

## MERRITT COLLEGE COURSE OUTLINE

|                    |               |  |                  |
|--------------------|---------------|--|------------------|
| <b>COLLEGE:</b>    |               | <b>STATE APPROVAL DATE:</b>                | 12/05/2018       |
| <b>ORIGINATOR:</b> | Daniel Lawson | <b>STATE CONTROL NUMBER:</b>               | CCC00036<br>8761 |
|                    |               | <b>BOARD OF TRUSTEES APPROVAL DATE:</b>    | 11/13/2018       |
|                    |               | <b>CURRICULUM COMMITTEE APPROVAL DATE:</b> | 09/13/2018       |
|                    |               | <b>CURRENT EFFECTIVE DATE:</b>             | 08/01/2019       |

### DIVISION/DEPARTMENT:

#### 1. REQUESTED CREDIT CLASSIFICATION:

Credit - Degree Applicable  
Course is not a basic skills course.  
Program Applicable

#### 2. DEPT/COURSE NO:

MATH 002

#### 3. COURSE TITLE:

Precalculus with Analytic Geometry

#### 4. COURSE: MC Course Modification

**TOP NO.** 1701.00

#### 5. UNITS: 5.000

**HRS/WK LEC: 5.00 Total: 87.50**

**HRS/WK LAB:**

#### 6. NO. OF TIMES OFFERED AS SELETED TOPIC:      AVERAGE ENROLLMENT:

#### 7. JUSTIFICATION FOR COURSE:

Course provides a foundation for more advanced study in mathematics, and related fields, e.g. physics; meets AA/AS area 4b, CSU area B4, IGETC area 2 requirements and is transferable to CSU, UC systems. Course is required for Math major (from list).

#### 8. COURSE/CATALOG DESCRIPTION

Advanced algebra and analytic geometry: Linear, quadratic, polynomial, rational, exponential and logarithmic functions; inverse functions; determinants, matrices and linear systems; zeros of polynomials, arithmetic and geometric sequences, mathematical induction; permutations and combinations, binomial theorem; vectors, conic sections, translation and rotation of axes, polar coordinates, lines and surfaces in space, and quadric surfaces.

#### 9. OTHER CATALOG INFORMATION

- a. Modular: No    If yes, how many modules:
- b. Open entry/open exit: No
- c. Grading Policy: Letter Grade Only
- d. Eligible for credit by Exam: No
- e. Repeatable according to state guidelines: No
- f. Required for degree/certificate (specify):  
    Liberal Arts: IGETC, Liberal Arts: CSU GE-Breadth
- g. Meets GE/Transfer requirements (specify):
- h. C-ID Number: Expiration Date:

i. Are there prerequisites/corequisites/recommended preparation for this course? Yes

    Date of last prereq/coreq validation: 08/23/2018

j. Acceptable for Credit: CSU/UC

#### 10. LIST STUDENT PERFORMANCE OBJECTIVES (EXIT SKILLS): (Objectives must define the exit skills required of students and include criteria identified in Items 12, 14, and 15 - critical thinking, essay writing,

problem solving, written/verbal communications, computational skills, working with others, workplace needs, SCANS competencies, all aspects of the industry, etc.)(See SCANS/All Aspects of Industry Worksheet.)

Students will be able to:

1. Solve equations and word problems in the following content areas: a. Linear, polynomial, rational, exponential and logarithmic functions b. Inverse functions c. Determinants d. Matrices and linear systems e. Zeros of polynomials f. Arithmetic and geometric sequences g. Mathematical induction h. Permutations and combinations i. Binomial theorem j. Vectors k. Conic sections l. Translation and rotation of axes m. Polar coordinates n. Lines and surfaces in space o. Quadric surfaces
2. Simplify algebraic expressions and solve first and second degree algebraic equations.
3. Simplify trigonometric expressions and solve trigonometric equations.
4. Graph exponential and logarithmic functions and solve word problems in these areas.
5. Simplify and graph conic expressions and solve system of conic equations and word problems.
6. Assess given information, explore alternate approaches, and arrive at conclusions based on the evidence and the application of appropriate concepts.

