Introductory Calculus (Math 120 Section 8) Spring 2011
Syllabus and Study Guide

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Class Times: Monday, Tuesday and Thursday, 5:30-6:45pm.
Class Location: Maybank Hall room 112.
Final Exam: Wednesday April 27, 8-11am.
Office hours: Monday, Tuesday and Thursday 4-5pm, and Wednesday 2-3pm.
I am also available immediately after each class.

Text, in three versions:
Calculus: Early Transcendentals
Single Variable Calculus: Early Transcendentals
Single Variable Calculus: Early Transcendentals, Volume 1
all by James Stewart, 6th. edition.

The first version covers the whole calculus sequence to Calculus 3 (MATH221);
the second covers this course and Calculus 2 (MATH220);
the third covers just this course.

The main online communication tools for this course are in WebAssign at
http://www.webassign.net/

The text is also supported by the website Tools for Enriching Calculus with many
worked solutions and tips for exercises,
http://www.stewartcalculus.com/tec/

There is also a site for this course in the College’s new Learning Management
system OAKS at https://lms.cofc.edu
OAKS is also accessible through MyCharleston at http://my.cofc.edu
(Click on the acorn.)
Objectives and expectations

The main goal of this course is for students to learn the basic concepts and skills of solving mathematical and scientific problems described by functions that are continuous (meaning no jumps or breaks in their graphs) and have a well defined slope at each point, and to solve problems whose solutions can at best only be approximated with algebra, geometry and trigonometry (like the areas of most regions), but can be solved exactly with the methods of calculus.

Applications include the description of motion in terms of velocity and acceleration, models of population growth, chemical reaction rates and growth of the value of an investment, and optimization problems such as minimizing the cost of a task or maximizing what can be achieved with a fixed amount of resources. This material is covered in the first five chapters of the text, with a few sections omitted or left until Calculus (Math 220).

Students are expected to do not only the graded online assignments and class exercises but also to review each section the text after it has been covered in class and to attempt the exercises set for each section. This is because, more broadly, it is expected that a majority of the learning in this or any College course comes through students’ efforts outside the classroom.

Textbook *Calculus: Early Transcendentals* 6th ed. by James Stewart, in three versions

The text for this course comes in three versions. They differ only by some having more chapters than others, and which one is best for you depends on how far you plan to go in the calculus sequence.

If you only plan to do this course, you can use the shortest version,

*Single Variable Calculus: Early Transcendentals, Volume 1.*

If you plan to do this course and Math 220 (Calculus 2) but not Math 221 (Calculus 3), you can use the intermediate version

*Single Variable Calculus: Early Transcendentals.*

For the full three semester calculus sequence, get the full version,

*Calculus: Early Transcendentals.*

The text is supplemented by the WebAssign browser based system which we use for online graded homework and communications. You get this either by buying a “bundled” version of the text, or by paying separately for WebAssign access, through its website.

The text is also supported by the Tools for Enriching Calculus (TEC) website

http://www.stewartcalculus.com/tec/

To use TEC, select our text (the *early transcendentals* version) and then select the chapter needed in menu Browse Homework Hints. The TEC exercises are also marked with a red boxed number in the textbook.

Calculators

You are expected to have a graphing calculator, and the recommended choice is the Texas Instruments TI-84 Plus, which is the one I will use in class demonstrations. If you plan to use any other calculator, check with me, as some are not allowed on tests or the exam.

Calculators will be allowed on only part of each test and of the exam; with the non-calculator part being the majority.
Exercises, assessment, and grading

Homework exercises These notes give a list of exercises for each section covered, to guide your study, not for grading. Doing them is essential; like learning a musical instrument or sport, success requires a lot of practice beyond what your teacher or coach sees and grades you on.

WebAssign homework There will be short graded homework assignments on each section, done online with WebAssign and normally due two class days after we finish the section. Some parts of WebAssign homework must be submitted on paper, for example because it involves sketching graphs or verbal explanations. WebAssign allows you to make several attempts at each problem, including coming back later to retry a problem after studying some more or getting help from me. It also allows you to ask me questions through the system, which is more convenient than regular email. I encourage you to start work on the assignment on each section as soon as we have covered it in class.

In-class exercises Most weeks there will be an in-class exercise: you are encouraged to work in groups and ask me questions, but you should each write up and hand in your own version of the results.

