from
textbook. Homework problems from text and instructor.
Students will compare and contrast the equations of
many different lines (linear functions) and analyze
their first important "family" of functions.
4   4   Introduction to and definition of the family of

exponential and logarithmic functions.
Reading from textbook. Homework problems from text
and instructor. Assignment of group #2.
Students will compare and contrast linear functions,
exponential and logarithmic functions. Students will
analyze their second important "family" of functions.
5   4   Applications of the logarithmic function, introduction
to the natural log function, fitting curves to data.
Reading from textbook. Homework problems from text
and instructor.
Students will analyze exponential and logarithmic
functions and their applications. Students will
discuss the relationship between the exponential
and logarithmic functions.
6   4   Exponential and logarithmic functions, continued.
Reading from textbook. Homework problems from text
and instructor. Assignment of group project #3.
See week 4 and 5 objectives.
7   4   Transformations of functions.
Reading from textbook. Homework problems from text
and instructor.
Students will analyze how and why varying the
parameters of a function affect the graph of that
function.
8   4   Introduction to trigonometric functions.
Reading from textbook. Homework problems from text
and instructor. Assignment of group project #4.
Students will compare and contrast the family of
periodic functions with those analyzed previously.
Students will discuss the use of angular variables
and the general nature of periodic functions.
Students will discuss, compare and contrast
trigonometric functions and their inverses. Students
will discuss and develop models of periodic
phenomena. Students will use trigonometric functions
to solve general triangles.
9   4   Trigonometric functions, continued.
Reading from textbook. Homework problems from text
and instructor. See week 8 objectives.
10   4   Trigonometric functions, continued.
Reading from textbook. Homework problems from text
and instructor. Assignment of group project #5.
See week 8 objectives.
11   4   Introduction to and definition of composite
functions, general inverse functions and
combinations of functions.
Reading from textbook. Homework problems from text
and instructor.
Students will analyze and discuss the composition of
function from the families of functions already
studied. Students will compare and contrast a
function and its inverse graphically. Students will
find inverses of functions both graphically and
algebraically. Students will discuss and analyze
combinations of functions.

12   4   Composite, inverse and combinations of functions, contined.
Reading from textbook. Homework problems from text and instructor.
Assignment of group project #6.
See week 11 objectives.
13   4   Introduction to and definition of polynomial and rational functions.
Reading from textbook. Homework problems from text and instructor.
Students will compare and contrast the family of power functions with those studied previously.
Students will develop polynomial functions as the sum of power functions. Students will analyze rational functions as the ratio of polynomial functions. Students will analyze the behavior of polynomial and rational functions near zeros and asymptotes.
14   4   Polynomial and rational functions, continued.
Reading from textbook. Homework problems from text and instructor. Assignment of group project #7.
See week 13 objectives.
15   4   Introduction to vectors and polar coordinates.
Reading from textbook. Homework problems from text and instructor.
Students will apply the principles of trigonometry to describe quantities with both magnitude and direction. Students will analyze a new way to describe points in the plane and compare and contrast polar coordinates with rectangular coordinates.
16   4   Introduction to and definition of sequences and series. Introduction to and definition of parametric equations and implicitly defined curves.
Reading from textbook. Homework problems from text and instructor. Assignment of group project #8.
Students will compare and contrast arithmetic and geometric sequences and series. Students will analyze functions and their graphs using an independent parameter.
17   4   Introduction to and definition of the complex plane and hyperbolic functions.
Reading from textbook. Homework problems from text and instructor.
Students will compare and contrast the complex plane with the real plane and analyze the appearance of solutions in each. Students will analyze the hyperbolic sine and cosine functions and compare and contrast them with the sine, cosine, and exponential functions.
18   2   Final Exam.
Included in content section.

METHODS OF INSTRUCTION:
Method of Instructon will include lecture/discussion/chalkboard work by

instructor, small group work assisted and directed by instructor, computer work done in the lab assisted and directed by instructor.

REPRESENTATIVE TEXTBOOKS:
Eric Connally, Deborah Hughes-Hallett, Andrew Gleason, Et. al.,
^uFunctions Modeling Change: A Preparation for Calculus,^s 1998.
John Wiley & Sons, Inc., or equivalent college level text.
Reading level of text: 10th grade
Other materials required to be purchased by the student:
Hand-held graphing calculator.

SUPPLEMENTAL DATA:
Basic Skills: N
Classification: A
Noncredit Category: Y
Cooperative Education:
Program Status: 2 Stand-alone
Special Class Status: N
CAN:
CAN Sequence:
CSU Crosswalk Course Department: MATH
CSU Crosswalk Course Number: 10
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000057741
Sports/Physical Education Course: N
Taxonomy of Program: 170100