



# AP Calculus AB – 2020-21

## Math 251 – Spring 2021

### SYLLABUS

**Instructor:** Troy Tactay

**CGCC Credits:** 5

**Meeting times and Location:** Hood River Valley High School, Room D09

#### **Contact Information**

**Times to get help:** Periods 4 and 7, lunch, and after school

**Phone Number:**

Office: 541-386-4500 ext 4610 (HRVHS)  
Cell/text: 541-399-1024 (personal cell phone)  
E-mail: [troy.tactay@hoodriver.k12.or.us](mailto:troy.tactay@hoodriver.k12.or.us)

#### **Textbooks and Materials**

- Calculus for AP. Ron Larson, Paul Battaglia. Cengage Learning. 2017. First Edition.
- Amsco's AP Calculus AB/BC: Preparing for the Advanced Placement Examinations. Maxine Lifshitz. Amsco School Publications. 2004.
- Master the AP Calculus AB & BC Tests. W. Michael Kelly and Contributing Author, Mark Wilding. Peterson's, a division of Thomson Learning, Inc. 2002.

(AP is a registered trademark of the College Entrance Examination Board, which does not endorse these books.)

- Graphing calculator required (any model from TI-83 to TI-89) or other CAS calculator recommended.

#### **Course Description - This course will cover all topics from Math 251 and AP Calculus AB**

**CGCC Math 251:** Includes limits, continuity, derivatives and its applications.

**AP Calculus AB:** Includes limits, continuity, derivatives and its applications as well as integral calculus and its applications.

**Prerequisites:** CGCC MTH 112 or HRVHS Honors Pre-Calculus

#### **Math 251 (AP Calculus AB) Intended Outcomes for the Course**

Upon successful completion of this course, students will be able to:

- Recognize applications in which the concept of limits, derivatives, and (integrals) can aid in overall understanding.
- Construct appropriate models using limits, derivatives, and (integrals).
- Accurately compute results from models through the appropriate use of technology, limits, derivatives, algebra, and (integrals).
- Analyze and effectively communicate results within a mathematical context.

#### **Math 251 Core Learning Outcomes**

Through their respective disciplines, CGCC students who earn a degree can:

- Major** 1. Communicate effectively using appropriate reading, writing, listening, and speaking skills. (*Communication*)
- Major** 2. Creatively solve problems by using relevant methods of research, personal reflection, reasoning, and evaluation of information. (*Critical thinking and Problem-Solving*)
- Major** 3. Extract, interpret, evaluate, communicate, and apply quantitative information and methods to solve problems, evaluate claims, and support decisions in their academic, professional and private lives. (*Quantitative Literacy*)
- Minor** 4. Recognize the consequences of human activity upon our social and natural world. (*Community and Environmental Responsibility*)

## Distance Learning (CDL) 2020-2021

### Typical Class Period (Teacher Facilitated Learning):

- JOIN Google Meets by clicking on the Google Meets Link in the Google Classroom Stream or the Google Meets Icon in the Google Classroom Classwork. Mandatory. Attendance will be taken.
- LESSON over the new assignment.
- WORK on the assignment, which is found in Google Classroom.
- SUBMIT assignment in one Google doc via Google Classroom.

### You will have three ways to access my lessons:

- pdf lesson - found in Google Classroom
- Video lesson - found in Google Classroom
- A virtual lesson - during the period

### Turning in Assignments: Everything will be done in Google Classroom.

- Print assignment and do the work directly on what you printed OR
  - Do the work on separate sheets of paper.
- Take a picture with your school issued ipad, upload the pictures on one google doc, and submit in Google Classroom.

### Office Hours (Applied Learning): 9:15 to 11:00 am. Not Mandatory.

I will keep my Google Meets on during my Office Hours. Use the Meeting Code tac. Use this time to ask questions about anything...problems on the assignments, review material with me, how to access stuff, what's going on around school, etc.

