General Education Review Committee
Agenda

December 14, 2007
ADM 201
12:30 p.m. – 1:30 p.m.

I. Roll
( ) Erik Hirschman Mat-Su/UAB Humanities/ Social Sciences
( ) Caedmon Liburd UAB
( ) Patricia Fagan CAS Humanities
( ) Bob Capuozzo COE
( ) Jack Pauli CBPP/UAB
( ) Jeane Breinig CAS Written Communication
( ) Len Smiley CAS/UAB Quantitative Skills
( ) Suzanne Forster CAS/UAB
( ) Robin Wahto CTC/UAB
( ) Walter Olivares CAS Fine Arts
( ) Tom Miller OAA Guest
( ) Gail Holtzman CHSW/UAB Social Sciences
( ) Grant Baker SOENGR/ UAB
( ) Barbara Harville CAS Oral Communication
( ) vacant Natural Science
( ) Karl Wing USUAA

II. Approval of Agenda (pg. 1)

III. Approval of Summary (pg. 2-3)

IV. Chair’s Report

V. Course Action Requests

<table>
<thead>
<tr>
<th>Chg</th>
<th>Course</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chg</td>
<td>LING A101</td>
<td>The Nature of Language (3 cr) (3+0)</td>
</tr>
<tr>
<td>No revisions received</td>
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<tr>
<td>Chg</td>
<td>MATH A107</td>
<td>College Algebra (4 cr) (4+0)</td>
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<td>(pg. 4-8)</td>
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<tr>
<td>Chg</td>
<td>MATH A108</td>
<td>Trigonometry (3 cr) (3+0)</td>
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<td>Chg</td>
<td>MATH A109</td>
<td>Precalculus (6 cr) (6+0)</td>
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<td>(pg. 13-18)</td>
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<td>Chg</td>
<td>MATH A172</td>
<td>Applied Finite Mathematics (3 cr) (3+0)</td>
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<td>MATH A200</td>
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<td>Chg</td>
<td>MATH A201</td>
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<td>Applied Calculus (3 cr) (3+0)</td>
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<td>(pg. 31-38)</td>
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VI. Old Business

VII. New Business

VIII. Informational Items and Adjournment
General Education Review Committee
Summary

November 30, 2007
ADM 201
12:30 p.m. – 1:30 p.m.

I. Roll
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( ) Grant Baker SOENGR/UAB
( ) Barbara Harville CAS Oral Communication
( ) vacant Natural Science
( ) Karl Wing USUAA

II. Approval of Agenda (pg. 1-2)
Approved

III. Approval of Summary (pg. 3-4)
Under New Business “Approved as models approved” remove second approve
Approved w/ changes

IV. Chair’s Report

V. Course Action Requests

Chg LING A101 The Nature of Language (3 cr) (3+0)
Tabled- no revisions received

Chg CHEM A103 Survey of Chemistry (3 cr) (3+0) (pg.5-12)
Approved

Chg CHEM A103L Survey of Chemistry Laboratory (1 cr) (0+3) (pg. 13-19)
Approved

Chg CHEM A104 Introduction to Organic Chemistry and Biochemistry (3 cr) (3+0) (pg. 20-26)
Approved

Chg CHEM A104L Introduction to Organic Chemistry and Biochemistry Laboratory (1 cr) (0+3) (pg. 27-33)
Approved

Chg CHEM A105 General Chemistry I (3 cr) (3+0) (pg. 34-40)
Approved

Chg CHEM A105L General Chemistry I Laboratory (1 cr) (0+3) (pg. 41-47)
Approved
Chg CHEM A106 General Chemistry II (3 cr) (3+0) (pg. 48-54)
Approved

Chg CHEM A106L General Chemistry II Laboratory (1 cr) (0+3) (pg. 55-61)
Approved

Chg HNRS A192 Honors Seminar: Enduring Books (3 cr) (3+0) (pg. 62-70)
Concerns raised:

If there is available space, non-honors students could register. However, there are rarely any slots open for non-honors students. Administratively, this course and HNRS A292 are already being accepted as GER only if student completes the Honors Core. Approving them as GERs would eliminate paperwork involved in petitioning each course. If this change is accepted, this would be a restrictive GER course. Major concern is that we are creating a second level of GERs.

Chg HNRS A292 Honors Seminar in Social Science (3 cr) (3+0) (pg. 71-78)
Motion: Pass these two Honors course with the comment to UAB that much concern was expressed regarding the creation of a restrictive category of GERs.
For 6
Against 0
Approved

VI. Old Business

VII. New Business

VIII. Informational Items and Adjournment

Meeting Adjourned @1:50 pm
# Curriculum Action Request

**University of Alaska Anchorage**

**Proposal to Initiate, Add, Change, or Delete a Course or Program of Study**

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>1b. Division</th>
<th>1c. Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS CAS</td>
<td>AMSC Division of Math Science</td>
<td>Mathematical Sciences</td>
</tr>
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<table>
<thead>
<tr>
<th>2. Course Prefix</th>
<th>3. Course Number</th>
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<tbody>
<tr>
<td>MATH</td>
<td>A107</td>
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<tr>
<th>4. Previous Course Prefix &amp; Number</th>
<th>5a. Credits/CEU</th>
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<tr>
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<td>4</td>
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<table>
<thead>
<tr>
<th>5b. Contact Hours (Lecture + Lab) (4+0)</th>
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</table>

- **6. Complete Course/Program Title**
  - **College Algebra**
  - **Abbreviated Title for Transcript (30 character)**

<table>
<thead>
<tr>
<th>7. Type of Course</th>
<th>8. Type of Action</th>
<th>9. Repeat Status No</th>
<th># of Repeats</th>
<th>Max Credits</th>
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</thead>
<tbody>
<tr>
<td>☑ Academic</td>
<td>☑ Course</td>
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<tr>
<th>10. Grading Basis</th>
<th>11. Implementation Date</th>
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<tbody>
<tr>
<td>☑ A-F</td>
<td>From: Fall/2008</td>
</tr>
<tr>
<td>☑ P/NP</td>
<td>To: /9999</td>
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<th>12. Cross Listed with</th>
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<td>☑ Stacked with</td>
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- **13. List any programs or college requirements that require this course**


