

## **A.P. CALCULUS**

SNOHOMISH HIGH SCHOOL

Room: D-208

Mr. Justin Fogg

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**COURSE DESCRIPTION:** This course is an elective two semester course designed to expand the concepts introduced in Precalculus 1-2 to standard concepts and language needed for beginning mathematics courses at the college level. The two major topics of calculus, derivatives and integrals of functions are examined with an emphasis on the students' development of a conceptual understanding of these topics, and the students' ability to apply that understanding to problem situations.

### **CELL PHONES AND PERSONAL ELECTRONIC DEVICE:**

Snohomish High School is committed to establishing a culture for learning. There is no doubt that smartphones have remarkable capabilities which could promote student learning. However, research shows that most students use their phones primarily to access digital amusements. This is a barrier to learning. Cell phones and other personal connected electronic devices should be turned off and put away while in class and during instructional time. Students should not use their cell phones while taking restroom breaks.

**ADVANCE PLACEMENT CREDITS OR COLLEGE IN THE HIGH SCHOOL CREDITS:** Students will have an option to take the A.P. Test in May for a fee of approximately \$95. If you get a 3, 4, or 5 on the exam you could receive collage credit for this class. Students could also choose to earn college credit for this class each semester through Everett Community College. The fee is \$220 per 5-credit class (re. per semester). The sign-up for the college credit usually takes place in October or November. This credit will transfer to most four-year state colleges, and many private colleges. However, you should check with each individual college.

**TEXTBOOK:** Calculus: Graphical, Numerical and Algebraic 5<sup>th</sup> ed. Finney, Demana, Waits, Kennedy, Bressoud

**REQUIREMENTS:** The following is required of students in this course.

1. Daily attendance and participation in class. School and learning are not spectator sports.
2. Completion of work assigned outside of the classroom. Although some of your work will be done in class, it is expected that any work not finished in class be completed and ready to correct on the assigned due date.
3. Self-motivation, you ask questions and seek extra help when needed. Use office hours!
4. Be sure that you have your own graphing calculator (TI-83+ or TI-84) every day for this class.
5. To be cheerful, happy and positive in your approach to class...remember: ATTITUDE is EVERYTHING!

**EXPECTATIONS:** I expect all students to be:

**Respectful** - Consideration should always be shown to others . This includes not talking when I am talking, or others are asking or answering questions. **No headphones or cell phones, during class please!**

**Ready** - Be at computer when zoom class begins. Have all required materials (textbook, notebook, paper, pencil, calculator, ready to go at your workspace.

**Responsible** - You will be held accountable for your actions. If you are absent (excused), you will have the same number of days to make up the work as you were absent (to a maximum of three). **You** are responsible for the grade you receive in class.

**NOTEBOOKS:** In order to help students stay organized, and well-prepared for class, I **strongly recommend** each student maintains a spiral notebook, used just for this class, in which s/he will take daily notes and do all daily assignments.

**ATTENDANCE:** It is your responsibility to be in class. You accept the responsibility to make-up work due to any absence. Make sure you know the consequences of being absent as described in this course description, the school attendance policy and current state law. As per school policy, if your absence is unexcused, credit may not be earned for assignments (including tests) completed, due or assigned during the time of the unexcused absence.

**OFFICE HOURS:** Office hours will run from 2:12 - 3:00 P.M. (M-Th) and 12:30 - 1:30 P.M (Fri). Office hours provide students an opportunity to seek individual help from teachers, make up missed work/tests. Office hours are designed to be self-directed. However, staff can require students to attend. I strongly encourage students to take advantage of this time to seek additional help, when needed.

**COURSE SYLLABUS:** We will cover the following topics from our course textbooks. Please keep in mind that this is a tentative schedule that includes both semesters and we will make any necessary adjustments.

- Chap. 1: Prerequisites for Calculus (Sections 1.1 - 1.3; 1.5 – 1.6)
  
- Chap. 2: Limits and Continuity (Sections 2.1 - 2.4)
- Chap. 3: Derivatives (Sections 3.1 - 3.5)
- Chap. 4: More Derivatives (Sections 4.1 - 4.4)
- Chap. 5: Application of Derivatives (Sections 5.1 - 5.6)
- Chap. 6: The Definite Integral (Sections 6.1 - 6.5; 5.8-5.9: 5.5-5.7 after the AP exam)
- Chap. 7: Differential Equations and Mathematical Modeling (Sections 7.1 – 7.4)
- Chap. 8: Application of Definite Integrals (Sections 8.1 - 8.3)
- Chap. 9: L’Hospital’s Rule and Improper Integrals (Sections 9.2 – 9.4)

**GRADES:** Your grades will be determined in the following way...

- A) **TESTS/QUIZZES/PROJECTS:** These scores will make up ~ 85% of your grade. You should plan on 4 to 6 tests per semester, with each test being worth 100 points. There may be a quiz, or a project thrown in at any time throughout the semester. The quizzes and projects are worth between 20 and 30 points each. These quizzes may not be announced ahead of time, so be sure to keep up with your work at all times.
  - 1) Test questions can come from anything that semester.
  - 2) We will review the day before the tests.
  - 3) We will drop your lowest test score at the end of the semester.
  
