

University of Houston-Clear Lake
Department of Mathematics and Statistics

Syllabus: MATH 2412.02

Course Name: Pre-Calculus Mathematics

Credit Hours: 4

Class Location: Bayou B1215

Class Meeting Time: M, T, W, Th 12:00-12:50

WebAssign Class Key: uhcl 7406 3045

Instructor:

Office Location:

Office Hours:

Email:

Phone Number:

Travis L Knodel, M.S.

B 3521-16

M-Th 9:00-9:50a, 11:00-11:50a

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281-283-3722

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

Course Prerequisite: MATH 1314 with a C- or better or meet requirement in UHCL Mathematics Department Placement and Testing policy.

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

Demonstrate and apply knowledge of properties of functions.

Recognize and apply algebraic and transcendental functions and solve related equations.

Apply graphing techniques to algebraic and transcendental functions.

Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians.

Prove trigonometric identities.

Solve right and oblique triangles.



Information Regarding the Applied Critical Thinking Aspect of This Course as Endorsed by the UHCL Quality Enhancement Plan

Applied Critical Thinking Statement:

This course has been authorized by UHCL as an Applied Critical Thinking (ACT) Course, which means in addition to learning specific course content, students will engage with some or all of the *Elements of Thought* and *Universal Intellectual Standards* of critical thinking. The objective of an ACT course is to develop the student's ability to become skilled at analysis and evaluation by applying a set of intellectual tools that may be effectively used across all disciplines (as well as to the student's personal life). Based on the Foundation for Critical Thinking (<http://www.criticalthinking.org/>), critical thinking involves thinking for a *purpose*, asking *questions*, using *information*, applying *concepts*, drawing *inferences and conclusions*, identifying *assumptions*, anticipating *implications and consequences*, and recognizing different *points of view*. The *Universal Intellectual Standards* are applied to *Elements of Thought* in order to develop *Intellectual Traits* including *clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness*.

Course Description and how Critical Thinking is Present:

In Math 2412 (Pre-Calculus Mathematics), the student will benefit most from applying their critical thinking towards analyzing and making connections. They will do this by emphasizing the understanding of relevant theorems and definitions, reflecting and acting upon those results to become a better problem solver in

preparation for the Engineering Calculus sequence and higher Mathematics. The students daily work will improve because of the student's desire and requirement to comprehend, analyze, and communicated Mathematics.

By actively participating in this course, the student will benefit professionally by developing the fundamental skills sets common to the STEM related industry. This includes but is not limited to analytic and strategic thinking, teamwork and collaboration through clear communication, problem solving skills in reflective and creative ways that consider all aspects of quantitative theory, critical thinking, and practice that are desired in the highly marketable STEM related fields.

Applied Critical Thinking Course Student Learning Outcomes (SLOs):

1. The student will be able to *clearly relate precise information* and **concepts** involving common functions that are commonly encountered in an Engineering Calculus/Higher Mathematics course sequence. The student will begin to make connections to their study of Pre-Calculus Mathematics to higher Mathematics and fields outside of Mathematics such as Natural Sciences, Social Sciences, etc.
2. The student will develop the ability to communicate Mathematics *applying precise concepts* developed in class through *logical interpretation*.
3. The student will develop the curiosity that is necessary to students as they become professionals in the Engineering Sciences. The student will be able to apply *significant* and *relevant conclusions* to their course of study and will develop an ability to work problems with *confidence in reason, intellectual autonomy, and perseverance*.

Major Activities that Promote or Require Critical Thinking and How They Link Back to the Student Learning Outcomes:

1. WebAssign - The student will submit weekly homework through the WebAssign homework submission website (www.webassign.net). The homework helps students tie **concepts, information, definitions, and theorems** together with algebraic and mathematics **properties** they already know. Since assignments are submitted to a computer, the solutions presented must be communicated clearly and precisely. (SLO #1)
2. Quizzes in Small Groups – The student will participate in weekly in class quizzes completed in small groups/pairs. The problems presented will require students to connect multiple **concepts** together to create *logical interpretation* (SLO #2) out of the curiosity developed from the course material. The quizzes will require students to *clearly* justify thinking to peer students and the instructor through *clear* verbal and written communication. The quizzes encourage students to make connections with classmates by working on these quizzes on a weekly basis.
3. Testing/Exams – The student will submit four in class exams that emphasize the *relevant conclusions interpretations* (SLO #3) of material covered in recent weeks. The exams will require students to be able to identify and connect fundamental concepts and present these ideas through *clear, precise, and logical* written communication.

