Course Outline Status: Active

TOP Code:

Board Approval Date: 09/22/2010

Technical Review Approval Date: 03/15/2010

CRC Approval Date: 04/12/2010

MISSION COLLEGE
Associate and Non-Associate Degree
Credit Course Outline

SECTION ONE - Course Specific Information

1. **Type of Credit Course:**
   __X__ Degree Applicable ____ Non Degree Applicable

2. **Course Number and Title:**
   MATH 000CG - Mathematics for the Associate Degree Student

3. **General Information:**
   3 **Total Units** (Based on 16-18 hours per semester for 1 lecture unit, and 48-54 hours per semester for 1 lab unit)

   Number of Lecture Units: 3
   Number of Student Contact Hours Per Semester: 54
   Total hours of student work required outside of class per semester: 108

   Number of Laboratory Units: 0
   Number of Student Contact Hours Per Semester: 0

   Number of Arranged Lab Units: 0
   Number of Student Contact Hours Per Semester: 0

   Number of Work Experience Hours: 0
   Number of Student Work Experience Hours Per Semester: 0

   Total Hours of Student Work Required Per Semester: 162

   Other Contact Hours: 0
   Distance Learning: No

4. **Size of Class:**
   Optimal Class Size based on instructional methodology described: 35

5. **Grade Type:**
   Pass/No Pass Option

6. **Repeatability:**
   A student who has previously earned a passing grade in the course may repeat this course 0 time(s).

7. **Recommended for Credit By Examination:**
   No

8. **Catalog Description**
   This course is designed to satisfy the graduation competency requirement in mathematics for the associate degree. The student studies a wide range of mathematical thinking that may include mathematical history, mathematics in different cultures and how to communicate mathematics to others. Topics may include a variety of techniques in critical thinking, problem solving and practical applications, using mathematics at the intermediate algebra level. This course does not substitute for the Math C prerequisite requirement for transfer level math courses.

9. **Description for the Schedule of Classes**
   This is a mathematics survey course that uses creative thinking and problem solving techniques. Topics may include mathematical history and cultures, critical thinking, symbol systems, geometric and algebraic patterns and a variety of real world applications. This is an associate degree level course but does not substitute for Math C.

10. **Content Review**
    List any prerequisites, corequisites, and advisories here.
    Advisory
    Eligibility for ENGL 001A and READ 053
    Prerequisite MATH 903 or
    Prerequisite MATH 903M or successful placement into the course based on the Mission College Mathematics Placement Exam.

11. **Instructional Methodology:**
    Guided Discussions
    Guided Practice

Hands-on
Activities/Exercises
In-Class Writing
Small Group Discussion
Lecture

SECTION TWO - Course Content

1. **Course Content and Scope**
    1. **Student Course Objectives**
    Upon completion of the course the student should be able to:
        1. understand and explain the historical development of mathematical concepts and number systems in a variety of ages and cultures.
        2. understand and explain the development of mathematical reasoning, logic and symbol systems and apply the results to critical thinking, mathematical reasoning and problem solving.
        3. use a variety of selected techniques from areas such as arithmetic, algebra, geometry, trigonometry or statistics to solve every-day applications of mathematics at the associate degree level.
        4. communicate the role and value of mathematics both historically and in today's society.

    2. **Outline of Topics to be Addressed**

    Topics will be selected from the following list according to the interests of students and instructor:

        1. Critical thinking and mathematics
            1. problem solving
            2. mathematical reasoning
            3. logic
            4. concept of mathematical proof
        2. Mathematics in history and culture
            1. historical development of the branches of mathematics
            2. cultural development of mathematical concepts and techniques
            3. the importance of symbol systems
            4. women and minorities in mathematics
            5. the impact of mathematics on humankind
        3. Number systems
            1. counting numbers and integers
            2. fraction and decimal representation
            3. finite systems
        4. Simple number patterns
            1. arithmetic sequences
            2. geometric sequences
            3. other sequences such as Fibonacci or prime number

