**Matlab Tutorial**

**Course Expectations**

**Course Learning Objectives**

Each student should be able to:

* Describe the Matlab desktop
* Explain the basic use of Matlab variables
* Explain the basic use of Matlab scripts
* Explain the basic mathematical operations in Matlab
* Explain the simple Matlab visualization techniques
* Explain simple Matlab programming

**Prerequisites**

* Some programming experience

**Resources**

**Presentations/Tutorials**

* [Matlab Tutorials](http://www.mathworks.com/support/learn-with-matlab-tutorials.html)
* Matlab Academy - <https://matlabacademy.mathworks.com/?s_tid=srchtitle>

**Required Readings**

* Desktop Basics - <https://www.mathworks.com/help/matlab/learn_matlab/desktop.html?s_cid=learn_doc>
* Matrices and Arrays - <https://www.mathworks.com/help/matlab/learn_matlab/matrices-and-arrays.html?s_cid=learn_doc>
* Array Indexing - <https://www.mathworks.com/help/matlab/learn_matlab/array-indexing.html>
* Workspace Variables - <https://www.mathworks.com/help/matlab/learn_matlab/workspace.html>
* Text and Characters - <https://www.mathworks.com/help/matlab/learn_matlab/character-strings.html>
* Calling Functions - <https://www.mathworks.com/help/matlab/learn_matlab/calling-functions.html>
* 2-D and 3-D Plots - <https://www.mathworks.com/help/matlab/learn_matlab/plots.html>
* Programming and Scripts - <https://www.mathworks.com/help/matlab/learn_matlab/scripts.html>
* Help and Documentation - <https://www.mathworks.com/help/matlab/learn_matlab/help.html>

**Classroom Activities**

**Presentations**

* Lecture Presentation *(“Matlab tutorial – 2021.pdf”)*

**Reinforcement Activities**

**Examples**

* Matlab Academy [-](https://www.mathworks.com/help/matlab/learn_matlab/help.html) <https://matlabacademy.mathworks.com/?s_tid=srchtitle>

**Videos**

* [Getting started with Matlab](http://www.mathworks.com/videos/getting-started-with-matlab-68985.html?s_cid=learn_vid)
* [Writing a Matlab Program](https://www.youtube.com/watch?v=pRsGM7H91VY)

**Assessment**

**Formative Assessment**

* Reflective Questions

1. What is the difference between the command window and workspace in the Matlab desktop?
2. What is the default precision for number in Matlab?
3. What are the built-in variables of Matlab that you cannot use as user-defined variables?
4. What is the difference between a matrix and a cell array in Matlab?
5. What symbol is used for comments in Matlab?
6. What is the difference between "clc" and "clear" in Matlab?
7. What is the purpose of "displ()"?
8. What is the difference between "standard" and "element-wise" operators?
9. What is the difference between "plot", "surf", and "contour" plots?
10. What is the difference between "if", "for", and "while" statements?
11. How do you get help in Matlab (and it is not “ask the TA”)?
12. How do you create a “string”?
13. How do you create a “row” vector”?
14. How do you create a “column” vector”?
15. What does the “length” command do?
16. How do you create a matrix?
17. How do you create a vector of “strings”?
18. What are the basic arithmetic operations in Matlab?
19. What is the symbol for exponentiation in Matlab?
20. What is the difference between the “round,” “floor”, and “ceil” commands?
21. Where can you find the functions provided by Matlab?
22. What is the transpose of a matrix?
23. How do you transpose a matrix in Matlab?
24. What is the difference between a dot-product and an outer-product?
25. How do you index a vector in Matlab?
26. How do you index a matrix in Matlab?
27. What is a function command?
28. What are the standard relational operators in Matlab?
29. What are the logical operators in Matlab?
30. What is the difference between a “struct” and a “cell” array in Matlab?

**References**

1. [Matlab documentation](http://www.mathworks.com/help/index.html)
2. [MIT Opencourseware, introduction to Matlab by Danilo Šćepanović](http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-094-introduction-to-matlab-january-iap-2010/)