JEFFERSON COLLEGE

COURSE SYLLABUS

MTH161

CALCULUS FOR BUSINESS AND THE SOCIAL SCIENCES

3 Credit Hours

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MTH161: Calculus for Business and the Social Sciences

I.   CATALOG DESCRIPTION

   A.   Course pre-requisites/co-requisites: COMPASS college algebra score of at least 46 or COMPASS trigonometry score of at least 31 within the past two years, ACT math score of 25 or higher within the past two years, or MTH134/134H with a grade of "C" or better, and reading proficiency

   B.   3 semester credit hours

   C.   Calculus for Business and the Social Sciences is an intuitive approach to that part of the calculus that deals with instantaneous rate of change and area under a curve. This course will not serve as a substitute for Calculus I. Students cannot apply both MTH161 and MTH180 toward graduation. (S)

   D.   Calculus for Business and the Social Sciences
           Fulfills Mathematic Sciences for AA, AAT, AFA, and select AAS degrees general education requirement, NOT part of MOTR CORE 42**.
           Students who directly place into and successfully complete (C or better) an advanced mathematical sciences 3+ credit hour course with one of the MTH general education MOTR courses as a prerequisite meet the general education CORE 42 requirement of a minimum of 3 credit hours in Mathematical Sciences.
           Three credit hours from this course may apply to meet the Mathematical Sciences and overall total of 42 credit hours for CORE 42 completion. Credits in excess of these three apply to degree requirements/electives.
           Students have the option of having the prerequisite course credit hours posted to their transcript for the normal credit hour posting fee.
           Elective course applies toward AA and AAT degree requirement.
           May not apply both MTH161 and MTH180 toward graduation.

II.   EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

   Note: Each of the following learning outcomes will be measured on at least one in-class exam, but instructors are encouraged to assess them with additional measures including homework, quizzes, and/or projects.

Expected Learning Outcomes	Assessment Measures
Analyze polynomial, rational, exponential, and logarithmic functions, and represent them using tables, graphs, equations, and words, and use them to model real world applications	Homework Quizzes/tests
Evaluate limits graphically, numerically,	Homework

and algebraically	Quizzes/tests
Calculate and interpret average and instantaneous rates of change.	Homework Quizzes/tests
Find and interpret the derivative function for functions defined by tables, graphs, and equations, focusing on applications related to business and social science	Homework Quizzes/tests
Calculate derivatives of polynomial, rational, exponential, and logarithmic functions and use them to solve a variety of applied problems	Homework Quizzes/tests
Find antiderivatives of algebraic, exponential, and logarithmic functions using substitution, integration by parts, and integration formulas, and interpret them in a real world context, using them to solve application problems	Homework Quizzes/tests
Calculate definite integrals using a limit process, antiderivatives, and technology, and interpret the definite integral as an area that represents total change	Homework Quizzes/tests
Use definite integrals to find average value, consumer and producer surplus, and present and future values of an income stream	Homework Quizzes/tests

III.   COURSE OUTLINE

   A.   Linear functions
       1.   Slopes and equations of lines
       2.   Linear functions and applications
       3.   The least squares line

   B.   Nonlinear functions
       1.   Properties of functions
       2.   Quadratic functions; translation and reflection
       3.   Polynomial and rational functions
       4.   Exponential functions
       5.   Logarithmic functions
       6.   Applications: mathematics of finance

   C.   The derivative
       1.   Limits
       2.   Continuity
       3.   Rates of change
       4.   Definition of the derivative

5.   Graphical differentiation

D.   Calculating the derivative
      1.   Techniques for finding derivatives
      2.   Derivatives of products and quotients
      3.   The Chain Rule
      4.   Derivatives of exponential functions
      5.   Derivatives of logarithmic functions

E.   Graphs and the derivative
      1.   Increasing and decreasing functions
      2.   Relative extrema
      3.   Higher derivatives, concavity, and the Second Derivative Test
      4.   Curve sketching

F.   Applications of the derivative
      1.   Absolute extrema
      2.   Applications of extrema
      3.   Economic lot size, economic order quantity, and elasticity of demand
      4.   Implicit differentiation
      5.   Related rates
      6.   Differentials: linear approximation

G.   Integration
      1.   Antiderivatives
      2.   Substitution
      3.   Area and the definite integral
      4.   The fundamental theorem
      5.   Area between two curves
      6.   Numerical integration

H.   Further techniques and applications of integration
      1.   Integration by parts
      2.   Volume and average value
      3.   Continuous money flow

IV.   METHODS OF INSTRUCTION

A.   Lecture

B.   Group exercises

C.   Class discussion

V.   REQUIRED TEXTBOOK

    A.   Lial, Greenwell, and Ritchey. *Calculus with Applications (Brief Version)* (Current Edition). Boston: Pearson.

    B.   *MyMathLab – Student Access Kit* (current edition). Boston: Pearson.

VI.   REQUIRED MATERIALS

Graphic calculator required (TI-83/84 recommended)
Symbolic manipulating calculators prohibited

VII.   SUPPLEMENTAL REFERENCE(S)

    A.   Student Solutions Manual (contained within *MyMathLab*)

    B.   Graphing Calculator Quick Reference Guide, Tutorial, Online Calculator Lessons, and TI Programs (contained within *MyMathLab*)

    C.   General Instructions for Excel Spreadsheets (contained within *MyMathLab*)

    D.   Study Plan (contained within *MyMathLab*)

VIII.   METHODS OF EVALUATION

    A.   Homework, 10-20%
        Students will submit homework in MyMathLab but are expected to keep written solutions for all work submitted. Additional problems from the textbook may also be assigned

    B.   Classwork, 0-20%
        Additional worksheets and projects may be assigned at the discretion of the instructor to reinforce various concepts.

    C.   Quizzes, 0-20%
        Both in-class and online quizzes may be used to evaluate mastery of concepts.

    D.   Tests, 30-60%
        Four one-hour in-class tests will be administered.

    E.   Comprehensive final examination, 15-25%
        All students will be required to take a comprehensive final exam, the score of which must be included in the final course grade.

IX.   ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Technology Center 101; phone 636-481-3169).

X.   ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu).

XI.   ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII.   OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.