Mathematics 160

# Calculus for Business and Life Sciences (3)

## (Effective Fall 2018)

**Prerequisite:** Appropriate mathematics placement or a grade of C or better in MATH 110 or 140 or 185.

**Catalog Description:** Average and instantaneous rates. The derivative and its application to curve tracing and max-min theory. Antiderivative, area under a curve, fundamental theorem. Natural logarithm and its application to interest, growth, and decay.

**Notes:**
1. This course requires the use of a graphing calculator. The department recommends a calculator of the TI-83, TI-84 series for this course. Computer algebra systems are prohibited. A TI-Nspire may only be used with a TI-84 faceplate.
2. Some instructors may require enhanced WebAssign, a computer supplement to the course text.
3. All students in this course will take the Department of Mathematics and Statistics common final exam.

**General Education:** The faculty of UT Martin have included this as a general education course with the following course goal and student learning outcomes.

Curriculum Goals: The purpose of the Mathematics requirement is to teach students to organize, evaluate and solve problems using both abstract and quantitative approaches. Courses in this area will enable students to communicate using the language of mathematics.

Student Learning Outcomes:

a. Students will use appropriate notation and vocabulary to communicate mathematics.
b. Students will use symbolic and numerical methods to perform calculations.
c. Students will solve problems with real-world applications.

**Teaching Objectives:** The student will:

1. Evaluate limits and understand concept of continuity of functions.
2. Differentiate sums, differences, products, quotients, and powers of functions; differentiate composite, logarithmic, and exponential functions; differentiate implicitly.
3. Find local maxima and minima, absolute maxima and minima, intervals of increase and decrease, concavity, and points of inflection.
4. Integrate sums, powers, and exponentials.
5. Integrate other functions using basic techniques.
6. Apply derivatives and integrals in solving problems in business and the life sciences.

**Text(s):**    Required text: <u>Applied Calculus for the Managerial, Life, and Social Sciences: A Brief Approach</u>, 10th edition, by Soo T. Tan. Brooks/Cole, Cengage Learning, 2014. ISBN: 978-1305299399. (This is a custom UTM version bundled with an Enhanced WebAssign printed access card.)

Optional text: <u>Student Solutions Manual</u> for Tan's Applied Calculus for the Managerial, Life, and Social Sciences: A Brief Approach, 10th edition, Brooks/Cole, 2014. ISBN: 978-1285854953.

**Outline:**

| Chapter | Title (Sections) | Days |
|---|---|---|
| 2 | Functions, Limits, and Derivatives (4–6) | 4 |
| 3 | Differentiation (1–7) | 10 |
| 4 | Applications of the Derivative (1–5) | 8 |
| 5 | Exponential and Logarithmic Functions (1–6) | 5 |
| 6 | Integration (1-7) | 10 |
| | One period tests | 4 |
| | Total days | 41 |

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