GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

# Course Outline

**COURSE:** MATH 1A DIVISION: 10 ALSO LISTED AS:

TERM EFFECTIVE: Spring 2021 CURRICULUM APPROVAL DATE: 12/8/2020

SHORT TITLE: CALC/ANAL GEOM I

LONG TITLE: Single-Variable Calculus and Analytic Geometry

| Units | Number of Weeks | Type | Contact Hours/Week | Total Contact Hours |
|---|---|---|---|---|
| 4 | 18 | Lecture: | 4 | 72 |
| | | Lab: | 0 | 0 |
| | | Other: | 0 | 0 |
| | | Total: | 4 | 72 |

**COURSE DESCRIPTION:**

A first course in differential and integral calculus of a single variable covering limits and continuity, analyzing the behavior and graphs of functions, derivatives, implicit differentiation, higher order derivatives, related rates and optimization problems, Newton's Method, Fundamental Theorem of Calculus, and definite and indefinite integrals. (C-ID: MATH 210, MATH 900S: Math 1A + Math 1B) PREREQUISITE: Mathematics 8B or Mathematics 11 with a grade of 'C' or better.

PREREQUISITES:
MATH 8B Or MATH 11 or MDPC = 28 or AM01 = 2900.

COREQUISITES:

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. Explain and evaluate limits in general, at infinity, and at particular points. Do it algebraically, graphically and numerically, utilizing technology.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

2. Use continuity to describe the behavior of a function and its differentiability.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

3. Explain the concept of a derivative graphically, numerically, algebraically, and verbally.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

4. Demonstrate the ability to differentiate polynomials, exponential, logarithmic, rational, implicit, and trigonometric functions. Be able to compute higher order derivatives of these functions.

Measure of assessment: HW, Quiz, Project, andExam

Year assessed, or planned year of assessment: 2017

Semester: Fall

5. Model and solve related rates and optimization problems.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

6. Analyze and graph functions w/o a calculator. Use derivatives to identify max and min, pts. of inflection, and concavity.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

7. Calculate limits using L'Hopital's Rule. Be able to determine whether it's applicable or not.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

8. Use technology to estimate roots using Newton's Method.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

9. Explain and apply the Fundamental Theorem of Calculus. Use it to evaluate definite and indefinite integrals. Compute basic antiderivatives.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

10. Use technology to evaluate the definite integral using the Right Hand, Left Hand, and Midpoint Rules. Do Riemann sums.

Measure of assessment: HW, Quiz, Project, and Exam

Year assessed, or planned year of assessment: 2017

Semester: Fall

**CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS**

Curriculum Approval Date: 12/8/2020

WEEK 1: 4 HOURS

CONTENT: Review functions and word problems. Begin discussion of a limit.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to work computational and word problems using functions.

WEEK 2: 4 HOURS

CONTENT: Continue review of functions algebraically, graphically, numerically, and verbally. Continue evaluating limits.

HOMEWORK: Read sections of book and do assigned problems. Do project.

PERFORMANCE OBJECTIVES: The student will be able to work computational and word problems using functions and limits.

WEEK 3: 4 HOURS

CONTENT: Work with limits algebraically and numerically, including limits at infinity. Define continuity.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to work computational and word problems using limits.

WEEK 4: 4 HOURS

CONTENT: Begin derivatives and work on differentiability.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to problems using derivatives and differentiable functions.

WEEK 5: 4 HOURS

CONTENT: Expand the work on derivatives by adding different functions - trigonometric, products, quotients, and Chain Rule.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to take the derivatives of all the different types of functions.

WEEK 6: 4 HOURS

CONTENT: Expand the palette of functions to include logarithmic, logarithmic differentiation, exponential, and implicit.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to spell palette and do problems from the whole palette of functions.

WEEK 7: 4 HOURS

CONTENT: Add higher order derivatives and inverse trigonometric functions. Gateway quiz.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to take higher-order derivatives and the derivatives of inverse trigonometric functions.

WEEK 8: 4 HOURS

CONTENT: Continue derivatives with hyperbolic functions (optional depending upon the time), differentials, and related rates.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to do problems with differentials and word problems with related rates.

WEEK 9: 4 HOURS

CONTENT: Continue related rates and cover maximum and minimum values.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to more wonderful word problems.

WEEK 10: 4 HOURS

CONTENT: Cover the Mean Value Theorem and Rolle's Theorem. Begin curve sketching.

HOMEWORK: Read sections of book and do assigned problems. Group Project.

PERFORMANCE OBJECTIVES: The student will be able to sketch simple curves and apply the Mean Value and Rolle's Theorems to the sketches.

WEEK 11: 4 HOURS

CONTENT: Continue curve sketching and how derivatives affect the shape of the graph.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to sketch ugly curves without a calculator.

WEEK 12: 4 HOURS

CONTENT: L'Hopital's Rule, indeterminate forms, and complete curve sketching.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to do problems with the above rules.

WEEK 13: 4 HOURS

CONTENT: Employ technology appropriately for sketching graphs. Optimization problems.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to employ technology and work optimization word problems.

WEEK 14: 4 HOURS

CONTENT: Newton's Method, and applications of Calculus to other disciplines.

HOMEWORK: Read sections of book and do assigned problems. Group project.

PERFORMANCE OBJECTIVES: The student will be able to use technology for Newton's Method and also problems that demonstrate applications of Calculus to other disciplines.

WEEK 15: 4 HOURS

CONTENT: Cover antiderivatives, areas, distances, and definite integrals.  Use the Left, Right, and Midpoint Rules.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to do problems employing the above rules. They will use them to find areas, distances, and areas under curves.

WEEK 16: 4 HOURS

CONTENT: Riemann sums. The Fundamental Theorem of Calculus and indefinite integrals.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to apply the Fundamental Theorem of Calculus and to take indefinite integrals.

WEEK 17: 4 HOURS

CONTENT: The substitution rule for integration and review for the final exam.

HOMEWORK: Read sections of book and do assigned problems.

PERFORMANCE OBJECTIVES: The student will be able to do basic integration and use the substitution method.

WEEK 18: 2 HOURS

CONTENT: 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 required to utilize technology, both calculators and computer software, to enhance their understanding of the material.

**METHODS OF EVALUATION:**

Writing assignments

Percent of total grade: 5.00 %

Percent range of total grade: 5 % to 20 % Lab Reports; Projects; Term or Other Papers

Problem-solving assignments

Percent of total grade: 80.00 %

Percent range of total grade: 80 % to 95 % Homework Problems; Quizzes; Exams

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours: 12

Assignment Description: 1. Regularly assigned homework that requires students to analyze and study pertinent text material, solved examples and lecture notes.

2. Regularly assigned homework that requires students to apply the principles and skills covered in class by solving related problems.

**REPRESENTATIVE TEXTBOOKS:**

Required Representative Textbooks

James Stewart. Calculus: Early Transcendentals. Brooks/Cole,2015.

ISBN: ISBN -10: 1285741552

Reading Level of Text, Grade: 12 Verified by: Jennifer Nari

**ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

GAV B4, effective 200670

CSU GE:

CSU B4, effective 200670

IGETC:

IGETC 2A, effective 200670

CSU TRANSFER:

Transferable CSU, effective 200670

UC TRANSFER:

Transferable UC, effective 200670

**SUPPLEMENTAL DATA:**

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN: MATH18
CAN Sequence: MATH SEQ BC
CSU Crosswalk Course Department: MATH
CSU Crosswalk Course Number: 1A
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: CCC000242538
Sports/Physical Education Course: N
Taxonomy of Program: 170100