Introduction to MATLAB
ITP 168x (2 Units)

Fall 2015

Objective

Fundamentals of MATLAB: a high-performance numeric computation and visualization environment. Overview of linear algebra and matrix manipulation; using 2-D and 3-D plotting routines; programming in MATLAB; basic numerical analysis

Concepts

Overview of MATLAB features, problem-solving methodology. arrays; use of files, functions and data structures; programming; plotting; solution of linear algebraic equations; statistics and probability; numerical methods for calculus and differential equations; and basics of symbolic methods, 2D and 3D visualization of scientific data

Prerequisites

Recommended Preparation: Math 118x or Math 125

Instructor	Raymond Kim
Contacting the Instructor	raymonmk@usc.edu (213) 740-4542 Office: TBD
Office Hours	Listed under Contacts in Blackboard
Lab Assistants	Listed under Contacts in Blackboard
Lecture	TBD
Lab	TBD

Required Textbooks

None

Optional Textbooks

"Mastering MATLAB" Duane Hanselman, Bruce Littlefield. Pearson Education. ISBN: 9780136013303

Website

All course material will be on Blackboard (http://blackboard.usc.edu).

Grading

The following percentage breakdown will be used in determining the grade for the course.

Labs/Assignments	45%
Midterm Exam	25%
Final Exam	30%
Total	100%

Grading Scale

The following shows the grading scale to be used to determine the letter grade.

93% and above	A
90% - 92%	A-
87% - 89%	B+
83% - 86%	B
80% - 82%	B-
77% - 79%	C+
73% - 76%	C
70% - 72%	C-
67% - 69%	D+
64% - 66%	D
63% and below	F

Policies

Labs

Labs are assigned during class and must be completed before the end of the class period. Students will apply the lecture material presented in class to complete the lab. Knowledge of previous material will also be required, but not the focus of the lab.

A late submission for a lab will be given a score of 0. No student is allowed to anticipate labs, or to begin work on labs before the class has started. Once a lab is graded, a student may not submit another lab for credit. There are no makeup labs. The only exception is a medical/family emergency, provided the student notify the instructor and provide official documentation for the emergency.

Makeup labs must be performed under the supervision of the instructor or member of the teaching staff only.

Attendance and Drops

It is the student's responsibility to withdraw officially from a course.
Students are expected to attend all class meetings, and they must notify the instructor about absences due to illness prior to class. Student will be dropped from the class for excessive absences as well as for missing the first class meeting.

Class Policies

Students are expected to:
- Attend and participate in lecture discussions and critiques
- Attend and complete weekly labs and quizzes
- Manage and complete individual class projects

Students are responsible for completing assignments and projects by stated deadlines. Most assignments will be uploaded to the course's Blackboard site.

Late Work

Assignments and projects will be accepted for full 50% credit for up to 5 days after the due date. It is the responsibility of the student to contact the grader when posting late projects. After the due date, up to 24 hours after the time it was due, the student will receive at most 90% of the original credit for the assignment. Every 24 hour period after that will result in a 10% reduction of the available points on the assignment. After 5 days, the student will receive a 0 for the assignment.

Homework Submission

It is the responsibility of the student to ensure that all work is submitted properly. All homework assignments will be submitted through Blackboard. In issues of **incorrect submission**, the student will receive a 0 for the assignment and will not be allowed to resubmit the assignment for a grade once the grade has been entered.

If a student resubmits an assignment before the grading of that assignment has been done, the student will be graded based on their last submission. If the submission is late, it will be penalized for being submitted late.

Computer Software and Labs

Students will be required to complete assignments and projects using MATLAB. This software is available in the on-campus computer labs (http://www.usc.edu/its/spaces/computing_centers/index.html). In addition, MATLAB R2013a may be downloaded from the USC ITS website.

Cell Phone / Distraction Policy

Out of respect for all students, please turn off all phones or MP3 players and refrain from answering, texting, checking email, or updating Facebook / Twitter / etc. during class.

Syllabus / Course Changes

This syllabus is a guideline so it is each student's responsibility to note any changes that are made.

Incomplete and Missing Grades

Excerpts for this section have been taken from the University Grading Handbook, located at http://www.usc.edu/dept/ARR/grades/gradinghandbook/index.html. Please see the link for more details on this and any other grading concerns.

