

# MATH 181, Calculus and Analytic Geometry II

## Fall 2006

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# 1 Introduction

The prerequisites for this class include the material on the differential calculus in chapters 1-4 of our textbook. Every course on the differential calculus will cover this material except possibly for what is in section 4.8. We will review that material but you should still read section 4.8 to determine if you have seen it before.

The primary goals of this course are for you to learn the basics of integral calculus, power series and the use of polar coordinates. The integral calculus and power series are covered in chapters 5-8 of our textbook. These two topics are fundamental tools of almost every scientific discipline and we will look at a variety of ways they are applied. We will also go cover the material on polar coordinates in the first four sections of chapter 9. For a more detailed list of topics in this course please see the Department of Mathematics and Computer Science's syllabus at MATH 181 Syllabus[3].

During a normal class day we will discuss new material, address questions that arise from reading the text, and work through assigned problems on which there are difficulties. When we discuss new material, we will look at these ideas in their simplest form to highlight how they fit together into the logical whole that is the "big picture" and will save discussion of the details and refinements necessary for a deeper understanding for a second (or third) pass through the material. You are to prepare outside of class for these detailed discussions by carefully reading the text and working on the assigned problems. Then, during class, we will address these deeper refinements by responding to questions on the reading and the problems that you bring to class. Hence, you are expected to participate in class by being present (and alert), by responding to questions I pose, and by asking the questions that you have. You should expect me to ask for ideas on how to proceed in a given problem or develop a new concept and should develop the habit of contributing to the discussion even if you are not confident your idea will work out. (See "How to Study" [4] for an excellent description of how to effectively study mathematics.)

## 2 Course Information

### 2.1 Textbook

The textbook is *University Calculus*, Hass, Weir, and Thomas, ©2007, Pearson Education, Inc.

### 2.2 Calculator

My current plan is to allow only minimal use of a calculator during tests. I do not care what calculator you use as long as it has the capabilities for function graphing, numerical equation solving, numerical differentiation, and numerical integration. If you want help, I am most familiar with TI calculators and, if you do not have a manual for your calculator, you should be able to find one on the internet – for example at

<http://education.ti.com/us/product/tech/86/guide/86guideus.html>. [6]. See Calculator Policy[5] for what the department has to say about calculator use.

As an aside and just for your information, those of you who are planning on majoring in mathematics or science will eventually want to learn how to use a technical word processor that incorporates a symbolic manipulation package. Mathematica, Matlab, Maple and Scientific Notebook are some of the better known programs that do this. I am **not** asking you to buy such a program, only mentioning it might be useful later for some of you.

## 2.3 Basic Information

You can find information pertinent to all of my classes at the link below and, once there, information specific to this class by clicking on the Math 181 link.

<http://math.ups.edu/~bryans/> [1]

### 2.3.1 Logistics

<b>Professor Bryan Smith</b>	(Temp) Temp. Bldg E, Room 2	879-3562	bryans[at]ups.edu
<b>Office Hours</b>		Monday	2:00 - 2:50 P.M
		Tuesday	9:30 - 10:30 A.M.
		Wednesday	2:30 - 3:20 P.M.
		Friday	10:00 - 10:50 A.M.
<b>Classroom / time</b>	Library 020	M,T,W,F	1:00 - 1:50 P.M.

I am also available for appointments at other times.

## 2.4 Examinations

All examinations are scheduled for Tuesday. On test weeks, the examination will be given from 12:30 until 2:00 and there will be a review session the night before from 5:30 until 7:00.

There will be five (5) 100 point, one hour, in-class examinations and I will drop the lowest score. Make-up examinations are occasionally granted but require that arrangements are made well before the exam. You **should not** expect all examination questions to closely mimic textbook examples or assigned homework problems. On the other hand, you should expect most exam questions to be similar to material that can be found in the textbook.

Examination One	Tuesday	February 6
Examination Two	Tuesday	February 27
Examination Three	Tuesday	March 27
Examination Four	Tuesday	April 24
Examination Five	Friday, May 11	12:00 P.M. (With the Final Exam.)

## 2.5 Final Examination: Friday, May 11 at 12:00 P.M.

The final examination and the fifth regular examination will both take place during this two (or three) hour period. The final examination portion will be comprehensive. The final cannot be rescheduled so do not schedule plane flights (or anything else) that will conflict with it.

## 2.6 Writing Projects

There will be 3 to 5 Writing Projects assigned this semester. These projects are designed to help you both better understand the current topic and to develop better writing skills. They will be graded both for mathematical content and for written presentation as specified in the rubric on the last page of this document. Note:

1. Feel free to use (or not) any technology that you like (e.g., calculators, Mathematica, MATLAB, etc.).
2. You may work with others in solving these problems but there is to be no collaboration on the written exposition of the solutions.

