BERGEN COMMUNITY COLLEGE
SCHOOL OF MATHEMATICS, SCIENCE AND TECHNOLOGY
DEPARTMENT OF MATHEMATICS

COURSE SYLLABUS

MAT-280 CALCULUS I

COURSE DESCRIPTION: Calculus I is a study of limits, continuity, the derivative of a function, differentiation of algebraic, trigonometric, inverse trigonometric, exponential and logarithmic functions, applications of the derivative, antidifferentiation, area under a curve, the definite integral, the Fundamental Theorem of the Calculus and its applications.

CREDITS/HOURS: 4 credits, 4 hours

PREREQUISITE: MAT-180 with a grade of C or better or by proficiency examination.

GENERAL EDUCAION COURSE: Yes

STUDENT LEARNING OBJECTIVES: **Upon successful completion of this course, the student will be able to:**

1. Evaluate and interpret limits.
2. Recognize and interpret continuous functions.
3. Demonstrate the ability to analyze and solve problems involving rates of change by applying the derivative.
4. Solve related rates and optimization problems using calculus techniques.
5. Sketch curves using techniques of calculus.
6. Use differentials in the solution of applied problems.
7. Evaluate definite and indefinite integrals using basic formulas and substitution method.
8. Find the area between two curves.

ASSESSMENT MEASURES: Each of the above listed student learning objectives will be assessed by:
1. Written assignments and/or quizzes
2. Written examinations
3. Other, as announced by the instructor.

COURSE GRADE: Students should refer to the instructor's grading policy which will be distributed during the first meeting of the class.

TEXTBOOKS: <u>Calculus, Early Transcendental Functions</u>, Larson/Edwards 6th Edition, Cengage Learning Publisher, 2015. (Bundled with Webassign or digital format)

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COURSE CONTENT:

TOPIC	CHAPTER	SECTIONS
1. Brief Review of Precalculus	1	1 – 3, 5, 6

   a. Graphs and Models
   b. Linear Models and Rates of Change
   c. Functions and Their Graphs
   d. Inverse Functions including Inverse Trigonometric functions
   e. Exponential and Logarithmic functions

TOPIC	CHAPTER	SECTIONS
2. Limits and their Properties	2	1 - 5

   a. A Preview of Calculus
   b. Finding Limits Graphically and Numerically
   c. Evaluating Limits Analytically
   d. Continuity and One-sided Limits
   e. Infinite limits

TOPIC	CHAPTER	SECTIONS
3. Differentiation	3	1 - 6

   a. The Derivative and the Tangent Line Problem
   b. Basic Differentiation Rules and Rates of Change
   c. Product and Quotient Rules and Higher-order Derivatives
   d. The Chain Rule
   e. Implicit differentiation
   f. Derivative of Inverse Functions

TOPIC	CHAPTER	SECTIONS
4. Applications of Differentiation	3	7
	4	1 - 8

   a. Related Rates
   b. Extrema on an Interval
   c. Rolle's Theorem and the Mean Value Theorem
   d. Increasing and Decreasing Functions and The First Derivative Test
   e. Concavity and The Second Derivative Test
   f. Limits at Infinity
   g. A Summary of Curve sketching
   h. Optimization problems
   i. Differentials

TOPIC	CHAPTER	SECTIONS
5. Integration	5	1 – 5, 7

   a. Anti-derivatives and indefinite integration
   b. Area under a curve
   c. Riemann sums and definite integrals
   d. The Fundamental Theorem of Calculus
   e. Integration by substitution

	CHAPTER	SECTIONS
f. Area of a region between two curves	7	1

REFERENCES: Calculus: Early Transcendentals, Stewart, Brooks/Calc.
Calculus: Early Transcendental Function, Smith and Minton,
McGraw Hill
Calculus: Early Transcendentals, Thomas, Addison Wesley
3000 Solved Problems in Calculus, Shaum's Solved Problem Series,
McGraw-Hill Pub.

ELECTRONIC   **The Department of Mathematics prohibits the use of cell-phones, PDA's,**
DEVICES: **laptops, headphones, IPODs and other such devices in mathematics classes**
unless otherwise specified in the grading policy provided by the instructor
at the beginning of the semester.

FACULTY   "CLASS CANCELLATIONS" may be found by clicking on the bottom of the
ABSENCE   Bergen Community College website, www.bergen.edu. A list is also posted in a
PROCEDURE: glass case near A-129, the main corridor on the first floor and in Ender Hall. Students
may consult these listings before going to class. If a cancelled class is not listed,
it should be reported to the Department Office (A-325) or the Adjunct Office (C-107).

WEBSITE: Go to www.bergen.edu/math for more information regarding the Mathematics Department.

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