

Department of Biomedical Engineering

BME 675

Computer Methods in BME

Fall 2012 Modified (8/31/2012)

Course Syllabus

Instructor

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Office Hours: Tuesday 4-5 and Wednesday 4-5 by appointment

Textbook

Mastering Matlab 7, Hanselman and Littlefield, 2004 or 2005, or newer version entitled
Mastering MATLAB, 2011

Other Information

MATLAB (download from NJIT website)
Each Matlab Toolbox has accompanying documentation.
Visual C++ (download from NJIT website) for last 2 classes

Course Requirements:

This is an advanced tools course covering MATLAB-based computing applied to BME research and development. It is NOT a programming course, but is focused on useful applications of computing that facilitate the collection, processing, analysis and presentation of experimental data. We will move very quickly and it is essential that the chapters have been read prior to each class. As can be seen from the course schedule, we will often cover material from a number of chapters in a single class. Classes will be a combination of lecture and studio. Programming style will be de-emphasized in favor of functional accomplishment.

Most classes will have a programming assignment that will be due the following week. Submission will be via Moodle. Grades will be based on these assignments. A major final project will also be required. There will be NO exams.

Final Project-50%

Homework/Studio Exercises- 50%

Some assignments will commence during class and will begin as group work. This will be particularly important during demonstrations of toolboxes as well as collection of data that depends on studio equipment. Code submitted for each assignment must be original, unless specified by the instructor.

Between classes, feel free to send questions via email, but please use the following in the subject header: **BME 675-That way your email will stand out from all others.**

Honor Code

The NJIT Honor Code will be strictly enforced. Any violation will be reported to the Dean of Students for resolution.

Course Schedule

9/4	Review of MATLAB Features and Differences	H&L 1-6, 10, 11
9/11	Functions/Subfunctions/Toolboxes	H&L 12
9/19	Data types/Cell Arrays and Structures	H&L 7-9
9/25	Object-Oriented Programming	H&L 33+ handout
10/2	Data Manipulation (integr./differ./interp./splines)	H&L 19-21
10/9	Human and Graphical User Interfaces	H&L 26-32
10/16	Graphical User Interfaces	H&L 31,32
10/23	Data Acquisition and Processing (serial, digital, analog i/o)	H&L 36 + Handout
10/30	Data Acquisition and Processing (filtering, freq anal)	DAQ Doc + Handout
11/6	Image Acquisition and Processing	Image processing Doc
11/13	Image Acquisition and Processing	Image processing Doc
11/27	Statistics and Data Analysis & Interfacing to Simulink	H&L 18 + Handouts
12/4	3D animation	SL3D Doc+ Handout
12/11	Accessing C and C++ functions and DLLs	H&L 34

Changes in Schedule will be made only with the approval of the class.

Course Software

This course requires the use of MATLAB both in the studio and at home. Matlab 7 (i.e. 2012a) and selected toolboxes can be downloaded at no cost from the NJIT Website at <http://ist.njit.edu/software/download.php>. The following toolboxes should also be downloaded at the same time. 32 bit versions are known to work with all these toolboxes, so you will use the 64 bit version at your own risk. If you have already downloaded 2011a or 2011b, there should be no problem using it in this course, however your license may expire mid-semester if you started using it last fall. Follow the instructions on the website to update your license.

- Simulink
- Data Acquisition Toolbox
- Image Processing Toolbox
- Image Acquisition toolbox
- Signal Processing Toolbox
- SL3D Toolbox
- Statistics toolbox