<table>
<thead>
<tr>
<th>15. General Education Requirement</th>
<th>16. Course Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Oral Communication</td>
<td>Covers equations and inequalities, function theory, solution of equations greater than second degree, determinants and matrices, systems of equations and inequalities, exponential and logarithmic function, graphs and equations of conic sections, including applications of all these topics; binomial theorem; sequences and series; mathematical induction and combinatoric notation. Special Notes: A student may apply no more than 7 credits from any combination of MATH A107, A108 and A109 toward the graduation requirements for any baccalaureate degree.</td>
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<table>
<thead>
<tr>
<th>17a. Course Prerequisite(s) (list prefix and number)</th>
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<tbody>
<tr>
<td>MATH A105 with minimum grade of C.</td>
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<tr>
<th>17b. Test Score(s)</th>
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<tr>
<th>17c. Co-requisite(s) (concurrent enrollment required)</th>
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- **17d. Other Restriction(s)**
  - ☑ College
  - ☑ Major
  - ☑ Class
  - ☑ Level

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<tr>
<th>17e. Registration Restriction(s) (non-codable)</th>
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<tr>
<td>If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.</td>
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<th>Initiator (faculty only)</th>
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<td>Dean/Director of School/College</td>
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<tr>
<td>Department Chairperson</td>
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<td>Undergraduate or Graduate Academy Chairperson</td>
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18. ☐ Mark if course has fees Math Lab Fee

19. Justification for Action
   Minor change in course description. Update evaluation guidelines, texts and bibliography.
Date: November 30, 2007

Course Information:
Course Subject/Number: Math A107
Credits and Contact Hours: 4.0 credits, 4+0 Contact Hours
Course Title: College Algebra
Grading Basis: A-F
Course Description: Covers equations and inequalities, function theory, solution of equations greater than second degree, determinants and matrices, systems of equations and inequalities, exponential and logarithmic function, graphs and equations of conic sections, including applications of all these topics; binomial theorem; sequences and series; mathematical induction and combinatoric notation.
Special Notes: A student may apply no more than 7 credits from any combination of MATH A107, A108 and A109 toward the graduation requirements for any baccalaureate degree.
Prerequisite: MATH A105 with minimum grade of C.
Registration Restrictions: If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.
Course Attributes: UAA GER Quantitative Skill Requirement.
Fees: Yes.

1. Instructional Goals and Student Outcomes
   Instructional Goals. The Instructor will:
   • Present proper notation, terminology and basic problem-solving methods
   • Demonstrate the classification of various types of problems in algebra and the identification of which methods to apply to specific problems
   • Present real-world applications using algebra

   Student Outcomes. Students will be able to:
   • Use proper notation, terminology and basic problem-solving methods
   • Select the appropriate method of solution for problems in algebra
   • Apply algebra to real-world problems

2. Guidelines for evaluation
   Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.

3. Course Level Justification
   The course is similar to standard College Algebra courses taught nationwide at the freshman level.
4. Course Outline

1.0 Basic Concepts. The student is expected to know the topics in this section prior to enrolling in MATH A107.
   1.1 Sets of Numbers and Their Properties
   1.2 Integer Exponents and Scientific Notation
   1.3 Rational Exponents and Radicals
   1.4 Polynomials
   1.5 Factoring Polynomials
   1.6 Algebraic Fractions

2.0 Equations and Inequalities
   2.1 Linear Equations and Modeling Applications
   2.2 Quadratic Equations and Modeling Applications
   2.3 Complex Numbers
   2.4 Polynomial and Radical Equations
   2.5 Inequalities and Absolute Value

3.0 Graphs of Equations
   3.1 The Rectangular Coordinate System
   3.2 The Slopes and Equations of Lines
   3.3 Graphs of Other Equations
   3.4 Proportion and Variation

4.0 Functions
   4.1 Functions and Function Notation
   4.2 Quadratic Functions
   4.3 Polynomial and Other Functions
   4.4 Translating and Stretching Graphs
   4.5 Rational Functions
   4.6 Operations on Functions
   4.7 Inverse Functions

5.0 Exponential and Logarithmic Functions
   5.1 Exponential Functions and Applications
   5.2 Base-e Exponential Functions and Applications
   5.3 Logarithmic Functions and Applications
   5.4 Properties of Logarithms
   5.5 Exponential and Logarithmic Equations

6.0 Polynomial Equations
   6.1 The Remainder and Factor Theorems
   6.2 Synthetic Division
   6.3 Descartes' Rules of Signs and Bounds on Roots
   6.4 Rational Roots of Polynomial Equations
   6.5 Irrational Roots of Polynomial Equations
7.0 Linear Systems
7.1 Systems of Linear Equations
7.2 Gaussian Elimination and Matrix Methods
7.3 Matrix Algebra
7.4 Matrix Inversion
7.5 Solution of Systems of Equations using Determinants
7.6 Partial Fractions
7.7 Systems of Inequalities and Linear Programming

8.0 Conic Sections and Quadratic Systems
8.1 The Circle
8.2 The Parabola
8.3 The Ellipse
8.4 The Hyperbola
8.5 Solving Simultaneous Second-Degree Equations

9.0 Natural Number Functions
9.1 The Binomial Theorem and Combinatoric Notation
9.2 Sequences, Series and the Summation Notation
9.3 Arithmetic and Geometric Sequences and Applications
9.4 Mathematical Induction