Your official grades will still be in HAC.

Not every procedure or rule in this may apply during distance Learning. Adjustments may be necessary.

## Classroom Expectations

- Student is expected to arrive to class (**Google Meets**) on time and stay for the entirety of the class session, unless you complete your assignment.
- No cell phones during class unless using the calculator app. Note: No cell phones will be allowed during a test.
- Exams may only be made up if prior notification is given to the instructor and make-ups are at the discretion of the instructor. There are no retakes of Exams.
- All students are expected to participate in classroom discussions, in-class activities and practice problems.

## LETTER GRADES

**Classwork: Homework and Quizzes** – **10%** of overall Semester Grade. Expect about 30 minutes to one hour of homework.

**ARC (Activities/Responsibility/Cooperation) Points** – **5%** of overall Semester Grade. This is basically behavior points. Students will lose points for disruptive behavior such as excessive talking, using electronic devices, tardies, and leaving class for personal reasons. **There are no ARC Points during Distance Learning.**

**Tests** – **45%** of overall Semester Grade. Projects will be graded as tests.

**Final Exam** – **40%** of overall Semester Grade.

**There are NO Test or Final Exam RETAKES. You are expected to finish during the class period.**

**Grade Scale (Note that HRVHS gives +/- grades however CGCC does not)**

**A 90.0% or above    B 80.0% - 89.99%    C 70.0% - 79.99%    D 60.0% - 69.99%    F less than 60.0%**

## Tentative Activity/Assignment Schedule - Math 251 Topics are highlighted

*The course content and requirements may be adjusted in response to institutional, weather, or class situations as needed with adequate notice to students.*

Week	Weekly Schedule	Homework - Assignment Sheets will be given at the start of every chapter with pages and specific problem numbers
	<b>Chapter 1: Functions and Graphs (3 weeks)</b>	
Week 1	A. <b>Continuity and The Intermediate Value Theorem</b> Simplify, Graph, and Analyze Basic Functions and their Graphs B. Understand the Properties and Language of Functions and Inverses. Graph a Function from a Family of Functions - Translations, Reflections, and Amplitudes	<b>Section 1.1 homework</b>  <b>Section 1.2 homework</b>
Week 2	C. <b>Introduction – Instantaneous rate of change and the need for limits</b> <b>Limit Theorems and Evaluating Limits</b> D. <b>One and two-sided limits: Squeeze Theorem</b> <b>Limits as Infinity and Infinity as a Limit</b> <b>Ch 1 Review</b> <b>NO TEST FOR THIS UNIT</b>	<b>Section 1.3 homework</b>  <b>Section 1.4 to 1.6 homework</b>  <b>AP Ch1 Practice Test</b>

	<b>Chapter: Introduction to The Derivative (3 weeks)</b>	
Week 3	<p>A. <b>Limit Definition of the Derivative</b></p> <p>B. The Derivative as the Average Rate of Change Difference Quotient</p> <p>C. <b>Derivatives as Functions :Higher Order Derivatives Derivatives and the Shape of Graphs</b></p>	<p><b>The Derivative Day 1 Worksheet</b></p> <p><b>The Derivative Day 2 Worksheet</b></p> <p><b>The Derivative Day 3 Worksheet</b></p>
Week 4	<p>E. Interpret the meaning of the Derivative</p> <p>F. Use 1<sup>st</sup> and 2<sup>nd</sup> Derivatives to Identify Concavity and Points of Inflection</p>	<p><b>The Derivative Day 4 Worksheet</b></p> <p><b>The Derivative Day 5 Worksheet</b></p>
Week 5	<p>G. Find the Equation of a Tangent Line and Local Linearization</p> <p><b>Chapter Test</b></p>	<p><b>The Derivative Day 6 Worksheet</b></p> <p><b>Ch Review</b> <b>Ch Test</b></p>

