



Purpose: It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of Wharton County Junior College, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction.

Course Title – Pre-Calculus Math

Course Prefix and Number – MATH 2312

Department - MATH

Division – Math and Science

Course Type: (check one)

- Academic General Education Course (from ACGM – but not in WCJC Core)
- Academic WCJC Core Course
- WECM course (This course is a Special Topics or Unique Needs Course: Y or N)

Semester Credit Hours # : Lecture hours # : Lab/Other Hours # **3:3:0**

Equated Pay hours for course - 3

Course Catalog Description - In-depth combined study of algebra, trigonometry, and other topics for calculus readiness.

Prerequisites/Co-requisites – MATH 1316 or four years of high school math including trigonometry or Pre-Calculus; or consent of department head.

Type: ACAD

List Lab/ Other Hours
Lab Hours
Clinical Hours
Practicum Hours
Other (list)

Prepared by Dale Neaderhouser

Date 8-24-13

Reviewed by Department Head Dale Neaderhouser

Date 8-24-13

Accuracy verified by Division Chair Kevin Dees

Date 8-24-13

Approved by Dean or Vice President of Instruction *gg hunt*

Date 8-24-13



I. 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):

- A. Review of Basic Algebra
 - 1. The real numbers
 - 2. Exponents and radicals
 - 3. Algebraic expressions
 - 4. Linear and absolute value equations
 - 5. Complex numbers
 - 6. Quadratic equations and equations with radicals
 - 7. Inequalities

- B. Functions and Graphs
 - 1. A two-dimensional coordinate system
 - 2. Functions
 - 3. Symmetry and translations
 - 4. Graphing techniques
 - 5. Algebra of functions
 - 6. Inverse functions
 - 7. Variation

- C. Polynomial and Rational Functions
 - 1. Linear functions
 - 2. Equations of a line
 - 3. Quadratic functions
 - 4. Polynomial functions
 - 5. Polynomial division
 - 6. Complex zeros of polynomials
 - 7. Rational zeros of polynomials
 - 8. Approximate zeros of polynomials
 - 9. Rational functions

- D. Exponential and Logarithmic Functions
 - 1. Exponential functions
 - 2. Logarithmic functions
 - 3. Evaluating logarithms
 - 4. Exponential and logarithmic equations
 - 5. Exponential growth and decay

- E. Trigonometric Functions
 - 1. Trigonometric functions
 - 2. Trigonometric functions of angles
 - 3. Values of trigonometric functions
 - 4. Graphs of Sine and Cosine functions
 - 5. Graphs of the other trigonometric functions
 - 6. Inverse trigonometric functions

- F. Analytic Trigonometry
 - 1. Fundamental identities
 - 2. Sum and difference identities
 - 3. Multiple-angle identities
 - 4. Sum and product identities
 - 5. Trigonometric equations

- G. Additional Applications of Trigonometry
 - 1. Right triangle applications
 - 2. Oblique triangles and the law of sines
 - 3. The law of cosines
 - 4. Sum and product identities
 - 5. Trigonometric equations

- H. Systems of Equations and Inequalities
 - 1. Linear systems of equations
 - 2. Matrix solution of linear systems of equations
 - 3. Properties of matrices
 - 4. Matrix inverses
 - 5. Determinants
 - 6. Cramer's rule
 - 7. Nonlinear systems of equations
 - 8. Systems of Inequalities
 - 9. Partial fractions

- I. Further Topics in Algebra
 - 1. Mathematical induction
 - 2. The binomial theorem
 - 3. Arithmetic sequences
 - 4. Geometric sequences
 - 5. Series

- J. Analytic Geometry
 - 1. Parabolas
 - 2. Ellipses and Hyperbola
 - 3. Conic sections
 - 4. Rotation of axes
 - 5. Polar equations
 - 6. Parametric equations

II. Course Learning Outcomes

Learning Outcomes	Assessment Methods
<p>Upon successful completion of this course, students will:</p> <ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. <u>Hour exam and final.</u> 2. <u>Hour exam and final.</u> 3. <u>Hour exam and final.</u> 4. <u>Hour exam and final.</u> 5. <u>Hour exam and final.</u> 6. <u>Hour exam and final.</u> <p>Outcomes assessed by:</p> <p>Hour exams Final Short Answer Discussion Board</p>

5. Prove trigonometric identities. 6. Solve right and oblique triangles.	
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III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.

Pre-Calculus, 4th edition 2009; Lial et al, Pearson Addison-Wesley Publishers (required)
Calculator (instructor's option)

IV. Suggested Course Maximum - 35

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

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.

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

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|--|--------|
| A. Comprehensive Department Final | 20-25% |
| b. Remainder of work (Unit tests, class participation) | 75-80% |
- Or grading as specified by the instructor

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

VII. Curriculum Checklist

- **Academic General Education Course** (from ACGM – but not in WCJC Core)
No additional documentation needed

- **Academic WCJC Core Course**
Attach the Core Curriculum Review Forms
- Critical Thinking
 - Communication
 - Empirical & Quantitative Skills
 - Teamwork
 - Social Responsibility
 - Personal Responsibility

- **WECM Courses**
If needed, revise the Program SCANS Matrix & Competencies Checklist.



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 2312

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
The SLO is:	Insert SLO (from Administrative Master Syllabi (AMS)) below	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:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Recognize and apply algebraic and transcendental functions and solve related equations. (AMS SLO #2)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. Including a brief paragraph explaining what was done.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Prove trigonometric identities. (AMS SLO #5)	A written paragraph explaining the steps one takes to prove an identity using the identities proved in class.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Apply graphing techniques to algebraic and transcendental functions. (AMS SLO #3)	Have the student grade an incorrect problem. The student should write a brief paragraph stating what was done incorrectly and what must be done to correct the solution.	A quiz, test or scanned artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: **Math 2312**

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
The SLO is:	Insert SLO (from Administrative Master Syllabi (AMS)) below	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:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Recognize and apply algebraic and transcendental functions and solve related equations. (AMS SLO #2)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. Including a brief paragraph explaining what was done.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Prove trigonometric identities. (AMS SLO #5)	A written paragraph explaining the steps one takes to prove an identity using the identities proved in class.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Apply graphing techniques to algebraic and transcendental functions. (AMS SLO #3)	Have the student grade an incorrect problem. The student should write a brief paragraph stating what was done incorrectly and what must be done to correct the solution.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.

Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 2312

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
The SLO is:	Insert SLO (from Administrative Master Syllabi (AMS)) below	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:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians. (AMS SLO #4)	A problem where the student computes the six trigonometric function for angles that are multiples of 30, 45, and 60 degrees (alternately in radians) in all quadrants of the unit circle.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Apply graphing techniques to algebraic and transcendental functions. (AMS SLO #3)	A problem where the student sketches $y = A + Bf(C(x-h))$ where $f(x)$ is a transcendental function and the constants represent shifts, scaling and reflection. Labeling is critical to show position, scale and period if applicable.	A quiz, test or scanned artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Solve right and oblique triangles. (AMS SLO #6)	A problem where the student solves a triangle using the law of sines or law of cosines. The student should show all steps.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.