5. Suggested Texts


6. Bibliography


## Curriculum Action Request

**University of Alaska Anchorage**  
Proposal to Initiate, Add, Change, or Delete a Course or Program of Study

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<tr>
<td>MATH</td>
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<th>6. Complete Course/Program Title</th>
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<tbody>
<tr>
<td>Trigonometry</td>
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<td>BLS, BA Elementary Education, AAS BS Construction Management, BS Technology, BS Technology Business Emphasis.</td>
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<th>14. Coordinate with Affected Units:</th>
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<tbody>
<tr>
<td>Faculty list serve, CAS, CTC, COE, KPC, KO, Matsu, Kachemak Bay, Construction Management, Computer Science, Engineering, Engineering Science, Geomatics, Geology, Physics. Department, School, or College</td>
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<td>Humanities</td>
<td>Integrative Capstone</td>
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<th>Academic Board Chairperson</th>
<th>Date</th>
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<th>Provost or Designee</th>
<th>Date</th>
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Course Information:

Course Subject/Number: MATH A108
Credits and Contact Hours: 3.0 credits, 3+0 Contact Hours
Course Title: Trigonometry
Grading Basis: A-F
Course Description: Covers angular measure and trigonometric functions, fundamental trigonometric identities, composite angle identities, and graphs of trigonometric functions. Also includes complex numbers, De Moivre's theorem, solution of right and oblique triangles, solution of trigonometric equations, inverse trigonometric functions and vectors. Provides calculation practice helpful for physics, engineering and survey technology courses.
Special Notes: A student may apply no more than 7 credits from any combination of Math A107, A108 and A109 toward the graduation requirements for any baccalaureate degree.
Prerequisites: Math A107 with minimum grade of C.
Registration Restrictions: If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.
Course Attributes: UAA GER Quantitative Skill Requirement.
Fees: Yes.

1. Instructional Goals and Student Outcomes
   Instructional Goals. The instructor will:
   • Prepare students for calculus courses involving trigonometric functions
   • Prepare students for courses in other disciplines involving trigonometric functions
   • Demonstrate the solution of applied problems involving both radian and degree calculations

   Student Outcomes. Students will be able to:
   • Perform trigonometric formula manipulations to simplify and solve equations
   • State properties of the graphs of trigonometric functions
   • Obtain numerical answers to a wide variety of measurement problems requiring trigonometry
2. **Guidelines for evaluation**
Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.

3. **Course level justification**
The course is similar to standard trigonometry courses taught nationwide at the freshman level.

4. **Course Outline**

   1.0  **Trigonometric Functions**
   1.1  The Unit Circle
   1.2  Trigonometric Functions of Real Numbers
   1.3  Trigonometric Graphs
   1.4  Modeling Harmonic Motion

   2.0  **Trigonometric Functions of Angles**
   2.1  Angle Measure
   2.2  Trigonometry of Right Angles
   2.3  The Laws of Sines
   2.4  The Law of Cosines

   3.0  **Analytic Trigonometry**
   3.1  Trigonometric Identities
   3.2  Addition and Subtraction Formula
   3.3  Double Angle, Half Angle, and Product-Sum Identities
   3.4  Inverse Trigonometric Functions
   3.5  Trigonometric Equations

   4.0  **Polar Coordinates, Complex Numbers and Vectors**
   4.1  Polar Coordinates
   4.2  Graphs of Polar Equations
   4.3  Complex Numbers and their Graphs
   4.4  Polar Form of Complex Number
   4.5  De Moivre's Theorem
   4.6  Vectors and the dot product

   5.0  **Analytic Geometry**
   5.1  Rotation of Axes
   5.2  Polar Equations of Conics
5.3 Parametric Equations

5. Suggested Texts


6. Bibliography


1a. School or College
   AS CAS

1b. Division
   AMSC Division of Math Science

1c. Department
   Mathematical Sciences

2. Course Prefix
   MATH

3. Course Number
   A109

4. Previous Course Prefix & Number

5a. Credits/CEU
   6

5b. Contact Hours (Lecture + Lab)
   (6+0)

6. Complete Course/Program Title
   Precalculus
   Abbreviated Title for Transcript (30 character)

7. Type of Course
   [ ] Academic
   [ ] Non-credit
   [ ] CEU
   [ ] Professional Development

8. Type of Action
   [ ] Course
   [ ] Program

   [ ] Add
   [ ] Change (mark appropriate boxes)
   [ ] Delete

   [ ] Prefix
   [ ] Credits
   [ ] Title
   [ ] Grading Basis
   [ ] Course Description
   [ ] Test Score Prerequisites
   [ ] Other Restrictions
     [ ] Class
     [ ] Level
     [ ] College
     [ ] Major
     [ ] Other CCG

9. Repeat Status No
   [ ] # of Repeats
   [ ] Max Credits

10. Grading Basis
    [ ] A-F
    [ ] P/NP
    [ ] NG

11. Implementation Date
    semester/year
    From: Fall/2008
    To: /9999

12. [ ] Cross Listed with
    [ ] Stacked with
    [ ] Cross-Listed Coordination Signature

13. List any programs or college requirements that require this course
    Bachelor of Liberal Studies, BA Elementary Education, AAS Construction Management, BS Construction Management, BS Technology.

14. Coordinate with Affected Units:
    [ ] Faculty list serve, CAS, CTC, COE, SOE, KPC, KO, Matsu, Kachemak Bay, Engineering, Geology, Statistics, Technology.
    [ ] Department, School, or College
    Initiator Signature
    Date

15. General Education Requirement
    [ ] Oral Communication
    [ ] Written Communication
    [ ] Quantitative Skills
    [ ] Humanities
    [ ] Fine Arts
    [ ] Social Sciences
    [ ] Natural Sciences
    [ ] Integrative Capstone

16. Course Description
    Intensive course covering polynomial, rational, exponential, logarithmic and trigonometric functions, composite and inverse
    functions, conic sections, matrices and determinants, solutions of equations and inequalities, vectors, complex numbers, DeMoivre’s
    theorem, polar coordinates, parametric and polar graphs, sequences and series, binomial theorem, and mathematical induction.
    Special Note: Intensive course designed for students who intend to take the calculus sequence (Math A200, A201, A202). A student
    may apply no more than 7 credits from any combination of MATH A107, A108 and A109 towards the graduation requirements for any
    baccalaureate degree.

