Calculus II (Math 220, Section 3), Fall 2015
Syllabus and Study Guide

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Website: http://blogs.cofc.edu/lemesurierb/

Class Times: Monday, Wednesday and Thursday, 4:00-5:15 pm
Class Location: Maybank Hall room 220.
Final Exam: December 9, 4-7pm. Location TBA (probably the normal class room)
Office hours: To be arrange during the first week of classes;
I am also always available immediately after each class.
Text: Single Variable Calculus: Early Transcendentals by James Stewart, 6th. edition,
and you need WebAssign access to go with this.
If you plan to continue to Calculus 3 (Math 221), you will need the extended
version Calculus: Early Transcendentals.

This course will use two main online tools:

- The OAKS "learning management system" https://lms.cofc.edu (which is
  also accessible from within http://my.cofc.edu).
- The online homework system WebAssign at http://www.webassign.net/

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

The main objective of this course is to learn three main topics:

Integration and its Applications: Chapters 6, 7 and part of 9.
Infinite Sequences and their Sums: Chapter 11.
Geometrical Applications of Calculus: selections from Chapters 8 and 10.

For example we study computing areas and volumes, lengths of curves, and solving differential equations which describe phenomena like population growth, and describing functions as “infinite polynomials”, also called “power series”.

I will also emphasize some generally useful mathematical skills:

- Learning correct use of mathematical notation and organization of thinking and written presentations so that it can be understood by peers and instructors.
- Facility and accuracy in basic computational manipulations so that these steps do not get in the way of understanding and solving the main questions at hand.
- Reading, working exercises and developing concise written summaries of important formulas, notation and ideas, to help with study and test preparation.

Students are expected to do not only the graded online assignments and class exercises but also to read each section of the text that is 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.

General Education Student Learning Outcomes

This course can be used to satisfy some general education requirements, for which there are some standard goals. Students are expected to display a thorough understanding of the topics covered. In particular, upon completion of the course, students will be able to

1. model phenomena in mathematical terms,
2. solve problems using these models, and
3. demonstrate an understanding of the supporting theory behind the models apart from any particular application.

These outcomes will be assessed on the final exam.

Undergraduate Mathematics Program Student Learning Outcomes

This course can be used to satisfy some requirements of the undergraduate mathematics degree program, for which there are also some standard goals. Students will:

1. Use algebra, geometry, calculus and other track-appropriate sub-disciplines of mathematics to model phenomena in mathematical terms.
2. Use algebra, geometry, calculus and other track-appropriate sub-disciplines of mathematics to derive correct answers to challenging questions by applying the models from the previous Learning Outcome.
3. Write complete, grammatically and logically correct arguments to prove their conclusions.

These outcomes will be assessed on the final exam.
Textbook *Calculus: Early Transcendentals* by James Stewart, and WebAssign

The text for this course comes in several versions.


2. If you go on to do Calculus III (MATH 221) you will need the longer version, *Calculus: Early Transcendentals*, which adds five chapters.

3. A newer option is the loose-leaf CofC custom edition, suitable for putting in a three-ring binder, which again covers through to MATH 221. Since I also provide downloadable study guides for every section, it can be convenient to use this version and keep everything in one binder. Also, it is the least expensive option.

With any of these, you also need access to WebAssign, which can be got by purchasing a “bundled” edition, or by purchasing access separately at its website. You need to self-enroll at the WebAssign site http://www.webassign.net/ to do online homework and to access other resources there, like communication tools for getting my help on homework.

Exercises, Online Assignments, Class Exercises, Tests and Final Exam

Study exercises I will give a list of exercises to be done for each section covered. These are not for grading, but doing them is essential to success in this course: like learning a musical instrument or sport, success requires a lot of practice beyond what your teacher or coach sees and grades you on.

Online homework with WebAssign There will be online homework assignments on each section, done with WebAssign, with about one week to work on each assignment from when the section is covered in class. WebAssign is a browser-based system that will let you make several attempts at each problem, including saving your work and coming back later to retry a problem after studying some more, or getting help from me. Thus I encourage you to start work on the assignment for each section as soon as we have covered it in class.

WebAssign, TEC and other graded homework exercises Each section of the notes has a list of exercises from the corresponding section of the textbook. Some WebAssign homework must also be submitted on paper, because it involves sketching graphs or verbal explanations. The text is supported by the Tools for Enriching Calculus website mentioned above, http://www.stewartcalculus.com/tec/. To use it, select our text (the early transcendentals version), and then select the chapter needed in menu Browse Homework Hints. The TEC exercises are also indicated in the textbook with a red, boxed number.

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

Tests There will be three in-class tests on Thursdays: see the list of important dates below. 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 always 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:
http://studentaffairs.cofc.edu/about/absence-memo/

If you have scheduling problems such as commitments to other official college activities, let me
know soon, not just before a test date.

