Syllabus for Math 220 (Section 2), Calculus 2

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1 Basic Information

Classes meet. Monday, Wednesday and Friday 1:00–1:50 pm and Thursday 1:40–2:55 pm, in MYBK 223.

Textbooks. All course materials are free, available as both websites and PDF, and with the option of buying inexpensive paperback versions.

- The primary source is Calculus, Volume 2 from OpenStax.
- I will also cross reference the text Calculus: Early Transcendentals that you might have used in a previous course.
- Finally, I will provide a study guide with further examples, recommended exercises, homework assignments and so on; that will be in OAKS.

Professor’s Office hours. To be arranged during the first week of classes; for now I am available immediately after each class and by appointment.

Professor’s Office. Room 344, Robert S. Small Building.

Professor’s Email Address. lemesurierb@cofc.edu

Professor’s Websites. http://lemesurierb.people.cofc.edu/ and http://blogs.cofc.edu/lemesurierb/, but once the course starts, most online communication will be through OAKS.

Prerequisites. MATH 120 or HONS 115.

2 Course Objectives and Student Learning Outcomes

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

1. Integration and its Applications.
   Chapters 6, 7 and part of 9.
2. Infinite Sequences and their Sums.
   Chapter 11.
3. **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.

By the end of the course, students will be able to:

1. Represent the following as definite integrals: area between curves, volume of a solid of revolution, average value of a function, arc length of a curve.
2. Evaluate integrals by applying integration by parts, trigonometric substitution, trigonometric identities, and partial fraction decomposition.
3. Identify and evaluate improper integrals and apply the comparison test to determine whether an improper integral converges.
4. Identify properties of sequences (monotonicity, boundedness, convergence) and find the limits of sequences.
5. Determine whether an infinite series converges by choosing and applying a suitable convergence test.
6. Determine the radius of convergence of a power series.
7. Use Taylor Series to express functions as power series and to evaluate infinite series.
8. Represent plane curves as parametric equations, and recognize the plane curve that corresponds to given parametric equations.
9. Use derivatives and integrals to find slopes and lengths of parametric curves, and areas bounded by them.
10. Convert between Cartesian and polar coordinates, graph polar curves, and apply calculus to polar curves as for parametric curves.
11. Model mathematical questions with differential equations, and use basic methods for solving such equations.

### 3 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.

4 Calculators

It might be useful to have a graphing calculator, and the standard recommendation is the Texas Instruments TI-84 Plus. However, many choices of free “calculating device” can work too, including websites, phone apps and computer software, and I will demonstrate some of them. One of my favorites is the Desmos Graphing Calculator; in addition to that website interface, this is available as a free app for iPhones, iPads, and Android devices.

There are also several other tools at the Desmos website, such as a Scientific Calculator. Such tools may be used for some homework and in-class exercises, but not on tests or the final exam.

5 Graded Work and Grading Scheme

5.1 Homework Exercises for Practice

The study guide will give a list of exercises for each section covered, to help your study. These are not for grading but doing them is an essential part of the course; like learning a musical instrument or sport, success in mathematics requires a lot of practice beyond what your instructor sees and grades you on.

5.2 In-class Exercises

There will be some in-class exercises for extra credit. You are encouraged to work on these in groups and ask me questions, but you should each write up and hand in your own version of the results.

5.3 Weekly Quizzes

There will be a short quiz on most Thursdays; the questions will be similar to some of the homework exercises for the sections covered since the previous quiz.

5.4 Mid-term Tests

There will be four mid-term tests, provisionally scheduled for the Friday classes of February 4, February 25, March 18, and April 15. These will be partially cumulative: each will focus on material covered since the previous test, but questions can often rely on ideas and methods learned earlier in the semester. (Math 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://studentaffairs.cofc.edu/about/services/absence.php

5.5 Final Exam

The final exam schedule is not yet available; it will cover the whole syllabus.
5.6 Grading Scheme

The combined scores for quizzes and in-class exercises will count for 20% of the course total; each mid-
semester test will count for 15%, and the final exam will count for the remaining 20%.

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% weight and that low score will count for 10% less.

The aggregate score guarantees at least the following grades:

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<thead>
<tr>
<th>Grade</th>
<th>Range</th>
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<tbody>
<tr>
<td>A</td>
<td>90–100</td>
</tr>
<tr>
<td>A−</td>
<td>87–89</td>
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<tr>
<td>B+</td>
<td>84–86</td>
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<tr>
<td>B</td>
<td>80–83</td>
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<tr>
<td>B−</td>
<td>77–79</td>
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<tr>
<td>C+</td>
<td>74–76</td>
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<td>C</td>
<td>70–73</td>
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<td>C−</td>
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<td>D+</td>
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<td>D</td>
<td>60–63</td>
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<tr>
<td>D−</td>
<td>57–59</td>
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6 Participation Requirements

Attendance to all classes is expected, as is active participation in all the work described above. You are
responsible for knowing what happens in each class including assignments, information about test topics,
and due dates: thus if you miss a class, check for news, either from a classmate or from me; checking the
course’s section in OAKS should help.

Absence from a test or more than three quizzes without adequate explanation will lead to failing the course;
thus if you miss any of these, contact me promptly to explain why.

7 Office Hours, and Additional Help from Tutors in the Math Lab at CSL

I will hold office hours at times to be arranged with the class, as well as being available immediately after
classes.

You can also get tutoring help in the Math Lab, located in the Addlestone Library, one of the walk-in labs
at the Center for Student Learning: http://csl.cofc.edu/labs/math-lab/ There you will find students
and some professors who will help you with any specific problems or questions you may have.

8 Accommodations for Students with Disabilities

If you have a documented disability, please contact me during the first two weeks of class or as soon as
you have been approved to receive accommodations, so that reasonable accommodations can be arranged.
Approval for such accommodations is arranged through the Center for Disability Services: see http://
disabilityservices.cofc.edu/accommodations/

9 College of Charleston Honor Code and Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified,
are investigated. Each incident will be examined to determine the degree of deception involved.

Cases of suspected academic dishonesty will be reported directly to the Dean of Students. A student found
responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure
of the course due to academic dishonesty. This grade will appear on the student’s transcript for two years
after which the student may petition for the XX to be expunged. The F is permanent. The student may also
be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from
the College by the Honor Board.

Students should be aware that unauthorized collaboration or working together without permission is a form
of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or
test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others’ exams, fabricating data, and giving unauthorized assistance.

Students can find the complete Honor Code in this page about the Honor System; see also this page about the Student Handbook.

10 Some Important Dates and Times

- **Monday January 10**: First day of classes.
- **Monday January 17**: Martin Luther King Day—No classes.
- **Tuesday January 18**: Last day to drop/add courses.
- **Saturday January 29**: Storm make-up day, if needed (classes will be made-up online).
- **Sunday January 30**: Storm make-up day, if needed (classes will be made-up online).
- **Friday February 4**: Mid-term Test 1, proposed date.
- **Friday February 25**: Mid-term Test 2, proposed date.
- **March 6 – 12**: Spring Break—no classes.
- **Friday March 18**: Mid-term Test 3, proposed date.
- **Friday March 25**: Last day to withdraw with a grade of “W”.
- **Friday April 15**: Mid-term Test 4, proposed date.
- **Monday April 25**: Last day of classes.
- **Tuesday April 26**: Reading Day.
- **TBA**: Final Exam.
- **Wednesday May 4**: Grades available on MyCharleston by 5pm.