17a. Course Prerequisite(s) (list prefix and number)
    MATH A105 with minimum grade of B.

17b. Test Score(s)

17c. Co-requisite(s) (concurrent enrollment required)

17d. Other Restriction(s)
    [ ] College
    [ ] Major
    [ ] Class
    [ ] Level

17e. Registration Restriction(s) (non-codable)
    If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.

18. [ ] Mark if course has fees Math Lab Fee

19. Justification for Action
    Update evaluation guidelines, texts and bibliography.

Initiator (faculty only)
Date

Approved
Disapproved

Dean/Director of School/College
Date

Approved
Disapproved

Undergraduate or Graduate
Date

Approved
Disapproved

Academic Board Chairperson
Date

Approved
Disapproved

Provost or Designee
Date
Date: November 30, 2007

Course Information:
Course Subject/Number: MATH A109
Credits and Contact Hours: 6.0 credits, 6+0 Contact Hours
Course Title: Precalculus
Grading Basis: A-F
Course Description: Intensive course covering polynomial, rational, exponential, logarithmic and trigonometric functions, composite and inverse functions, conic sections, matrices and determinants, solutions of equations and inequalities, vectors, complex numbers, DeMoivre's theorem, polar coordinates, parametric and polar graphs, sequences and series, binomial theorem, and mathematical induction.
Special Note: Intensive course designed for students who intend to take the calculus sequence (Math A200, A201, A202). A student may apply no more than 7 credits from any combination of MATH A107, A108 and A109 towards the graduation requirements for any baccalaureate degree.
Prerequisite: MATH A105 with minimum grade of B.
Registration Restrictions: If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.
Course Attributes: UAA GER Quantitative Skill Requirement.
Lab Fees: Yes.

1. Instructional Goals and Student Outcomes

   Instructional Goals. The instructor will:
   - Present proper notation, terminology and basic problem-solving methods
   - Demonstrate the classification of various types of problems in algebra and trigonometry and the identification of which methods apply to specific problems
   - Present real-world applications of algebra and trigonometry

   Student Outcomes. Students will be able to:
   - Use proper notation, terminology and basic problem-solving methods
   - Select the appropriate method of solution for problems in algebra and trigonometry
   - Apply algebra and trigonometry to real-world problems

2. Guidelines for evaluation
Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.

3. **Course level justification**  
This course satisfies the Quantitative Skills category of the General Education Requirements at UAA. It is designed to complete the student's algebraic and trigonometric skills that are necessary for mathematical course work in calculus. This course is similar to standard precalculus courses taught nationwide at the freshman level.

4. **Course Outline**  
1.0 Algebra background for precalculus  
   1.1 Sets of Real Numbers  
   1.2 Absolute Value  
   1.3 Polynomials and Factoring  
   1.4 Quadratic Equations  

2.0 Coordinates, Graphs and Inequalities  
   2.1 Rectangular Coordinates  
   2.2 Graphs and Equations  
   2.3 Equations of Lines  
   2.4 Symmetry and Graphs  
   2.5 Inequalities  

3.0 Functions  
   3.1 The Definition of a Function  
   3.2 The Graph of a Function  
   3.3 Techniques in Graphing  
   3.4 Methods of Combining Functions  
   3.5 Inverse Functions  

4.0 Polynomial and Rational Functions. Applications to Optimization.  
   4.1 Linear Functions  
   4.2 Quadratic Function  
   4.3 Applied Problems  
   4.4 Maximum and Minimum Problems  
   4.5 Polynomial Functions  
   4.6 Rational Functions  

5.0 Exponential and Logarithmic Functions
5.1 Exponential Functions
5.2 Natural Exponential Function \( y=e^x \)
5.3 Logarithmic Functions
5.4 Properties of Logarithms
5.5 Exponential and Logarithmic Equations
5.6 Applications including Compound Interest and Exponential Growth and Decay Problems

6.0 Trigonometric Functions of Angles
6.1 Trigonometric Functions of Acute Angles
6.2 Algebra and the Trigonometric Functions
6.3 Right-Triangle Functions
6.4 Trigonometric Functions of Angles
6.5 Trigonometric Identities

7.0 Trigonometric Functions of Real Numbers
7.1 Radian Measure and Geometry
7.2 Trigonometric Functions of Real Numbers
7.3 Graphs of the Sine and Cosine Functions
7.4 Graphs of \( y=A \sin (Bx-C) \) and \( y=A \cos (Bx-C) \)
7.5 Graphs of the Tangent and Reciprocal Functions

8.0 Analytical trigonometry
8.1 The Addition Formulas for Sine and Cosine
8.2 The Double Angle Formulas
8.3 The Product-To-Sum and Sum-To-Product Formulas
8.4 Solution of Trigonometric Equations
8.5 The Inverse Trigonometric Functions

9.0 Additional Topics in Trigonometry
9.1 The Law of Sines and the Law of Cosines
9.2 Vectors in the Plane: a Geometric Approach
9.3 Vectors in the Plane: an Algebraic Approach
9.4 Parametric Equations
9.5 Introduction to Polar Coordinates
9.6 Curves in Polar Coordinates

10.0 Systems of Equations
10.1 Systems of Equations in Two Unknowns
10.2 Gaussian Elimination
10.3 Matrices
10.4 The Inverse of a Square Matrix
10.5 Determinants and Cramer’s Rule
10.6 Nonlinear Systems of Equations
10.7 Systems of Inequalities

11.0 Analytic Geometry
11.1 The Basic Equations
11.2 The Parabola
11.3 The Ellipse
11.4 The Hyperbola
11.5 The Focus-Directrix Property of Conic Sections (optional)
11.6 The Conic Sections in Polar Coordinates (optional)
11.7 Rotation of Axes

