Basic MATLAB for Oceanographers and Engineers (2 credits)
Fall 2013

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Class time: T 9:00 – 10:50 am
241 Owen Hall

Office hours: Mondays, 10:00 – 12:00, or by appointment

Class objectives: This course will provide an introduction to the numerical computing and graphics environment and programming language, MATLAB, and is intended for beginning graduate students in engineering, oceanography, atmospheric sciences and marine geosciences. The MATLAB desktop environment will be introduced and basic programming and data analysis skills will be developed, with an emphasis on writing optimized routines to analyze data sets utilizing matrix algebra and vectorization of functions. Basic graphics and visualization will be covered, including two-dimensional and three-dimensional graphing, contouring and movies. The course will emphasize hands-on computer lab experience during the lecture hours and out of class programming assignments.

Lecture Format:
• Hands on – log in when you arrive
• Review of previous homework
• New material
• Q&A

Textbooks:
• Numerous eBooks from the OSU Library (pick eBooks, search for MATLAB). Read on line or 28-day download.
• Online documentation and movies are extensive and excellent
• Tons of actual books, should you want a hard copy reference.

Assignments and grading:
• The course grade is based on weekly assignments.
• You may discuss your assignments with others and work through common issues in a group, but you must hand in your own original work.

ESSENTIAL: For you to have access, you MUST, prior to the first day of class, visit http://engr.oregonstate.edu/teach and create an account. ONLY students who are enrolled in the class will be able to create this required account.
• Assignments are due at the start of the next class. Late assignments can not be accepted.

How to get help:
• Ask your friends (or others)
• Online help – Matlab Central (http://www.mathworks.com/matlabcentral/) is a great place to start.
• Demos – Online or at the command prompt.
• Texts
• Ask me

Computer Lab Access:
• CEOAS Facilities
  o Burt I, Room 326
  o Strand Ag 316
  o Strand Ag 324
  o Weniger 535
  o Student GIS Lab, Burt II-178
• COE Facilities
  o Many (http://engineering.oregonstate.edu/computing/labs/186)
  o COE Computer Support (http://engineering.oregonstate.edu/computing/)

Tentative Class Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Oct 1</td>
<td>Introduction – MATLAB desktop and environment</td>
</tr>
<tr>
<td>2</td>
<td>Oct 8</td>
<td>Data types and arrays – addressing array elements</td>
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<tr>
<td>3</td>
<td>Oct 15</td>
<td>m-files, functions, and flow control</td>
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<tr>
<td>4</td>
<td>Oct 22</td>
<td>m-files, functions, and flow control</td>
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<tr>
<td>5</td>
<td>Oct 29</td>
<td>Matrix Algebra</td>
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<tr>
<td>6</td>
<td>Nov 5</td>
<td>Toolboxes, central limit theorem, Monte Carlo</td>
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<tr>
<td>7</td>
<td>Nov 12</td>
<td>Plotting and advanced plotting</td>
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<tr>
<td>8</td>
<td>Nov 19</td>
<td>Least squares, optimization</td>
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<tr>
<td>9</td>
<td>Nov 26</td>
<td>Images and maps, importing and exporting data</td>
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<tr>
<td>10</td>
<td>Dec 3</td>
<td>Inevitable overflow from previous weeks, wrapup, misc.</td>
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Assignment #0:
Please respond by email to me with the following information.

Name: ____________________________________________________________

Major: __________________ in the College of _________________

Year status:  Undergrad; 1\textsuperscript{st} year grad; 2\textsuperscript{nd} year grad; etc __________

What types of tasks do you anticipate using MATLAB for?

Are there any specific topics you would like covered in this course?

Do you already have experience with MATLAB? If so, how much?