

SYLLABUS

AP Calculus BC
QSI Virtual School

Term: 2022/23

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Instructor Information

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Email: soltan-ovelekova@ashgabat.qsi.org

Online Office Hours: Monday-Friday, 3pm-4pm, time zone, your skype name or teams homeroom link

Preferred Method of Communication: Microsoft Teams, Email and if nothing else works skype.

Course Description

The primary objective of the course is to provide a fundamental understanding of Differential and Integral Calculus. In order to meet this objective, the course will develop a student's comprehension of calculus by incorporating graphical, analytical, numerical and verbal representations of calculus. This course is designed to follow the topic outline explicitly stated in the College Board Course Description Manual for AP Calculus BC.

This course may be offered as either a second year of calculus or as a very intensive one-year course including the topics from AP Calculus AB plus the additional concepts necessary for successful completion of the AP Calculus BC exam. The AP Calculus AB curriculum includes topics typically covered in a first semester university calculus course; the AP Calculus BC course includes both the first and second semester topics from university Calculus curriculum. Both AP Calculus AB and BC courses were developed by College Board in conjunction with university faculty.

Before studying calculus, all students should complete four years of secondary mathematics designed for college-bound students: 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 the numbers 0 , $\pi/6$, $\pi/4$, $\pi/3$, $\pi/2$, and their multiples.

Course Credit Equivalency: 1 Carnegie credit

Approximate length of the course – 35 Weeks

Course Prerequisites

AP Calculus AB

Required Materials

CALCULUS OF A SINGLE VARIABLE, Ninth Edition, by Larson, Hostetler and Edwards, published by Houghton Mifflin Ninth Edition, ISBN: 978-0-547-20998-2

Cracking the AP Calculus AB & BC Exams, 2013, by Princeton Review, David Kahn, published by Random House Publishing Team, ISBN: 978-0-307-94486-3

College Board AP Calculus Course Description

Other Resources:

- a. <https://apcentral.collegeboard.org>
AP Central
- b. www.khanacademy.org/ (educational videos, assessments and student tracking)
- c. <https://edpuzzle.com/> (educational videos)
- d. <http://www.geogebra.org/cms/>
GeoGebra - free graphing/geometric software
- e. <http://www.askmrcalculus.com/>
Mr. Calculus Help Page
- f. <http://www.calcchat.com/book/Calculus-9e/>
- g. <http://www.jamesrahn.com/pages/other/educational%20lessons.html>

Technology Information and Requirements

Computer with internet access

Microphone

Camera on your phone or computer

Desmos Graphing App (desmos.com)

It is mandatory all students purchase the following:

Texas Instruments TI-84 Plus Graphing Calculator. For further information see <http://education.ti.com>)

Course Grading

1. Grading Rubric

Each unit contains an individualized rubric that aligns with the essential outcomes (TSWs). Students must be assessed for mastery at the A or B level on each essential outcome (TSW). A student who has not yet achieved at least a 'B' level mastery on all essential units remains in progress, denoted with a 'P' on the unit card.

A – All essential parts of the unit were mastered at an appropriately high level. The student consistently demonstrated noteworthy achievement of high quality, particularly in the higher order thinking and performance skills. The student shows mastery “above and beyond” expectations.

B - All essential parts of the unit were mastered at an appropriately high level in which the student successfully engaged in higher order thinking or performance skills.

P - The student has not yet mastered the unit; it is “in progress”.

2. Practices

After watching the videos and completing the assigned reading, the students have to complete practice problems. They ought to show work for every problem, check their answers, and make notes that will help them reflect on their learning.

3. Quizzes

Quizzes allow the teacher to know which topics need to be revisited before the unit assessment. They serve as another learning opportunity for students, and based on them teacher plans the review time and helps students who need further instruction.

4. Unit Assessments

After every unit, students will take a unit assessment which consists of material covered in a given unit. Each test is modeled after the AP Exam. Students complete certain portions of the test using graphing calculators, but are prohibited from using them on other parts of the tests. These assessments are completed from memory with the use of the calculator, where allowed.

5. Unit projects and/or discovery activities that incorporate skills from multiple essential outcomes (TSWs)

Students have projects assigned for every unit. Projects are an important part of the course, and for each of them, detailed grading rubric is provided.

If students did not finish the course by the end of the school year **maximum of 2 units can be completed in June.**

Course content

Students complete IOL prior to being enrolled into their main QVS course.

The AP Calculus course is divided into eight essential units and three selective units. A student must master ten units in total; these ten units are composed of all eight essential units, plus two selective units of the teacher's choice.

Essential Units: (must be mastered to complete the course)

E01 – Limits and Derivatives

E02 – Applications of Differentiation

E03 – Integration

E04 – Transcendental Functions

E05 – Integration techniques and Applications

E06 – Infinite Series Part 1

E07 – Infinite Series Part 2

E08 – Parametric, Polar, and Vector-Valued Functions

Selective Units: (to complete the course content or for additional study)

S01 – Review of AP Calculus AB Concepts

S02 – AP Calculus BC Exam Review

S03 – Calculus Project

Attendance Policy

5 periods per week, (equivalent of 225 minutes per week)

Students are expected to submit work daily, when assignments are submitted in bulk feedback time increases (1 assignment graded per day).

Classroom Behavior expectations

- ❖ Be self-motivated, take responsibility for your learning and be ready to work hard!
- ❖ Read and write technical mathematics;
- ❖ Take notes and keep a class binder with handouts, formulas, etc.
- ❖ Complete online lessons (watch videos and do practice problems) according to the calendar;
- ❖ Persistent practice of concepts - review concepts previously taught;
- ❖ Work independently and cooperatively;
- ❖ Near perfect attendance;

- ❖ If you need help, don't hesitate to ask questions. Use the discussion forums and communicate with your peers!

Academic honesty

Refer to the QVS School Handbook @ <https://qvs.qsi.org/academics/school-handbook>