

# Maple Training



## Get Productive, Fast!

Our training programs are carefully designed to ensure that you and your colleagues get the most out of Maplesoft products in the shortest possible time. All our instructors are highly skilled in the use of our products, having been deeply involved in many engineering projects across a wide range of applications. Our instructors will help you to bring your skill level from novice to highly productive in a matter of days, guiding you through best practices and helping you avoid pitfalls.

The core Maple™ training course is a two day program. The course can then be extended to cover more advanced topics, and further extended to allow you to complete your first application with the help of your instructor.

**Day 1:** The Basics: Getting Started with Maple

**Day 2:** Intermediate Techniques

**Day 3:** Advanced and Specialized Topics (*Optional*)

**Day 4 and Beyond:** Developing Your Own Application

**Maple™**

# Maple Training Course Outline

## Day 1: The Basics

The first day delivers the fundamental skills you need to be a successful Maple user. A series of exercises ensure attendees acquire and retain the skills demonstrated throughout the day.

- Introduction to the Document Interface
- Navigating the help menu and accessing support resources
- Entering and editing math expressions
  - Using the palettes and the keyboard
  - Simple calculations and numerical formatting
  - Equation labels to reference and manipulate results
- Working with variables and functions
  - Creating variables and functions
  - Scope and evaluation precedence
  - Piecewise functions
  - Suppressing/displaying intermediate results
  - Clearing memory space
- Entering and editing text
  - Customizing text formats and styles
  - Switching between math and text
- Formatting a document
  - Headers/footers (calculation header blocks)
  - Inserting whitespace and sections/subsections
  - Importing/inserting pictures, sketching canvas
- Introduction to context-sensitive menus
  - Point-and-click differentiation, integration, matrix manipulation, plotting
- Basic Maple commands
  - Symbolic and numeric solution of equations
  - Differentiation, integration
  - Command completion
  - Introduction to Maple packages
- Basic plotting
  - Plotting expressions and functions
  - Formatting and overlaying plots
- Basic data structures
  - Expression sequences, lists, sets, arrays
  - Manipulating and referencing data structures
- Introductory Maple programming
  - Choosing between document or worksheet mode
  - Creating simple procedures using looping and conditional statements

## Day 2: Intermediate Techniques

The second day builds on the earlier topics, and helps you build compelling Maple applications. Given the interests of the attendees, certain subjects may be emphasized or not covered. Please discuss your needs with your trainer before the session.

- Solving Differential Equations
  - Entering ODEs in different notations
  - Symbolic and numeric solutions
  - ODE Assistant and command-based solutions
  - Plotting and visualizing solutions
- Matrix and Vector Computations
  - Data structures: Matrix, Vector
  - Creating, manipulating and referencing matrices and vectors
  - Matrix math and linear algebra (for example, solving linear systems)
- Data Analysis
  - Importing and plotting data (with context-sensitive menus and commands)
  - Curve fitting, single-variable regression
  - Data statistics (standard deviation, variation, R-squared, etc.)
- Dynamic Systems
  - Creating dynamic system objects (transfer functions, differential equations, state space)
  - Converting between different representations (context-sensitive menus and commands)
  - Bode/Phase/Nyquist/Root-locus plots
  - Discretizing transfer functions
- Optimization
  - Finding minima/maxima
  - Least-squares and multivariable regression techniques for model fitting
  - Linear programming
  - Global optimization (requires the Maple Global Optimization Toolbox)
- Creating GUIs and interactive documents
  - Sliders, buttons, etc.
  - Fine-tuning the look of an interactive document
  - Scripting behavior
  - Deploying to the web (requires MapleNet™)

## Day 3: Advanced and Specialized Topics (Optional)

The third day covers topics chosen by attendees in greater depth. The following are just a sample of the topics that can be covered. Since only a small number of topics can be covered in a single day, please discuss your interests with your trainer to determine what can be reasonably achieved in the time available.

- Signal Processing
  - FFTs/IFFTs
  - Basic windowing and filtering
- Advanced Programming
  - Preparing procedures for code generation
  - Creating reusable and deployable code
  - Parallel and multithreaded programming
- Interfacing with MATLAB®
  - Transferring data between MATLAB® and Maple
  - Using Maple from MATLAB® and vice versa
  - Importing and translating MATLAB® Code
- Using Maple in Other Applications and Using External Code in Maple
  - OpenMaple™ API
  - Interfacing Maple with Visual Basic®/external C programs
  - Using externally-compiled DLLs in Maple
- Connectivity with CAD tools (NX®, SolidWorks®, Autodesk Inventor®)

