Lassen Community College Course Outline

MATH-1B Analytic Geometry and Calculus II   5.0 Units

I.   Catalog Description

Continuation of Math 1A. A second course in differential and integral calculus of a single variable: integration, techniques of integration; infinite sequences and series, polar and parametric equations: applications of integration. Primarily for science, technology, engineering & math majors. This course has been approved for online and hybrid delivery. This course has been approved to be web-enhanced. Access to a computer with internet access is required.

Prerequisite(s): Completion of Math 1A with a grade of 'C' or better or the equivalent multiple measures placement. Student will be able to:
1. Determine limits and continuity of algebraic and trigonometric functions.
2. Calculate derivatives of algebraic and trigonometric functions.
3. Calculate implicit differentiations.
4. Integrate algebraic and trigonometric functions in expressions that may require using substitution.
5. Apply derivatives to analyze graphs and solve problems involving; optimization, extreme values or related rates.
6. Differentiate and integrate logarithmic, exponential, and other transcendental functions.
7. Demonstrate application of definite integrals.

Transfers to both UC/CSU
General Education Area: D2
CSU GE Area: B4
IGETC GE Area: 2A
C-ID MATH 221
85 Hours Lecture, 170 Hours Expected Outside Class Work, 255 Total Student Learning Hours
Scheduled: Spring

II.   Coding Information

Repeatability: Not Repeatable, Take 1 Time
Grading Option: Graded or Pass/No Pass
Credit Type: Credit - Degree Applicable
TOP Code: 170100

III.   Course Objectives

A. Course Student Learning Outcomes

Upon completion of the course the student will be able to:
1. Analyze problems utilizing the application of the principles of analytic geometry and calculus: including transcendental functions, techniques of integration, indeterminate forms, solving applications such as work or length of curve; improper integrals, convergence tests for infinite sequences and series, power series, differentiation and integration of functions in polar and parametric form.
2. Solve calculus problems using numeric, graphic, and symbolic techniques.

B. **Course Objectives**
   Upon completion of this course the student will be able to:
   1. Evaluate indeterminate forms using L'Hopital's Rule.
   2. Find derivatives of transcendental functions.
   3. Evaluate definite and indefinite integrals using a variety of integration formulas and techniques.
   4. Use integration to solve applications such as work or length of a curve;
   5. Evaluate improper integrals.
   6. Apply convergence tests to sequences and series.
   7. Represent functions as power series.
   8. Graph, differentiate and integrate functions in polar and parametric form.

IV. Course Content
   A. Derivatives and integrals of inverse functions and transcendental functions such as trigonometric, exponential or logarithmic;
   B. Indeterminate forms and L'Hopital's Rule;
   C. Additional techniques of integration including integration by parts and trigonometric substitution;
   D. Numerical integration; trapezoidal and Simpson's rule;
   E. Improper integrals;
   F. Additional applications such as work, volumes, arc length, area of a surface of revolution, moments and centers of mass, separable differential equations, growth and decay;
   G. Introduction to sequences and series;
   H. Multiple tests for convergence of sequences and series;
   I. Power series, radius of convergence, interval of convergence;
   J. Differentiation and integration of power series;
   K. Taylor series expansion of functions;
   L. Parametric equations and calculus with parametric curves; and
   M. Polar curves and calculus in polar coordinates.

V. Assignments
   A. **Appropriate Readings**
   Students will be required to read and study the assigned chapters in the textbook. Supplemental readings are generally not assigned, but may be assigned.
   B. **Writing Assignments**
   1. Prepare for class and review material and concepts presented in class.
   2. Complete homework assignments, including applications of representative symbol systems and/or word problems.
   3. Understand and apply the theories and techniques taught in class.
   C. **Expected Outside Assignments**
   Student expected to spend a minimum of 2 hours outside of class in practice and preparation for each hour of class. Assignments may include: reading the text, application of formulas and theorems, and practice problems from the text.
   D. **Specific Assignments that Demonstrate Critical Thinking**
   Students will be required to interpret mathematical principles and techniques to solve broader and more difficult problems than those presented in class. Students will solve a variety of problems, including those that demand the application of principles in a

number of different contexts. Multiple measures of student performance including in-class, out-of-class work, multiple exams, and final exam.

VI. Methods of Evaluation

Traditional Face-to-Face
Tests, examinations, homework or projects where students demonstrate their mastery of the learning objectives and their ability to devise, organize and present complete solutions to problems and a comprehensive final.

Web-enhanced course
Additional information and resources may be made available to students online, and students may be required to do research and complete and/or submit assignments online. Quizzes may be administered online, but exams and summative assessments must be administered face-to-face.

Online Evaluation
A variety of methods will be used, such as: research papers, asynchronous and synchronous discussions (chat/forum), online quizzes and exams, postings to online website, email communications, and digital homework completions.

Hybrid Evaluation
All quizzes and exams will be administered during the in person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

☒ **Traditional Classroom Delivery**   ☒ Web-enhance course

☒ Hybrid Delivery   ☒ Online Delivery ☐ Correspondence Delivery

Traditional Classroom Delivery
Classroom instruction consisting of (but not limited to) lecture, questions and answers, demonstrations, and discussion.

Web-enhanced course
Same as face to face with additional information and resources made available to students online, and students may be required to do research and complete and/or submit assignments online. Quizzes may be administered online, but exams and summative assessments must be administered face-to-face.

Online Delivery
Online instruction will be utilized. 85 hours will be instructed online through the technology platform adopted by the District. Online delivery will consist of participation in forum-based discussions and posts, web links, email communications, lecture posts, exams and online lectures. Adding extra resources and other media sources as appropriate.

Hybrid Delivery
A combination of traditional classroom and online instruction will be utilized. Each semester a minimum of 17 hours, or 1/3 of the lecture hours, will be taught face-to face

by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional class instruction will consist of exercises/assignments, lectures, visual aids, and practice exercises. Online delivery will consist of exercises/assignments, lecture posts, discussions, adding extra resources and other media sources as appropriate.

VIII. Representative Texts and Supplies

Traditional Classroom Course
WebAssign Instant Access for Larson/Edwards' Calculus, Single-Term, current edition, ISBN: 9781337879644. WebAssign access code provides the student with access to the latest edition e-book for the class: Larson/Edwards, Calculus, current edition, Brooks/Cole.

Web-enhanced Course
WebAssign Instant Access for Larson/Edwards' Calculus, Single-Term, current edition, ISBN: 9781337879644. WebAssign access code provides the student with access to the latest edition e-book for the class: Larson/Edwards, Calculus, current edition, Brooks/Cole.

Online Course
WebAssign Instant Access for Larson/Edwards' Calculus, Single-Term, current edition, ISBN: 9781337879644. WebAssign access code provides the student with access to the latest edition e-book for the class: Larson/Edwards, Calculus, current edition, Brooks/Cole.

Hybrid Course
WebAssign Instant Access for Larson/Edwards' Calculus, Single-Term, current edition, ISBN: 9781337879644. WebAssign access code provides the student with access to the latest edition e-book for the class: Larson/Edwards, Calculus, current edition, Brooks/Cole.

IX. Discipline/s Assignment
Mathematics

X. Course Status
Current Status: Active
Original Approval Date: 5/8/1990
Revised By: Natalia McClellan
Curriculum/Academic Standards Committee Revision Date 02/15/2022