

## 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>	CCC00037 1752
		<b>BOARD OF TRUSTEES APPROVAL DATE:</b>	11/13/2018
		<b>CURRICULUM COMMITTEE APPROVAL DATE:</b>	03/28/2018
		<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 001

#### 3. COURSE TITLE:

Pre-Calculus

#### 4. COURSE: MC Course Changes in Catalog Info

**TOP NO.** 1701.00

#### 5. UNITS: 4.000

**HRS/WK LEC:** 4.00 **Total:** 70.00

**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

Preparation for the calculus sequence or other courses requiring a sound algebraic background: Inequalities, theory of equations, sequences and series, matrices, functions and relations, logarithmic and exponential functions; function concept used as a unifying notion.

#### 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):

Mathematics

g. Meets GE/Transfer requirements (specify):

AA/AS area 4b CSU GE-Breadth area B4 IGETC area 2

h. C-ID Number: Expiration Date:

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

Date of last prereq/coreq validation: 12/11/2017

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. Conic sections
2. Simplify algebraic expressions and solve first and second degree algebraic equations.
3. Graph exponential and logarithmic functions and solve word problems in these areas.
4. 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 12%
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 12%
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 monomials
  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 12%
1. Exponential functions
  2. Inverse functions
  3. Logarithm functions
  4. Computing logarithm functions
  5. Applications

- F. Linear and Polynomial Algebra 12%
1. Linear systems
  2. Matrices
  3. Matrix inverse
  4. Determinants
  5. Polynomial division
  6. Zeros and polynomials
  7. Partial fractions
- G. Discrete Algebra 12%
1. Sequences
  2. Summation
  3. Mathematical induction
  4. Permutations induction
  5. The binomial theorem
- H. Vectors in the Plane 8%
1. Vector algebra
  2. Lines and segments
- I. Plane Analytic Geometry 8%
1. Translation and circles
  2. Tangents and loci
  3. Conics: The parabola
  4. The ellipse
  5. The hyperbola

**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 including problems equivalent in content and level of difficulty to those covered in the lectures. 3. Additional problems that introduce supplemental concepts and formulas; and require the synthesizing of various concepts.

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. Pearson Education  
Rationale: -

\*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 203: Intermediate Algebra
- or

**PREREQUISITE:**

- MATH 211D: Intermediate Algebra (Lab)
- or

**PREREQUISITE:**

- MATH 230: Elementary and Intermediate Algebra for Business or STEM majors

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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.

*This outcome maps to the following Institution Outcomes:*

- Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
- Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

**Assessment:** Quizzes, exams

2. **Outcome:** Solve inequalities

*This outcome maps to the following Institution Outcomes:*

- Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
- Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

**Assessment:** Quizzes, exams

3. **Outcome:** Express graphically the behavior of rational functions and polynomial functions

*This outcome maps to the following Institution Outcomes:*

- Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
- Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

**Assessment:** Quizzes, exams

4. **Outcome:** Solve linear, quadratic, exponential, and logarithmic equations

*This outcome maps to the following Institution Outcomes:*

- Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.
- Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.

**Assessment:** Quizzes, exams

5. **Outcome:** Solve exponential growth and decay problems

*This outcome maps to the following Institution Outcomes:*

- Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.
- Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.

**Assessment:** Quizzes, exams

6. **Outcome:** Solve polynomial, rational, exponential, logarithmic equations, and the system of equations for application problems

*This outcome maps to the following Institution Outcomes:*

- Quantitive Reasoning - Apply college-level mathematical reasoning to analyze and explain real world issues and to interpret and construct graphs, charts, and tables.
- Critical Thinking - Think critically using appropriate methods of reasoning to evaluate ideas and identify and investigate problems and to develop creative and practical solutions to issues that arise in workplaces, institutions, and local and global communities.

**Assessment:** Quizzes, exams

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