Critical Thinking Activities and Assessment

Critical thinking activities are integrated in the course. Lectures will include examples to highlight the critical thinking elements, standards, and application. Homework (WebAssign), Quizzes in small groups, and tests contain Active Critical Thinking components.

The student will demonstrate active critical thinking in two assignments to assess how well critical thinking is incorporated into the class. These assessments will be used as input to the UHCL Critical Thinking database for internal assessment of Critical Thinking and beyond the grade attached to the overall assignment, will NOT affect your grade for the course.

1. **Modeling Sinusoidal Motion through Applications (Q3.3)** – Students will construct a graph, model, and function that describe the tidal waves of a nearby beach. The assignment requires the student to make *clear connections* between provided **data** and asks the student to **interpret information** and use **concepts** to provide a **purpose** to the study of Trigonometric functions. The student will *clearly* and *accurately* use the **information** to provide **relevance** to the study of Trigonometric functions to related fields of science.
2. **A Critical Thinking Component to the Final Exam** – Students will answer questions on the final exam that tie multiple concepts together. The questions will ask students to demonstrate the *breadth* of their **experiences** in the course to solve a **problem** with **multiple concepts**. The student will demonstrate a *logical* and *accurate* **solution** to the critical thinking problems given on the exam by making *connections* to various **concepts** covered in the course.

The course assesses connections out of the four C's. The related Student Learning Outcome (SLO) are as follows:

ACT Assessment Activity	ACT SLO
Quiz 3.3	1, 2, 3
Final Exam Critical Thinking Component	1, 2, 3

The assessment criteria for the assessment activities will be as follows:

ACT Assessment Activity	Assessment Outcome		
	Unacceptable	Acceptable	Excellent
Quiz 3.3	0-69%	70-89%	90-100%
Final Exam CT Component	0-69%	70-89%	90-100%

One Primary Focus: Connections

All four C's are addressed in this course, but the primary focus in this course will be making connections.

Course Materials: The instructor will refer to and requires the following course materials:

Textbook: *Precalculus: Mathematics for Calculus*. Stewart, Redlin and Watson, 7th Edition, Published by Cengage, ISBN: 978-1-305-07175-9.

Calculator: A TI-83/84 is required for this course. The instructor recommends and will frequently use a TI-83/84 in class to demonstrate lecture material. It is recommended that the student bring the calculator to class daily. Unless otherwise directed, calculators are not allowed on quizzes, tests, or the final exam. TI-86/89/92, etc. are not allowed under any circumstance and are oftentimes incompatible with the programs and methods that the instructor and other students will employ on the TI-83/84 calculator.

Course Packet: A copy of the lecture notes will be posted on BlackBoard and available for purchase at the UHCL Copy Center (B2403). It is recommended that the student bring a copy of these notes to class for daily lectures.

Course Assignments: Homework, quizzes, tests, and a comprehensive final exam are assigned in this class. Each of these assignments has a specific goal in the learning process.

Homework: Homework is the foundation of a student’s success in every math course. Daily homework is assigned and graded through WebAssign (<https://webassign.com>). Additional prescribed homework problems will be posted on BlackBoard to supplement student learning.

Quizzes: Weekly in class quizzes emphasize writing mathematics in a clear and concise manner. At least two quiz grades will be dropped to allow a reasonable accommodation for bad grade(s) and/or the event of absence. There are no “makeup” quizzes. Quiz solutions are posted on BlackBoard to allow for student study.

Tests: Tests are similar to homework and quizzes and focus on mastery of relevant course content. Test dates are given a week in advance to allow for preparation.

Final Examination: The final exam for this course is a comprehensive test covering the student learning outcomes for this class. The purpose of the test is to give the student and instructor a general view of student mastery of course material.