Tests There will be three tests, provisionally scheduled for the Thursday classes of February 10, March 17, and April 14. These will be partially cumulative: each will focus on material covered since the previous test, but some questions will rely on ideas and methods learned earlier in the semester. Mathematics is like that! There are no make-up tests. If you miss a test for a good, documented reason, the score can be replaced by your results on the corresponding part of the final exam. Such absences should be documented through The Office of the Associate Dean of Students: see http://www.cofc.edu/studentaffairs/general_info/absence/

Final exam The final exam is a common exam for all sections of MATH 120, which will be held on Wednesday April 27, from 8 till 11 am. This will cover the whole syllabus.

Grading scheme The combined scores for assignments and in-class work will count for 15% of the course total, each test will count for 20% and the final exam score will count for the remaining 25% in the course total. However, if the final exam score is better than the lowest test score or the assignment-classwork average, the exam score will carry an additional 10% and that low score will count for 10% less.

The aggregate score guarantees at least the following letter grades:

\[
\begin{align*}
\geq 90\% : & \text{ A} \\
\geq 80\% : & \text{ B} \\
\geq 70\% : & \text{ C} \\
\geq 60\% : & \text{ D}
\end{align*}
\]
Participation requirements

I do not take the roll in class but do require active participation in all the work described above, and you are responsible for knowing what happens in each class, including which sections have been covered, exercises and assignments, information about test topics, and due dates. Absence from a test or failure to attempt any three WebAssign assignments or in-class exercises, unless adequately excused, will lead to a W/A: withdrawal due to absence. So if you miss a class you should get notes, check assignments and find out about any other announcements, and if you miss a test, you should contact me promptly to explain why.

Office hours and additional help in the Math Lab.

I will hold office hours at times to be arranged with the class, and am available immediately after classes.

You can also get tutoring help in the Math Lab, located in Addlestone Library room 110, part of the Center for Student Learning: http://www.cofc.edu/~csl/math/

There you will find students and some professors who will help you with any specific problems or questions you may have. They also have a list of private tutors. The schedule is still to be announced but will probably be Monday-Thursday 9am-9pm and Friday 9am-noon.

Some important dates and times

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday January 17</td>
<td>Martin Luther King Day: no classes</td>
</tr>
<tr>
<td>Tuesday January 18</td>
<td>Last day to add/drop courses (changed due to the storm day)</td>
</tr>
<tr>
<td>Thursday February 10</td>
<td>Proposed date for Test 1</td>
</tr>
<tr>
<td>Wednesday February 22</td>
<td>Last day to withdraw with a grade of “W”</td>
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<tr>
<td>March 7–13</td>
<td>Spring Break — no classes</td>
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<tr>
<td>Thursday March 17</td>
<td>Proposed date for Test 2</td>
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<tr>
<td>Thursday April 14</td>
<td>Proposed date for Test 3</td>
</tr>
<tr>
<td>Monday April 25</td>
<td>Last day of classes</td>
</tr>
<tr>
<td>Wednesday April 27, from 8 till 11am</td>
<td>Common Final Exam, location TBA</td>
</tr>
<tr>
<td>Friday May 13</td>
<td>Grades available on MyCharleston</td>
</tr>
</tbody>
</table>
Topics, sections and homework exercises

A star * indicates an exercise on which a WebAssign homework exercise is based. The other exercises are for study, not grading, and there is help and solutions for most of them at the Tools for Enriching Calculus website http://www.stewartcalculus.com/tec/

Questions are welcome in class on any exercise, for grading or otherwise.

“Chapter 0” A Preview of Calculus

Homework Read all parts except “The sum of a series”; that is covered in Calculus 2.

Chapter 1 Functions and Models

Section 5 Exponential Functions

Homework Exercises 1, 2, 7, 8, 13*, 15*, 17, 18*, 25, 26*.

Section 6 Inverse Functions and Logarithms

Homework Exercises 1, 2, 3, 4*, 6*, 7, 15, 18*, 24*, 25, 26, 34*.

We omit the final topic of INVERSE TRIGONOMETRIC FUNCTIONS for now, reviewing it when we encounter these functions in Section 3.5.

Chapter 2 Limits and Derivatives

Section 1 The Tangent and Velocity Problems

Homework Exercises 1, 2, 3, 4*, 5, 6*.

Section 2 The Limit of a Function

Homework Exercises 1-4, 6*, 15, 18*, 19, 27, 28*.

Section 3 Calculating Limits Using Limit Laws

Homework Exercises 1, 2, 3, 4*, 7, 11, 12*, 15, 35, 40*, 42*, 45, 48*.

