

# COMP 116 – 001: Introduction to Scientific Programming

**Lectures:** MTWRF 1:15 – 2:45pm, Sitterson 014

Bring your laptop. We may have some practice time every class.

**Instructor:** Hua Yang, phone: 962-1789, email: yanghua@cs.unc.edu

Office hours: Sitterson 235, MTWRF 10:00 – 11:00am or by appointment.

**Catalog description:** COMP 116 Introduction to Scientific Programming (3). An introduction to programming for computationally oriented scientists. Fundamental programming skills, using MATLAB and another imperative programming language (such as C). Problem analysis and algorithm design, with examples drawn from simple numerical and discrete problems. Students can only receive credit for one of COMP 114, 115, or 116.

**Prerequisite:** MATH 231. We assume familiarity with univariate differential and integral calculus and the ability to manually solve a system of simultaneous linear equations.

## Invitation

Computers are powerful tools because of their flexibility; they can be programmed to deal with numerous tasks. And once people have written a program, we can, with a little more programming, effectively use their expertise.

COMP 116 has been created to address needs expressed (by Mathematics, Mathematical Sciences, Environmental Engineering, and the Carolina Environmental Program) for a one-semester introduction to programming for scientists. The course introduces many basics of programming (variables, data types, flow of control, modular design) that are common to many languages.

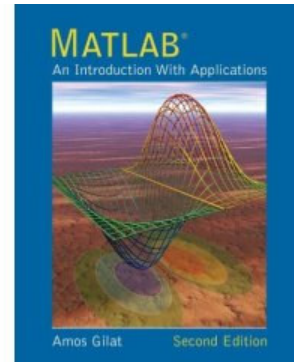
Learning a programming language is like learning spoken language. Texts and lectures are insufficient—one must use the language to make it your own. Substantial time with the computer is necessary to practice the language. This has implications for how to study:

- There is always more than one way to say something, although some ways will be more “elegant” than others. You learn to recognize elegant expressions as you become more familiar with a language and to use them as you become more skilled.
- Keep a record of things you learn in the lab, lecture, and recitation sections. Whether this is a formal lab notebook, or a small diary or PDA, find a way that works for you to record your insights and ideas.
- Languages classes are cumulative; don't fall behind. Ask for assistance from your fellow students, or from me, especially if you find yourself struggling.

**Textbook:** *MATLAB: An Introduction With Applications*, 2<sup>nd</sup> Edition, by Amos Gilat.

Publisher: John Wiley & Sons, Inc., 2004.

It should be in stock at UNC bookstore.



**Web site:** We use the Blackboard web site, <http://blackboard.unc.edu>, for access to handouts, email and discussion boards. You need your ONYEN to log in to Blackboard. (See <http://onyen.unc.edu> if you do not have an onyen. Forgotten passwords can be changed in the basement of Wilson if you bring your ID card.)

**MATLAB** (<http://help.unc.edu/restricted/?id=3684>): You can access MATLAB from a computer lab on campus (<http://help.unc.edu/?id=1908>) or from AFS Space, or a student edition can be purchased from the bookstore or <http://www.mathworks.com/store/index.html>.

### **Grading**

Quizzes: 10%    Assignments: 50%

Midterms: 15%    Final Exam: 25%

**Quizzes:** There will be a 10-15 minutes quiz almost every Wednesday. I will announce it in class on Monday. No makeup is given for missed quizzes, but the lowest score will be dropped.

**Assignments:** Every week there will be an assignment to write a program and turn it in using the electronic drop box on the Blackboard web site. Assignments are to be submitted before midnight on their due date (the same day next week, unless particularly notified). Once grading has begun, late assignments will not be accepted.

**Exams:** There will be a midterm and a final.

**Collaboration:** Collaboration on assignments IS encouraged. However whatever you hand in must be your own writing/typing. Good scholarship requires that all collaboration must be acknowledged. Thus, if you collaborate on the solution of a problem set, I expect that you list your collaborators at the top of the page. Collaboration on in-class evaluations (quizzes, midterms, final) is, of course, a violation of the Honor Code <http://www.cs.unc.edu/Admin/Courses/HonorCode.html>.

**Approximate Schedule:** (subject to change based on actual situations)

week	date	Topic	Assignment
1	6/21 R	Welcome, introduction, survey ( <b>QUIZ 1</b> )	
	6/22 F	Start matlab programming	Assignment 1.
2	6/25 M	Variables, vectors, matrices	
	6/26 T	Variables, vectors, matrices (continue)	
	6/27 W	Script files ( <b>QUIZ 2</b> )	
	6/28 R	2D plot & functions	
	6/29 F	Practice	Assignment 2.
3	7/2 M	Programming	
	7/3 T	Programming (continue) ( <b>QUIZ 3</b> )	
	7/4 W		
	7/5 R	Sort and search	
	7/6 F	Practice + review	Assignment 3.
4	7/9 M	<b>Midterm</b>	
	7/10 T	Go over midterm I, string	
	7/11 W	File I/O ( <b>QUIZ 4</b> )	
	7/12 R	Bioinformatics & PDB file	
	7/13 F	Recursion, Function & Debugging	Assignment 4.
5	7/16 M	Cells & structures	
	7/17 T	MATLAB GUI + 3D plot	
	7/18 W	C Programming ( <b>QUIZ 5</b> )	
	7/19 R	C Programming (continue)	Assignment 5.
	7/20 F	Clustering + Differential Equations	
6	7/23 M	Dynamic Programming	
	7/24 T	Review	
	7/25 W	Reading Day	
	7/26 R	<b>Final</b>	