Official Course Outline
MAC 1140
Precalculus Algebra

General Course Information

Common Course Number: MAC1140

Course Title: Precalculus Algebra

Prerequisite(s): Minimum grade of C in MAC 1105 or appropriate score on an approved assessment

Contact Hour Breakdown: **CR** 3 **CLASS** 3 **LAB** 0

Discipline: Mathematics

Catalog Description: Prerequisite: Algebra preparation for the calculus sequence. Topics include a symbolical, graphical, and numerical analysis of polynomials, exponential, logarithmic, power, and rational functions; matrices, sequences, induction, binomial theorem and conic sections. Applications emphasizing connections with other disciplines and with the real world will be included. Technology tools will be utilized in addition to analytical methods. Gordon Rule course. Minimum grade of C required if MAC 1140 is used to satisfy Gordon Rule and general education requirements. Credit not given for both MAC 1140 and MAC 1132 nor for MAC 1140 and MAC 1142 nor for MAC 1140 and MAC 1147.

Major Topics/ Concepts/ Skills/ Issues

- POLYNOMIAL, RATIONAL, AND OTHER ALGEBRAIC FUNCTIONS, THEIR PROPERTIES AND GRAPHS
- POLYNOMIAL AND RATIONAL INEQUALITIES

- EXPONENTIAL AND LOGARITHMIC FUNCTIONS, THEIR PROPERTIES AND GRAPHS
- PIECEWISE DEFINED FUNCTIONS
- CONIC SECTIONS
- MATRICES AND DETERMINANTS
- SEQUENCES AND SERIES
- MATHEMATICAL INDUCTION
- BINOMIAL THEOREM
- APPLICATIONS

Major Learning Outcomes with Evidence, Core Competencies and Indicators

Learning Outcome 1:

Develop and solve linear and non-linear systems of equations that model real-world applications, and use matrices to solve systems of equations.

Corresponding Evidence of Learning

- Solve systems of equations using different methods (elimination, substitution, matrices, & technology)
- Find the determinant of a matrix and utilize Cramer's Rule to solve systems of equation.
- Perform matrix operations.

Core Competency: Communicate

Indicators	Level of Integration	Method of Assessment
• employ methods of communication appropriate to your audience and purpose	• Instruct • Practice	

Core Competency: Think

Indicators	Level of Integration	Method of Assessment
• employ the facts, formulas, procedures of the discipline	• Instruct • Practice • Assess	• Knowledge recall quiz • Locally developed exam/objective • Locally developed multiple choice exam • Problem-solving quiz • Project • Instructor may choose one of the above assessments, or use one of their own.

Core Competency: Act

Indicators	Level of Integration	Method of Assessment

• implement effective problem-solving, decision-making, and goal-setting strategies	• Instruct • Practice	

Core Competency: Think

Indicators	Level of Integration	Method of Assessment
• draw well-supported conclusions	• Instruct • Practice	

Learning Outcome 2:

Recognize, algebraically and graphically, the major conic sections (parabolas, circles, ellipses, and hyperbolas).

Corresponding Evidence of Learning

- Given the equation, recognize the particular conic and its orientation (vertical or horizontal)
- Recognize standard form vs. general form of the equation of a circle and be able to find the center and the radius and generate a graph of the circle
- Recognize the equation of an ellipse and be able to find endpoints of the major/minor axes and the foci and then graph the ellipse
- Recognize the equation of a hyperbola and be able to utilize asymptotes to graph the hyperbola

Core Competency: Communicate

Indicators	Level of Integration	Method of Assessment
• employ methods of communication appropriate to your audience and purpose	• Instruct • Practice	

Core Competency: Think

Indicators	Level of Integration	Method of Assessment
• analyze data, ideas, patterns, principles, perspectives	• Instruct • Practice	
• employ the facts, formulas, procedures of the discipline	• Instruct • Practice • Assess	• Knowledge recall quiz • Locally developed exam/objective • Locally developed multiple choice exam • Problem-solving quiz • Project • Instructor may choose one of the above assessments, or use one of their own.

