**Roanoke Valley Governor’s School for Science and Technology  
Dual Enrollment/Advanced Placement Accelerated Calculus BC**

**Syllabus 2023-2024**

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1. **Course Information**
   1. **Course Description**

AP Accelerated Calculus BC provides motivated and talented students a unique opportunity to cover the AB and BC calculus content in one year. The major themes are limits, continuity, derivatives, optimization, related rates, integration techniques, series and approximation, parametric and polar functions, multivariable functions, differential equations, and real world modeling of scientific phenomena. Students are expected to obtain a qualifying score of 3, 4, or 5 on the AP Calculus BC exam at the end of this course if they take the Advanced Placement exam.

Students have the option of dual enrolling through Virginia Western community College. They may earn a total of 8 credits by successfully completing both semesters of this course. First semester correlates with Virginia Western’s course: MTH 263 (4 credits) and second semester correlates with Virginia Western’s course: MTH 264 (4 credits).

**Gifted education strategies**

* 1. **Understand the connections** between various mathematical representations: graphical, numerical, analytical, and verbal
  2. **Communicate** mathematics both orally and in well-written sentences, including being able to explain one’s solutions to problems
  3. **Model** a written description of a physical situation with a function, a differential equation, or an integral (problem-solving)
  4. Use **technology** to help solve problems, experiment, interpret results, and verify conjectures
  5. Determine the **reasonableness** of solutions, including sign, size, relative accuracy, and units of measurement
  6. Develop an **appreciation** of calculus as a coherent body of knowledge and as a human accomplishment
  7. **Text, Printed Resources, and Media Resources**

1. Hass, J., Weir, M. D., & Thomas Jr., G. B. (2016). *University Calculus: Early Transcendentals.* New York: Pearson.
2. Hockett, S. O., & Bock, D. (2010). *Barron's AP Calculus, 10th Edition.* Ithaca: Barron's Educational Series, Inc.
   1. **Learning Objectives and Course Outcomes**

At the completion of this course, the student should be able to:

* Explain the concepts of the derivative and differentiability.
* Explain the concepts of limit and continuity.
* Determine derivatives for appropriate algebraic and transcendental functions.
* Apply differentiation to solve problems of motion, optimization, and related rates.
* Apply the first and higher derivatives in determining extrema and concavity of curves for the solution of science and engineering problems.
* Reconstruction a function from knowledge of its derivative.
* Understand and evaluate antiderivatives, make substitutions to evaluate integrals of algebraic and transcendental functions.
* Evaluate definite integrals by definition.
* Evaluate Riemann sums.
* Be able to use Maple (or comparable software) to solve differential calculus problems.
* Solve appropriate applied problems from the area of science and engineering.
* Evaluate improper integrals.
* Integrate transcendental functions.
* Find area and volume of solids of revolution.
* Use the rectangular and polar coordinate systems including finding area, lengths, and graphing.
* Graph, evaluate, differentiate, integrate and define parametrized functions and applications.
* Determine whether an infinite series is convergent or divergent.
* Find the radius of convergence of a Taylor Series.
* Use Maple (or comparable software) to solve integral calculus problems and applications.

