GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

Course Outline

COURSE: MATH 1B DIVISION: 10 ALSO LISTED AS:

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

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

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:

1. Identify and use the techniques and applications of differentiation and integration learned in Math 1A.

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2016

Semester: Spring

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

4. Formulate and evaluate an integral to find area, volume, work, arc length, and surface area, and to solve problems found in business, economics, physics, science, statistics, and other disciplines.

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2016

Semester: Spring

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

8. 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 and arc length, both with and without the use of technology.

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2016

Semester: Spring

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

Measure of assessment: homework, quiz, exam

Year assessed, or planned year of assessment: 2012

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

Curriculum Approval Date: 12/8/2020

DE MODIFICATION ONLY

WEEK 1: 4 HOURS

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

HOMEWORK: Read sections of the book and complete problems assigned.

PERFORMANCE OBJECTIVES: The student will be able to: differentiate a function, use a derivative to determine rate of change, concavity, extrema and points of inflection. Evaluate both definite and indefinite Integrals using substitution.

WEEK 2: 4 HOURS

CONTENT: Area bounded by curves and volume of solid of revolution using disc, washer and shell method.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: set up and evaluate an integral to find area and volume.

WEEK 3: 4 HOURS

CONTENT: Work and average value problems.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: set up and evaluate an integral to solve work and average value problems.

WEEK 4: 4 HOURS

CONTENT: Integration by parts, trigonometric substitution.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: evaluate both definite and indefinite integrals using integration by parts and trigonometric substitution.

WEEK 5: 4 HOURS

CONTENT: Trigonometric substitution, partial fraction expansion, strategies of integration.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: integrate a function using trigonometric substitution and partial fraction expansion. Determine an appropriate strategy for integrating a function and apply that strategy to perform the integration.

WEEK 6: 4 HOURS

CONTENT: Improper integrals, approximating integrals using Trapezoid and Simpson's Rule.

HOMEWORK: Read sections of the book and complete problems assigned using technology.

PERFORMANCE OBJECTIVE: The student will be able to: evaluate improper integrals. Utilize technology to evaluate a definite integral for functions that cannot be integrated using the techniques covered previously in class.

WEEK 7: 4 HOURS

CONTENT: Additional applications of integration.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: find the area of a surface of revolution, moments and centers of mass. Set up and evaluate integrals to solve problems encountered in statistics, economics and biology.

WEEK 8: 4 HOURS

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

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: determine whether a given function is a solution to a differential

equation. Use technology to estimate a solution to a differential equation given an initial condition. Understand the difference between a general and specific solution to a

differential equation. Solve separable differential equations.

WEEK 9 : 4 HOURS

CONTENT: Applications of differential equations.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: set up and solve differential equation to solve problems found in chemistry, biology, economics and other fields.

WEEK 10: 4 HOURS

CONTENT: Linear differential equations.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: solve linear differential equations and use linear differential equations to solve problems found in chemistry, biology, economics and other fields.

WEEK 11: 4 HOURS

CONTENT: Parametric equations and applications.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: graph parametric equations with and without the use of a calculator, differentiate and integrate parametric equations and use to find area, arc length, surface area, the equation of tangent lines, and/or other applications.

WEEK 12: 4 HOURS

CONTENT: Polar equations and applications.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: plot points using polar coordinates, translate polar coordinates to Cartesian coordinates and vice versa, graph polar equations, use polar equations in applied problems.

WEEK 13: 4 HOURS

CONTENT: Introduction to series and sequences.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: evaluate convergence/divergence of a sequence. Understand the difference between a sequence and a series.

WEEK 14: 4 HOURS

CONTENT: Comparison test, alternating series, absolute and conditional convergence

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: use comparison tests and alternating series test to determine convergence and divergence of a series. Understand concept of absolute and conditional convergence.

WEEK 15: HOURS

CONTENT: Ratio and Root tests. Strategies on testing series for convergence/divergence.

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: determine whether a series is absolutely convergent, conditionally convergent or divergent using the ratio an root tests. Choose and apply a strategy for evaluating convergence/divergence of a series.

WEEK 16: 4 HOURS

CONTENT: Power series, Taylor and MacLaurin series

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: determine radius and interval of convergence for power series. Find Taylor and MacLaurin

series representation of a function about a given point.

WEEK 17: 4 HOURS

CONTENT: Taylor and MacLaurin series. Review for final exam

HOMEWORK: Read sections of the book and complete problems assigned.

STUDENT PERFORMANCE OBJECTIVES: The student will be able to: determine Taylor and MacLaurin series representation of a function about a given point. Review for final exam.

WEEK 18: 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 to enhance their understanding of the material.

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.

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: 85.00 %

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 200370

CSU GE:

CSU B4, effective 200370

IGETC:

IGETC 2A, effective 200370

CSU TRANSFER:

Transferable CSU, effective 200370

UC TRANSFER:

Transferable UC, effective 200370

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: 1B
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