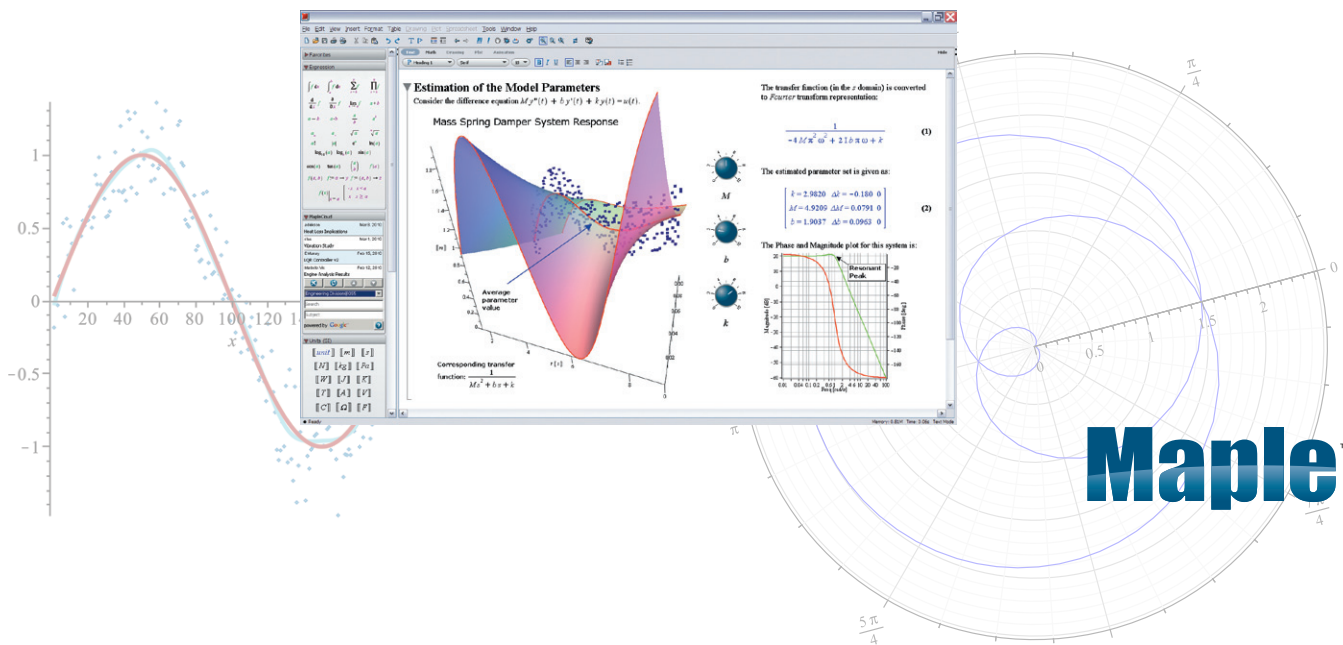
## Day 4 and Beyond: Building your Own Application (Optional)

This is your opportunity to use the knowledge from days 1, 2 and 3 to develop a Maple solution that is specific to your needs. It is strongly recommended that you include at least one day of application building in your training to make the course as relevant as possible to the work that you do. Your instructor will work with you on planning and building a suitable proof-of-concept model that will provide a good starting point for further development after the course is over.

To ensure the success of this session, it is important that you provide a description of what you want to achieve in advance. Your instructor can help you determine how many days of training will be required to meet your goals or what would be achievable in the time you have available.

In advance of the session, you will need to provide:

- Description of analysis you would like to develop (technical references would be useful)
- Domain expertise that will be required to develop the analysis (engineering, statistics, signal processing, etc.)
- Target user for the analysis (for example, expert, technician, unskilled)
- Specific areas of focus and priorities
- What you would consider to be a successful outcome for this session



## Additional Options

### Custom Content

This course is structured to allow any attendee with little or no prior knowledge of Maple to fully understand the basics of the product before getting into more advanced materials. If you have different requirements, we can work with you to address your needs. Please contact your Maplesoft representative to discuss your requirements further.

### On-line Training

On-line training is also available. Training is delivered live using WebEx® technology, which permits meaningful interaction with the instructor throughout the course. Please contact your Maplesoft representative for details.

### Application Development Support Service

Harness the knowledge and experience of our Application Engineers to help you complete your Maple project even faster! An Application Development Support contract provides you with full access to a wide range of modeling experts who can provide answers and advice quickly to help keep your projects moving. They can even work directly with you over a WebEx session, so you can test out ideas instantly, together. Please contact your Maplesoft representative for more details.

## On-site requirements

You are responsible for providing suitable training facilities for the number of attendees, computers with all necessary software pre-installed, and data projection equipment for the instructor. Temporary licenses for Maplesoft products can be provided if required.

[www.maplesoft.com](http://www.maplesoft.com)



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