Core Competency: Act		
Indicators	**Level of Integration**	**Method of Assessment**
• implement effective problem-solving, decision-making, and goal-setting strategies	• Instruct • Practice	
Core Competency: Think		
Indicators	**Level of Integration**	**Method of Assessment**
• draw well-supported conclusions	• Instruct • Practice	

Learning Outcome 3:

Recognize patterns that lead to sequences.		
Corresponding Evidence of Learning		
• Use summation notation to represent a series • Be able to recognize arithmetic vs. geometric sequences and find the common difference vs. the common ratio • Be able to find the nth term of an arithmetic/geometric sequence • Be able to find the sum of the 1st n terms of an arithmetic/geometric sequence		
Core Competency: Act		
Indicators	**Level of Integration**	**Method of Assessment**
• implement effective problem-solving, decision-making, and goal-setting strategies	• Instruct • Practice	
Core Competency: Communicate		
Indicators	**Level of Integration**	**Method of Assessment**
• employ methods of communication appropriate to your audience and purpose	• Instruct • Practice	
Core Competency: Think		
Indicators	**Level of Integration**	**Method of Assessment**

• employ the facts, formulas, procedures of the discipline	• Instruct • Practice • Assess	• Knowledge recall quiz • Locally developed exam/objective • Locally developed multiple choice exam • Problem-solving quiz • Project • Instructor may choose one of the above assessments, or use one of their own.

Learning Outcome 4:

Expand a binomial using the Binomial Theorem.		
Corresponding Evidence of Learning		
• Recognize situations where the Binomial Theorem can be utilized & use it to expand binomials raised to positive integer exponents		
Core Competency: Think		
Indicators	**Level of Integration**	**Method of Assessment**
• employ the facts, formulas, procedures of the discipline	• Instruct • Practice • Assess	• Knowledge recall quiz • Locally developed exam/objective • Locally developed multiple choice exam • Problem-solving quiz • Project • Instructor may choose one of the above assessments, or use one of their own.
Core Competency: Communicate		
Indicators	**Level of Integration**	**Method of Assessment**
• employ methods of communication appropriate to your audience and purpose	• Instruct • Practice	
Core Competency: Act		
Indicators	**Level of Integration**	**Method of Assessment**
• implement effective problem-solving, decision-making, and goal-setting strategies	• Instruct • Practice	

Learning Outcome 5:

Formulate a proof using the technique of mathematical induction.

Corresponding Evidence of Learning

- Recognize situations in which the method of mathematical induction can be utilized
- Use the method of mathematical induction to prove a general mathematical statement

Core Competency: Act

Indicators	Level of Integration	Method of Assessment
• implement effective problem-solving, decision-making, and goal-setting strategies	• Instruct • Practice	

Core Competency: Communicate

Indicators	Level of Integration	Method of Assessment
• employ methods of communication appropriate to your audience and purpose	• Instruct • Practice	

Core Competency: Think

Indicators	Level of Integration	Method of Assessment
• employ the facts, formulas, procedures of the discipline	• Instruct • Practice • Assess	• Knowledge recall quiz • Locally developed exam/objective • Locally developed multiple choice exam • Problem-solving quiz • Project • Instructor may choose one of the above assessments, or use one of their own.

Learning Outcome 6:

Student will solve equations and applications involving Polynomial, Rational, Exponential/Logarithmic, & Other Algebraic Functions.

Corresponding Evidence of Learning

- Finding rational zeros and graphing polynomial functions, finding asymptotes and graphing rational functions, graphing piecewise-defined functions, and solving polynomial & rational inequalities
- Applications of Exponential/Logarithmic functions (radioactive half-life, carbon dating, etc.)

Core Competency: Act		
Indicators	**Level of Integration**	**Method of Assessment**
• implement effective problem-solving, decision-making, and goal-setting strategies	• Instruct • Practice	
Core Competency: Think		
Indicators	**Level of Integration**	**Method of Assessment**
• employ the facts, formulas, procedures of the discipline	• Instruct • Practice • Assess	• Knowledge recall quiz • Locally developed exam/objective • Locally developed multiple choice exam • Problem-solving quiz • Project • Instructor may choose one of the above assessments, or use one of their own.
• analyze data, ideas, patterns, principles, perspectives	• Instruct • Practice	
Core Competency: Communicate		
Indicators	**Level of Integration**	**Method of Assessment**
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