CIS 009: MATHEMATICAL MODELING FOR BUSINESS

Originator
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Justification / Rationale
Removing non-approved C-ID; TA
Adding UC TCA Transfer status; rb 09.09.2022

Effective Term
Spring 2023

Credit Status
Credit - Degree Applicable

Subject
CIS - Computer Information Systems

Course Number
009

Full Course Title
Mathematical Modeling for Business

Short Title
MATH MODELING BUSINESS

Discipline

Disciplines List
Computer Information Systems (Computer network installation, microcomputer technology, computer applications)
Business

Modality
Face-to-Face
100% Online
Hybrid

Catalog Description
The study of functions including polynomial, rational, radical, exponential, absolute value, logarithmic, and power equations and functions. Applications to business, technology, government, science, and other fields. Use of spreadsheets and other technologies for visualization, experimentation, and problem solving.

This college level course is designed for students majoring in Business Administration or Computer Information Systems (CIS) for transfer to California State University system.

Schedule Description
This course is intended for Business Administration and Computer Information Systems majors or anyone who wishes to gain an understanding of how functions are used in a business environment. It introduces students to the basic principles of various types of functions, their applications in the industry, and techniques used to facilitate decision-making. Prerequisite: MATH 040 or MATH 049

Lecture Units
2
Lecture Semester Hours
36

Lab Units
1
Lab Semester Hours
54

In-class Hours
90

Out-of-class Hours
72

Total Course Units
3

Total Semester Hours
162

Class Size Maximum
35

Prerequisite Course(s)
MATH 040 or MATH 049

Required Text and Other Instructional Materials

Resource Type
Book (Recommended)

Open Educational Resource
No

Author
Crauder, B.; Evans, B.; Noell, A.

Title
Functions and Change

Edition
6

Publisher
Cengage

Year
2018

Resource Type
Web/Other

Open Educational Resource
No

Description
Students are required to have access to a computer with Microsoft Office Excel installed or capable or running Office 365 cloud services.

Resource Type
Web/Other

Open Educational Resource
No

Description
Enhanced WebAssign

Resource Type
Web/Other
Open Educational Resource
Yes

Description
MyOpenMath

Entrance Skills
Recognize different types of functions given a table, graph, or equation.

Requisite Course Objectives
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 049-Comprehend that the key characteristic of a linear model is its constant rate of change. Recognize when a table, graph or equation is linear.

Entrance Skills
Solve problems that involve a constant of change.

Requisite Course Objectives
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 049-Find the equation of a line and apply it to solve problems with a constant rate of change.

Entrance Skills
Understand basic function notation and terminology.

Requisite Course Objectives
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 049-Apply the definition of a function including function notation and terminology (domain and range), especially as function notation relates to a graph. Develop the ability to read a graph and precisely describe how the output variable changes wrt (with respect to) the output variable, using function notation and inequality notation.

Course Content
1. Functions including, polynomial, rational, radical, exponential, absolute value, logarithmic, and power
2. Algebra of functions
3. Equations including rational, linear, absolute value, polynomial, radical, exponential, logarithmic
4. Inverses of functions
5. Graphs of functions including asymptotic behavior, intercepts, vertices
6. Linear and nonlinear inequalities
7. Systems of equations
8. Linear programming
9. Complex numbers
10. Application using data from disciplines including business and computer information system.
11. Use of technology tools such as EXCEL, or graphic calculators, to analyze data and functions.

Lab Content
The course lab is intended to provide contextualized applications to the lecture material. This will include the use of technology in one form or another, including, but not limited to spreadsheet programs, apps, and simulations.

Course Objectives

	Objectives
Objective 1	Analyze and investigate properties of functions.
Objective 2	Synthesize results from the graphs and/or equations of functions.
Objective 3	Solve and apply equations including rational, linear, absolute value, polynomial, exponential, and logarithmic equations.
Objective 4	Solve linear and nonlinear systems of equations and inequalities.
Objective 5	Recognize the relationship between functions and their inverses graphically and algebraically.
Objective 6	Use linear programming to streamline business operations and reduce costs and maximize profits.
Objective 7	Use appropriate function to model, analyze, and interpret applications based on data from disciplines including business, social science, psychology, life science and education.
Objective 8	Apply studied principles and skills to new situations in addition to situations that mirror those on the homework and those shown in class.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Apply algebraic principles to contrast different families of functions.
Outcome 2	Demonstrate problem solving skills in application problems relating to business and CIS, with an emphasis on the concept of function.
Outcome 3	Create, analyze, and interpret graphs of functions.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Lecture	Provision and employment of a variety of learning resources such as videos, slides, audio tapes, computer-based tools, manipulatives, and worksheets in order to address multiple learning styles and to reinforce material.
Discussion	Students will participate in discussion forums centered around applications to real world situations as well as to review, analyze, and evaluate various methods of solution.
Demonstration, Repetition/Practice	Drills and pattern practices utilizing hand-outs and/or computer-based tools in order to assist the students in mastering the techniques involved in graphing functions.
Collaborative/Team	Pair and small group activities, discussions, and exercises in order to promote mathematics discovery and enhance problem solving skills.
Laboratory	Lab will be used, in groups or individually, for student exploration of the topics of the course.
Activity	Activities in the lab portion of the class will include using various tools for developing problem solving skills.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Written homework	Students will be evaluated by homework assignments that reinforce topics discussed in lecture.	Out of Class Only
Mid-term and final evaluations	Quizzes and midterm/final examinations designed to evaluate students' applications of functions to the fields of Business and Computer Information Systems.	In Class Only
Laboratory projects	Students will apply course topics to solve significant problems emphasizing applications in business and CIS.	In Class Only

