AP Calculus AB Syllabus

Fall 2003-Spring 2004

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Welcome to AP Calculus AB! This syllabus is designed to explain this course and what your responsibilities are. Please keep this sheet as a reference for the remainder of the course.

COURSE DESCRIPTION

This is a high-level mathematics course intended for the advanced mathematics student. The course will be taught at the **college** level with the requirement that all students take the Advanced Placement Calculus AB Examination on 5 May 2004. In order to cover all of the material necessary to succeed on the examination, the course has additional class time scheduled outside of the normal school day. The course begins with a comprehensive review of algebra, trigonometry, and analytic geometry. Then, coverage of limits of functions, the derivative and its applications, and the integral and its applications is provided. Students complete a review of previous AP Calculus Examinations at the end of the course in preparation for the AP Examination. There will be an emphasis on the use of technology and applying calculus to real world problems.

COURSE OBJECTIVES

When students successfully complete AP Calculus, they will be able to:

- communicate using mathematics, both orally and in well-written sentences.
- model a written description of a physical situation with a function, a differential equation, or an integral.
- use technology to help solve problems, experiment, and interpret results, and verify conclusions.
- determine the reasonableness of solutions, including sign, size, relative accuracy, and units of measure.
- demonstrate an appreciation of calculus as a coherent body of knowledge and as a human accomplishment.
- demonstrate the ability to work cooperatively within group problem solving situations.
- demonstrate the qualities of a self-directed learner.
- work with functions represented in a variety of ways: graphically, numerically, analytically, or verbally and demonstrate an understanding of the connections among these representations.
- demonstrate an understanding of the meaning of the derivative in terms of a rate of change and local linear approximations and use derivatives to solve a variety of problems.
- demonstrate an understanding of the meaning of the definite integral both as a limit of Riemann sums and as the net accumulation of a rate of change and use integrals to solve a variety of problems.
- demonstrate an understanding of the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.

COURSE OUTLINE

The textbook that will be used in this course (Larson, Roland E., Robert P. Hostetler, and Bruce H. Edwards. *Calculus of a Single Variable, Early Transcendental Functions,* Third Edition. Boston, MA: Houghton Mifflin Company, 2003.) is designed for a three-semester calculus course. Since this course is a two-semester course, only the first seven chapters (and Chapter 0) will be covered. An outline of the topics that we will cover is provided below. Please note that the dates are approximate. However, because the date of 5 May 2004 is looming large, any deviations from this calendar will be slight.

Dates:	Topic:
22 August – 15 September	Chapter 0 (Prerequisites)
18 September – 1 October	Chapter 1 (Limits)
2 October – 5 November	Chapter 2 (Differentiation)
6 November – 3 December	Chapter 3 (Applications of Differentiation)
4 December – 26 January	Chapter 4 (Integration)
28 January – 5 February	Chapter 5 (Differential Equations)
6 February – 3 March	Chapter 6 (Applications of Integration)
4 March – 2 April	Chapter 7 (Techniques of Integration and L'Hôpital's Rule)
7 April – 4 May	AP Calculus AB Examination Review
5 May 2004, 7:30 a.m.	AP Calculus AB Examination

INSTRUCTIONAL APPROACH

Although my courses tend to be lecture based, I believe that it is imperative to incorporate as much group learning into this class as possible. Therefore, expect to do a great deal of active learning in this course. Many of the things that we do in this course will be done together; in other words, each student will share a responsibility in teaching as well as learning. You should not plan on performing 50-minute lectures, but you should be prepared to play the role of "expert" in certain situations. I am convinced that this approach will ensure the greatest level of success for all of the individuals involved in this class (myself included).

REQUIRED SUPPLIES

1. **Textbook**. Larson, Roland E., Robert P. Hostetler, and Bruce H. Edwards. *Calculus of a Single Variable, Early Transcendental Functions,* Third Edition. Boston, MA: Houghton Mifflin Company, 2003.

2. **Writing Utensils**. All of your homework, quizzes, and tests should be completed in pencil unless I tell you otherwise. I will **not** accept work done in pen (in other words, you get a **zero** for that assignment).

3. **Paper**. I recommend that you take notes on loose-leaf paper kept in a sturdy one-inch, three-ring binder. You must complete all homework on loose-leaf paper.

4. **Graphing Calculator**. A TI-83 or TI-83 Plus graphing calculator will be necessary in this course and may prove helpful in future math courses. As these two models are the official calculators for Notre Dame High School, no technical support will be provided for any other calculator.

CLASSROOM GUIDELINES

Attendance is mandatory. By the time you reach the level of an Advanced Placement course, this should not be an issue, so I will be brief: Do not miss class. Do not *ever* miss a test. If you fail to follow either of these recommendations, contact me the day of your absence, if not sooner. You are responsible for figuring out what you missed. Finally, you must make up a test as soon as you return to school (but remember, do not ever miss a test!).

