Wheeler High School ECE Math 1131

Teacher:	Mrs. Reyes	**Classroom:**	205
Phone:	860-535-0377	**Email:**	reyesa@northstonington.k12.ct.us
Term:	Fall 2018	Meeting:	5th period each day

This course is given in cooperation with the Early College Experience Program at the University of Connecticut, ece@uconn.edu, 860-486-1045.

Course Overview

This course will meet the requirements of the University of Connecticut Math 1131 (Calculus I). The main objective of this course is to enable students to utilize their prior knowledge to appreciate and understand calculus conceptually and **provide them a college experience** with its methods and applications. The course emphasizes a multi-representational approach to calculus; with concepts, results and problems being expressed graphically, numerically, analytically and verbally. The four major topics that are covered are limits, derivatives, indefinite integrals and definite integrals. The emphasis of instruction is to balance teaching the skills, understanding the concepts to make connections and the use of technology to explore, discover and reinforce the concepts of calculus.

The first semester is the University of Connecticut course Math 1131 (Calculus I). The Early College Experience will help ease the transition to college math courses. The students are held to the same standards of rigor and pace as those taking the class at the University of Connecticut. Students that earn a C or higher will receive UConn credit for this course and any grade of a C- or lower will be converted to an audit only.

Course Objectives

- Students should be able to work with functions represented in a variety of ways: graphical, numerical, analytical or verbal. They should understand the connections among these representations.
- Students should understand the meaning of the derivative in terms of a rate of change and local linear approximation and should be able to use derivatives to solve a variety of problems.
- Students should understand the meaning of the definite integral both as a limit of Riemann sums and as the net accumulation of change and should be able to use integrals to solve a variety of problems.
- Students should understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.
- Students should be able to communicate mathematics and explain solutions to problems both verbally and in written sentences.
- Students should be able to model a written description of a physical situation with a function, a differential equation or an integral.
- Students should be able to use technology to help solve problems, experiment, interpret results and support conclusions.
- Students should be able to determine the reasonableness of solutions, including sign, size, relative accuracy and units of measurement.
- Students should develop an appreciation of calculus as a coherent body of knowledge and as a human accomplishment.

Prerequisites
Before studying calculus, all students should complete courses in which they study algebra, geometry, trigonometry, analytic geometry and elementary functions. These functions include linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric and piecewise-defined functions. In particular, before studying calculus, students must be familiar with the properties of functions, the algebra of functions and the graphs of functions. Students must also understand the language of functions (domain and range, odd and even, periodic, symmetry, zeros, intercepts and so on) and know the values of the trigonometric functions at specified numbers.

Students should have successfully completed Honors Precalculus with a B- or above.

Class/ Behavior Expectations

- Be respectful, responsible, honest, and safe to self, others, and all property.
- Be on time and prepared for class.
- Be active and involved in learning.
- All school rules and policies as stated in the Wheeler handbook apply.
- The use of technology (iPods, phones, laptops) is prohibited in this classroom unless directed by the instructor. All technology should be kept in lockers or backpacks. If used without permission, the technology will be confiscated and kept until the end of the period. Multiple offenses will result in teacher detentions and/or office blue slips.

Homework
Homework will be given daily in this class. Homework may be to watch a short video while taking notes or completing a practice assignment of a set of problems. You must watch all videos and complete the problem sets to be successful in this course. There will also be graded homework assignments (GHA's) given that will be collected and graded.

Notebook
Students are required to have a binder or a section of a binder for this class. Students should keep all assignments to help prepare for the midterm and AP exam.

Teaching Strategies
Students are taught that ideas can be investigated analytically, graphically and numerically. Students are expected to relate the various representations to each other. Students are encouraged to explore and discover whenever possible and work with each other.

The first semester will follow a flipped classroom model. Students will watch short videos outside the classroom as homework and take notes on them. Students will use class time to complete the practice assignments after watching the videos. Students are encouraged to actively participate by asking questions and working with each other.

Technology
Students will use the TI-83/84 graphing calculator. They will be issued a TI-83/84 if needed. . Calculators are used to explore, discover and reinforce the concepts of calculus throughout the course.

Extra help

Seek help immediately. I will be available for students whenever possible for extra help. Students need to make arrangements to see me for extra help in advance.

Topics

Time	*Section*	*Topic*
1 week	1.1	Four Ways to Represent a Function
	1.2	Mathematical Models
	1.3	New Functions from Old Functions
	1.4	Graphing Calculators
	1.5	Exponential Functions
	1.6	Inverse and Logarithms
		Unit 1 Test
4 weeks	2.1	The Tangent and Velocity Problems
	2.2	The Limit of a Function
	2.3	Limit Laws
	2.4	The Precise Definition of a Limit
	2.5	Continuity
	2.6	Limits at Infinity; Horizontal Asymptotes
	2.7	Derivatives and Rates of Change
	2.8	Derivative as a Function
		Unit 2 Test
4 weeks	3.1	Derivatives of Polynomials and Exponential Functions
	3.2	The Product and Quotient Rules
	3.3	Derivatives of Trigonometric Functions and Inverse Functions
	3.4	The Chain Rule
	3.5	Implicit Differential
	3.6	Derivatives of Logarithmic Functions
	3.7	Rates of Change in the Natural and Social Sciences
	3.8	Exponential Growth and Decay
	3.9	Related Rates
	3.10	Linear Approximations and Differentials
		Unit 3 Test
5 weeks	4.1	Minimum and Maximum Values
	4.2	The Mean Value Theorem
	4.3	How Derivatives Affect the Shape of a Graph
	4.4	Indeterminate Forms and l'Hospital's Rule
	4.5	Summary of Curve Sketching
	4.6	Graphing with Calculus and Calculators
	4.7	Optimization Problems
	4.8	Newton's Method
	4.9	Antiderivatives
		Unit 4 Test

4 weeks	5.1	Areas and Distances
	5.2	The Definite Integral
	5.3	The Fundamental Theorem of Calculus
	5.4	Indefinite Integrals and the Net Change Theorem
	5.5	The Substitution Rule
		Unit 5 Test
6 weeks	6.1	Area between Curves
	6.2	Volumes
	6.5	Average Value of a Function
		Unit 6 Test

Grading Policy

Students will receive an ECE Math 1131 grade for the first semester only since it is a semester course. The ECE Math 1131 quarter grades will be calculated using percentages from quiz grades, test grades, and other small assignments. The ECE semester grade will be computed from the first and second quarter grades and the midterm exam grade but must be within one letter grade of the midterm exam grade. The midterm exam is made up using some of the exact problems from the exam given at UConn (65%) and problems that are added (35%).

	ECE Math 1131 (1^{st} and 2^{nd} quarter)
Tests	70%
Quizzes	20%
Homework/In-class assignments	10%

Wheeler High School Academic Expectations:

- Literacy
- **Analysis (assessed in this course)**
- Collaboration
- Communication

Major Text

Stewart, James. *Single Variable Calculus Early Transcendentals*: 7th ed. Belmont, CA: Brooks/Cole 2012.