**11A. COURSE CONTENT:** List major topics to be covered. This section must be more than listing chapter headings from a textbook. Outline the course content, including essential topics, major subdivisions, and supporting details. It should include enough information so that a faculty member from any institution will have a clear understanding of the material taught in the course and the approximate length of time devoted to each. There should be congruence among the catalog description, lecture and/or lab content, student performance objectives, and the student learning outcomes. List percent of time spent on each topic; ensure percentages total 100%.

**LECTURE CONTENT:**

- |   |     |
|---|-----|
| A. Basic Algebra                          | 10% |
| 1. Algebraic notation                     |     |
| 2. Integral exponents                     |     |
| 3. Roots and radicals                     |     |
| 4. Rational exponents                     |     |
| 5. Polynomials                            |     |
| 6. Polynomials in several variables       |     |
| 7. Factoring                              |     |
| 8. Rational expressions                   |     |
| B. Equations and Inequalities             | 10% |
| 1. Equations and inequalities             |     |
| 2. Linear equations                       |     |
| 3. Applications of linear equations       |     |
| 4. Quadratic equations                    |     |
| 5. The quadratic formula                  |     |
| 6. Other types of equations               |     |
| 7. Applications of non-linear equations   |     |
| 8. Order                                  |     |
| 9. Absolute value                         |     |
| 10. Inequalities                          |     |
| C. Functions and Graphs                   | 12% |
| 1. Coordinates in the plane               |     |
| 2. Functions                              |     |
| 3. Graphs and functions                   |     |
| 4. Construction of functions              |     |
| 5. Linear functions                       |     |
| 6. Quadratic functions                    |     |
| 7. Graphs of relations                    |     |
| D. Polynomial and Rational Functions      | 12% |
| 1. Graphs of linear equations             |     |
| 2. Tips on graphing                       |     |
| 3. Graphing of polynomials                |     |
| 4. Rational functions                     |     |
| 5. Graphs of rational functions           |     |
| 6. Completely factored rational functions |     |
| E. Exponential and Logarithm Functions    | 10% |

1. Exponential functions
2. Inverse functions
3. Logarithm functions
4. Computing logarithm functions
5. Applications
- F. Trigonometric Functions 6%
  1. Angles, sines, and cosines
  2. Right triangle and tangents
  3. Circular functions
  4. The tangent; graphing methods
  5. Cotangent, secant, and cosecant
  6. Periodic functions and further graphs
- G. Identities and Inverse Functions 6%
  1. Basic identities
  2. Proving identities
  3. The addition laws
  4. Further identities
  5. Inverse trigonometric functions
  6. Trigonometric functions
- H. Solving Triangles 6%
  1. Right triangles
  2. Applications
  3. Law of cosines
  4. Law of sines
  5. Applications
- I. Linear and Polynomial Algebra 6%
  1. Linear systems
  2. Matrices
  3. Matrix inverse
  4. Determinants
  5. Polynomial division
  6. Zeros and polynomials
  7. Partial fractions
- J. Discrete Algebra 6%
  1. Sequences
  2. Summation
  3. Mathematical induction
  4. Permutations induction
  5. The binomial theorem
- K. Vectors in the Plane 4%
  1. Vector algebra
  2. Lines and segments
  3. Length and inner product
  4. Normal form
- L. Plane Analytic Geometry 6%
  1. Translation and circles
  2. Tangents and loci
  3. Polar coordinates
  4. Polar graphs
  5. Conics: The parabola
  6. The ellipse
  7. The hyperbola
  8. Rotation of axes
- M. Solid Analytic Geometry 3%
  1. Coordinates and vectors
  2. Lines and planes
  3. Quadratic surfaces
- N. Complex Numbers 3%
  1. Complex arithmetic
  2. The complex plane
  3. Zeros of polynomials
  4. De Moivre's theorem

**11B. LAB CONTENT:**

n/a

**12. METHODS OF INSTRUCTION** (List methods used to present course content.)

1. Lecture
2. Other (Specify)

Other Methods:

Lecture introducing the major concepts, theory and applications. Class discussion to include question and answer sessions and skill demonstrations which emphasize alternative approaches and their underlying rationale.

