

## MATLAB BOOTCAMP SYLLABUS – SEPTEMBER 2014

SIO 209, section 822598, 1 unit S/U

*Instructor:* Sarah Giddings, [sarahgid@ucsd.edu](mailto:sarahgid@ucsd.edu)

*Class meetings:* Sept 29 - Oct 2, every day, 10am-12pm, Nierenberg Hall, room 101

*Office hours:* every day 12-1pm, MESOM 365, or [email me](#) to set up an appointment

### Course Summary:

This course will provide a hands-on introduction to MATLAB. No prior experience is necessary. The course will cover variables, plotting, scripts, matrices and other ways to store data including NetCDF, loops, and an introduction to more advanced techniques. Course material including notes, homework, and .mat files will be posted here as the course progresses.

### Requirements:

You do not need any background with Matlab or computer programming. In order to follow along and do the homework, you will need to have access to a computer that runs Matlab. If your advisor cannot provide you with this, check with Lisa Lehmann (COAP only) or try the [virtual lab](#). Worst case scenario, buy a copy of the student version at the UCSD bookstore (\$100). You do not need to bring a laptop to class, but I highly encourage it. Code is learned best by practice.

### Credit & homework:

To get course credit, you must attend all 4 days of class and complete the daily homework. Homework will not be graded, it will be self-check. Again, you learn code best by doing!

### References:

#### *Textbooks:*

There are many textbooks covering Matlab, so you might check out the selection at the UCSD bookstore. Here are a couple of suggestions:

- Matlab, Third Edition: A Practical Introduction to Programming and Problem Solving by Stormy Attaway ([bookstore link](#)) ([Amazon link](#)). This one is well reviewed and recent.
- Physical Oceanography: A Mathematical Introduction with MATLAB by Reza Malek-Madani ([bookstore link](#)) ([Amazon link](#)). This book seems useful for those interested in using Matlab to solve numerical problems in physical oceanography. For those of you in different fields, look on-line, there are great books for applications to engineering, numerical methods, biology, etc.

#### *Online tutorials:*

- Mathworks (the company who developed Matlab) has an online tutorial as well as a detailed [users manual](#) is available.
- Regular Google searches work pretty well too as there is a very large user community and on-line responses to questions as well as application specific code sharing. Some code you will find through individual websites (e.g., [TEOS-10](#)) others you can find on the Matlab code [file exchange](#).

#### *Matlab help files (online and offline)*

All of the Matlab help files are available within the program and [online help](#). For functions, (e.g. the “plot” function), you can use the help command: `>> help plot` OR `>> doc plot`.

## **APPROXIMATE SCHEDULE**

### **Monday September 29<sup>th</sup>**

Workspace, startup, basic math, matrices & arrays, element-by-element vs. matrix math, symbolic algebra, scripts, best practices, basic plotting, saving figures, saving & loading data

### **Tuesday September 30<sup>th</sup>**

Basic statistics, basic fitting, Loading and saving .txt or ascii files, MATLAB dates, indexing, 2D plotting, other figure properties, get and set, characters & strings

### **Wednesday October 1<sup>st</sup>**

Functions, if statements, for & while loops, vectorizing code for efficiency, mapping

### **Thursday October 2<sup>nd</sup>**

Structures, cell arrays, Native MATLAB NetCDF, SNCtools NetCDF