Section 4 The Precise Definition of a Limit

Homework Exercises 1, 2, 3, 4*, 14*, 15, and 17.

Also study text examples 1, 2 and 4 in particular.

Section 5 Continuity

Homework Exercises 1-3, 4*, 5, 7, 11, 15, 18, 27, 32, 34*, 47, 60*, 61.

Section 6 Limits at Infinity: Horizontal Asymptotes

Homework Exercises 1, 2, 3, 4*, 7, 11, 12*, 16*, 19, 20*, 22*, 25, 41.

We omit the final topic, PRECISE DEFINITIONS.

Section 7 Derivatives and Rates of Change

Homework Exercises 1, 4*, 7, 9, 10*, 13, 17, 19.

Section 8 The Derivative as a Function

Homework Exercises 1, 3 , 4*, 5, 11, 15, 16, 20*, 38*.

Chapter 3 Differentiation Rules

Section 1 Derivatives of Polynomial and Exponential Functions

Homework Exercises 4, 5, 7, 8*, 9, 10*, 11, 17, 18*, 23, 31, 33, 48*, 49.

Section 2 The Product and Quotient Rules

Homework Exercises 1, 3, 4*, 5, 7, 8*, 9, 11, 25, 27, 30*, 33, 43, 48*, 55.

Section 3 Derivatives of Trigonometric Functions

Homework Exercises 1, 2*, 3, 5, 9, 11, 12*, 13, 15, 17-19, 22, 24*, 33.

Section 4 The Chain Rule: Derivatives of Compositions

Homework Exercises 1, 3, 4*, 5, 9, 10*, 11, 13, 20*, 31, 39, 43, 51.
Section 5 Implicit Differentiation
Homework Exercises 1, 3, 5, 7, 8*, 15, 25, 27, 46*, 47, 53, 57, 67.

Section 6 Derivatives of Logarithmic Functions
Homework Exercises 1, 3, 5, 8*, 19, 37, 38*, 43.

Section 7 Rates of Change in the Natural and Social Sciences
Homework Exercises 1, 3, 8*, 13, 16, 23*, 24 and 27.
We will look at a few examples, not every topic in this section.

Section 9 Related Rates of Change
Homework Exercises 1, 6*, 7, 11, 15, 19, 20*, 25, 27, 31, 37.

Section 10 Linear Approximations and Differentials
Homework Exercises 3, 4*, 5, 6*, 9, 13, 15, 16*, 29, 33.

Chapter 4 Applications of Differentiation

Section 1 Maximum and Minimum Values
Homework Exercises 1, 2, 9, 11, 13, 25, 30*, 31, 39, 47, 49, 50*, 52*, 65, 67.

Section 2 The Mean Value Theorem
Homework Exercises 1, 5, 11, 12*, 17, 19, 23, 24*, 25, 35.

Section 3 How Derivatives Affect the Shape of a Graph
Homework Exercises 1, 3, 5, 11, 12*, 15, 23, 25, 29, 31, 43.

Section 4 Indeterminate Forms and L’Hôpital’s Rule
Homework Exercises 1, 2*, 3, 5, 8*, 11, 15, 23, 25, 29, 40*.

Section 5 Summary of Curve Sketching
Homework Exercises 5, 9, 19, 33, 41.

Section 7 Optimization Problems
Homework Exercises 1, 5, 9, 10*, 11, 13, 16, 17, 21, 22, 30, 33, 49.
We omit the topic APPLICATIONS TO BUSINESS AND ECONOMICS.

Section 9 Anti-derivatives
Homework Exercises 1, 5, 7, 9, 13, 14*, 15, 21, 23, 27, 39, 42*, 49, 53, 57.

Chapter 5 Integrals

Section 1 Areas and Distances
Homework Exercises 1, 4*, 5, 7, 11, 12*, 17, 21.

Section 2 The Definite Integral
Homework Exercises 1, 5, 6*, 9, 19, 20*, 33, 36, 47, 49, 53.

Section 3 The Fundamental Theorem of Calculus
Homework Exercises 3, 9, 10*, 11, 13, 14*, 21, 28*, 29, 43, 51, 72.

Section 4 Indefinite Integrals and the Net Change Theorem
Homework Exercises 1, 2, 5, 8*, 9, 16*, 23, 30*, 31, 43, 51, 57, 59.

Section 5 The Substitution Rule