Reformulate the standard 3-semester calculus sequence—primarily by reordering topics—so that the first two semesters constitute a strong 2-course sequence for students in the life sciences, economics, and chemistry, while strengthening the resulting 3-course sequence for math, physics, and engineering majors.

### Key Sequencing Changes
- Early Multivariate Calculus (2nd semester)
  - Vectors
  - Functions of Several Variables
  - Double Integrals
- Early Sequences and Parametric (1st semester)
- Late Series (3rd semester)

### Benefits
- Calculus 1 and 2 form a strong 2-course sequence for students in biology, chemistry, and economics.
- Difficulty level increases steadily throughout the 3-course sequence.
- Students gain earlier entry into calculus-based probability, linear algebra, and differential equations.
- Students first encounter vectors, matrices, and partial derivatives in a mathematics class.
- Calculus 3 courses actually complete vector calculus through Stokes’ Theorem and the Divergence Theorem.

### Challenges
- Entrenchment of current sequence
- Transfer issues
- AP BC credit
- Pacing

### The Reformulated Sequence at a Glance

#### Calculus 1
(Math, Phys, Engr, Chem, Biol, Econ)
- Functions
- Limits
- The Derivative
- Applications of Derivatives
- The Integral

#### Calculus 2
(Math, Phys, Engr, Chem, Biol, Econ)
- Techniques of Integration
- Applications of Integration
- Differential Equations
- Vectors and Matrices
- Functions of Several Variables
- Double Integrals

#### Calculus 3
(Math, Phys, Engr)
- Infinite Series
- Vector-Valued Functions
- Surfaces and Multiple Integrals
- Vector Analysis
- Differential Equations Revisited

### The Text (Really!)

### Progress to Date
- Textbook Development
  - 11 chapters (Calculus 1 and 2)
  - 700 pages
  - 3000 exercises
  - 1000 graphics
- Classroom Testing at University of Evansville
  - Calculus 1 – Fall 2010, Spring 2011, Summer 2011, Fall 2011
  - Calculus 2 – Spring 2011, Summer 2011, Fall 2011
  - Calculus 3 – Summer 2011, Fall 2011 (using selected sections of a traditional text)
- Assessment
  - Surveys of students and faculty in physics and engineering courses that require calculus, both before and after resequencing
  - Skills assessment of students completing old and new sequences
  - Student surveys for evaluation of textbook
  - Feedback from other faculty who have taught the new sequence

### Next Steps
- Refine and expand text for 1st and 2nd semester
- Develop text for 3rd semester
- Develop online modules to assist with transfer issues
- Apply for TUES Type 2 grant
- Pilot sequence at other institutions
- Pursue commercial publication

### Further Information
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