12.0 Roots of Polynomial Equations
12.1 The Complex Number System
12.2 Division of Polynomials
12.3 The Remainder Theorem and the Factor Theorem
12.4 The Fundamental Theorem of Algebra
12.5 Rational and Irrational Roots
12.6 Conjugate Roots and Descarte's Rules of Signs
12.7 Partial Fractions

13.0 Additional Topics in Algebra
13.1 Mathematical Induction
13.2 The Binomial Theorem
13.3 Introduction to Sequences and Series
13.4 Arithmetic Sequences and Series
13.5 Geometric Sequences and Series
13.6 De Moivre’s Theorem

5. Suggested Texts


6. Bibliography


## Curriculum Action Request
### University of Alaska Anchorage
#### Proposal to Initiate, Add, Change, or Delete a Course or Program of Study

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>1b. Division</th>
<th>1c. Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS CAS</td>
<td>AMSC Division of Math Science</td>
<td>Mathematical Sciences</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Course Prefix</th>
<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
<th>5a. Credits/CEU</th>
<th>5b. Contact Hours (Lecture + Lab)</th>
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<tbody>
<tr>
<td>MATH</td>
<td>A172</td>
<td></td>
<td>3</td>
<td>(3+0)</td>
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### 6. Complete Course/Program Title
**Applied Finite Mathematics**

### 7. Type of Course
- Academic
- Non-credit
- CEU
- Professional Development

### 8. Type of Action
- Course
- Program

### 9. Repeat Status
- No
- # of Repeats
- Max Credits

### 10. Grading Basis
- A-F
- P/NP
- NG

### 11. Implementation Date
- From: Fall/2008
- To: 9999

### 12. Cross Listed with
- Stacked with

### 13. List any programs or college requirements that require this course:
- Bachelor of Liberal Studies
- BBA Accounting
- AAS Small Business Administration
- Bachelor of Business Administration
- AAS Computer Information Systems
- BBA Management Information Systems
- AAS Logistics
- AAS Air Traffic Control
- AAS Aviation Administration
- AAS Computer Systems Technology

### 14. Coordinate with Affected Units:
- Faculty list serve, CAS, CBPP, CTC, KPC, KO, Matsu, Kachemak Bay, Business, Biological Sciences, Computer Information Systems, Complex Systems, Computer Science, Economics, Electrical Engineering

### 15. General Education Requirement
- Oral Communication
- Written Communication
- Quantitative Skills
- Humanities
- Fine Arts
- Social Sciences
- Natural Sciences
- Integrative Capstone

### 16. Course Description
Covers linear and quadratic equations and inequalities, algebra of matrices, introductory linear programming, exponential and logarithmic functions. Applications emphasizing the relationships of these mathematical concepts to quantitative decision making in the managerial and social sciences.

### 17a. Course Prerequisite(s) (list prefix and number)
- Math A105 with minimum grade of C.

### 17b. Test Score(s)

### 17c. Co-requisite(s) (concurrent enrollment required)

### 17d. Other Restriction(s)
- College
- Major
- Class
- Level

### 17e. Registration Restriction(s) (non-codable)
If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.

### 18. Mark if course has fees
- Math Lab Fee

### 19. Justification for Action
- Minor change in course description. Update evaluation guidelines, texts and bibliography.

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### Initiator (faculty only)

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### Dean/Director of School/College

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### Undergraduate or Graduate

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### Provost or Designee

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Course Information:
Course Subject/Number: Math A172
Credits and Contact Hours: 3.0 credits, 3+0 Contact Hours
Course Title: Applied Finite Mathematics
Grading Basis: A-F
Course Description: Covers linear and quadratic equations and inequalities, algebra of matrices, introductory linear programming, exponential and logarithmic functions. Applications emphasizing the relationships of these mathematical concepts to quantitative decision making in the managerial and social sciences.
Prerequisite: Math A105 with minimum grade of C.
Registration Restrictions: If prerequisite is not satisfied, appropriate SAT or ACT scores or approved UAA Placement Test required.
Course Attributes: UAA GER Quantitative Skill Requirement.
Fees: Yes.

1. Instructional Goals and Student Outcomes
   Instructional Goals. The instructor will:
   - Introduce students to the concept of function, its notation, and graph, including algebraic, exponential and logarithmic functions
   - Introduce students to matrices, elementary operations on matrices, and applications
   - Introduce applications in management, life sciences and social sciences

   Student Outcomes. Students will be able to:
   - Use the concept of function, its notation, and graph
   - Apply the rules of logarithms and exponents to evaluate logarithmic and exponential functions and to solve equations using these functions
   - Solve systems of equations using elimination, substitution and matrix methods
   - Translate a real-life problem into a mathematical model that can be solved using suitable algebra techniques

2. Course level justification
   The course is similar in content to standard courses for managerial and social sciences students taught at the freshman level.
3. Course Evaluation
Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.

4. Course Outline

1.0 Algebraic Concepts
   1.1 Sets
   1.2 The Real Numbers
   1.3 Integer Exponents
   1.4 Radicals and Rational Exponents
   1.5 Operations with Algebraic Expressions
   1.6 Factoring
   1.7 Algebraic Fractions

2.0 Linear Equations and Functions
   2.1 Solutions of Linear Equations in One Variable
   2.2 Graphing Linear Equations
   2.3 Functions
   2.4 Special Functions and their Graphs
   2.5 Applications of Functions
   2.7 Solutions of Systems of Linear Equations
   2.8 Applications of Systems of Linear Equations

3.0 Non-Linear Models
   3.1 Quadratic Equations
   3.2 Quadratic Functions: Parabolas
   3.3 Business Applications of Quadratic Functions
   3.4 Special Functions and their Graphs

