GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: MATH 1B DIVISION: 20 ALSO LISTED AS:

TERM EFFECTIVE: Fall 2022 CURRICULUM APPROVAL DATE: 12/13/2022

SHORT TITLE: CALC/ANAL GEOM II

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

Out of Class Hrs:	144.00
Total Learning Hrs:	216.00

COURSE DESCRIPTION:

A second course in differential and integral calculus of a single variable covering methods of integration, applications of the integral, differential equations, parametric and polar equations, and sequences and series. (C-ID: MATH 220, MATH 900S: Math 1A + Math 1B) PREREQUISITE: Mathematics 1A with a grade of 'C' or better.

PREREQUISITES:

Completion of MATH 1A, as UG, with a grade of C or better.

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:

By the end of this course, a student should:

1. Evaluate definite and indefinite integrals graphically, numerically, and analytically using a variety of integration formulas and techniques.

2. Apply integration theory to applications including volume, area, arc length, work, evaluation of improper integrals and population dynamics and use appropriate integrals and differential equations to analyze them mathematically.

3. Use parametric and polar equations to graph, differentiate and integrate functions.

4. Determine convergence or divergence of infinite series and sequences using a variety of convergence/divergence tests. Represent functions as power series and determine radius and interval of convergence

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Evaluate definite and indefinite integrals using the substitution method, integration by parts, trigonometric substitution, and partial fraction expansion.

2. Choose an appropriate strategy for integrating a function and perform the integration.

3. Formulate and evaluate an integral to find area, volume, work, arc length, and average value.

4. Formulate and evaluate integrals to solve problems encountered in statistics, economics, physics and biology.

5. Use technology to approximate definite integrals of functions that cannot be integrated using the above mentioned techniques.

6. Evaluate improper integrals and use them to solve applied problems.

7. Formulate and evaluate an integral to find surface area, moments and centers of mass, and hydrostatic force.

8. Determine whether a given function is a solution to a differential equation and use technology to estimate a solution to a differential equation given an initial condition.

9. Solve separable and linear differential equations.

10. Set up and solve differential equations to model applications in business, science, physics, engineering and other disciplines.

11. Set up, compute and analyze derivatives and integrals of parametric and polar equations to find local extrema, points of inflection, intervals of increasing/decreasing, concavity, equations of tangent lines, area, surface area, and arc length..

12. Explain the concepts of convergence, absolute convergence, conditional convergence and divergence of a series and convergence and divergence of a sequence.

13. Use the Integral Test, Comparison Test, Limit Comparison Test, Alternating Series Test, Ratio Test and Root Test to determine convergence or divergence of a series.

14. Find the Taylor and MacLaurin Series expansion of a function centered about a given point.

COURSE CONTENT:

Curriculum Approval Date: 12/13/2022

16 HOURS

CONTENT: Review the techniques and applications of differentiation and integration learned in Math 1A. Integration by substitution.

Area bounded by curves and volume of solid of revolution using disc, washer and shell method. Work and average value problems.

18 HOURS

CONTENT: Integration by parts, trigonometric integrals, trigonometric substitution, partial fraction expansion, strategies of integration.

Improper integrals, approximating integrals using Trapezoid and Simpson's Rule. Additional applications of integration.

9 HOURS

CONTENT: Introduction to differential equations, Euler's Method, separable differential equation. Applications of differential equations.

Linear differential equations.

9 HOURS

CONTENT: Curves defined by parametric equations. Calculus with parametric curves. Polar equations and applications. Areas and lengths in polar coordinates.

18 HOURS

CONTENT: Introduction to series and sequences. The integral test, estimates of sums, the comparison test and the limit comparison test, alternating series, absolute and conditional convergence. Ratio and

Root tests. Strategies on testing series for convergence/divergence. Power series, including radius of convergence, representation of functions as power series, and differentiation and integration of power series.

Taylor and Maclaurin series including Taylor polynomials

2 HOURS

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 to utilize technology, such as calculators and/ or computer software, to enhance their understanding of the material.

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours 144

Assignment Description

20 hours: Reading assigned text book section, reviewing textbook examples and class notes

100 hours: Doing assigned problems; group projects

20 hours: Studying for a test, reviewing problem solving techniques

4 hours: Online discussions

METHODS OF EVALUATION:
Writing assignments
Evaluation Percent 5
Evaluation Description
Lab Reports; Projects; Research Papers; Discussions

Problem-solving assignments
Evaluation Percent 15
Evaluation Description
Homework Problems; Quizzes

Objective examinations
Evaluation Percent 80
Evaluation Description
Written exams

REPRESENTATIVE TEXTBOOKS:
James Stewart. Calculus: Early Transcendentals. Brooks/Cole, 2021.
ISBN: 978-1-337-61392-7
Reading Level of Text, Grade: 12 Verified by: Jennifer Nari

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

GAV B4, effective 200370

CSU GE:

CSU B4, effective 200370

IGETC:

IGETC 2A, effective 200370

CSU TRANSFER:

Transferable CSU, effective 200370

Not Transferable

UC TRANSFER:

Transferable UC, effective 200370

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN: MATH20
CAN Sequence: MATH SEQ BC
CSU Crosswalk Course Department: MATH
CSU Crosswalk Course Number: 220
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: CCC000204947
Sports/Physical Education Course: N
Taxonomy of Program: 170100