

MATH 1A Course Outline as of Fall 2014

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 (VF); OR Course Completion of MATH 25 and MATH 58; OR Qualifying Test Score in Math Algebra and Course Completion of MATH 58; OR Qualifying Test Score in Math Trigonometry and Course Completion of MATH 25; OR Qualifying Test Score in Math Algebra and Qualifying Test Score in Math Trigonometry

**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)  
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of MATH 58; OR Qualifying Test Score in Math Trigonometry and Course Completion of MATH 25; OR Qualifying Test Score in Math Algebra and Qualifying Test Score in Math Trigonometry

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 1981
<b>CSU GE:</b>	<b>MC</b>	Math Competency	
	<b>Transfer Area</b>	Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 1981
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 1981
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981
		Inactive:	
<b>UC Transfer:</b>	Transferable	Effective:	Fall 1981
		Inactive:	
<b>CID:</b>			
CID Descriptor:	MATH 900S	Single Variable Calculus Sequence	
SRJC Equivalent Course(s):		MATH1A AND MATH1B	

### **Certificate/Major Applicable:**

Major Applicable Course

## **COURSE CONTENT**

### **Outcomes and 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.