4.0 Linear Algebra
   4.1 Matrices
   4.2 Multiplication of Matrices
   4.3 Gauss-Jordan Elimination: Solving Systems of Equations
   4.4 Inverse of a Square Matrix
   4.5 Applications of Matrices

5.0 Inequalities and Linear Programming
   5.1 Linear Inequalities in One Variable
   5.2 Linear Inequalities in Two Variables
   5.3 Linear Programming: Graphical Methods
6.0  Exponential and Logarithmic Functions
6.1  Exponential Functions
6.2  Logarithmic Functions
6.3  Solution of Exponential Equations
6.4  Applications of Exponential and Logarithmic Functions

7.0  Applications in Management, Life and Social Sciences
7.1  Arithmetic Sequences and Applications
7.2  Geometric Sequences and Applications
7.3  Annuities
7.4  Loans and Amortization

5.  Suggested Texts


6.  Bibliography


Curriculum Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course or Program of Study

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<th>4. Previous Course Prefix &amp; Number</th>
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<th>5b. Contact Hours</th>
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<td>✗ A-F</td>
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<th>13. List any programs or college requirements that require this course</th>
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<tr>
<td>BS (CAS), BS Biological Sciences, BS Chemistry, BA &amp; BS Computer Science, GS Geological Sciences, Bachelor of Liberal Studies, BA &amp; BS Mathematics, BBA Accounting, BBA, BBA Management Information Systems, BA Economics, BA Elementary Education, BS Construction Management, BS Technology, BS Civil Engineering, Electrical Engineering, BS Engineering, AAS and BS Geomatics, Mechanical Engineering.</td>
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<th>14. Coordinate with Affected Units:</th>
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<td>Faculty list serve, CAS, CBPP, CTC, COE, SOE, KPC, KO, Matsu, Kachemak Bay, Chemistry, Economics, Electrical Engineering, Engineering, Engineering Science, Geomatics, Honors, Physics, Statistics.</td>
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<th>15. General Education Requirement</th>
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<td>✗ Oral Communication</td>
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<td>✗ Written Communication</td>
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<td>✗ Quantitative Skills</td>
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<td>✗ Integrative Capstone</td>
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<table>
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<th>16. Course Description</th>
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<tbody>
<tr>
<td>A first course in calculus covering limits, including those with indeterminate form; and derivatives of algebraic and transcendental functions. Applications of derivatives including curve sketching, rates of change, and Newton’s Method. Definite and indefinite integrals, including integration by substitution.</td>
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<thead>
<tr>
<th>17a. Course Prerequisite(s) (list prefix and number)</th>
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<td>[Math A107 with minimum grade of C] or [Math A109 with minimum grade of C].</td>
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<th>17e. Registration Restriction(s) (non-codable)</th>
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<td>If prerequisite is not satisfied, appropriate SAT, ACT or AP scores or approved UAA Placement Test required.</td>
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<tr>
<th>19. Justification for Action</th>
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<td>Update course description and course content guide to reflect current content.</td>
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<th>Provost or Designee</th>
<th>Date</th>
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Date: November 30, 2007

Course Information:
Course Subject/Number: MATH A200
Credits and Contact Hours: 4.0 credits, 4+0 Contact Hours
Course Title: Calculus I
Grading Basis: A-F
Course Description: A first course in calculus covering limits, including those with indeterminate form; and derivatives of algebraic and transcendental functions. Applications of derivatives including curve sketching, rates of change, and Newton’s Method. Definite and indefinite integrals, including integration by substitution.
Prerequisite: [Math A107 with minimum grade of C and Math A108 with minimum grade of C] or [Math A109 with minimum grade of C].
Registration Restrictions: If prerequisite is not satisfied, appropriate SAT, ACT or AP scores or approved UAA Placement Test required.
Course Attributes: UAA GER Quantitative Skill Requirement.
Fees: Yes.

1. Instructional Goals and Student Outcomes

Instructional Goals. The instructor will:
- Introduce students to the concept of limit, its notation and computation
- Present to students the concept of differentiation, its notation, calculation, and application
- Introduce students to the concept of integration, its notation and calculation

Student Outcomes. Students will be able to:
- Differentiate algebraic, exponential, logarithmic, trigonometric, hyperbolic, inverse trigonometric and inverse hyperbolic functions
- Evaluate elementary integrals using the substitution method
- Apply the concept of differentiation to sketch curves and to solve related rate and optimization problems
2. **Guidelines for evaluation**  
Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.

3. **Course level justification**  
The prerequisites for Math A200 are at the 100 level. Calculus I is taught nationwide at the lower division level.

4. **Course Outline**

1.0 Brief Review of Precalculus Concepts  
1.1 Equations, Inequalities and Absolute Value  
1.2 Points and Lines in the Plane  
1.3 Functions and Combinations of Functions  
1.4 Graphs and Aids to Graphing  
1.5 Trigonometric Functions and Identities  
1.6 Exponential and Logarithmic Functions

2.0 Limits, Continuity and Derivatives  
2.1 The Limit of a Function  
2.2 Calculating Limits using Limit Laws  
2.3 The Definition of Limit  
2.4 Continuity  
2.5 Limits at Infinity; Horizontal Asymptotes  
2.6 Tangents, Velocities and other Rates of Change  
2.7 Definition of Derivative  
2.8 The Derivative as a Function

3.0 Differentiation Rules  
3.1 Derivatives of Polynomials and Exponential Functions  
3.2 The Product and Quotient Rules  
3.3 Derivatives of Trigonometric Functions  
3.4 The Chain Rule  
3.5 Implicit Differentiation  
3.6 Higher Order Derivatives  
3.7 Derivatives of Logarithmic Functions  
3.8 Hyperbolic Functions  
3.9 Related rates  
3.10 Linear Approximations and Differentials

4.0 Applications of the Derivative
4.1 Maximum and Minimum Values
4.2 The Mean Value Theorem
4.3 The First and Second Derivative Tests
4.4 How Derivatives Affect the Shape of a Curve
4.5 Indeterminate Forms and L’Hospital’s Rule
4.6 Summary of Curve sketching
4.7 Optimization Problems
4.8 Newton’s Method