1. **Grading Policy**
   1. **Grading Scale**

100-90% **A**

89-80% **B**

79-70% **C**

69-60% **D**

59-0% **F**

1. **Types of Evaluations**
   * 1. **Semester Exams:** At the end of each semester, a comprehensive exam will be given on a scheduled exam day. These exams will cover **all** material covered during the semester.
     2. **Tests:** Tests will be administered after several integrated competencies have been mastered. These tests are designed to help the students learn to think about the broad connections between topics.
     3. **Quizzes:** Quizzes will be given to assess for connections between objectives. You will find a list of competencies and enabling objectives on-line that you are expected to master in this course.
     4. **Labs/Projects:** A lab is a problem or set of exercises designed to make use of current technology and/or ideologies requiring the use of higher order thinking skills. Labs are designed to be completed independently or in groups based upon instructions. These labs may involve mathematical modeling, data collecting, statistical analysis, and the use of computer software and/or graphing calculators.
        1. Often, projects assigned will enhance your understanding of the integration of mathematics into other disciplines. Since many lab and project assignments will require you to work in a cooperative learning environment, your participation or lack thereof directly affects your learning experience as well as the other members of your group.
        2. Labs/projects will receive a 10% grade penalty for each day that it is turned in late for a maximum of 5 days. After 5 days, the assignment will not be accepted.
     5. **Homework:** Homework is an integral part of this course, and it is extremely important that it be completed on time. You are expected to check answers in the back of the book before coming to class and make note of specific questions/problems you would like to review. Homework will be checked on a regular basis by various methods, including, but not limited to, asking you to exhibit proof that you worked on the assignment, asking you to write down your solution and work on an assigned problem and turning it in, or asking you to self-evaluate, etc.
        1. All assignments are due at the beginning of class. Homework is graded for completeness and timeliness. If a student is absent, it is due upon the student’s return. Homework may be submitted one day late for half credit. After one day, it will not be accepted.
        2. Homework will be checked for various combinations of completion, effort, and accuracy. You will be informed which grading method will pertain to a particular assignment.
        3. Complete your homework by showing all work to support your answers. Your work should be well organized, neat, and easy to read. If I cannot read your handwriting, you will be asked to do your assignments using Math Type. Use graph paper if applicable. Expectations regarding acceptable graphs will be discussed in class.
        4. ­Start each assignment on a clean sheet of paper labeled with your name, the date, the correct page number(s), and problem number(s).
        5. Students may collaborate on any homework or class work assignment unless otherwise specified.
   1. **Semester Grade Determination**

|  |  |  |
| --- | --- | --- |
| **Category** | **Fall Semester** | **Spring Semester** |
| Exam | 15% | 15% |
| Tests | 40% | 40% |
| Quizzes | 30% | 30% |
| Labs/Projects | 10% | 15% |
| Homework | 5% | 0% |

* 1. **Final Grade Determination**

The final grade is the average of the 2 semester grades. Students who fail to maintain a B average or above will be subject to the RVGS probationary policy.

1. **Class Policies and Procedures**
   1. **Absences and tardies:** The policy in the RVGS student handbook will be followed.
   2. **Make-up Work:** Course activities, assignments, and the course calendar will be available on Moodle or through e-mail. Please check Moodle and your Governor’s School email account daily. If you are not in school, you should check the course calendar and Moodle first for information and assignments. You should make every attempt to complete these assignments and submit them upon your return.
   3. **Late-work policy:** Late assignments (with the exception of homework, see above) will lose 10% credit for each day late and no assignments will be accepted more than **four days** late, at which point you will receive a zero. Group assignments are to be submitted on the due date regardless of whether all group members are present on the due date. Each day Governor’s School has scheduled classes counts as one day, even if you do not have my particular class that day. In other words, if you wait until you are in my class again, you will lose credit for each school day that has passed since the assignment was due, not for each class meeting that has passed.
   4. **Cheating:** The policy in the RVGS student handbook student code of conduct will be followed.
   5. **Technology Policy:** The RCPS Acceptable Use Policy and the RVGS student handbook policy will be followed.
   6. **Cell phones:** The policy in the RVGS student handbook for cell phones and electronics will be followed. If parents need to contact a student during class, they should call the front office.
   7. **Extra help:** It is inevitable that there will be times when you may not grasp a concept the first time. Extra help is always available, but it is up to you to seek help as soon as possible. The following options are available to you, but you should be sure to make arrangements with your teacher to make sure that she is available at a given time:
2. Before School (8:00-8:25)
3. After School (including 11:00 – 11:30 am for AM students; 3:35 – 4:00 pm)
4. During Lunch (arrangements must be made in advance)
5. E-mail: Emails received before 3:30 pm Monday through Friday will be answered in a timely fashion; emails received outside these times will be answered at the teacher’s earliest convenience.