**The Final Exam** covering the whole syllabus, will be on **Wednesday December 9, 4-7pm**, probably
in the normal classroom. The College does not allow final exams to be rescheduled except for
clashes with other exams, so check your exam schedule before booking any flights home!

**Participation Requirements**

I do not usually take the roll in class but do require active participation in all the work described
above. Students will be dropped for unexcused absence from any test or for unexcused failure to
attempt any three assignments in WebAssign or in-class exercises. You are responsible for knowing
what happens in each class including which sections have been covered, study exercises and
assignments, information about test topics, and due dates. Thus you should contact me to explain
any missed assignment or class, and more so any missed test.

**Reading, Asking Questions, Office Hours and other Communication Options**

Reading assignments will be given at the end of class. Classes will start with a few minutes for
questions about recent readings, classes, homework exercises, or any related topics, but questions
are welcomed at any time, not just at the start of class.

I am available immediately after class: this can be quicker than coming to office hours. I will
hold office hours at times to be arranged with the class. Electronic communication is also useful:
WebAssign has a nice system for requesting help on exercises and other messaging, and I will post
notices there that you see at login. WebAssign also has a grade book, where you will have access
to your grades for all work including tests. So bookmark http://www.webassign.net/.

Please email me soon at lemesurierb@cofc.edu from the account that you prefer to use, so
that I can ensure that it is not rejected by the College’s vigorous junk mail filters and add it to my
address book.

**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 will count for the remaining 25% in the course total.

The aggregate score guarantees at least the following letter grades:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>93–100</td>
</tr>
<tr>
<td>A−</td>
<td>89–92</td>
</tr>
<tr>
<td>B+</td>
<td>85–88</td>
</tr>
<tr>
<td>B</td>
<td>81–84</td>
</tr>
<tr>
<td>B−</td>
<td>77–80</td>
</tr>
<tr>
<td>C+</td>
<td>73–76</td>
</tr>
<tr>
<td>C</td>
<td>69–72</td>
</tr>
<tr>
<td>C−</td>
<td>65–68</td>
</tr>
<tr>
<td>D+</td>
<td>61–64</td>
</tr>
<tr>
<td>D</td>
<td>57–60</td>
</tr>
<tr>
<td>D−</td>
<td>53–56</td>
</tr>
</tbody>
</table>
### Some Important Dates and Times

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday August 31</td>
<td>Last day to drop/add courses.</td>
</tr>
<tr>
<td>Monday September 7</td>
<td>Labor day — classes do meet.</td>
</tr>
<tr>
<td>Thursday September 24</td>
<td>Test 1, proposed date.</td>
</tr>
<tr>
<td>Friday October 2</td>
<td>Math 245 Test 1, proposed date.</td>
</tr>
<tr>
<td>Monday October 19 and Tuesday October 20</td>
<td>Fall break.</td>
</tr>
<tr>
<td>Thursday October 22</td>
<td>Test 2, proposed date.</td>
</tr>
<tr>
<td>Thursday October 29</td>
<td>Last day to withdraw with a grade of “W”.</td>
</tr>
<tr>
<td>Tuesday November 3</td>
<td>Election day — classes do meet.</td>
</tr>
<tr>
<td>Thursday November 19</td>
<td>Test 3, proposed date.</td>
</tr>
<tr>
<td>Wednesday November 25 to Friday November 27</td>
<td>Thanksgiving break — no classes.</td>
</tr>
<tr>
<td>Monday December 7</td>
<td>Last day of classes.</td>
</tr>
<tr>
<td>December 9, 4-7pm</td>
<td>Final Exam, location TBA</td>
</tr>
<tr>
<td>Friday December 18</td>
<td>Final grades available in MyCharleston, by 5pm.</td>
</tr>
</tbody>
</table>
Topics and Sections Covered, and Study Exercises

We will cover all (or most) of Chapters 6, 7 and 11, and parts of Chapters 3, 8, 9 and 10, in the order below, which follows the grouping into three main topic areas described above.

In the exercises listed, an asterisk * denotes exercises on which WebAssign homework is based. Except as noted otherwise, I recommend that you review all exercises in each section covered.

Chapter 6 Applications of Integration

Section 1 Areas Between Curves
Review Examples 1, 2, 5 and 6 in the text.
Study Exercises 1, 3T, 4*, 5, 6*, 9T, 10, 13T, 21T, 29T, 31, 32*, 33.

Section 2 Volumes
Review Examples 1–5 and 8 in the text.
Study Exercises 1, 7T, 9T, 11T, 12*, 31, 32, 39, 42*, 43T.

Section 3 Volumes by Cylindrical Shells
Review Examples 1, 2, and 4 in the text.
(Also 3 if you wish, but always try to avoid equation solving!)
Study Exercises 2*, 5T, 6, 17T, 18*, 24, 25T, 29T, 41T, 45T.

