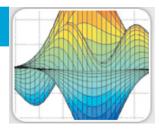
Winter 2011 Bi 199: Introduction to MatLab



Tuesdays and Thursday's, 1:00 to 2:30 PM in 100 Powell-Booth. The goal of this one term class is to introduce biology and chemistry graduate students to MatLab and its applications in biology and biochemistry.

Instructors:

Mary B. Kennedy

Davis Professor of Biology

Email: kennedym@its.caltech.edu

Ciro Donalek (Ph.D. in Applied Math and Computational Sciences)

Postdoctoral Fellow in Astronomy Email: <u>donalek@astro.caltech.edu</u>

Alexandre Cunha (Ph.D. in Computional Science and Engineering)

Staff of Moore Cell Center (CACR) Email: <u>cunha@cacr.caltech.edu</u>

Sean Upchurch (B.S. in Chemistry, M.S. in Biological Sciences) Staff, Wold lab, bioinformatics and scientific programming

Email: sau@caltech.edu

Santiago Lombeyda (M.S. in Computer Science) Staff of CACR (Specialist in Data Visualization)

Email: slombey@cacr.caltech.edu

T.A. Timothy Miles, Graduate student in Biology

Email: tmiles@caltech.edu

Required Text:

<u>Getting Started with MatLab</u> <u>A quick introduction for scientists and engineers</u> (2010, updated for version 7.8 release 2009a) by Rudra Pratap, Oxford University Press.

The book will be available through the Caltech web bookstore.

Required Software:

Caltech has a large number of site licenses for MatLab. These licenses work only when you are connected to a Caltech URL. Before the first class, please visit the Caltech Online Software Center: http://elms05.e-academy.com/caltech/ to download a copy of the latest release of MatLab onto your laptop computer. The software uses a network based licensing method that permits its use on campus. BRING YOUR LAPTOPS TO EACH CLASS.

General Plan:

About 30-60 minutes of each class will be devoted to lecture/demonstrations. The remaining time will be used by the students to work through problem sets and exercises on their own. There will be two or three instructors available during the entire class to answer questions and help.

Over the first 3 weeks, Dr. Kennedy will lead the students through several of the introductory tutorials in the required Textbook. Then, Dr. Donalek will provide more in-depth training on several of the

central aspects of MatLab that were introduced in the tutorials. Dr. Cunha will introduce the Image Analysis Toolbox and its applications in biological research. Mr. Upchurch will cover best practices for scientific programming. Finally, Mr. Lombeyda will introduce programs and methods for visualization of biological and biochemical data that can be used in conjunction with MatLab.

Approximate Schedule (We will be flexible with the schedule.):

Week 1	Jan 4, 2010	Kennedy: Introduction, Check Installations, Lesson 1 (Getting Started) and associated problems (page 17) TA: Miles
	Jan 6, 2010	Kennedy: Lesson 2 (Arrays and Vectors) and associated problems (page 21) TAs: Cunha and Miles
Week 2	Jan 11, 2010	Kennedy: Lesson 3 (Making and printing simple plots), and associated problems (page 25) TAs: Miles
	Jan 13, 2010	Kennedy: Lesson 4 (Intro to Script files, page 29), and Lesson 11 (Publishing Reports, page 58) and associated problems TAs: Cunha and Miles
Week 3	Jan 18, 2010	Kennedy: Lesson 5 (Function files), and associated problems (page 33) TAs: Miles
	Jan 20, 2010	Kennedy: Tutorial 6 (Working with Matrices, page 39), and Tutorial 9 (importing and exporting data, page 51) and associated problems TAs: Cunha and Miles
Week 4	Jan 25, 2010	Donalek: Data Structures, matrices and variables, and associated exercises. TAs: Kennedy and Miles
	Jan 27, 2019	Donalek: Functions and associated exercises TAs: Kennedy and Miles
Week 5	Feb 1, 2010 Feb 3, 2010	Donalek: Plotting data, adding simple statistics TAs: Miles Donalek: Scripting - loops and conditionals TAs: Kennedy and Miles
Week 6	Feb 8, 2010	Donalek: Matrix Arrays, Cell Arrays TAs: Kennedy and Miles
	Feb $10, 2010$	Donalek: Build your own GUI interface TAs: Kennedy and Miles
Week 7	Feb 15, 2010	Cunha: Image Processing, Formats and Intensity Transformations TAs: Kennedy and Miles
	Feb 17, 2010	Cunha: Image Processing: Filtering and Restoration TAs: Kennedy and Miles
Week 8	Feb $22, 2010$	Cunha: Image Processing: Mathematical Morphology TAs: Kennedy and Miles
	Feb $24, 2010$	Cunha: Image Segmentation TAs: Kennedy and Miles
Week 9	Mar 1, 2010	Upchurch: Best Practices for Scientific Programming TAs: Kennedy and Miles
	Mar 3, 2010	Lombeyda: Advanced Data Visualization Programs TAs: Kennedy and Miles
Week 10	Mar 8, 2010	Lombeyda: Advanced Data Visualization Techniques TAs: Kennedy and Miles
	Mar 10, 2010	Projects TAs: All