Cover Sheet for Proposal to the Undergraduate Curriculum and Catalog Review Committee

Date: January 24, 2014
Department: Mathematics and Statistics
Current Course or Program ID: MATH 151

Proposal Category: (√ all that apply). A cover sheet must be submitted for each proposal.

___ Course Prerequisite Change
___ Course Credit Hour Change
___ Course Title Change
___ New Course
___ Course Deletion
___ Change to Official Detailed Course Description (formerly referred to as Official Course Syllabus)
___ Course Number Change
___ Change to Catalog Description
___ Program Revision
___ Minor Change to Course
___ New Program
   (Major, minor, or certificate)

Other Proposal Requirements: (√ as applies and attach form)
___ For New Course Proposals, attach the New Course Proposal with appropriate signatures.

Proposal Description with Rationale: (State current status, proposed change, and why the change is desired. Attach additional sheets if necessary).

The department proposes to list the courses MATH 151:152 as separate entities in the catalog. This separation will clarify the content for each of the courses, and facilitate transfers. This proposal contains the updated MATH 151 description.
Effective Date:
Reason for requesting an alternative effective date:

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<tr>
<th>Signature</th>
<th>Title</th>
<th>Date</th>
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<tbody>
<tr>
<td></td>
<td>Department Curriculum Committee Chair</td>
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<td>College Curriculum Committee Chair</td>
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<td>College Dean</td>
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If this proposal in any way affects a professional education program, it must be submitted to and approved by the Professional Education Committee and the Faculty Senate:

<table>
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<tr>
<th>Professional Education Committee Chair</th>
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<tr>
<td>General Education Curriculum Advisory Committee Chair</td>
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<tr>
<td>Faculty Senate President</td>
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<td>UG Curriculum &amp; Catalog Review Committee</td>
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<td>Provost and VP for Academic Affairs</td>
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Proposed Listing for MATH 151

Catalog Entry

MATH 151. Calculus and Analytic Geometry I.
Three hours lecture (3).

Prerequisite: Students registering for Math 151 must satisfy one of the following criteria:

1. A grade of C or better in an approved college-level precalculus course, including or in addition to some trigonometry at the high school or college level.
2. An SAT math score of 550 or better.
3. A passing score on a placement exam approved by the math department.

This course covers the concept of functions, limits, and continuity of functions, the derivative, rules and applications of differentiation. Mathematical software packages and graphing calculators will be used as illustrative and problem-solving devices. This course has been approved for credit in the Mathematical Sciences Area of the Core Curriculum.

Detailed Description of Content of Course

The following topics will be covered:

- Functions and their graphs, algebra of functions, inverse functions
- Important classes of functions, including exponential, logarithmic and trigonometric functions
- Limits: graphical, numerical and analytic methods, one-sided limits
- Continuity
- Derivatives: Definition, basic rules of differentiation, including the power, product, quotient and chain rule, implicit differentiation, derivatives of inverse functions.
- Curve sketching, extrema and inflection points, optimization problems, related rates, Newton’s method and differentials.

Detailed Description of Conduct of Course

Instructors will use a combination of lectures, group work and computer laboratory sessions. Some may require students to present homework problems to the rest of the class on a regular basis. Software packages and graphing utilities will be used in solving problems and as illustrative aids.

Goals and Objectives of the Course

Students are expected to learn the basic principles of Calculus and Analytic Geometry and to demonstrate the use of these principles in problem solving. In addition to paper and pencil
problem solving, students will use appropriate graphing calculator and computer algebra system technology to solve equations, plot and differentiate.

Students will be able to use the tools of mathematics and quantitative reasoning to conceptualize and solve problems.

Students will be able to:

- identify and interpret relationships among numeric, symbolic, and graphical information
- generate mathematical models using numeric, symbolic, and graphical information for use in real-world applications
- solve problems using numeric, symbolic, and graphical information

**Assessment Measures**

Graded tasks may include tests, quizzes, homework exercises, papers, class participation and attendance. Students will be required to demonstrate literacy in the use of mathematical software packages and/or graphing calculators as effective tools in problem-solving.

**Other Course Information**

This course is primarily intended for freshman and sophomore students, especially those majoring in mathematics, computer science, the sciences, psychology, or economics.
MATH 151:152
CALCULUS AND ANALYTIC
GEOMETRY

Catalog Entry

MATH 151:152. Calculus and Analytic Geometry I & II. (3:3)
Three hours lecture, one hour lab, three
hours credit for each course.

