LABETTE COMMUNITY COLLEGE BRIEF SYLLABUS

SPECIAL NOTE:
This brief syllabus is not intended to be a legal contract. A full syllabus will be distributed to students at the first class session.

TEXT AND SUPPLEMENTARY MATERIALS USED IN THE COURSE (if any):

Please check with the LCC bookstore http://www.labette.edu/bookstore for the required texts for this class.

COURSE NUMBER: MATH 201

COURSE TITLE: CALCULUS III

SEMESTER CREDIT HOUR: 5

DEPARTMENT: Mathematics

DIVISION: General Education

PREREQUISITE: MATH 131 Calculus II

COURSE DESCRIPTION:
This third course will complete the calculus sequence. The course will cover infinite sequences and series and tests of convergence and divergence. The calculus of multi-variable functions, partial derivatives, and optimization of higher dimensional surfaces will be covered. The theory and use of vector-valued functions to calculus will be presented. Problems of areas, volumes, and moments will be extended to three-dimensional space and solved using multiple integration techniques (including the line integral, Stoke's Theorem, and Green's Theorem in vector fields.) This course is required of any student seeking a degree in physics, mathematics, engineering, chemistry, and other related fields at a four-year institution.

COURSE OUTCOMES AND COMPETENCIES:
Students who successfully complete this course will be able to:

1. Use the concepts of calculus in alternate coordinate systems.

- Convert the equations of curves between polar - 2D Cartesian and between cylindrical spherical - 3D Cartesian coordinate systems.
- Compute derivatives and integrals in all coordinate systems listed in 1a.
- Compute areas, volumes, lengths of curves and moments (torques) in all coordinate systems listed in 1a.
- Perform the calculations in 1b and 1c with curves in parametric form.
- Graph curves in all 2D coordinate systems and surfaces in all 3D coordinate systems listed in 1a.

2. Integrate the idea of a vector-valued function with calculus.

- Add, subtract, and perform dot and cross product operations with vectors in 2D and 3D space.
- Use vector operations to describe lines, planes, distance, lengths of curves, and curvature in 2D and 3D space.
- Perform calculations using derivatives and integrals of vector-valued functions in N-Dimensional space.
- Calculate the gradient of a curve or surface in space.
- Determine tangent plane approximations to surfaces in space.

3. Use the concepts of calculus with multivariate functions.

- Determine limits and continuity of surfaces defined by multivariate functions.
- Calculate partial derivatives and partial integrals of multivariate functions.
- Expand the single variable derivative tests to include multivariate functions in order to optimize surfaces.
- Use Lagrange Multipliers to perform constrained optimization of surfaces.

4. Use the concepts of the iterated integral.

- Perform double and triple integrals.
- Calculate moments, centers of mass, areas, and volumes using double and triple integrals.

5. Using the tools of calculus to work with vector fields.

- Use line integrals to calculate work, circulation, and flux.
- Use line integrals to determine path independence in a vector field.
- Use Green's Theorem, Stoke's Theorem, and the Divergence Theorem to expand the calculations of 5a into higher coordinate systems.