Course Outline

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

TERM EFFECTIVE: Spring 2018  CURRICULUM APPROVAL DATE: 04/10/2017

SHORT TITLE: CALC/ANAL GEOM II

LONG TITLE: Single-Variable Calculus and Analytic Geometry

<table>
<thead>
<tr>
<th>Units</th>
<th>Number of Weeks</th>
<th>Type</th>
<th>Contact Hours/Week</th>
<th>Total Contact Hours</th>
</tr>
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<tr>
<td>4</td>
<td>18</td>
<td>Lecture: 4</td>
<td>72</td>
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<tr>
<td></td>
<td></td>
<td>Lab: 0</td>
<td>0</td>
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<td>Other: 0</td>
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<td></td>
<td>Total: 4</td>
<td>72</td>
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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

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

4/25/2017
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: 04/10/2017

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
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
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

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 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.

**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
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

4/25/2017
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000204947
Sports/Physical Education Course: N
Taxonomy of Program: 170100