5. Linear equations and inequalities
    1. algebraic approaches
    2. graphical approaches
    3. applications such as linear programming
6. Set theory and applications
    1. symbolic notation and manipulation
    2. Venn diagrams
    3. applications to surveys or counting problems
7. Mathematics education
    1. math anxiety
    2. discalculia
    3. curriculum and standards for K-12
    4. learning theories
    5. teaching techniques
8. Geometry
    1. simple length, area and volume calculations
    2. symmetry and similarity
    3. geometric fiogures in two and higher dimensions
    4. Pythagorean Theorem
    5. circles and the number pi
    6. Non-Euclidean dimensions
9. Introduction to combinatorics
    1. counting techniques
    2. permutations
    3. combinations
    4. simple applications to probability
10. Introduction to statistics
    1. descriptive statistics - graphs and charts
    2. descriptive statistics - calculations such as mean
    3. simple inferential statistics
11. Mathematics of finance
    1. simple interest
    2. compound interest
    3. annuities and loans
    4. credit cards
12. Quadratic equations and inequalities
    1. algebraic solutions
    2. graphical solutions
    3. applications to conic sections
    4. applications to complex numbers
13. Functions
    1. notation
    2. linear, quadratic and other nonlinear examples
    3. exponential and logarithmic examples
    4. applications of functions
14. Introduction to trigonometry
    1. angle measurement
    2. trigonometric ratios

3. simple applications such as distance measurement
15. Applications of mathematics to voting
16. Applications of mathematics to green/environmental issues

3. **Cultural Pluralism/Diversity**
   This course will include exploration of the historical development of mathematics. Students will describe mathematical concepts and techniques developed in different cultures over time and apply them to contemporary as well as current problems.

2. **Student Preparation and Evaluation**
   1. **Textbooks and Readings**

      1. **Textbooks**

         Berlinghoff, William P & Gouvea, Fernando.
      Math Through the Ages. Expanded ed. Mathematical Association of America, 2004.
      Smith, Karl J. Math for Liberal Arts. 1st ed. Cengage, 2010.

      2. **Manuals**

      3. **Periodicals**

      4. **Other**

3. **Writing/Skill Building**
   Students use the concepts and skills of associate degree level mathematics to analyze the historical development of a variety of mathematical techniques, and their current use to solve practical applications.

   Example: Prepare and present a five minute speech that describes the development of algebra in the first millennium Hindu-Arabic world. Include an equation from that time and solve it using present day techniques.

4. **Outside Assignments**
   Students read material from the textbook and other outside sources in order to research the role in society of associate degree level mathematics. Students spend approximately six hours a week on these assignments.

   Example: Visit the MERLOT Website (Multimedia Resource for Learning and Online Teaching). Explore three items in the mathematics discipline area. Write a critical analysis of the content, application and effectiveness of each item, and post your work

in the user comment area of the MERLOT website.

5. **Critical Thinking Assignments**
   Students solve application problems using associate degree level mathematics.

   Example: You reach into a bag containing eight DVDs and twelve CDs, in identical cases. You select two cases at random. Calculate the probability that you get one CD and one DVD.

6. **Student Evaluation**
   Grades include the following factors:
   a. Participation in class activities, such as group discussion or quizzes
   b. Assigned homework problems
   c. In-class presentations of oral reports or projects
   d. Written midterm and final papers

SECTION THREE - Course Support

1. **Rationale for Course/Needs Assessment**
   This course meets a need created by two recent changes in the mathematics curriculum. Math G now carries an Intermediate Algebra prerequisite and is no longer suitable for the new mathematics competency requirement for an associate degree, which specifies a course with a Beginning Algebra prerequisite. This course is designed to provide an alternative to Intermediate Algebra for associate degree students who do not intend to take additional math classes. Instead of offering two sections per semester of Math G we anticipate one section of Math G and one of this new course Math CG.

2. **Discipline Area**
   (List all acceptable disciplines from state discipline list)
   Mathematics

3. **Resources Needed or Anticipated**
   Books, AV materials. the Internet, and software are already available in the college library. The Math Learning Center is an important resource.

4. **Plan for Evaluation of Course**
   In addition to Program Review, this course will be evaluated by:

   student surveys and department discussion. In addition the department will track student enrollment and completion annually as well as during Program Review.

SECTION FOUR - Transferability and Classification

1. **Request for Transferability**
   (Note: Applicable to Associate Degree Level courses only.)
   - **California State University (Baccalaureate level):**
     No

   - **University of California (To be submitted to U.C.):**
     No

2. **Classification of Course for Major and/or General Education**
   (Note: Necessary for Associate Degree courses only.)
   1. **Are you requesting that this course be added to the requirements for a major?**
      No

   2. **Are you requesting that this course satisfy a General Education requirement?**
      Yes
      Associate Degree General Education - A2 Language and Rationality - Analytical Thinking & Oral Communication

Curriculum Approval Date: 04/12/2010

CID: 2874