Have Respect for Yourself and Others. Again, this should not be an issue. Respect all authority figures in this school, especially any substitute teachers that you may have. You must follow the Notre Dame Honor Code at all times. Please refer to page 39 of the *Notre Dame High School Parent/Student Handbook 2003-2004*, for full details.

Cell Phones. The official school policy is that cell phones (and similar items) are to remain off and in students' lockers or bags during the school day. Due to unpleasant experiences in the past with these devices my policy is more strict: ALL CELL PHONES AND SIMILAR DEVICES ARE PROHIBITED IN MY CLASSROOM. If I see one, I will confiscate it and turn it into the Dean of Students, no exceptions.

GRADING POLICY

- Your final grade will be based upon the following:

Tests:	75%
Homework/Quizzes/Journals/Projects:	25%

  Please be aware, *I reserve the right to change this breakdown at any time. You will be apprised of any changes in writing*.

- Tests will be formatted similarly to the AP Calculus examination. This means that you will see multiple choice and free response questions on every test. This also means that no partial credit will be given on multiple choice questions, but it will be given on free response questions. You will be able to use your calculator on some questions; you will not be able to use it on others. Certain tests will contain material covered during previous chapters (in other words, the tests will have a "cumulative" aspect to them).

- The semester examinations will be the equivalent of two tests. During the second semester, your semester examination will be an old AP Calculus test, administered on 2 May 2004. Expect this to last almost four hours.

- Your tests will be graded with a "natural breaks" philosophy. With this method, an A on one test might be 97%; on another test, it might be 80%. Please be aware, this grading philosophy is designed to *help* you, not hurt you. I want you to worry about your course grade as little as possible and focus on mastering the material instead.

- Successful mastery of calculus involves, in part, the ability to recall a multitude of mathematical definitions, formulae, and rules. With this in mind, I will ask that each of you prepare a set of calculus flashcards (use 3"x5" notecards) for each chapter. These cards should contain information that will be "common knowledge" by the time the AP test arrives. Several times during this course, we will have flashcard quizzes, either written or oral. These quizzes will be brief, but will provide motivation for you to commit these factoids to memory as we go along, as opposed to cramming them into your head in May. These quizzes will also be cumulative (Please note: the number of flashcards you have will have no bearing on how you perform on these quizzes. A good philosophy to have is "if I know it already, I do not need to write it down.").

- Homework will be assessed in a variety of ways. I may collect assignments daily, or I may choose to collect a full chapter of assignments at once. I may also elect to perform a homework check where I ask you to record selected homework problems from several assignments on one piece of paper. There may be several assignments that I do not check at all. In all cases of homework assessment, however, completeness **and** correctness of solutions will determine your grade for that assignment.

- Do not expect extra credit opportunities.

- Although I do not have an official class participation component in my grading system, **I RESERVE THE RIGHT TO USE CLASS PARTICIPATION, ATTENDANCE, AND OTHER NON-OBJECTIVE CRITERIA IN DETERMINING FINAL GRADES**.

MISCELLANEOUS ITEMS

- The AP Examination is on Wednesday, 5 May 2004 at 7:30 a.m.

- There are two mandatory preparation sessions for the examination, Saturday, 17 April 2004 and Sunday, 2 May 2004. Times are to be determined, but clear your schedules now, as they will be mandatory. Sample AP Examinations will be taken during these sessions, and should take between three and four hours to complete.

- During the past several years, I have been fortunate enough to have several conversations with very distinguished AP Calculus teachers from across the United States. Through these conversations, I have recognized that we need to include additional instructional time into our schedule. Other schools with excellent academic reputations provide their students with greater amounts of in-class time for courses such as this in order to help their students move through the curriculum with greater facility and comfort. It is important that you understand that additional class time is not my renegade attempt to make your lives miserable. Rather, it is a decision that I have made – in cooperation with the math department and with the support of the Notre Dame administration – to provide you with a greater opportunity to experience success, given our schedule constraints.

- I have designed a webpage for this course that will hopefully be a positive supplement to the learning that occurs in class. This site will be used to access my personal information, course handouts, and assignments. The URL for the site is http://www.geocities.com/tthiele_95035.

- Since many of you have not had the experience of me as a teacher, you may not understand my behavior at first. It is important for you to understand two things: I want you to succeed in this course, and your experience will be a great deal more pleasurable if you do things exactly the way I want them to be completed.

- I really like to utilize a team-oriented approach to this course. Each day of class serves as a practice for our competitions, which are our tests. Finally, our championship game has already been scheduled. It is on 5 May 2004, and it is called the AP Calculus AB Examination. As your coach, it is my expectation that while we may lose some games along the way, we will win the championship match. In an attempt to impart this philosophy, I have adopted the following mantra (taken from my favorite local team, Stanford) for this course:

BEAT CALC:

THE BIG GAME

ON

5 MAY 2004

DISCLAIMER*: I retain the right to modify the contents of this syllabus at any time during the school year*.