Section 5 Average Value of a Function
Study Exercises 4*, 7T, 9T, 13T, 14*, 17T.

Chapter 3, Section 11 Hyperbolic Functions
Study Exercises 7, 9T, 15T, 18*, 20*, 21, 23(e,f,h), 30*, 31, 35T, 42*, 45T.

Chapter 7 Techniques of Integration

Section 1 Integration by Parts

Section 2 Trigonometric Integrals
Review Examples 1–4 and 7–9 of the text in particular.
Study Exercises 2*, 33, 7T, 8*, 13T, 23T, 26*, 29T, 43T, 55T, 61T.

Section 3 Trigonometric Substitution (and Inverse Substitution)
Study Exercises 2*, 3T, 7T, 10*, 13T, 17T, 22T, 31T.

Section 4 Integration of Rational Functions by Partial Fractions
Review Examples 1–8 of the text.

Section 5 Strategy for Integration
Review Examples 1–5 of the text.
Study Exercises 7T, 17T, 23T, 31T, 41T, 45T, 49T, 57T, 61T, 69T.

Section 6 Integration Using Tables
Review Examples 1–4 of the text.
(We omit the topic Computer Algebra Systems, and thus Examples 5–7.)
Study Exercises 4*, 7*, 10T, 12*, 17T, 23, 24*, 26T.

Section 7 Approximate Integration
Review Examples 1–7 of the text.
Study Exercises 3T, 5, 6*, 35T.

Section 8 Improper Integrals
Review Examples 1–10 of the text.
Chapter 11  Sequences and Series

Section 1  Sequences
Study Exercises 1, 2, 8*, 12*, 13T, 15T, 18*, 19T, 35T, 42*, 43T, 54T, 59T, 61T.

Section 2  Series [Sums of Infinite Sequences]
Review examples 1–8 in the text.
Study Exercises 1, 2, 4T, 9T, 16*, 17T, 18*, 22*, 35T, 44*, 47T, 55T, 59T, 65T, 71T

Section 3  The Integral Test and Estimates of Sums
Study Exercises 1, 2, 7T, 11T, 12*, 17T, 21T, 27T, 33T, 34*.

Section 4  The Comparison Tests
Study Exercises 1T, 8T, 10T, 12*, 17T, 18*, 31T, 34*, 41T

Section 5  Alternating Series
Study Exercises 2*, 3T, 7T, 11T, 13T, 14*, 17T, 23T, 24*, 32T

Section 6  Absolute Convergence and the Ratio and Root Tests
Study Exercises 4T, 10*, 13T, 14*, 19T, 21T, 28*, 29T, 31T, 33T

Section 7  Strategy for Testing Series [for Convergence]
The WebAssign Exercises are 2, 16, 18, 20: also work a selection of other exercises.

Section 8  Power Series
Study Exercises 3T, 6*, 7T, 10*, 15T, 18*, 23T, 24T, 29T, 37T

Section 9  Representation of Functions as Power Series
Study Exercises 4*, 5T, 8T, 13T, 15T, 16*, 21T, 23T, 26

Section 10  Taylor [and McLaurin] Series
Study Exercises 4*, 5T, 8*, 15T, 27T, 33T, 34*, 35T, 39T, 45T, 48*, 57T, 63T

Chapter 8  Further Applications of Integration

Section 1  Arc Length
Study Exercises 2*, 7T, 11T, 13T, 14*, 33T.

Section 2  Surface Area
Study Exercises 1T, 2*, 5T, 11T, 15T.

Chapter 10  Parametric Equations and Polar Coordinates

Section 1  Curves Defined by Parametric Equations
Study Exercises 4T, 8*, 9T, 13T, 20*, 21T, 28*, 31T, 33T, 34T

Section 2  Calculus with Parametric Curves
Study Exercises 5T, 6*, 11T, 23T, 25T, 31T, 32*, 40*, 41T, 44*, 45T

Section 3  Polar Coordinates

Section 4  Areas and Lengths in Polar Coordinates
Study Exercises 10*, 11T, 21T, 27T, 41T, 47T, 48*

Chapter 9  Differential Equations (topic choices depending on time available)

Section 1  Modeling With Differential Equations
Review Examples 1 and 2 in the text.
Study Exercises 3T, 7T, 9T, and 6(a,c,d)*: hand in 6 on paper too.

Section 3  Separable Equations
Review examples 1–3 in the text. Physics students might want to look at Example 4.
Study Exercises 4*, 10T, 14*, 15T, 25T.

Section 5  Linear Equations
Review examples 1–3 in the text. Physics students: see Examples 4 and 5 as well.
Study Exercises 5T, 8*, 9T, 12*, 19T, 31T