	<b>Chapter 2: Rules and Shortcuts of The Derivative (4 weeks)</b>	
Week 6	<p>A. <b>Derivatives of Polynomials and the Binomial Expansion Theorem Derivatives of Exponential Function</b></p> <p>B. <b>Derivatives of Trigonometric Functions Derivative Theorems; Product Rule - Quotient Rule</b></p> <p>E. <b>Chain Rule</b></p>	<p><b>Section 2.2 Homework</b></p> <p><b>Section 2.3 Day 1 Homework</b></p> <p><b>Section 2.3 Day 2 Homework</b></p>
Week 7	<p>F. 2<sup>nd</sup> Derivatives and Higher Order Derivatives</p> <p>G. Derivatives of Natural Logs</p>	<p><b>Section 2.4 Day 1 Homework</b></p> <p><b>Section 2.4 Day 2 Homework</b></p>
Week 8	<p>H. <b>Implicit Function Differentiation</b></p> <p>I. <b>Derivative of Inverse Functions</b> and Inverse Trigonometric Functions</p>	<p><b>Section 2.5 Homework</b></p> <p><b>Section 2.6 Homework</b></p>
Week 9	<p>J. <b>Tangent Line Approximations and Differentials</b></p> <p><b>Chapter 2 Test</b></p>	<p><b>Ch 2 Review</b> <b>Ch 2 Test</b></p>

	<b>Chapter 3: Using Derivatives to Understand the Behavior of the Parent Function (5 weeks)</b>	
Week 10	A. Critical Points, <b>First Derivative Tests</b> , Local (Relative) Extrema, and Global (Absolute Extrema) B. Intervals of Increase or Decrease, Concavity, and Points of Inflection C. <b>Extreme Value Theorem and Closed Interval Problems</b>	<b>Section 3.3 Day 1 Homework</b> <b>Section 3.3 Day 2 Homework</b> <b>Section 3.1 Homework</b>
Week 11	D. Finding Intervals of Concave Up or Down <b>Calculus and Graphing</b> E. Use the <b>Second Derivative Test</b> to Find Relative Extrema	<b>Section 3.4 Day 1 Homework</b> <b>Section 3.4 Day 2 Homework</b>
Week 12	F. <b>Optimization</b> G. <b>Related Rates</b> E. Use the Derivative to Solve Problems Involving Position, Velocity, and Acceleration of a Particle in Motion or Projectile	<b>Section 3.6 Homework</b> <b>Section 2.7 Homework</b> <b>Particles in Motion Worksheet</b>
Week 13	F. The Intermediate Value Theorem, <b>The Mean Value Theorem</b> , and Rolle's Theorem G. Evaluate Limits using <b>L'Hôpital's Rule</b> <b>Newton's Method</b>	<b>Section 3.2 Homework</b> <b>L'Hôpital's Rule and Newtons Method Wkst</b>
Week 14	<b>Chapter 3 Test</b>	<b>Ch 3 Review</b> <b>Ch 3 Test</b>

	<b>Chapter 4 Part 1: The Definite Integral (4 weeks)</b>	
Week 15	A. Area Under a Curve Using Riemann Sums Left- and Right-Hand Sums, Trapezoid Rule, Midpoint Rule B. Approximate Definite Integral Using Area C. Use the Short-Cuts to Find the Antiderivatives or Indefinite Integrals of Power Functions	<b>Reimann Sums and Definite Integrals Worksheet</b> <b>Section 4.3 Homework</b> <b>Section 4.1 Homework</b>
Week 16	D. Integrate Exponential, Natural Logarithmic, and Trigonometric Functions Apply Fundamental Theorem of Calculus to Find the Definite Integral E. Apply The Fundamental Theorem of Calculus to Find Total Change of the Antiderivative from Rates Average Value of a Function	<b>Section 4.4 Day 1 Homework</b> <b>Section 4.4 Day 2 Homework</b>
Week 17	F. Using Antiderivatives and The Fundamental Theorem of Calculus to Solve Initial Value Problems G. Find the Area Between Two Functions H. Use that Area of the Function to Graph the Antiderivative	<b>Fundamental Theorem of Calculus Wkst</b> <b>Section 4.4 Day 3 Homework</b> <b>Sketching Antiderivatives Worksheet</b>
Week 18	<b>Chapter 4 Part 1 Test</b>	<b>Ch 4 Review</b> <b>Ch 4 Test</b>