5.0 The Integral
5.1 The Definite Integral
5.2 The Fundamental Theorem of Calculus
5.4 Indefinite Integrals and Integration Rules
5.5 Integration by Substitution
5.6 Logarithm Defined as an integral

5. Suggested Texts


6. Bibliography


Curriculum Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course or Program of Study

1a. School or College
   AS CAS

1b. Division
   AMSC Division of Math Science

1c. Department
   Mathematical Sciences

2. Course Prefix
   MATH

3. Course Number
   A201

4. Previous Course Prefix & Number

5a. Credits/CEU
   4

5b. Contact Hours
   (Lecture + Lab)
   (4+0)

6. Complete Course/Program Title
   Calculus II

   Abbreviated Title for Transcript (30 character)

7. Type of Course
   Academic

8. Type of Action
   Course

   Add
   Change
   Delete

9. Repeat Status
   No

10. Grading Basis
    A-F
    P/NP
    NG

11. Implementation Date
    From: Fall/2008
    To: 9999

12. Cross Listed with
    Stacked with
    Cross-Listed Coordination Signature

13. List any programs or college requirements that require this course
   BS Biological Sciences, BS Chemistry, BS Computer Science, Bachelor of Liberal Studies, BA & BS Mathematics, BA Elementary Education, BS Civil Engineering, Electrical Engineering, BS Engineering, BS Geomatics, Mechanical Engineering.

14. Coordinate with Affected Units:
    Faculty list serve, CAS, CTC, COE, SOE, KPC, KO, Matsu, Kachemak Bay, Electrical Engineering, Engineering Science, Physics.

15. General Education Requirement
    Oral Communication
    Written Communication
    Quantitative Skills
    Fine Arts
    Social Sciences
    Natural Sciences
    Integrative Capstone

16. Course Description
    Covers integration techniques and applications; sequences and series, including convergence tests; curves in the plane and polar coordinates.

17a. Course Prerequisite(s) (list prefix and number)
    Math A200 with minimum grade of C.

17b. Test Score(s)

17c. Co-requisite(s) (concurrent enrollment required)

17d. Other Restriction(s)
    College
    Major
    Class
    Level

17e. Registration Restriction(s) (non-codable)

18. Mark if course has fees Math Lab Fee

19. Justification for Action
    Update course description and course content guide to reflect current content.

Initiator (faculty only) Date

Initiator (PRINT NAME)

Approved
Disapproved

Dean/Director of School/College Date

Approved
Disapproved

Undergraduate or Graduate Date

Approved
Disapproved

Academic Board Chairperson

Approved
Disapproved

Provost or Designee Date

Curriculum Committee Chairperson Date
Course Information:
Course Subject/Number: MATH A201
Credits and Contact Hours: 4.0 credits, 4+0 Contact Hours
Course Title: Calculus II
Grading Basis: A-F
Course Description: Covers integration techniques and applications; sequences and series, including convergence tests; curves in the plane and polar coordinates.
Prerequisite: Math A200 with minimum grade of C.
Course Attributes: UAA GER Quantitative Skill Requirement.
Fees: Yes.

1. Instructional Goals and Student Outcomes
   Instructional Goals. The instructor will:
   • Present techniques of integration
   • Introduce applications of integration
   • Present sequences and series
   • Present parametric equations and polar coordinates

   Student Outcomes. Students will be able to:
   • Evaluate a variety of integrals using standard integration techniques
   • Solve applied problems using integration techniques
   • Use the fundamental tests of convergence of infinite series and be able to manipulate sequences and series
   • Parameterize curves and use polar coordinates

2. Guidelines for evaluation
   Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.

3. Course level justification
   The calculus sequence is taught nationwide at the lower division level.
4. **Course Outline**

1.0 Techniques of Integration  
  1.1 Integration by Parts  
  1.2 Trigonometric Integrals  
  1.3 Trigonometric Substitutions  
  1.4 Integration of Rational Functions using Partial Fractions  
  1.5 Integration using Tables and Computer Algebra Systems (optional)  
  1.6 Trapezoidal and Simpson’s Rule  
  1.7 Improper Integrals  

2.0 Applications of Integration  
  2.1 Areas Between Curves  
  2.2 Volumes  
  2.3 Volumes of Revolution  
  2.4 Arc Length  
  2.5 Work Problems  
  2.6 Separable Differential Equations  

3.0 Sequences and Series  
  3.1 Sequences  
  3.2 Series  
  3.3 Integral Test  
  3.4 The Comparison Tests  
  3.5 Alternating Series  
  3.6 Absolute Convergence and the Ratio and Root Tests  
  3.7 Power series  
  3.8 Taylor and Maclaurin Series  
  3.9 Binomial series  
  3.10 Applications of Taylor Polynomials  

4.0 Parametric Equations and Polar Coordinates  
  4.1 Parametric Curves  
  4.2 Length and Surface Area for Parameterized Curves  
  4.3 Polar Coordinates  
  4.4 Length and Area in Polar Coordinates  
  4.5 Conic Sections  

5. **Suggested Texts**  

6. **Bibliography**


1a. School or College  
AS CAS  

1b. Division  
AMSC Division of Math Science  

1c. Department  
Mathematical Sciences  

2. Course Prefix  
MATH  

3. Course Number  
A272  

4. Previous Course Prefix & Number  

5a. Credits/CEU  
3  

5b. Contact Hours  
(Lecture + Lab) (3+0)  

6. Complete Course/Program Title  
Applied Calculus  
Abbreviated Title for Transcript (30 character)  

7. Type of Course  
[ ] Academic  [ ] Non-credit  [ ] CEU  [ ] Professional Development  

8. Type of Action  
[ ] Course  [ ] Program  

[ ] Add  
[ ] Change  
(mark appropriate boxes)  

