

Fundamentos y técnicas de programación con MATLAB.

Curso presencial

Objetivo del curso:

Themes of data analysis, visualization, modeling, and programming are explored throughout the course. In the latter stages of the course it includes concepts that form the foundation for writing full applications, developing algorithms, and extending built-in MATLAB capabilities.

Requisito(s):

Undergraduate-level mathematics and experience with basic computer operations.

Descripción del curso:

This course starts with a comprehensive introduction to the MATLAB® technical computing environment and a hands-on experience using the features in the MATLAB® language to write efficient, robust, and well-organized code.

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Emmanuel Olivar Domínguez, egresado de la Universidad Autónoma de la Ciudad de México (UACM), cuenta con amplia experiencia en el mantenimiento preventivo y correctivo de equipo electrónico industrial y comercial, además de utilizar tecnología Mathworks (MATLAB y Simulink) por más de cinco años. Se especializa en las áreas de control e instrumentación con la finalidad de apoyar en la solución de las problemáticas que se puedan presentar en éstas, además de utilizar diversas herramientas con el fin de desarrollar controladores aplicados a la industria.

Actualmente ocupa el cargo de Ingeniero de Aplicación MATLAB en MultiON Consulting S.A. de C.V. en donde se dedica a la resolución de problemas de índole computacional que enfrentan organizaciones tanto públicas como privadas.

Temario

**El manual del curso se encuentra en inglés.*

1. Working with the MATLAB® User Interface.
 - 1.1 The MATLAB® Desktop.
 - 1.2 Customizing the Desktop.
 - 1.3 Interactive Importing.
 - 1.4 Variables in the Base Workspace.
 - 1.5 The Variable Editor.
 - 1.6 New Variables.
 - 1.7 Saving and Loading Variables.
 - 1.8 Plotting the Data.
 - 1.9 Plot Tools.
 - 1.10 Multiple Plots.
 - 1.11 Formatting the Plot.
 - 1.12 Basic Fitting.
 - 1.13 Exporting to Another Application.
 - 1.14 Shortcuts.

2. Variables and Commands.
 - 2.1 Entering commands.
 - 2.2 Getting Data into MATLAB®.
 - 2.3 Assigning Values to Variables.
 - 2.4 Using Built-In Functions and Constants.
 - 2.5 Plotting.
 - 2.6 Plot Options.
 - 2.7 Obtaining Help.
 - 2.8 Creating Characters and Strings.
 - 2.9 Annotating Plots.
 - 2.10 The Command History.
 - 2.11 The MATLAB® Editor.
 - 2.12 Running a Script.
 - 2.13 Adding Plots.

3. Analysis and Visualization with Vectors.
 - 3.1 Vectors, Matrices, and Arrays.
 - 3.2 Array Operations.
 - 3.3 Mathematical Functions.
 - 3.4 Statistical Functions.
 - 3.5 Indexing into Vectors.
 - 3.6 Changing Values in a Vector.

- 3.7 Entering Vectors Manually.
 - 3.8 Creating Vectors of Equally Spaced Values.
 - 3.9 Accessing Data in Vectors.
 - 3.10 Multiple Figures.
 - 3.11 Additional Vector Plot Types.
 - 3.12 Axis Control.
 - 3.13 Providing Help and Documentation.
 - 3.14 Publishing Code.
4. **Analysis and Visualization with Matrices.**
- 4.1 Concatenating Arrays.
 - 4.2 Creating Matrices with Functions.
 - 4.3 Accessing Data in Matrices.
 - 4.4 Matrix Operations.
 - 4.5 Array Operations.
 - 4.6 Matrix Mathematics.
 - 4.7 Mathematical Functions.
 - 4.8 Data in the MATLAB® Environment.
 - 4.9 Plotting Multiple Columns.
 - 4.10 Matrix Visualization.
 - 4.11 Reshaping.
5. **Dates and Times.**
- 5.1 Dates and Durations.
 - 5.2 Creating Datetime Variables.
 - 5.3 Date Arithmetic.
 - 5.4 Displaying and Plotting Dates
 - 5.5 Extracting Date Components.
 - 5.6 Extracting Duration Components.
 - 5.7 Making Other Kinds of Plots with Dates.
6. **Tables of Data.**
- 6.1 Storing Data as a Table.
 - 6.2 Operating on Tables.
 - 6.3 Extracting Portions of a Table.
 - 6.4 Extracting Data from a Table.
 - 6.5 Modifying Tables. 6.6. Operating on Tables.
 - 6.6 Exporting Tables.
7. **Conditional Data Selection.**
- 7.1 Logical Operations and Variables.
 - 7.2 Combining Logical Conditions.

