

**SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES**

Mathematics

Revision Date: 2014-10-06

Term: 2014 Fall
Course: MATH-1600-ES31 (Calculus 1)
Class Time: MTWTF 11:00–12:20
Class Room: ESQ 102

Instructor: Toby Bartels, PhD
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Office Hour: MWF 12:30–13:30, TT 12:30–14:30, TT 15:00–17:00
Office: ESQ 112

Course policies are available at <http://TobyBartels.name/MATH-1600/2014f/>.

I. CATALOG DESCRIPTION

Course Number: MATH-1600
Course Title: Calculus & Analytic Geometry I
Prerequisites: A grade of C or higher in MATH-1150 and MATH-1200 or MATH-1300 or equivalent, or math placement test.
Catalog Description: Review of functions, introduction to limits, differentiation of algebraic and trigonometric functions, applications, anti-differentiation and the definite integral. A graphing calculator is required.
Credit Hours: 7.5
Class Hours: 72¼
Lab Hours: 0
Total Contact Hours: 72¼

II. COURSE OBJECTIVES: *Course will:*

- A. Perform computation of limits and continuity using appropriate analytical, graphical, and numerical methods.
- B. Calculate derivatives using the definition of derivative.
- C. Calculate derivatives using the rules of differentiation.
- D. Apply the concepts of differentiation to analyze increasing and decreasing functions and determine concavity.
- E. Apply the concepts of differentiation to calculate rates of change and perform optimization.
- F. Calculate integrals using the definition of integrals and approximation.
- G. Calculate integrals using the rules of integration.
- H. Apply the concepts of integration to calculate area under a curve and volumes of solids.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

- A. Student Learning Outcomes: *Student will be able to:*
1. To understand concepts of calculus using algebraic, geometric, and numeric approaches.
 2. To be able to apply calculus concepts to solve practical applications.
 3. To be able to use calculus for modeling.
 4. To learn mathematics from investigation of practical problems.

- B. General Education Learning Outcomes
1. Thinking Critically: The ability to examine data, ideas, issues and arguments; understand and evaluate assumptions and evidence; and reach logically valid conclusions. *(GELO 2)*
 2. Problem Solving: The ability to define a problem, propose hypotheses and strategies for testing solutions, implement outcomes that address all factors of the problem, evaluate results, and define any need for further work. *(GELO 3)*
 3. Information Literacy: The ability to identify the need for information; identify and assess sources; and interpret, synthesize, organize and use information within legal and ethical guidelines. *(GELO 5)*
 4. Quantitative Reasoning – The ability to reason and solve quantitative problems in a variety of contexts utilizing mathematical manipulations such as words, data sets, graphs, tables, etc. *(GELO 6)*

IV. COURSE CONTENT

- A. Rates of Change & Tangents to Curves
- B. Limit of a Function and Limit Laws
- C. Formal Definition of a Limit
- D. One Sided Limits and Limits at Infinity
- E. Infinite Limits and Vertical Asymptotes
- F. Continuity
- G. Tangents and Derivatives at a Point
- H. Derivative as a Function
- I. Differentiation Rules
- J. The Derivative as a Rate of Change
- K. Derivatives of Trigonometric Functions
- L. The Chain Rule
- M. Implicit Differentiation
- N. Derivatives of Inverse Functions
- O. Inverse Trigonometric Functions
- P. Related Rates
- Q. Extreme Values of Functions
- R. The Mean Value Theorem
- S. The First Derivative Test
- T. Concavity and Curve Sketching
- U. Indeterminate Forms and L'Hopital's Rule
- V. Newton's Method
- W. Applied Optimization
- X. Antiderivatives
- Y. Estimates with Finite Sums
- Z. Sigma Notation and Limits of Finite Sums
- AA. Definite Integrals
- BB. The Fundamental Theorem of Calculus
- CC. Indefinite Integrals and Substitution
- DD. Substitution and Area Between Curves
- EE. Volumes by Slicing
- FF. Volumes by Cylindrical Shells
- GG. Lengths of Plane Curves
- HH. Areas of Surfaces of Revolution

V. INSTRUCTIONAL MATERIALS

- A. Required text: Hass, *University Calculus, Early Transcendentals*, 2nd Edition, Pearson (Prentice-Hall), 2012, ISBN 321717392.
- B. Other resources:
 - 1. A graphing calculator is strongly suggested.
 - 2. MyMathLab access codes are recommended.

VI. METHODS OF PRESENTATION/INSTRUCTION

Methods of presentation typically include a combination of the following:

- A. Lecture
- B. Small group discussion

VII. METHODS OF EVALUATION

- A. Homework
- B. Comprehensive Final Exam
- C. SCC GRADING SCALE:

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. SPECIFIC COURSE REQUIREMENTS

None

SYLLABUS STATEMENTS

Statement of Equal Opportunity and Nondiscrimination

It is the policy of Southeast Community College to provide equal opportunity and non-discrimination in admission, attendance and employment matters for all qualified persons, attending or seeking admission to the College, without regard to race, color, ethnicity, religion, sex, age, marital status, national origin, veteran status, sexual orientation, disability, or other factors prohibited by law. Inquiries concerning the application of Southeast Community College's policies on equal opportunity and nondiscrimination should be directed to the Vice President for Access, Equity and Diversity, SCC Area Office, 301 S 68th Street Pl, Lincoln NE 68510-2449; Phone 402-323-3412; Fax 402-323-3420; Internet e-mail jsoto@southeast.edu.

Americans with Disabilities Act – Reasonable Accommodations

If you have a disabling condition that may substantially limit your ability to participate in this class, it is your responsibility to contact the Disability Services provider on campus. For additional information and assistance contact:

Lincoln	Room J2	402-437-2620
Milford	Assessment Office	402-761-8202
Beatrice	Jackson Hall – Room J406	402-228-8242

Academic Integrity

Academic Integrity is one of the basic principles of a college community. SCC encourages and expects the highest standards of academic honesty from all students. Please note that cheating, plagiarism, or other forms of academic dishonesty are monitored and subject to disciplinary action.

Electronic Devices

Personal use of any electronic device not authorized by the instructor is **prohibited**. **Violations may lead to formal disciplinary action.** Instructors, for instructional purposes, may allow in the classroom the **use of cell phones and personal electronic devices.**

Firearms/Weapons Strictly Prohibited

SCC policy prohibits the possession of firearms, weapons, or fireworks on College property or at any College-sponsored event. Effective January 1, 2007, Nebraska State Statute 69-2441 makes it unlawful to carry a concealed handgun into a meeting of the governing body of a political subdivision, collegiate athletic event, school, school grounds, school-owned vehicle, or school-sponsored activity or athletic event. These prohibitions apply to EVERYONE (employees, students, invitees, and visitors) and are enforceable EVERYWHERE (all college property and all college-related events.) Violations of these prohibitions will result in disciplinary and/or law enforcement action.