



COURSE OUTLINE OF RECORD

Number: MATH A170

TITLE: Precalculus

ORIGINATOR: Tab Livingston

EFF TERM: Spring 2014

FORMERLY KNOWN AS:

DATE OF

OUTLINE/REVIEW: 03-02-2016

CROSS LISTED COURSE:

TOP NO: 1701.00

CID:

SEMESTER UNITS: 4.0

HRS LEC: 90.0

HRS LAB: 0.0

HRS OTHER: 0.0

CONTACT HRS TOTAL: 90.0

STUDY/NON-CONTACT HRS RECOMMENDED: 126.0

CATALOG DESCRIPTION:

The course includes structure and properties of number systems; applications, solution and graphs of polynomials, rational, exponential, logarithmic and trigonometric functions; matrices; sequences and series; analytic geometry. Prepares students for Mathematics A180. May be taken for grades or on a pass-no pass basis. This course may also be offered online. Transfer Credit: CSU; UC.

JUSTIFICATION FOR COURSE:

Comparable to lower division UC and CSU courses

PREREQUISITES:

- MATH A070: Intermediate Algebra and Trigonometry with a minimum grade of C or better
or
- OCC Math Placement Level of 60 or higher.
- MATH A120: Trigonometry with a minimum grade of C or better
or
- OCC Math Placement Level of 70 or higher.
or
- qualifying OCC mathematics placement score. See mathematics assessment requirement.
- GWC Math Placement Level of 70 or higher.
or
- OCC Math Placement Level of 80 or higher.
or
- GWC Math Placement Level of 80 or higher.
or
- CCC Math Placement Level of 80 or higher.
or
- OCC Math Placement Level of 90 or higher.
or
- GWC Math Placement Level of 90 or higher.
or
- CCC Math Placement Level of 90 or higher.
or
- MATH A120: Trigonometry with a minimum grade of C or better
or
- MATH G120: Trigonometry with a minimum grade of C or better
or
- MATH C120: Trigonometry with a minimum grade of C or better
or
- MATH A070: Intermediate Algebra and Trigonometry with a minimum grade of C or better
or

MATH A170-Precalculus

- MATH A180: Calculus 1 with a minimum grade of C or better
or
- MATH A180H: Calculus 1 Honors with a minimum grade of C or better
or
- MATH G180: Calculus 1 with a minimum grade of C or better
or
- MATH C180: Calculus 1 with a minimum grade of C or better
or
- MATH A182H: Calculus 1 and 2 Honors with a minimum grade of C or better
or
- MATH A185: Calculus 2 with a minimum grade of C or better
or
- MATH A185H: Calculus 2 Honors with a minimum grade of C or better
or
- MATH G185: Calculus 2 with a minimum grade of C or better
or
- MATH C185: Calculus 2 with a minimum grade of C or better
or
- MATH A230: Introduction to Discrete Mathematics with a minimum grade of C or better
or
- MATH G235: Applied Linear Algebra with a minimum grade of C or better
or
- MATH A280: Calculus 3 with a minimum grade of C or better
or
- MATH A280H: Calculus 3 Honors with a minimum grade of C or better
or
- MATH G280: Calculus 3 with a minimum grade of C or better
or
- MATH C280: Calculus 3 with a minimum grade of C or better
or
- MATH A285: Introduction to Linear Algebra and Differential Equations with a minimum grade of C or better
or
- MATH G285: Introduction to Linear Algebra and Differential Equations with a minimum grade of C or better
or
- MATH C285: Introduction to Linear Algebra and Differential Equations with a minimum grade of P or better
or
- MATH A290H: Introduction to Tensors and Calculus on Manifolds Honors with a minimum grade of C or better
or

COREQUISITES:

ADVISORIES:

ASSIGNED DISCIPLINES:

Mathematics

MATERIAL FEE: Yes [] No [X] Amount: \$0.00

CREDIT STATUS: Noncredit [] Credit - Degree Applicable [X] Credit - Not Degree Applicable []

GRADING POLICY: Pass/No Pass [X] Standard Letter [X] Not Graded []

OPEN ENTRY/OPEN EXIT: Yes [] No [X]

TRANSFER STATUS: CSU Transferable[] UC/CSU Transferable[X] Not Transferable[]

BASIC SKILLS STATUS: Yes [] No [X]

LEVELS BELOW TRANSFER: Not Applicable

CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable

NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course

OCCUPATIONAL (SAM) CODE: E

REPEATABLE ACCORDING TO STATE GUIDELINES: No [X] Yes [] **NUMBER REPEATS:**

REQUIRED FOR DEGREE OR CERTIFICATE: No [X] Yes []

GE AND TRANSFER REQUIREMENTS MET:

IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

2A: Mathematic

CSU GE Area B: Scientific Inquiry and Quantitative Reasoning

B4 - Mathematics/Quantitative Thinking

OCC AA Gen Ed

AREA A2: LANGUAGE AND RATIONALITY - Communication and Analytical Thinking

OCC AS Gen Ed

AREA A2 – ENGLISH COMMUNICATION - Communication and Analytical Thinking

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Maximize and minimize quadratic, polynomial, and rational functions using appropriate strategies, generalized forms, and theorems.
2. Solve and graph elementary functions with a minimum of plotting points.