Makeup Policy on Assignments: Under the discretion of the instructor, there are generally no “makeup” homework and quizzes. If there exists a situation where the student is found to have a legitimate excuse for being absent to a test date, arrangements will be dealt with on a student-by-student basis. Students who plan on being absent to a test should contact the instructor as soon as possible to schedule an alternative time for testing. Students that fail to contact the instructor within 12 hours of a scheduled testing time or who do not take a test within one week of the scheduled date will be subject to an automatic “0.” Contact with the instructor of this course does not mean the student has been excused from a test date. Arrangements for missed tests are not final until the student presents reasonable documentation for absence. It is the student’s responsibility to follow through with test absence arrangements. When in doubt, the student should use good judgment and keep the instructor informed.

Grading Formula: The instructor will use a standard 0-100 grading scale for each assignment. The following formula is applied when assigning the student’s final average:

Homework Average:	25%
Quiz Average:	15%
Test Average:	40%
+Final Exam:	20%
Total:	100%

Final Grade Assignments: The instructor of this course will apply the above grading formula to assign the official final grades for this course as follows:

A:	90.0 – 100.0	B:	80-86.9
B+:	87-89.9	C:	70-76.9
C+:	77-79.9	D:	60-66.9
D+:	67-69.9		
F:	Below 60.0		

Important Dates: The official university academic calendar is posted and updated at: <http://prtl.uhcl.edu/registrar/academic-calendar> .

First Class Day:	28 August
Census Day:	13 September
Last Day to Drop/Withdraw:	13 November
Last Class Day:	9 December
Final Exam Days:	11-16 December
Scheduled University Holiday(s):	4 September, 22-24 November

Final Exam Dates and Time: The official university final exam schedule is posted and updated at: <http://prtl.uhcl.edu/registrar/final-exam-schedule> .

Date and Time of Final Exam for This Course: Monday, 11 December – 10a-12:50p

Students With Disabilities: The instructor of this course is determined to help students with disabilities overcome obstacles to success in their academic careers and provide reasonable, fair, and university approved accommodations. If you are certified as a disabled student by the UHCL Health and Disability Services Office, please notify the instructor of this course as soon as reasonably possible. If you are not currently certified and believe you should qualify, please contact the UHCL Health and Disability Services Office.
<http://www.uhcl.edu/disability-services>

Academic Integrity and Honesty: Academic integrity and honesty is a fundamental expectation in higher education. A breach of academic integrity and/or honesty is usually treated universally by academic institutions with extremely serious consequences to the violator(s) of these policies. Every student in this course is expected to abide by The University's Honesty Policy. <http://prtl.uhcl.edu/dean-of-students/files/academic-honesty-policy.pdf>

Classroom Etiquette and Behavior Expectations: Students and faculty each have a responsibility to maintain a productive learning environment. Disruptive behavior that interferes with the learning and success of other students and faculty is not tolerated. Students that distract from learning in the classroom will be asked to leave the classroom and not allowed to return until consultation with the instructor of this course has been completed.

Cell phones should be properly silenced and not used in class. Tablets and laptops are allowed in class, but only under the condition that they are used relating to material being discussed in class. The instructor does not allow the use of electronic devices in class that are not related to the course material (ie: no Facebook, Instagram, Reddit, news, web browsing, etc.). Students that violate this policy will be asked to put away their electronic device or leave the classroom.

Six-Drop Limitation: In accordance with Senate Bill 1231, an undergraduate student that enrolls in a Texas public college or university, as a first-time freshman, in Fall 2007 or later will be limited to a total of six dropped courses during their entire undergraduate career. Dropping this or any other course between the first day of class and the census date for the semester does not count against this rule. However, dropping a course between the census date and the last class day for the semester does count against this total. Students should take this limitation into consideration before dropping this or any other course. For more information about this rule, please contact SCE, SOE, or the Registrar. <http://prtl.uhcl.edu/registrar/6-drop-rule>

Math Help: The Math Center is staffed with tutors that can assist you with mathematics questions outside of your instructor's regular office and duty hours. The center is located in B2127 and is open Monday-Thursday 9:00-18:00 and Friday 9:00-14:00. <http://prtl.uhcl.edu/math-center>