***Note: If you choose to dual enroll this course through Virginia Western Community College you have access to their campus resources which include but are not limited to the Brown Library and tutors. Please refer to the Virginia Western website for more information: www.virginiawestern.edu***

* 1. **Student/Parent Vue:** Grades are available through Parent Vue. For assistance with accessing your grades, please contact the school’s guidance counselor. If you have questions regarding a particular grade entry, please let your teacher know as soon as possible.
  2. **Interim Reports:** A hard-copy of your current grade will be given to you to take home three times during each semester (see dates on the school calendar). The interim report is a snapshot of the current class average. Please feel free to discuss your report with the teacher at any time.
  3. **Student Performance Strategy:** Interventions will be implemented at the teacher’s discretion or in the event that the student's grade falls below an 80.
  4. **General classroom procedures**
     1. **Calculators:** Bring your calculator to class **every day** although we may not use it every day. Always keep your calculator in excellent working condition. Do not expect to be provided with a calculator if you do not bring yours or have not kept your batteries in good working order. Not having a calculator means that you are not prepared for class.
     2. **Rounding Rules:** When a calculator is involved, students should store values until the final step of the solution and then round or truncate per AP guidelines which will be discussed in class.
  5. **SEC Notification:** Per Virginia Code (§ 22.1-16.8), parents must be aware of the use of any instructional materials with explicit content.  No explicit materials are used in this course.

**All students must fill out an online Virginia Western Application and MUST have an EMPL ID number to be enrolled in any dual class.**

***Virginia Western Community College Policies***

**Academic Dishonesty:**

Academic dishonesty is not tolerated at Virginia Western; violations of this policy can result in disciplinary actions, including suspension or expulsion from the college.  According to The Virginia Western Student Handbook, academic dishonesty includes, but is not limited to, the following:

\*  Cheating on a test by giving, receiving, offering, and/or soliciting information.

\*  Buying, selling, stealing, or soliciting any material purposed to be a part of an assignment.

\*  Plagiarism (taking and using the ideas of another as one’s own).

\*  Unauthorized use of materials, notes, or other aids during a test.

For more information, read the “Conduct” section of the VWCC Student Handbook

**ADA Statement:** Questions or concerns about the college’s and student’s rights and responsibilities regarding persons with disabilities may be directed to the 504/ADA Coordinator.  The Americans with Disabilities Act of 1990 (ADA) and section 504 of the Rehabilitation Act provides protection from illegal discrimination for qualified individuals with disabilities.

**Copyright Statement:** The materials for this course are only for the use of students enrolled in this course for purposes associated with the course and may not be retained or further disseminated.

Here are some VWCC resources that may be useful to you!

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| Emergency Alert Information | <http://www.virginiawestern.edu/police/crisismanagement.php> |
| Campus Safety Video | <http://www.virginiawestern.edu/police/safety.php> |
| Student Consumer Information | <http://www.virginiawestern.edu/services/studentconsumerinfo.php> |
| VWCC Withdrawal Policy | <http://www.virginiawestern.edu/services/withdrawal.php> |
| VWCC Student Resources | <http://www.virginiawestern.edu/services/resources.php> |
| VWCC Student Rights and Responsibilities | <http://www.virginiawestern.edu/services/handbook/studentconduct.php> |
| VWCC Student Conduct Policy | <http://www.virginiawestern.edu/services/handbook/studentconduct.php> |
| VWCC Student Grievance Procedures | <http://www.virginiawestern.edu/services/handbook/grievance.php> |
| Title IX:   Policy on Sexual Violence, Domestic Violence, Dating Violence, and Stalking | <http://www.virginiawestern.edu/services/intervention/sexualharassment.php> |