

# MATH 181, Calculus and Analytic Geometry II

## Fall 2010

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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 differential calculus textbook covers this material except possibly for what is in section 4.8.

There are two main goals for this course: learn the basics of **integral** calculus and of power series.

This material is covered in chapters 5-8 of our textbook and develops fundamental tools that apply to almost every scientific discipline. So we will highlight a few applications as examples. 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 you wish to discuss. When we introduce new material, we will do so using simple examples to highlight how the concepts 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. Part of your grade will depend on your preparation and classroom participation. You should expect me to ask for ideas on how to proceed in a given problem or in developing 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 minimal use of a calculator during tests. I do not care what calculator you use as long as it has the the capabilities for function graphing, numerical equation solving, numerical differentiation, and especially 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/83/guide/83guideus.html> [6]. See Calculator Policy[5] for what the department has to say about calculator use.

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, Scientific Notebook, and Sage are some of the better known programs that do this. I am **not** asking you to buy such a program (and Sage is free), only mentioning it might be useful later for many of you.

### 2.3 Basic Information

You can find information pertinent to all of my classes at the url 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>Bryan Smith</b>  | TH 390D | 879-3562 | bryans[at]ups.edu                        |
| Math 181            | TH 283  | M, F     | 8:00-8:50am                              |
|                     |         | T, Th    | 8:30-9:20am                              |
| <b>Office Hours</b> |         | Tue      | 8:00-8:30am, 10:30-11am, 1:30-2pm, 2-3pm |
|                     |         | Wed      | 3:00-4:30pm                              |
|                     |         | Thu      | 2:00-3:00pm                              |
|                     |         | Other    | By Appointment                           |

## 2.4 Examinations

There will be five (5) 100 point, one hour, in-class examinations and I will drop the lowest score. Make-up examinations are granted only for truly exceptional circumstances. 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.

There are copies of old exams on my web site. They might contain typos or even errors. They are offered “as is” for those who might use them as a study aid. But they are (not) part of this semester’s course.

|                   |          |        |
|-------------------|----------|--------|
| Examination One   | Thursday | Sep 16 |
| Examination Two   | Thursday | Oct 08 |
| Examination Three | Thursday | Oct 28 |
| Examination Four  | Thursday | Nov 18 |
| Examination Five  | Thursday | Dec 02 |

## 2.5 Final Examination: Monday, December 13, at 8:00 A.M.

The final examination is scheduled for

Friday, December 19 8:00 - 10:00 AM

The final examination will be comprehensive and cannot be rescheduled so do not plan plane flights (or anything else) that will conflict with it. I will allow you to work longer than the two hours scheduled for the final.

## 2.6 Homework

I will assign homework daily but will not collect it. Each Tuesday we will have a 10-minute, in-class quiz consisting of 2 or 3 of the previous week’s homework problems. You are encouraged to bring your worked homework to class and to copy your solutions onto the quiz sheet.

I expect you to do many more homework problems than I assign.

## 2.7 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 to get a “feel” for the concepts and

another time where you concentrate on understanding the details. 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.)

There will be three reading questions associated with each section we cover. You can find these questions on my website. Each section’s reading questions will be due, by email, at 7:00 A.M. on the morning we cover that material in class (there is a daily schedule of what material we are covering on my website). Note these will not be accepted late.

- My email address is bryans(at)ups.edu
- The “Subject” line must contain “181” followed by the chapter and section. For example, the first reading assignment should have “181, 5.1” in it’s subject line.
- Have your full name as the first line of your response.
- Give very brief answers. Do not include computations for numerical questions but do give brief reasons.
- Send only pure text. Do not send attachments, WORD files, or graphics. Do not send your answer in HTML.
- Mathematical notation is cumbersome in text-only email but don’t worry too much about it. I should be able to decipher most reasonable attempts.

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.

## 2.8 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.

## 2.9 Total Points

|                   |     |
|-------------------|-----|
| In-Class Quizzes  | 30% |
| Reading Questions | 10% |
| Examinations      | 48% |
| Final Examination | 12% |

## 2.10 First Reading Assignment (Due Wednesday, Sep 1 at 5:00pm)

1. Look over both my university web page <http://math.pugetsound.edu/~bryans/> [1] and the course webpage for MATH 181 you’ll find there.
2. Skim “How to Study” <http://www.cse.buffalo.edu/~rapaport/howtostudy.html>

3. Send an e-mail message to me at bryans [at] pugetsound.edu responding to the points below. Use the subject line “181 First Assignment” as you follow the directions for submitting answers to reading questions (see the Reading section above).
  - (a) Tell me if you have any schedule conflicts from 8:00 to 8:30am on Tuesday or Thursday.
  - (b) Tell me your major, if you have one. If not, mention those subjects that interest you the most.
  - (c) Tell me which of the suggested techniques in the Rapaport [4] reading seemed obvious to you even though you haven’t used them in previous classes.
  - (d) Tell me one or two of the techniques in the Rapaport reading that you had never thought of before but that you will try this semester.
  - (e) Note that professors expect you to study at least two hours outside of class for each hour you spend in class. That’s more than 40 hours per week for most of you. Have you been thinking of college as a full-time job?

## 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, fully documented 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.