

# Math 245: Numerical Methods and Mathematical Computing Fall 2011

**Professor:** Dr. Brenton LeMesurier

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but this is being replaced by a blog at  
<http://blogs.cofc.edu/lemesurierb/>

**Classes meet:** Monday, Wednesday and Friday, 1-1:50 pm in Maybank 223,  
with occasional visits to Maybank 200.

**Final Exam:** Friday December 9, noon-3pm.

**Office hours:** are to be arranged during the first week of classes;  
for now I am available immediately after each class.

**Text:** *Numerical Mathematics and Computing* (6th ed.)  
by Ward Cheney and David Kincaid.

There is a site for this course in the College's Learning Management system  
OAKS, at <http://lms.cofc.edu>  
and also accessible from MyCharleston at <http://my.cofc.edu> via the  
"acorn" link.

# Syllabus for Math 245, Fall 2011, Dr. LeMesurier

## Course Objectives and Expected Student Outcomes

The main expectation of this course is that students learn methods for computing accurate numerical solutions to mathematical and scientific problems, and acquire an understanding of when and why a particular methods work, and how reliable, accurate and efficient they are.

The first main topic is a review of Taylor polynomials, which are a basic tool in numerical computation because they allow the approximation of many functions by polynomials, which are easy to evaluate.

Then we consider general issues of how to describe and measure the accuracy of numerical solutions, and sources of inaccuracy such as rounding in arithmetic.

We will see methods for numerically solving problems such as nonlinear equations, systems of simultaneous equations, approximating functions by polynomials, fitting straight lines and simple curves to experimental data, and approximating derivatives and definite integrals: mainly from Chapters 1-7 and 12 of the textbook, but not all sections of each chapter. We will also look briefly at solving differential equations (Chapter 10), to preview an important topic that you are likely to see in later courses.

## Computers and Software

We will use the software Matlab in the computer classroom Maybank 200, which provides a powerful interactive system for basic numerical computing and graphing, and also the ability to write programs for larger problems.

No familiarity with Matlab or computer programming is assumed; this will be learnt in the co-requisite course *Numerical Computing and Programming Laboratory* (Math 246).

If you are an experienced programmer and wish to work in another language like Python, discuss it with me: that might be possible using tools like pylab for Python, but I will not be able to help you as much, as I am have only recently started to learn Python.

## Graded Work: Assignments, In-class Tests and Final Exam

There will be assignments bi-weekly, involving a mixture of written and programming work; two programming projects; two in-class tests, and a final exam, more like a third test.

For all computer work, you will submit drafts for for my comments and then a final version, and we will discuss your work in progress to ensure that the final version is working right.

## Grading Scheme

The total grade will be weighted an equal 20% on the assignment total, the projects, each test, and the final exam. The assignments and projects are a major learning activity in this course.

The aggregate score guarantees at least the following letter grades:

$$\geq 90\% : A \quad \geq 80\% : B \quad \geq 70\% : C \quad \geq 60\% : D.$$

## Reading Assignments and Question Time

I will usually set reading at the end of each class, and start each class with time for questions on the reading, current assignments and such.

## Class Attendance Policy

I will not check attendance, but 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 web page should also help.

Missing a test or or project or more than two assignments without adequate explanation may lead to a W/A: withdrawal due to absence. So if you miss any of these, you should contact me promptly to explain why.

## Some Important Dates

<b>Monday August 29</b>	Last day to drop/add courses.
<b>Monday September 5</b>	Labor Day; classes <u>do</u> meet.
<b>Friday September 30</b>	Test 1, proposed date
<b>Mon. October 17 &amp; Tue. October 18</b>	Fall Break — no classes
<b>Friday October 21</b>	Last day to withdraw with a grade of “W”
<b>Friday November 4</b>	Test 2, proposed date
<b>Wed. November 23 – Fri. November 25</b>	Thanksgiving Break — no classes
<b>Monday December 5</b>	Last day of classes
<b>Friday December 9, noon-3pm</b>	Final Exam, in MYBK 223.