SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Mathematics
Revision Date: 2014-03-31

Term: **2014 Winter**
Course: **MATH-2080-ES31 (Calculus 3)**
Class Time: **MTWT 15:30–16:50 CT**
Class Room: **ESQ 105**

Instructor: **Toby Bartels, PhD**
Email: **TBartels@Southeast.edu**
Voice mail: **402-323-3452**
Text: **402-805-3021**
Office Hour: **MWF 13:00–15:00 CT (advising TT 10:00–12:00 CT)**
Office: **ESQ 112**

Course policies are available at **http://TobyBartels.name/MATH-2080/2014s/.**

I.   CATALOG DESCRIPTION
　　　　Course Number:　　　MATH-2080
　　　　Course Title:　　　　Calculus & Analytical Geometry III
　　　　Prerequisite:　　　　MATH-1700
　　　　Catalog Description:　Study of calculus and analytic geometry for functions of two or more variables.
　　　　　　　　　　　　　　Coordinates, three-dimensional vectors, three-dimensional analytic geometry,
　　　　　　　　　　　　　　differentiation and integration of functions of many variables and integration in
　　　　　　　　　　　　　　vector fields.
　　　　Credit Hours:　　　　6.0
　　　　Class Hours:　　　　54⅔
　　　　Lab Hours:　　　　　0
　　　　Total Contact Hours:　54⅔

II.   COURSE OBJECTIVES: *Course will:*
　　　　A.　　Investigate vectors, vector operations, and applications of vectors to curves and surfaces in space.
　　　　B.　　Investigate functions of two or more variables using geometric, numerical, and algebraic
　　　　　　　techniques.
　　　　C.　　Investigate applications of differential and integral calculus to functions of two or more variables.
　　　　D.　　Introduce and develop concepts for calculus of vector fields.

III.   STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES
　　　　A.　　Student Learning Outcomes: *Student will be able to:*
　　　　　　　1.　　Identify basic surfaces from equations, and write equations for basic curves and surfaces
　　　　　　　　　　is three dimensions.
　　　　　　　2.　　Perform basic vector operations (sum, difference, scalar multiplication, dot products,
　　　　　　　　　　cross product, and box product) algebraically and interpret the operations graphically.
　　　　　　　3.　　Write equations for lines in space, and planes.
　　　　　　　4.　　Compute and interpret derivatives and integrals for vector-valued functions.
　　　　　　　5.　　Compute limits and derivatives for functions of two or more variables.
　　　　　　　6.　　Use limits and derivatives to analyze functions of two or more variables.

7. Use various tools to find extrema of a function on the interior of its domain and on the boundary of its domain.
8. Write, evaluate, and interpret iterated integrals (double and triple integrals).
9. Use triple integrals to determine the mass, moments, and center of mass for solids in space.
10. Use iterated integrals in cylindrical and spherical coordinates.
11. Evaluate line integrals.
12. Use line integrals in a vector field to compute flow, work, circulation, and flux.
13. Use Green's Theorem to evaluate line integrals to compute flux, and circulation in a vector field.
14. Evaluate surface integrals.
15. Use surface integrals to compute surface area, and the flux of a vector field through a surface.
16. Compute the curl and divergence of a vector field.
17. Use Stokes's Theorem and the Divergence Theorem to evaluate surface integrals of a vector field.

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. **CONTENT/TOPICAL OUTLINE**
A. Three Dimensional Coordinate Systems
B. Vectors
C. The Dot Product
D. The Cross Product
E. Lines and Planes in Space
F. Cylinders and Quadratic Surfaces
G. Vector Functions and Their Derivatives
H. Integrals of Vector Functions
I. Functions of Several Variables
J. Limits and Continuity in Higher Dimensions
K. Partial Derivatives
L. The Multivariable Chain Rule
M. Directional Derivatives and Gradient Vectors.
N. Tangent Planes and Differentials
O. Extreme Values and Saddle Points
P. Lagrange Multipliers
Q. Taylor's Formula for Two Variables
R. Double and Iterated Integrals
S. Double Integrals over General Regions
T. Area by Double Integration

U.   Double Integrals in Polar Form
V.   Triple Integrals in Rectangular Coordinates
W.   Moments and Center of Mass
X.   Triple Integrals in Cylindrical and Spherical coordinates
Y.   Line Integrals
Z.   Vector Fields, Work, Circulation, and Flux
AA.   Path Independence, Potential Functions, & Conservative Fields
BB.   Green's Theorem in the Plane
CC.   Surface Integrals and Flux
DD.   Stokes's Theorem
EE.   The Divergence Theorem & Unified Theory

V.   INSTRUCTIONAL MATERIALS
A.   Required text: Hass et al, University Calculus, Early Transcendentals, 2nd Edition, Pearson, 2012, ISBN-13 978-0-321-71739-9, or loose leaf with MML Student Access Code Card, ISBN-13 978-0-321-77192-6.
B.   Other resources:
     1. A graphing calculator is strongly suggested.
     2. MyMathLab access codes are recommended.

VI.   METHODS OF PRESENTATION/INSTRUCTION
A.   Lecture
B.   Small group discussion

VII.   METHODS OF EVALUATION
A.   Homework
B.   Comprehensive final
C.   SCC GRADING SCALE:

A+	95%+	C+	75%+	F	60%–
A	90%+	C	70%+		
B+	85%+	D+	65%+		
B	80%+	D	60%+		

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.