	<b><u>Chapter 4 Part 2: More on The Definite Integral</u> (3 weeks)</b>	
Week 19	A. Integrate by $u$ -Substitution 1. Indefinite Integrals 2. Definite Integrals	<b>Section 4.5 Day 1 Homework</b> <b>Section 4.5 Day 2 Homework</b>
Week 20	C. Integrating Natural Logarithms C. Solve Differential Equations by Antidifferentiation D The Second Fundamental Theorem of Calculus E. Population Density	<b>Section 4.6 Homework</b>  <b>Section 4.4 Homework</b> <b>Population Density Worksheet</b>
Week 21	<b>FINAL EXAM</b>	<b>Review</b> <b>FINAL EXAM</b>

	<b><u>Additional AP Topics of The Definite Integral and AP Exam Review</u> (8 to 9 weeks)</b>	
Week 22	A. Find the Volumes of Solids of Revolution 1. Disk Method 2. Washer Method	<b>Unit 1 Day 1 Worksheet</b>  <b>Unit 1 Day 2 Worksheet</b>
Week 23	B. Find the Volumes of Solids with Known Cross Sections Perpendicular to the $x$ or $y$ axes	<b>Unit 1 Day 3 Worksheet</b> <b>Unit 1 Day 4 Worksheet</b>
Week 24	C. Analyze Rates Using the Fundamental Theorem of Calculus D. Analyze Two Rate Functions Over a Given Interval	<b>Unit 2 Day 1 Worksheet</b> <b>Unit 2 Day 2 Worksheet</b>
Week 25	<b>AP Test Practice 1</b>	<b>Review</b> <b>AP Test Practice 1</b>
Week 26	E. Solve Differential Equations by Separation of Variables F. Sketch the Slope Fields of the Solutions of Differential Equations	<b>Unit 3 Day 1 Worksheet</b> <b>Unit 3 Day 2 Worksheet</b>
Week 27	G. Solve Integral Function Problems 1. Use The Second Fundamental Theorem of Calculus a. Find Intervals of Increase/Decrease b. Find Relative Extrema c. Find Intervals of Concave Up/Down and Points of Inflection 2. Graph the Integral Functions	<b>Unit 4 Day 1 Worksheet</b> <b>Unit 4 Day 2 Worksheet</b> <b>Unit 4 Day 3 Worksheet</b> <b>Unit 4 Day 4 Worksheet</b>
Week 28	<b>AP Test Practice 2</b>	<b>Review</b> <b>AP Test Practice 1</b>
Week 29	AP Exam Review	<b>Review Material</b>
Week 30	AP Exam Review  <b>AP CALCULUS AB EXAM - Tuesday, May 4, 2021 (A-Day)</b>	<b>More Review Material</b>  <b>AP CALCULUS AB EXAM</b>

	<b>Unit after the AP Exam : AP Calculus BC Preview (4 weeks)</b>	
Week 31	<b>PROJECT: Derivative project</b>	<b>PROJECT due in one week</b>
Week 32	A. Find the Derivative of Hyperbolic Trigonometric Functions (Cosh and Sinh) B. Apply Newton's Method to Approximate Roots of a Differentiable Function	<b>Section 3.5 Worksheet Newton's Method Worksheet</b>
Week 33	C. Trigonometric Limits D. Exponential Growth and Decay	<b>Trig Limits Worksheet Exponential Growth and Decay Wkst</b>
Week 34	<b>Test (on last 3 weeks only)</b>	<b>Review TEST</b>

## Important CGCC Grading Information

### **IMPORTANT CHANGE TO GRADING POLICY:**

The student is the only person who can file a request for a grade other than an A-F. Faculty no longer has the option of giving a P/NP or audit grade if the student does not officially request it by the deadlines through Student Services. Once the grade request has been submitted by the student, the grade option cannot be changed.