A grade of Missing Grade (MG) "should only be assigned in unique or unusual situations… for those cases in which a student does not complete work for the course before the semester ends. All missing grades must be resolved by the instructor through the Correction of Grade Process. One calendar year is allowed to resolve a MG. If an MG is not resolved [within] one year the grade is changed to [Unofficial Withdrawal] UW and will be calculated into the grade point average a zero grade points.

A grade of Incomplete (IN) "is assigned when work is no completed because of documented illness or other 'emergency' **occurring after the twelfth week** of the semester (or 12th week equivalency for any course scheduled for less than 15 weeks)."

Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *Scampus,* the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to your course instructor (or TA) as early in the semester as possible. DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday. Website and contact information for DSP http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu

Emergency Preparedness/Course Continuity in a Crisis

In case of emergency, when travel to campus is difficult, if not impossible, USC executive leadership will announce a digital way for instructors to teach students in their residence halls or homes using a combination of the Blackboard LMS (Learning Management System), teleconferencing, and other technologies. Instructors should be prepared to assign students a "Plan B" project that can be completed 'at a distance.' For additional information about maintaining your classes in an emergency, please access: http://cst.usc.edu/services/emergencyprep.html

Introduction to MATLAB
ITP 168x (2 Units)

Course Outline
Note: Schedule subject to change

Week 1 – Introduction
- Basics of MATLAB
- Overview of features and workspace
- Data types

Reading
Mastering MATLAB: Chapter 1, 2, 3

Assignment/Lab
None

Week 2 – MATLAB and Problem Solving
- Defining the Problem
- Developing the Algorithm
- Coding
- Debugging
- Documentation

Reading
Mastering MATLAB: Chapter 4, 7

Assignment/Lab
Assignment 1

Week 3 – Arrays
- Initialization and definition
- Array functions
- 2-D Arrays
- Multidimensional Arrays
- Processing Array elements
- Array sorting

Reading
Mastering MATLAB: Chapter 5, 6

Assignment/Lab
Assignment 2

Week 4 – Controls
- Flow of Control
- If-Else

- Switch
- Try-Catch
- Boolean Operators

Reading
    Mastering MATLAB: Chapter 10, 11.3-11.5

Assignment/Lab
    Assignment 3

Week 5 – Cell Arrays and Structures
- Cell Array Creation
- Manipulation
- Cell Functions
- Structure Creation
- Manipulation
- Structure Functions

Reading
    Mastering MATLAB: Chapter 8

Assignment/Lab
    Assignment 4

Week 6 – Loops
- For Loop
- While Loop

Reading
    Mastering MATLAB: Chapter 11.1-11.2

Assignment/Lab
    Assignment 5

Week 7 – Files and I/O
- Reading from a file
- Writing to a file
- Formatting output

Reading
    Mastering MATLAB: Chapter 13

Assignment/Lab
    Assignment 6

Week 8 – Midterm

Week 9 – Functions
- Function definitions
- Function arguments
- Function returns
- Embedded Functions

Assignment/Lab
    Assignment 7

Week 10 – Plots and Graphs
- Plot Types
- Plot formatting
- Multiple plots

Reading
    Mastering MATLAB: Chapter 25

Assignment/Lab
    Assignment 8

Week 11 – Data Manipulation
- Plot Fits
- Extrapolation and regression

Reading
    Mastering MATLAB: Chapter 18, 19, 20

Assignment/Lab
    Assignment 9

Week 12 – Differential Equations
- Introduction to DE's
- Solving DE's

Reading
    Mastering MATLAB: Chapter 24

Assignment/Lab
    Assignment 10

Week 13 – Linear Algebra
- Introduction to Linear Algebra
- Solving basic Matrix equations
- Modeling systems of equations
- Solving systems of equations

Reading
    Mastering MATLAB: Chapter 16

Assignment/Lab
    Assignment 11

Week 14 – Strings
- String Construction
- Number to String to Number
- String Evaluation
- String Functions
- Regular Expressions

Reading
    Mastering MATLAB: Chapter 9

Assignment/Lab
    Assignment 12

Week 15 – Advanced Topics
- Optimization
- Integration and Differentiation
- Symbolic Manipulator

Reading
    Mastering MATLAB: Chapter 22, 23

Assignment/Lab
    No Assignment

Final Exam
- Final Exam

Date, Time, and Place
    According to the final exam schedule on the Schedule of Classes