MATH 181, Calculus and Analytic Geometry II Spring 2008

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Contents

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.

There are two main goals for this course: learn the basics of integral calculus and learn how to use and understand power series. We will also take two or three days at the end of the semester to introduce 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 cover the material on polar coordinates in the first three 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 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.

To put this in another way, I expect you to do the assigned reading and to participate in classroom discussions on that material. 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 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 restrict, but not ban, the use of calculators during tests. This is one way to ensure that you have learned why certain facts are true and how to use them rather than just learning how to believe what the calculator tells you. On the other hand, calculators are wonderful tools for **checking** your understanding. So, no matter what, I expect you to use a calculator as a reference when doing homework or any other class work that is not a test.

It does not matter which 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. Also, if you do not have a manual for your calculator, you should be able to find one on the internet – for example the TI-86 manual is at

`http://education.ti.com/us/product/tech/86/guide/86guideus.html`. [6]. The department has a precise statement of its calculator policy at this link. [5]

As an aside, 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 but want you to be aware that such tools will 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

Professor Bryan Smith	Thompson 390D	879-3562	bryans[at]ups.edu
Classroom / time	Thompson 191	M,T,Th,F	10:00 - 10:50 A.M.
Office Hours		Mon.,Tue.,Thu.,Fri.	2:00 - 2:50 P.M
		Wednesday	2:30 - 3:15 P.M.

I am also available for appoinments at other times.

2.4 Examinations

All examinations are scheduled for Thursday. On test weeks, the examination will be given from 9:30 until 11:00 and I will be experimenting with a review session the night before from 7:00 until 8:20.

There will be four (4) 100 point, one hour, in-class examinations and I will drop the lowest score. Make-up examinations are occasionally granted for extreme circumstances but require that arrangements are made well before the exam. Many, but not all, examination questions will be similar to problems in the textbook (but not necessarily the "assigned" problems).

Examination One	Thursday	February 7
Examination Two	Thursday	February 28
Examination Three	Thursday	March 27
Examination Four	Thursday	April 17

2.5 Comprehensive Final Examination:

Math 181D Monday May 12, 8:00 - 10:00 A.M.

The final cannot be rescheduled so do not schedule plane flights (or anything else) that will conflict with it.

2.6 Homework

I will post homework problems on my webpage in three categories:

Computational These will be more straightforward problems from the textbook. Being able to solve such problems comfortably is consistent with what I consider "C" level understanding of the material.

One Step These will be less straightforward problems that require "one step" or more additional understanding of the material. Being able to solve these is consistent with a "B" or higher.

Turn In These will be problems (one per day) that you will turn in to me for assessment. These are to be written out using complete sentences and including all pertinent steps. Grades will be assigned for mathematical content, correct use of terminology and writing style. Please see the Writing Guidelines at the end of this document for more specific information.

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 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.

2.8 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 181D), 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

Homework	36%
Examinations	48%
Final Examination	16%

2.10 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, 181D, and your name are in the "Subject" line.

   (a) Tell me why you are taking this class. Include your major, if you have one. If not, mention those subjects that interest you the most as possible majors.

   (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`

[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 "Turn In" Problems   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

These write-ups are not term papers but I do expect you to justify each step as well as motivate any step that does not strike you as "obvious". Be sure to use complete sentences.

    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. Include, at the beginning of your solution, a list of all resources you used: names of discussants, reference texts, technological tools, etc. Include your name at the top of this list.

  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 a very dark pencil or typed 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.