- 7.3 Logic with Dates.
- 7.4 Finding and Counting.
- 7.5 Logical Indexing.

- 8. **Analyzing Data from Files.**
 - 8.1 Importing Data Programmatically
 - 8.2 Dealing with Missing Data.
 - 8.3 Locating Missing Values.
 - 8.4 Fitting a Polynomial.
 - 8.5 Adding a Theoretical Curve.
 - 8.6 Specifying Color.
 - 8.7 Customizing Plots.
 - 8.8 Creating Multiple Axes.
 - 8.9 Customizing Axes.

- 9. **Flow Control.**
 - 9.1 User Interaction.
 - 9.2 Flow control.
 - 9.3 For-Loops.
 - 9.4 Determining Size.
 - 9.5 Indexing into Cell Arrays.
 - 9.6 While-Loops.

- 10. **Writing Functions.**
 - 10.1 Creating functions
 - 10.2 Calling functions
 - 10.3 Workspaces.
 - 10.4 Calling Precedence.
 - 10.5 The MATLAB® Path.
 - 10.6 Debugging.
 - 10.7 Using breakpoints
 - 10.8 Examining Values.
 - 10.9 Ending Debugging.
 - 10.10 MATLAB® Data Types.
 - 10.11 Combining Heterogeneous Data with Structures.

- 11. **Utilizing Development Tools.**
 - 11.1 Obtaining Folder Overviews.
 - 11.2 Analyzing Code in the Editor.
 - 11.3 Resolving Dependencies.
 - 11.4 Avoiding Bugs in Comparisons.
 - 11.5 Measuring Performance.

11.6 Finding Bottlenecks.

12. Verifying Application Behavior.

- 12.1 Writing test scripts.
- 12.2 Running test scripts.
- 12.3 Testing for Behavior.
- 12.4 Using test functions.
- 12.5 Passing Commands as an Input.
- 12.6 Adding Pre- and Post-Test Tasks.

13. Creating Robust Applications.

- 13.1 Validating Function Inputs.
- 13.2 Generating Custom Warnings and Errors.
- 13.3 The MException Object.
- 13.4 The try-catch Construct.
- 13.5 Setting Default Function Inputs.
- 13.6 Creating Flexible Function interfaces.
- 13.7 Parsing Property-Value Lists.

14. Structuring Code.

- 14.1 Private Functions.
- 14.2 Local Functions.
- 14.3 Nested Functions.
- 14.4 Function Handles.
- 14.5 Anonymous Functions.
- 14.6 Changing the Interface with Anonymous Functions.
- 14.7 Precedence Rules.
- 14.8 Comparison of Function Types.

15. Structuring Data.

- 15.1 Data Types
- 15.2 Cell and Structure Arrays.
- 15.3 Extracting Data.
- 15.4 Concatenation and Conversion.
- 15.5 Converting Cells and Structures.
- 15.6 Other Data Types.
- 15.7 Custom Data Types.

16. Managing Data Efficiently.

- 16.1 Preallocation Cells and Structures.
- 16.2 Vectorization.
- 16.3 Applying Scalar Functions to Arrays.

- 16.4 Vectorizing and Memory.
- 16.5 Copy-on-Write Behavior.
- 16.6 In-Place Optimizations.

17. Creating a Toolbox.

- 17.1 Organizing Custom Documentation.
- 17.2 Creating Documentation Pages.
- 17.3 Packaging the Toolbox.
- 17.4 Distributing the Toolbox.



MultiON es una empresa 100% mexicana fundada en 1989 por el ingeniero y maestro en administración Joaquín Antonio Maury González, durante sus estudios de doctorado. MultiON ES LÍDER EN México y Latinoamérica en la comercialización, soporte y capacitación de cómputo científico y técnico: software y hardware para la ciencia, la educación, la industria y los servicios.

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