

## Administrative Master Syllabus

### Course Information

<b>Course Title</b>	Pre-Calculus
<b>Course Prefix, Num. and Title</b>	MATH 2412
<b>Division</b>	Math & Physical Sciences
<b>Department</b>	Mathematics
<b>Course Type</b>	Academic WCJC Core Course
<b>Course Catalog Description</b>	In-depth combined study of algebra, trigonometry, and other topics for calculus readiness.
<b>Pre-Requisites</b>	MATH 1314; or Division Chair approval
<b>Co-Requisites</b>	None

### Semester Credit Hours

<b>Total Semester Credit Hours (SCH): Lecture Hours:</b>	4:4:0
<b>Lab/Other Hours</b>	
<b>Equated Pay Hours</b>	4
<b>Lab/Other Hours Breakdown: Lab Hours</b>	0
<b>Lab/Other Hours Breakdown: Clinical Hours</b>	0
<b>Lab/Other Hours Breakdown: Practicum Hours</b>	0
<b>Other Hours Breakdown</b>	0

### Approval Signatures

Title	Signature	Date
<b>Department Head:</b>		
<b>Division Chair:</b>		5-22-2024
<b>VPI:</b>		

## Additional Course Information

**Topical Outline:** Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

### Unit 1: Functions

Section 2.1 - Functions

Section 2.2 – Graphs of Functions

Section 2.3 – Getting Information From the Graph of a Functions

Section 2.4 – Average Rate of Change of a Function

Section 2.5 – Linear Functions and Models

Section 2.6 – Transformations of Functions

Section 2.7 – Combining Functions

Section 2.8 – One-to-One Functions and Their Inverses

### Unit 2: Polynomial and Rational Functions

Section 3.1 – Quadratic Functions and Models

Section 3.2 – Polynomial Functions and Their Graphs

Section 3.3 – Dividing Polynomials

Section 3.4 – Real Zeros of Polynomials

Section 3.5 – Complex Zeros and the Fundamental Theorem of Algebra

Section 3.6 – Rational Functions

Section 3.7 – Polynomial and Rational Inequalities

### Unit 3: Exponential and Logarithmic Functions

Section 4.1 – Exponential Functions

Section 4.2 – The Natural Exponential Function

Section 4.3 – Logarithmic Functions

Section 4.4 – Laws of Logarithms

Section 4.5 – Exponential and Logarithmic Equations

Section 4.6 – Modeling with Exponential Functions

### Unit 4: Trigonometric Functions: Unit Circle Approach and Right Triangle Approach

Section 5.1 – The Unit Circle

Section 5.2 – Trigonometric Functions of Real Numbers

Section 5.3 – Trigonometric Graphs

Section 5.4 – More Trigonometric Graphs

Section 5.5 – Inverse Trigonometric Functions and Their Graphs

Section 6.1 – Angle Measure

Section 6.2 – Trigonometry of Right Triangles

Section 6.3 – Trigonometric Functions of Angles

Section 6.4 – Inverse Trigonometric Functions and Right Triangles

Section 6.5 – The Law of Sines

Section 6.6 – The Law of Cosines

### Unit 5: Analytic Trigonometry; Polar Coordinates and Parametric Equations

Section 7.1 – Trigonometric Identities

Section 7.2 – Addition and Subtraction Formulas

Section 7.3 – Double-Angle, Half-Angle, and Product-Sum Formulas

Section 7.4 – Basic Trigonometric Equations  
Section 7.5 – More Trigonometric Equations  
Section 8.1 – Polar Coordinates  
Section 8.2 – Graphs of Polar Equations  
Section 8.4 – Plane Curves and Parametric Equations

### **Course Learning Outcomes:**

**Learning Outcomes – Upon successful completion of this course, students will:**

1. Demonstrate and apply knowledge of properties of functions.
2. Recognize and apply algebraic and transcendental functions and solve related equations.
3. Apply graphing techniques to algebraic and transcendental functions.
4. Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians.
5. Prove trigonometric identities.
6. Solve right and oblique triangles.

### **Methods of Assessment:**

Final Exam (Required)

Other Methods of Assessment:

- Hour Exams
- Homework
- Quizzes
- Short Answer
- Discussion Board
- Participation
- Projects

### **Required text(s), optional text(s) and/or materials to be supplied by the student:**

“Precalculus: Mathematics for Calculus” by Stewart; 7<sup>th</sup> edition; Cengage

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

### **Suggested Course Maximum:**

35

### **List any specific or physical requirements beyond a typical classroom required to teach the course.**

None

**Course Requirements/Grading System:** Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

- A. Final Exam 15-30%
- B. Other Course Requirements 70-85%

A = 90-100  
B = 80-89  
C = 70-79  
D = 60-69  
F = 59 or below

### **Curriculum Checklist:**

- Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.
- Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms
  - Critical Thinking
  - Communication
  - Empirical & Quantitative Skills
  - Teamwork
  - Social Responsibility
  - Personal Responsibility
- WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist

### Core Curriculum Review Form

**Foundational Component Area:** Core 020: Mathematics

**Course Prefix & Suffix:** MATH 2412 Pre-Calculus

**Core Objective:**

**Critical Thinking Skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

**Student Learning Outcome Supporting Core Objective:**

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Recognize and apply algebraic and transcendental functions and solve related equations. (SLO #2)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. A brief paragraph will be included explaining what was done.	A quiz, test, or discussion board artifact showing the student's written work. Grading for correctness and the rubric for critical thinking will assess this.
Choose a SLO status.	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.
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### Core Curriculum Review Form

**Foundational Component Area:** Core 020: Mathematics

**Course Prefix & Suffix:** MATH 2412 Pre-Calculus

**Core Objective:**

**Communication Skills**—to include effective development, interpretation and expression of ideas through written, oral and visual communication

**Student Learning Outcome Supporting Core Objective:**

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Recognize and apply algebraic and transcendental functions and solve related equations. (SLO #2)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. A brief paragraph will be included explaining what was done.	A quiz, test, or discussion board artifact showing the student’s written work. Grading for correctness and the rubric for critical thinking will assess this.
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### Core Curriculum Review Form

**Foundational Component Area:** Core 020: Mathematics

**Course Prefix & Suffix:** MATH 2412 Pre-Calculus

**Core Objective:**

**Empirical and Quantitative Skills**—to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

**Student Learning Outcome Supporting Core Objective:**

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Recognize and apply algebraic and transcendental functions and solve related equations. (SLO #2)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. A brief paragraph will be included explaining what was done.	A quiz, test, or discussion board artifact showing the student’s written work. Grading for correctness and the rubric for critical thinking will assess this.
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