MATH 1A Course Outline as of Summer 2019

CATALOG INFORMATION

Dept and Nbr: MATH 1A   Title: CALCULUS 1
Full Title: Calculus, First Course
Last Reviewed: 9/14/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	5.00	17.5	Lecture Scheduled	87.50
Minimum	5.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 175.00   Total Student Learning Hours: 262.50

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Limits and continuity, differentiation, applications of the derivative, integration, applications of the integral.

Prerequisites/Corequisites:
Completion of MATH 27 or higher (MATH); OR Course Completion of MATH 25 and MATH 58; OR appropriate placement based on AB 705 mandates.

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Limits and continuity, differentiation, applications of the derivative, integration, applications of the integral. (Grade Only)
Prerequisites/Corequisites: Completion of MATH 27 or higher (MATH); OR Course Completion of MATH 25 and MATH 58; OR appropriate placement based on AB 705 mandates.
Recommended:
Limits on Enrollment:

Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 1981	
	MC	Math Competency		
CSU GE:	**Transfer Area**		Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 1981	
IGETC:	**Transfer Area**		Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 1981	

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:
UC Transfer:	Transferable	Effective:	Fall 1981	Inactive:

CID:
CID Descriptor:MATH 900S   Single Variable Calculus Sequence
SRJC Equivalent Course(s):   MATH1A AND MATH1B

Certificate/Major Applicable:
Major Applicable Course

Approval and Dates

Version:	07	Course Created/Approved:	8/1/1981
Version Created:	11/8/2018	Course Last Modified:	8/15/2021
Submitter:	Josh Adams	Course last full review:	9/14/2020
Version Status:	Approved (Changed Course)	Prereq Created/Approved:	9/14/2020
Version Status Date:	11/26/2018	Semester Last Taught:	Summer 2021
Version Term Effective:	Summer 2019	Term Inactive:	Fall 2021

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. State and apply basic definitions, properties, and theorems of first semester calculus.
2. Calculate limits, derivatives, definite integrals, and indefinite integrals of algebraic and transcendental functions.
3. Model and solve application problems using derivatives and integrals of algebraic and transcendental functions.

Objectives:
Upon completion of the course, students will be able to:
1. Calculate limits and use limit notation.
2. Determine continuity of a function at a real value.
3. Determine derivatives of polynomial, rational, algebraic, exponential, logarithmic, and

trigonometric functions.
4. Use techniques of differentiation, including product, quotient, and chain rules; determine derivatives implicitly and determine derivatives of inverse functions.
5. Apply derivatives to graphing, optimization, and science problems.
6. Determine antiderivatives of polynomial, rational, algebraic, exponential, logarithmic, and trigonometric functions.
7. Use limits of Riemann sums to evaluate definite integrals to find areas.
8. Evaluate definite integrals using the fundamental theorem of calculus.
9. Use Trapezoidal and Simpson's Rules to approximate definite integrals.
10. Apply definite integration to compute area, volumes, and arc length, and to solve problems in science and related fields.
11. Evaluate integrals with the use of tables or a computer algebra system.

Topics and Scope:

I.   Limits and Continuity
    A. Definitions
       1. Limit
       2. Basic limit theorems
    B. Limits from graphs
    C. Continuity of functions at real values
II. The Derivative
    A. Definition
    B. Difference quotients
    C. Slope of tangent line
    D. Velocity, acceleration and rates of change
    E. Product, quotient, and chain rules
    F. Basic differentiation formulas for algebraic, trigonometric,logarithmic, exponential, hyperbolic functions and inverses of functions
    G. Antiderivatives
III. Applications of the Derivative
    A. Implicit differentiation
    B. Mean value theorem
    C. Differentials
    D. Related rates
    E. Optimization
    F. Separable differential equations
    G. Other applications and modeling
    H. Indeterminate forms and L'Hospital's rule
IV. The Integral
    A. Definite integrals as limits of Riemann sums
    B. Definite and indefinite integrals
    C. Fundamental theorem of calculus
    D. Integration of polynomial, logarithmic, exponential, and trigonometric functions
    E. Integration by substitution
    F. Numerical integration using Trapezoidal and Simpson's Rules
    G. Evaluation by tables or computer algebra systems
V.   Applications of the Integral
    A. Area
    B. Volumes
    C. Arc length
    D. Other applications and modeling

Assignment:

1. Daily reading outside of class (20-50 pages per week).
2. Problem set assignments from required text or supplementary materials chosen by the instructor (1-6 assignment sets per week).
3. Quizzes (0-4 per week).
4. Exams (3-8 per term) including final exam.
5. Projects, for example, computer explorations or modeling activities (0-10 per term).

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems	Problem solving 5 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Final Exam: Multiple choice and free response exams; quizzes	Exams 70 - 95%

Other: Includes any assessment tools that do not logically fit into the above categories.

Projects	Other Category 0 - 10%

Representative Textbooks and Materials:
Calculus: Early Transcendentals, 7 th edition. Stewart, James. Brooks/Cole, Cengage Learning: 2012.

OTHER REQUIRED ELEMENTS

STUDENT PREPARATION

Matric Assessment Required:	M	Requires Math Assessment
Prerequisites-generate description:	U	User Generated Text
Advisories-generate description:	NA	No Advisory
Prereq-provisional:	N	NO
Prereq/coreq-registration check:	Y	Prerequisite Rules Exist
Requires instructor signature:	N	Instructor's Signature Not Required

BASIC INFORMATION, HOURS/UNITS & REPEATABILITY

Method of instruction:	02	Lecture
	99	Credit by Exam
	71	Internet-Based, Simultaneous Interaction
	72	Internet-Based, Delayed Interaction
Area department:	MATH	Mathematics
Division:	73	Science, Technology, Engineering & Mathematics
Special topic course:	N	Not a Special Topic Course
Program status:	1	Major Applicable Course
Repeatability:	00	Two Repeats if Grade was D, F, NC, or NP
Repeat group id:		

SCHEDULING

Audit allowed:	N	Not Auditable
Open entry/exit:	N	Not Open Entry/Open Exit
Credit by exam:	Y	Credit by examination allowed
Budget code: Program:	0000	Unrestricted
Budget code: Activity:	1701	Mathematics-General

OTHER CODES

Discipline:	Mathematics	
Basic skills:	N	Not a Basic Skills Course
Level below transfer:	Y	Not Applicable
CVU/CVC status:	Y	Distance Ed, Not CVU/CVC Developed
Distance Ed Approved:	N	None
Emergency Distance Ed Approved:	Y	Fully Online
		Partially Online
		Online with flexible in-person activities
Credit for Prior Learning:	N	Agency Exam
	N	CBE
	N	Industry Credentials
	N	Portfolio
Non-credit category:	Y	Not Applicable, Credit Course
Classification:	Y	Liberal Arts and Sciences Courses
SAM classification:	E	Non-Occupational
TOP code:	1701.00	Mathematics, General
Work-based learning:	N	Does Not Include Work-Based Learning
DSPS course:	N	Not a DSPS Course

In-service: N   Not an in-Service Course