3. You must include a reference paragraph at the beginning of your paper either affirming the work is completely yours or citing each resource you use: names of participants in discussions (other than in-class discussions), technological tools, reference texts employed, and anything else other than your own thoughts. Failure to include references is intellectual theft!

## 2.7 Homework

Approximately 15 homework problems will be assigned from each section of the book. I expect you to be able to do all of them but will collect and mark only two from each section. I strongly suggest you do **more** homework problems than I assign.

## 2.8 Reading

One of the most important skills you can develop from this class is that of reading technical material. This is much different from the “skim” reading you will often use in other classes. For mathematics, it is very important that you read the material at least twice. Once before and once after it is discussed in class. It is also important that you read correctly. Mathematics requires that you read **slowly** and with a pencil and paper at hand. (See “How to Study” [4] on the course webpage for more details.)

I expect you to carefully read the material before we introduce it in class and to ask questions during class about points you do not understand. Your questions will arise naturally if you develop the habit of reading slowly with a pencil and paper at hand.

## 2.9 Course Information Updates

If you wish, I will post on my university web page, a grade report with your current standing in the class. You should keep track of your grades on the various assignments and check them against these reports. If there are any discrepancies they should be dealt with immediately.

To have your information posted you need to print your name, the class (MATH 181), and a code on a sheet of paper. Then sign the paper and physically hand it to me. The code is to be a sequence of up to 23 symbols I can type on a keyboard.

## 2.10 Total Points

Homework	20%
Writing Projects	20%
Examinations	48%
Final Examination	12%

## 2.11 First Graded Homework Assignment

**(Due Friday of Week 1 at 5:00 P.M.)**

1. Look over both my university web page <http://math.ups.edu/~bryans/> [1] and the course webpage for MATH 181 you’ll find there.
2. Send an e-mail message to me at bryans [at] ups.edu that contains the information below. Make sure the course number, 181, and your name are in the “Subject” line.
  - (a) Tell me your major, if you have one. If not, mention those subjects that interest you the most.

- (b) Write a paragraph or two detailing your personal learning style. Include any classroom techniques you have found that enhance or block your learning.
- (c) Tell me how much time you expect to spend each week studying for this class.

## References

- [1] Bryan Smith's Homepage  
<http://math.ups.edu/~bryans/>
- [2] Math 181 Course Webpage  
[http://math.ups.edu/~bryans/Current/Spring\\_2007/181Index\\_Spring2007.html](http://math.ups.edu/~bryans/Current/Spring_2007/181Index_Spring2007.html)
- [3] Department Syllabus for MATH 181  
<http://www.math.ups.edu/~matthews/Syllabi/MA181Syllabus.pdf>
- [4] William Rapaport's "How to Study"  
<http://www.cse.buffalo.edu/~rapaport/howtostudy.html>
- [5] Department Calculator Policy  
<http://www.math.ups.edu/info/calcpolicy.pdf>
- [6] TI-86 Manual  
<http://education.ti.com/us/product/tech/86/guide/86guideus.html>

### 3 Math 181 Writing Projects

### Grading Rubric

Points	Logic and Mathematics
6	Arguments are correct, complete and without inappropriate material.
5	Arguments have one minor error, omission or inappropriate inclusion.
3	Arguments have two minor errors, omissions or inappropriate inclusions.
0	Arguments are seriously flawed.
Points	Use of Terminology and Notation
3	All technical terms, concepts and notation are used correctly.
2	Arguments have one lapse in terminology and notation
1	There are minor problems with terminology or concepts.
0	There are major problems with terminology or concepts.
Points	Written Presentation
1	Follows citation requirements and all other writing guidelines.
0	Has more lapses in following the guidelines.

#### 3.1 Writing Guidelines

It is best to think of these writing projects as officially assigned papers in which you completely explain and justify your analyses of the problems. You may work with others in solving these problems but there is to be **no collaboration on the written exposition of the solutions**. In addition I expect your papers to be

- Fully documented – specifically:
  1. You **must** include a reference paragraph at the beginning of your paper either affirming the work is completely yours or listing each resource you use: names of participants in discussions (other than the in-class discussions), technological tools, reference texts employed, and anything else other than your own thoughts.
  2. Any idea obtained during brainstorm sessions or in discussions is cited in-line.
  3. All textbook results (theorems, propositions, and lemmas) are cited in-line and include the name of the result.
  4. Any use of technology is cited in-line.
- Carefully handwritten in ink or written with a word processor. (I can show you how to use Scientific Notebook in the labs or you can use Microsoft Word. Please check with me before using any other program.)
- Written using complete, accurately punctuated sentences.
- Presented in active voice, the first person plural and with a clear, easy-to-follow expository style.
- Targeted at an audience consisting of students not in this class but with an equivalent mathematical background – say those currently in another section of this course.