### **PASS/NO PASS:**

With instructor approval, a student can change their grading option to pass/no pass (if P/NP is an approved option). Students will have through week 8 of the term to choose between A-F and P/NP. Two things must occur:

- 1) The student must obtain the instructor's signature on the Registration Form.
- 2) The student must submit the Registration Form to Student Services by noon on Friday of the eighth week of the term.

After the eighth week of the term, students will no longer be able to change their grading option between letter grad (A-F) and pass/no pass (P/NP). It **MUST** be done prior to the eighth week.

### **AUDIT:**

With instructor approval, a student can choose to audit a course (if AUD is an approved option). Students must make this selection prior to the end of the second week of the term and submit appropriate forms through Student Services.

## CGCC Policy Statements

### **Academic Honesty – Plagiarism/Cheating Statement:**

Students are expected to be honest and ethical in their academic work. Academic dishonesty includes cheating and plagiarism. All work submitted in this course is to be your own new, original work written in response to the assignments. Consciously or unknowingly presenting the ideas or writings of others as your own will result in academic sanctions that may include a grade of F for the assignment or for the class and possible institutional sanctions including suspension or expulsion. See the [Student Handbook](https://www.cgcc.edu/students). <https://www.cgcc.edu/students>.

### **ADA Statement:**

CGCC is committed to providing support to students with disabilities. Students requesting assistance related to a disability should contact the Student Support Services Coordinator at (541) 506-6046 or by email at [sdahl@cgcc.edu](mailto:sdahl@cgcc.edu) as early in the term as possible for information and assistance regarding accommodations. 711 Relay. For more information, visit [www.cgcc.edu/disability](http://www.cgcc.edu/disability).

### **Non-Discrimination Statement:**

It is the policy of Columbia Gorge Community College and its Board of Education that there will be no discrimination or harassment on the grounds of race, color, sex, marital status, national origin, religion, age, disability, veteran status, sexual orientation, and any other status protected by applicable local, state, or federal law in any educational programs, activities, or employment.

### **Flexibility Statement:**

The course content and requirements may be adjusted in response to institutional, weather, or class situations as needed, with adequate notice to students.

### **Alternative Assignment Statement:**

Requests for accommodations must be made during the first week of the course by submitting in writing the dates of observances.

### **Diversity, Equity and Inclusivity Statement:**

Columbia Gorge Community College is dedicated to building and fostering a global, positive learning environment where individual differences are welcomed, appreciated, and respected. CGCC respects the expression of diverse perspectives, abilities, interests and backgrounds, understanding that these will strengthen our ability to collaborate effectively and to solve complex challenges. The college provides equal access to and opportunity in our academic programs and facilities.

### **Student Support Services Available:**

If you or a fellow student do not have reliable access to food or other essential needs, or if personal concerns are interfering with success, there are resources and counseling services available through CGCC's Support Services. For information, please contact Shayna Dahl at 541-506-6046; [sdahl@cgcc.edu](mailto:sdahl@cgcc.edu), or visit [www.cgcc.edu/support](http://www.cgcc.edu/support).



**Instead of signing below, go onto my Google Classroom and complete the ASSIGNMENT: Syllabus to confirm that both you and at least one Parent/Guardian read and understand the syllabus.**

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By signing below, you have confirmed that you have read and understand this course's expectations and guidelines. Detach this bottom portion and return to Mr. Tactay.

PRINT Student's Name \_\_\_\_\_

Date \_\_\_\_\_

PRINT Parent/Guardian's Name \_\_\_\_\_

Parent/Guardian's Signature \_\_\_\_\_