- B) **HOMEWORK:** These items will make up ~ 15% of your grade. Homework will be assigned on a daily basis, and you will be held responsible for the material from each assignment. All class notes and subsequent assignments should be kept in student’s class (spiral) notebook, in the proper order, with the assignment, page and problem numbers at the start of each day’s work.
  - 1) Assignments are worth 10 points/assignment: full credit is earned for complete, accurate, completely shown work presented in a neat, organized fashion with answers easily identified. Scores are reduced accordingly for anything less than this. Late assignments will not be accepted.
  - 2) The quizzes and the projects are worth between 20 and 30 points each.

➔ Letter Grades are Based upon the Following Scale:

88 – 89 %	B+	93 – 100 %	A	90 – 92 %	A -
78 – 79 %	C+	83 – 87 %	B	80 – 82 %	B -
68 – 69 %	D+	73 – 77 %	C	70 – 72 %	C
		60 – 67 %	D		
		below 60 %	F		

**COLLEGE IN THE HIGH SCHOOL (CONTINUED):** From Everett Community College (EvCC):

- 1) This course qualifies for EvCC’s College in the High School Program (CHS). Students seeking to earn college credit must enroll in the EvCC CHS program. **Program processes and deadlines can be found at [www.everettcc.edu/chs](http://www.everettcc.edu/chs).**
- 2) Students will receive 5 credits for MATH& 151 Calculus I: AND 5 credits for MATH& 152: Calculus II. Students must register for both and complete both semesters at the high school to earn the 10 credits. No partial credit is awarded. Enrollment is a 3-Step process and **each step has a deadline**. Students will enroll in Calculus I & II, 10 credits, \$440:
  - Step 1:** Apply for Admission in October.
  - Step 2:** Complete Program Application in November.
  - Step 3:** Registration and Payment in November.
- 3) For withdraw and refund policies visit <http://www.everettcc.edu/ccec/college-in-high-school/registration-and-refund-deadlines/>

- 4) Second semester registration required. Students who qualify for free or reduced priced meals may apply for a fee waiver for two classes per year. Students will indicate if they qualify for the fee waiver during Step 2. Families who need extra time to make payment can request a payment plan. Visit <https://www.everettcc.edu/ccec/college-in-high-school/cost-fees>

5) **Course Descriptions and Student Learning Objectives:**

**Semester 1 - MATH& 151 - Calculus I**

**Course Description:** First course in calculus sequence. Limits, continuity, differentiation and antidifferentiation of algebraic and transcendental functions with applications. For majors in engineering, science, mathematics and others requiring more than one quarter of calculus.

**Student Learning Objectives:** Upon successful completion of this course, **students will be able to:**

1. Evaluate limits graphically and using limit laws.
2. Define and prove the continuity of a function at a point and on an interval.
3. Define, determine by definition, and interpret geometrically and physically the derivative of a function.
4. Apply the rules of differentiation including the chain rule, product rule, quotient rule, and implicit differentiation to find derivatives of transcendental functions and composites.
5. Use derivatives in graphing, related rates, and extreme value problems.
6. Define, interpret, and compute the differential of a function and use it in approximations.
7. Find antiderivatives and apply initial conditions.
8. Apply antidifferentiation to problems in rectilinear motion.
9. Evaluate indeterminate limits using L'Hopital's Rule.

**Semester 2 - MATH& 152 - Calculus II**

**Course Description:** Second course in calculus sequence. Integration of algebraic and transcendental functions and applications of definite integration, including areas, volumes, work, hydrostatic force and centers of mass; polar coordinate calculus and parametric equations. Numerical techniques and improper integrals. For majors in engineering, science, mathematics and others requiring more than one quarter of calculus.

**Student Learning Objectives:** Upon successful completion of this course, **students will be able to:**

1. Compute definite integrals as limits of Riemann sums.
2. Evaluate definite integrals using the Fundamental Theorem of Calculus.
3. Evaluate integrals using substitution.
4. Use definite integrals to compute area between two curves, volumes of revolution and volumes with known cross sections.
5. Use definite integrals to compute mass, center of mass, moments of inertia, work and force due to fluid pressure.
6. Evaluate integrals involving transcendental functions, inverse trigonometric functions and hyperbolic functions.
7. Use various techniques of integration and tables to evaluate integrals.
8. Define and determine the convergence or divergence of improper integrals.
9. Solve and apply separable differential equations.
10. Sketch and analyze graphs of polar and parametrically defined curves.
11. Find slope, area and arc length in polar coordinates.

**LEARNING OUTCOMES:** This course:

- 1) **introduces** the Core Learning Outcome #1: **Engage and take responsibility as active learners.**
- 2) **assesses** the Core Learning Outcome #2: **Think Critically.**
- 3) **assesses** the Program Specific Outcomes: **Interpret and manipulate symbolic language.**

**REMEMBER: DO NOT BE AFRAID TO ASK QUESTIONS...**

Mr. Fogg