[ ] Delete  

[ ] Prefix  [ ] Credits  [ ] Title  [ ] Grading Basis  
[ ] Course Description  [ ] Test Score Prerequisites  
[ ] Other Restrictions  
[ ] Class  [ ] Level  
[ ] College  [ ] Major  
[ ] Other CCG  

9. Repeat Status No  
# of Repeats  Max Credits  

10. Grading Basis  
[ ] A-F  [ ] P/NP  [ ] NG  

11. Implementation Date  
From: Fall/2008  To: 9999  

12. [ ] Cross Listed with  
[ ] Stacked with  
Cross-Listed Coordination Signature  

13. List any programs or college requirements that require this course  
BS (CAS), BA Computer Science, Bachelor of Liberal Studies, BBA Accounting, BBA, BBA Management Information Systems, BA Economics, AAS Air Traffic Control, AAS Aviation Administration, BS Aviation Technology, BS Construction Management, BS Technology.  

14. Coordinate with Affected Units:  
Faculty list serve, CAS, CBPP, CTC, KPC, KO, Matsu, Kachemak Bay, Aviation, Business, Computer Science, Economics, Honors, Statistics.  

Department, School, or College  

Initiator Signature  Date  

15. [ ] General Education Requirement  
[ ] Oral Communication  [ ] Written Communication  [ ] Quantitative Skills  [ ] Humanities  
[ ] Fine Arts  [ ] Social Sciences  [ ] Natural Sciences  [ ] Integrative Capstone  

16. Course Description  
Covers functions and graphs, differentiation, exponential and logarithmic functions, antidifferentiation and integration, functions of several variables. Applications of these mathematical concepts.  

17a. Course Prerequisite(s) (list prefix and number)  
MATH A107 with minimum grade of C or  
MATH A172 with minimum grade of C.  

17b. Test Score(s)  

17c. Co-requisite(s) (concurrent enrollment required)  

17d. Other Restriction(s)  
[ ] College  [ ] Major  [ ] Class  [ ] Level  

17e. Registration Restriction(s) (non-codable)  

18. [ ] Mark if course has fees Math Lab Fee  

19. Justification for Action  
Modify prerequisites for consistency with other GER Quantitative Skills courses. Update evaluation guidelines, texts and bibliography.  

Initiator (faculty only)  Date  

Initiator (PRINT NAME)  

Approved  Disapproved:  
Dean/Director of School/College  Date  

Approved  Disapproved:  
Department Chairperson  Date  

Approved  Disapproved:  
Undergraduate or Graduate  
Academic Board Chairperson  Date  

Approved  Disapproved:  
Provost or Designee  Date  

31
Course Information:
Course Subject/Number: MATH A272
Credits and Contact Hours: 3.0 Credits, 3+0 Contact Hours
Course Title: Applied Calculus
Grading Basis: A-F
Course Description: Covers functions and graphs, differentiation, exponential and logarithmic functions, antidifferentiation and integration, functions of several variables. Applications of these mathematical concepts.
Prerequisites: MATH A107 with minimum grade of C or MATH A172 with minimum grade of C.
Course Attributes: UAA GER Quantitative Skill Requirement.
Lab Fees: Yes.

1. Instructional Goals and Student Outcomes
   Instructional Goals. The instructor will:
   • Introduce techniques and rules of differentiation and integration
   • Present applications of differentiation and integration
   • Introduce partial derivatives and appropriate applications

   Student Outcomes. Students will be able to:
   • Differentiate functions involving rational, exponential and logarithmic functions and combinations of these functions
   • Integrate functions using the power rule (substitution method) and integration by parts techniques
   • Use differentiation and integration techniques to solve applied problems

2. Course level justification
   The course has a prerequisite of college algebra taught at the freshman level. The course is similar to standard calculus courses for business and life sciences students taught at the sophomore level.

3. Course Evaluation
   Grading policy and procedures are at the discretion of the faculty member teaching the course. Assessment may be based on homework assignments, quizzes, tests and a midterm examination. A comprehensive final exam will be given. The grade in the course will be based on how well the student masters the course content.
4. Course Outline

1.0 Introduction to Differentiation
1.1 Limits
1.2 Continuous Functions
1.3 The Derivative: Rates of Change; Tangent to a Curve
1.4 Derivative Formulas
1.5 Product and Quotient Rules
1.6 The Chain Rule and the Power Rule
1.7 Higher-Order Derivatives
1.8 Applications of Derivatives in Business and Economics

2.0 Applications of Derivatives
2.1 Relative Maxima and Minima; Curve Sketching
2.2 Concavity; Points of Inflection
2.3 Optimization Problems in Business, Economics and the Social Sciences
2.4 Limits at Infinity and Asymptotes; More Curve Sketching

3.0 Derivatives of Exponential and Logarithmic Functions
3.1 Derivatives of Exponential Functions
3.2 Derivatives of Logarithmic Functions
3.3 Implicit Differentiation
3.3 Related Rates
3.4 Applications in Business and Economics

4.0 Indefinite Integrals
4.1 The Indefinite Integral
4.2 The Power Rule
4.3 Integrals involving Logarithmic and Exponential Functions
4.4 Applications in Business and Economics
4.5 Differential Equations and Applications

5.0 Definite Integrals
5.1 Area under a Curve
5.2 The Fundamental Theorem of Calculus
5.3 Area Between Curves
5.4 Applications in Business and Economics
5.5 Using Integral Tables
5.6 Integration by Parts
5.7 Improper Integrals and their Applications
6.0 Functions of Several Variables
6.1 Functions and Domains
6.2 Partial Derivatives
6.3 Applications of Partial Derivatives
6.4 Higher Order Partial Derivatives
6.5 Maxima and Minima
6.6 Lagrange Multipliers (Optional)

5. Suggested Texts


6. Bibliography


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BBA Management Information Systems 134
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