**13. ASSIGNMENTS:** 0.00 hours/week (List all assignments, including library assignments. Requires two (2) hours of independent work outside of class for each unit/weekly lecture hour. Outside assignments are not required for lab-only courses, although they can be given.)

Out-of-class Assignments:

1. Assigned text readings. 2. Problem sets, bonus problems, corrections of tests. 3. Notebook (to be graded) with class notes and problems worked outside of class, which provides the background for tests and the final.

ASSIGNMENTS ARE: (See definition of college level):  
Primarily College Level

**14. STUDENT ASSESSMENT:** (Grades are based on):

COMPUTATION SKILLS

NON-COMPUTATIONAL PROBLEM SOLVING (Critical thinking should be demonstrated by solving unfamiliar problems via various strategies.)

SKILL DEMONSTRATION

MULTIPLE CHOICE

Why "ESSAY" is not checked:

**15. TEXTS, READINGS, AND MATERIALS**

A. Textbooks:

Michael Sullivan. 2016. *Precalculus* 10th. Prentice Hall

\*Date is required: Transfer institutions require current publication date(s) within 5 years of outline addition/update.

B. Additional Resources:

Library/LRC Materials and Services:

The instructor, in consultation with a librarian, has reviewed the materials and services of the College Library/LRC in the subject areas related to the proposed new course

Are print materials adequate? No

Are nonprint materials adequate? No

Are electronic/online resources available? No

Are services adequate? No

Specific materials and/or services needed have been identified and discussed. Librarian comments:

C. Readings listed in A and B above are: (See definition of college level):

Primarily college level

**16. DESIGNATE OCCUPATIONAL CODE:**

E - Non-Occupational

17. **LEVEL BELOW TRANSFER:**  
Y - Not Applicable
18. **CALIFORNIA CLASSIFICATION CODE:**  
Y - Credit Course
19. **NON CREDIT COURSE CATEGORY:**  
Y - Not Applicable
20. **FUNDING AGENCY CATEGORY:**  
Not Applicable - Not Applicable

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### SUPPLEMENTAL PAGE

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Use only if additional space is needed. (Type the item number which is to be continued, followed by "continued." Show the page number in the blank at the bottom of the page. If the item being continued is on page 2 of the outline, the first supplemental page will be "2a." If additional supplemental pages are required for page 2, they are to be numbered as 2b, 2c, etc.)

1a. Prerequisites/Corequisites/Recommended Preparation:

**PREREQUISITE:**

- MATH 050: Trigonometry

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### STUDENT LEARNING OUTCOMES

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1. **Outcome:** Evaluate functions at numerical values and at abstract values of linear, quadratic, exponential, and logarithmic functions.  
**Assessment:** Quizzes and/or tests Final comprehensive examination
2. **Outcome:** Express graphically the behavior of rational functions and polynomial functions.  
**Assessment:** Quizzes and/or tests Final comprehensive examination
3. **Outcome:** Solve the system of equations for application problems.  
**Assessment:** Quizzes and/or tests Final comprehensive examination
4. **Outcome:** Solve a triangle (right, acute, obtuse), given various angles and sides.  
**Assessment:** Quizzes and/or tests Final comprehensive examination
5. **Outcome:** Apply concepts of analytic geometry to solve application problems.  
**Assessment:** Quizzes and/or tests Final comprehensive examination
6. **Outcome:** Solve trigonometric equations.  
**Assessment:** Quizzes and/or tests Final comprehensive examination

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