Computational/problem-solving evaluations	Students will be evaluated by completing challenging problem sets requiring careful reasoning and application of a variety of course topics.	In and Out of Class
Student participation/contribution	Students will be evaluated by their participation in lab activities and may be required to turn in written summaries of these activities.	In Class Only
Tests/Quizzes/Examinations	Students will take exams/quizzes based on each chapter of content. Roughly 5 or 6 of them.	In Class Only

Assignments

Other In-class Assignments

1. Attend classroom lectures and take notes.
2. Participate in classroom discussions to review, analyze, diagnose and evaluate various methods of solution used in homework assignments and exams.
3. Complete examinations involving problems that apply studied principles to new situations. Students will complete an assessment for each chapter covered.
4. Students will work in groups to develop projects and presentations.

Other Out-of-class Assignments

1. Read textbooks and supplementary assignments.
2. Complete assigned homework including problem solving exercises to improve skills and mathematical understanding.
3. Analyze properties of functions and their graphs using a graphing utility, such as Excel.

Grade Methods
Letter Grade Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %
100

What will you be doing in the face-to-face sections of your course that necessitates a hybrid delivery vs a fully online delivery?
Some students struggle with math so it would be prudent to offer at least one section in a hybrid format for those students who wish to have some level of classroom instruction.

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?
Lab activities will be clearly labeled on the LMS and will mostly focus on applying the topics introduced in lecture to business or CIS discipline.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?
Students will work on various capstone projects individually or as a group throughout the semester. They will then submit their completed projects through the LMS for the instructor to grade and provide feedback.

How will you assess the online delivery of lab activities?
Through various student evaluations deployed throughout the semester rather than just one at the conclusion of the course.

Instructional Materials and Resources

If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?
We might use the MyMath or MyOpenMath platforms to help with homework and practice problems.

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.
These two platforms offer robust resources for learners in the form of lectures, animations, and videos. They also regenerate exercises if a student wishes more practice in a certain topic.

Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

Within Course Management System:

Chat room/instant messaging
Discussion forums with substantive instructor participation
Online quizzes and examinations
Private messages
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Video or audio feedback
Weekly announcements

External to Course Management System:

Direct e-mail
Posted audio/video (including YouTube, 3cmediasolutions, etc.)
Synchronous audio/video
Telephone contact/voicemail

For hybrid courses:

Library workshops
Orientation, study, and/or review sessions
Scheduled Face-to-Face group or individual meetings
Supplemental seminar or study sessions

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

Regular effective contact is necessary for proper instruction; I would argue that in a course that is so heavy with math concepts and applications, it is even more important to maintain constant communication and feedback with students. Recurring meetings, f2f or virtual, will go a long way in helping students feel more confident in their skills.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

By using one of the platforms (MyMathLab or MOM), we give students the opportunity to practice exercises with instant feedback and provide them with additional resources.

Other Information

Comparable Transfer Course Information

University System
CSU
Campus
CSU San Bernardino

Course Number
1301
Course Title
Modeling with Functions

Catalog Year
2020

Rationale
College algebra course for non-STEM majors.

COD GE
C4.B - Language and Rationality - Communication and Analytical Thinking

MIS Course Data

CIP Code
52.0101 - Business/Commerce, General.

TOP Code
050100 - Business and Commerce, General

SAM Code
D - Possibly Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Program Applicable

Transfer Status
Transferable to both UC and CSU

General Education Status
B = Mathematics/Quantitative Reasoning/Analytical Thinking

Support Course Status
N = Course is not a support course

Allow Audit
No

Repeatability
No

Materials Fee
No

Additional Fees?
No

Approvals

Curriculum Committee Approval Date
05/05/2021

Board of Trustees Approval Date
06/24/2021

Course Control Number
CCC000631586

Programs referencing this course
CSU Golden 4 Transfer Certificate (http://catalog.collegeofthedesert.eduundefined/?key=405)