COURSE OBJECTIVES:

1. Graph a linear function, including intercepts and slope.
2. Graph a quadratic function and complete the square to find its vertex.
3. Factor and graph polynomials using the quadratic formula or synthetic division.
4. Solve quadratic inequalities possibly including absolute value.
5. Graph rational functions including asymptotes.
6. Graph exponential and logarithmic functions.
7. Solve exponential and logarithmic equations.
8. Define, use, and graph trigonometric and inverse trigonometric functions.
9. Solve triangles using right triangle trigonometry including the law of sines or the law of cosines.
10. Verify trigonometric identities.
11. Solve trigonometric equations.
12. Perform vector operations in rectangular and trigonometric form.
13. Solve systems of linear equations using elimination with or without matrices.
14. Use mathematical induction and the binomial theorem.
15. Perform algebra involving summation notation.
16. Find n th terms and finite and infinite sums of arithmetic and geometric sequences.
17. Graph conic sections in standard position and using translation.
18. Graph polar and parametric functions.
19. Translate applications into mathematical expressions and solve.

COURSE CONTENT:

LECTURE CONTENT:

It is imperative that instructors cover all topics in the outline in order to prepare the students for Math A180. Some topics are listed as optional. These topics are not part of the core material for the course and should be presented only if time permits and should not be discussed at the expense of a core topic. Applications should be included and discussed whenever possible. The math department encourages the instructor to incorporate the graphing calculator wherever it is appropriate.

- A. Brief Review of Algebra
 - 1. Simple equations, inequalities, algebraic expressions, and complex numbers
- B. Functions
 - 1. Definition
 - 2. Review basic graphing techniques and operations of linear and quadratic functions
 - 3. Operations and properties
 - 4. Inverse functions
- C. Polynomial Functions of Degree Greater than Two
 - 1. Theor of functions, including the Division Algorithm, Remainder Theorem, Factor Theorem, Fundamental Theorem of Algebra, and the Complete Factorization Theorem
 - 2. Analysis of real and imaginary zeros for a polynomial function
 - 3. **Optional: Descarte's Rule of Signs and the theorems for bounds of real zeros
 - 4. **Optional: Synthetic division
 - 5. Graphs of polynomial functions of higher degree
- D. Rational Functions
 - 1. Analysis and graphs of rational functions, including horizontal, vertical, and slant asymptotes
- E. Logarithmic and Exponential Functions
 - 1. Definitions and properties
 - 2. Graphs of logarithmic and exponential functions
 - 3. Solving equations containing logarithmic or exponential expressions
- F. Trigonometric Functions
 - 1. Review of angle measurement, right angle trigonometry
 - 2. Unit circle and definition of trig functions of real numbers
 - 3. Graphs of sine, cosine, and tangent functions with period changes, phase shifts, and vertical shifts
 - 4. Basic graphs of secant, cosecant, and cotangent functions without period changes, phase shifts, and vertical shifts
 - 5. Trigonometric identifies, including sum and difference, double-angle, and half-angle formulas
 - 6. **Optional: Product-to-sum and sum-to-product identities
- G. Application of Trig Functions
 - 1. Solving equations containing trig functions
 - 2. Right triangle trig applications
 - 3. Oblique triangle applications using the law of sines and the law of cosines
 - 4. *Note: The ambiguous case of the law of sines should be treated lightly
 - 5. **Optional: Trigonometric form of complex numbers
 - 6. **Optional: DeMoivre's Theorem and Nth roots of complex numbers
 - 7. Vectors, vector operations, and the dot product of vectors
 - 8. Polar coordinates and graphs of polar functions
 - 9. **Optional: Harmonic motion
- H. Systems of Equations
 - 1. Gauss-Jordan elimination using equations
 - 2. Gauss-Jordan elimination using augmented matrices and the elementary row operations
 - 3. Determinants and properties of determinants
 - 4. Cramer's rule
 - 5. Non-linear systems of equations
 - 6. Addition, multiplication, and inverses of matrices
 - 7. Properties of matrices
 - 8. Using the matrix inverse method to solve 2 by 2 or 3 by 3 linear systems of equations

9. **Optional: Systems of inequalities and linear programming
 10. **Optional: Partial fractions decompositions
- I. Conic Sections
1. Definition, analysis and graphs of circles, parabolas, ellipses, and hyperbolas in Cartesian form
 2. **Optional: Rotation of axes
 3. Graphs of parametric equations
 4. **Optional: Polar equations of conics
- J. Sequences, Series, and Probability
1. Definition and analysis of sequences, including arithmetic and geometric
 2. Definition and analysis of series, including arithmetic and geometric
 3. Mathematical induction
 4. Binomial theorem
 5. **Note: Permutations, combinations, and probability are not discussed in this course

LABORATORY CONTENT:

METHODS OF INSTRUCTION:

- A. Lecture:
- B. Online:
- C. Independent Study:

INSTRUCTIONAL TECHNIQUES:

Lecture, discussion, written homework

COURSE ASSIGNMENTS:

Out-of-class Assignments

Assigned written homework, problem solving exercises. 6 hour

Writing Assignments

Writing is encouraged throughout the course but is not necessarily a part of the grading or exams. 1 hour

Reading Assignments

Assigned from textbook. 1 hour

METHODS OF STUDENT EVALUATION:

Final Exam
Written Assignments
Objective Examinations
Problem Solving Exercises

Demonstration of Critical Thinking:

Several written tests and a comprehensive final

Required Writing, Problem Solving, Skills Demonstration:

Writing is encouraged throughout the course but is not necessarily a part of the grading or exams.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

1. Swokowski, Earl. *Precalculus Functions and Graphs*, ed. New York: Cengage Learning publishers., 2007

LIBRARY:

Adequate library resources include: Print Materials

Non-Print Materials

Online Materials

Services

Comments:

Attachments:

[Attached Files](#)