Prerequisite: Students registering for Math 151 must satisfy one of the following
criteria:

1. A grade of C or better in an approved
college-level precalculus course,
including or in addition to some
trigonometry at the high school or
college level.
2. An SAT math score of 550 or better.
3. A passing score on a placement
exam approved by the math
department.

The first part of this course covers the
concept of functions, limits, and continuity
of functions the derivative, rules and
applications of differentiation. The second
part deals with the Riemann integral, the
fundamental theorem of calculus, methods
of integration, and applications.
Mathematical software packages and
graphing calculators will be used as
illustrative and problem-solving devices.
This course has been approved for credit in
the Mathematical Sciences Area of the Core Curriculum.

Proposed

MATH 151. Calculus and Analytic
Geometry I.
Three hours lecture (3).

Prerequisite: Students registering for Math
151 must satisfy one of the following
criteria:

4. A grade of C or better in an approved
college-level precalculus course,
including or in addition to some
trigonometry at the high school or
college level.
5. An SAT math score of 550 or better.
6. A passing score on a placement
exam approved by the math
department.

This course covers the concept of functions,
limits, and continuity of functions, the
derivative, rules and applications of
differentiation. Mathematical software
packages and graphing calculators will be
used as illustrative and problem-solving
devices. This course has been approved for
credit in the Mathematical Sciences Area of
the Core Curriculum.
Detailed Description of Content of Course

The following topics will be covered in MATH 151:

- Functions and their graphs, algebra of functions, inverse functions
- Important classes of functions, including exponential, logarithmic and trigonometric functions
- Limits: graphical, numerical and analytic methods, one-sided limits
- Continuity
- Derivatives: Definition, basic rules of differentiation, including the power, product, quotient and chain rule, implicit differentiation, derivatives of inverse functions.
- Curve sketching, extrema and inflection points, optimization problems, related rates, Newton’s method and differentials.

The following topics will be covered in MATH 152:

- Anti-derivatives and the indefinite integral.
- Fundamental properties of the Riemann integral and its relation to area, Riemann sums, properties of definite integrals, the Fundamental Theorem of Calculus.
- Basic techniques of integration including the integration of polynomials, exponential, logarithmic and simple trigonometric functions, integration by substitution, integration by parts, partial fractions and trigonometric substitutions.

Detailed Description of Content of Course

The following topics will be covered:

- Functions and their graphs, algebra of functions, inverse functions
- Important classes of functions, including exponential, logarithmic and trigonometric functions
- Limits: graphical, numerical and analytic methods, one-sided limits
- Continuity
- Derivatives: Definition, basic rules of differentiation, including the power, product, quotient and chain rule, implicit differentiation, derivatives of inverse functions.
- Curve sketching, extrema and inflection points, optimization problems, related rates, Newton’s method and differentials.
- Numerical integration methods and the use of tables and formulas.
- Applications of the definite integral to calculating area, volume, arc length, and applications to the physical science.
- L'Hôpital's rule
- Improper Integrals
- Elementary differential equations, exponential growth and decay, the logistic equation.

Detailed Description of Conduct of Course

Instructors will use a combination of lectures, group work and computer laboratory sessions. Some may require students to present homework problems to the rest of the class on a regular basis. Software packages and graphing utilities will be used in solving problems and as illustrative aids.

Goals and Objectives of the Course

Students are expected to learn the basic principles of Calculus and Analytic Geometry and to demonstrate the use of these principles in problem solving. In addition to paper and pencil problem solving, students will use appropriate graphing calculator and computer algebra system technology to solve equations, plot, differentiate and integrate.

Students will be able to use the tools of mathematics and quantitative reasoning to conceptualize and solve problems.
Students will be able to:

- identify and interpret relationships among numeric, symbolic, and graphical information
- generate mathematical models using numeric, symbolic, and graphical information for use in real-world applications
- solve problems using numeric, symbolic, and graphical information

Assessment Measures

Graded tasks may include tests, quizzes, homework exercises, papers, class participation and attendance. Students will be required to demonstrate literacy in the use of mathematical software packages and/or graphing calculators as effective tools in problem-solving.

Other Course Information

This course is primarily intended for freshman and sophomore students, especially those majoring in mathematics, computer science, the sciences, psychology, or economics.

Review and Approval

11/5/2008