AWR® Training Classes 09

AWR Training For Efficient High-Frequency Design

OVERVIEW

At AWR, we are constantly expanding and improving the quality of our training courses so that you, our customer, are able to obtain the most value possible from our software products. We realize there is not one way to teach.

Each of us has our own way to learn new information. With this in mind AWR offers a host of training courses with delivery methods that range from in-class lectures to hands-on exercises.

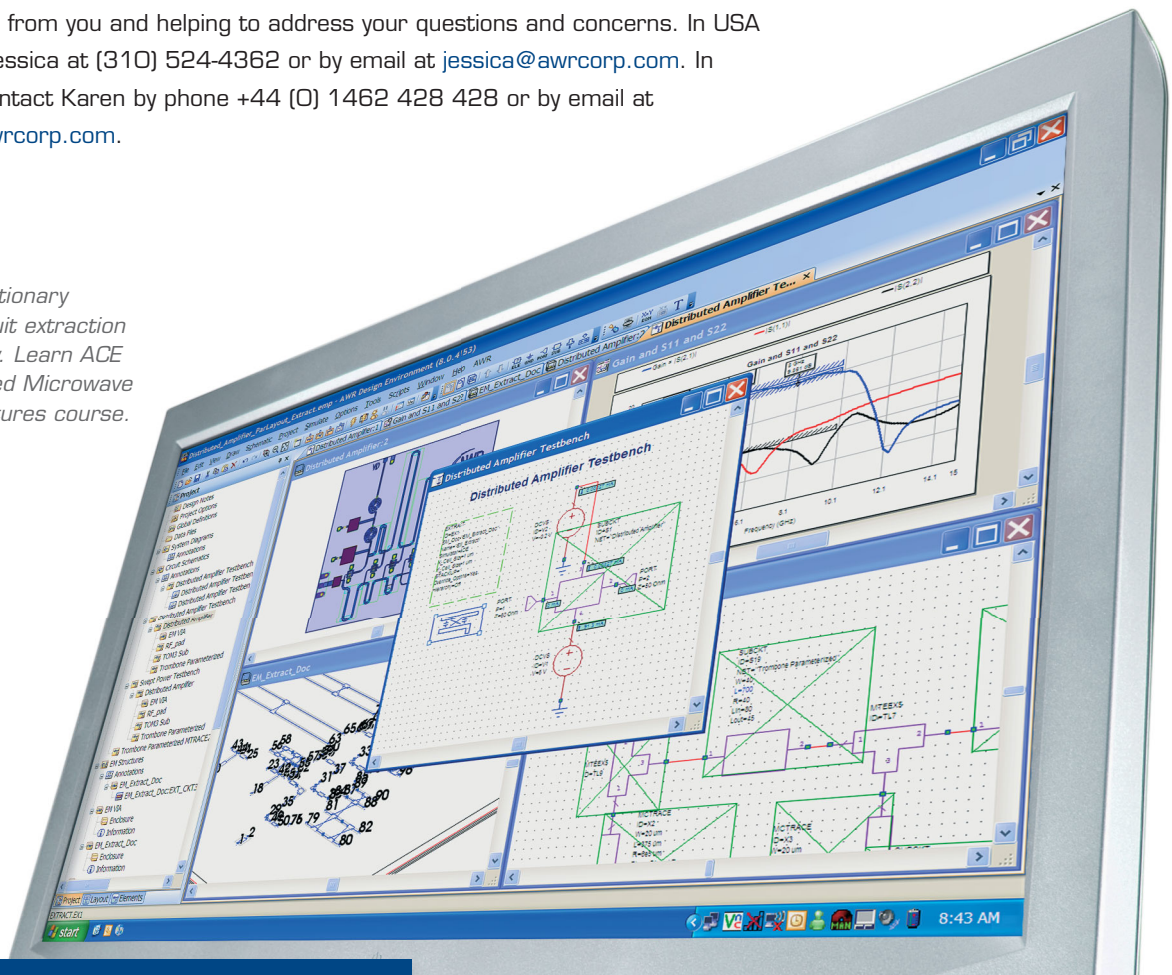
TRAINING COURSE OFFERING

- Microwave Office® (MWO) for Designers, a 3-day course
- Advanced MWO Features, a 3-day course
- Visual System Simulator™ (VSS) for Designers, a 2-day course
- Analog Office® (AO) for Designers, a 3-day course
- NEW COURSE: Electromagnetic (EM) Simulation for Designers, a 2-day course

All of the above training courses are taught at a training facility near you on a periodic basis. The current schedule of courses is available on our website http://web.awrcorp.com/Usa/News–Events/Events/Training. The courses do fill up quickly, so early registration is recommended!

QUESTIONS OR CONCERNS

What if you aren't sure which course is right for you? Give us a call and we'll do our best to make sure you fi nd a solution that works for you – whether it be a video training module or an on-site customized course. We always look forward to hearing from you and helping to address your questions and concerns. In USA contact Jessica at (310) 524-4362 or by email at jessica@awrcorp.com. In Europe contact Karen by phone +44 (0) 1462 428 428 or by email at karen@awrcorp.com.



The revolutionary ACE™ circuit extraction technology. Learn ACE in Advanced Microwave Office Features course.

Detailed Course Agendas

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MWO FOR DESIGNERS - 3 DAYS

Intended audience:

This 3-day course is intended for engineers who desire a working knowledge of Microwave Office. The attendee will learn the essential features of the software necessary to insure success in their day to day work. The concepts are explained and reinforced with interactive exercises. If you are new to Microwave Office or have a desire to be more effective in your use of Microwave Office, this is the course for you.

Day 1: Overview of Microwave Office

- The Microwave Office Environment
- Simulation methods overview: linear, harmonic balance, and time domain
- Design methodology: the overall design process in Microwave Office: the interaction between schematic, layout, and circuit and electromagnetic simulation
- Linear circuit simulation: the working details of using Microwave Office for linear circuit design; an extended linear amplifier design is used

Day 2: Circuit simulation and introduction to layout

- Non-linear circuit simulation: using the harmonic balance method for nonlinear circuits in Microwave Office
- A power amplifier example is used to illustrate common measurements, including compression, IP3 and more
- Tuning, optimization, and yield analysis
- Layout overview: how layout works in Microwave Office

Day 3: Using layout and EM simulation

- Schematic layout: understanding how layout and schematic circuit views interact
- Artwork cells: how to create and use artwork cells effectively
- Electromagnetic simulation: using the EM Socket™ technology effectively. Topics include import of layout cells, electrical extraction, and correct setting up of the EM environment.
- An introduction to EMSight™ and AXIEM™: AWR's embedded EM simulators in Microwave Office

ADVANCED MWO FEATURES - 3 DAYS

Intended audience:

This 3-day course should be taken by the designer who wants to be able to use the advanced features in Microwave Office. The attendee is shown how to customize the software to meet his or her specific needs so that it can be used to its full potential. The course is broken up into four major sections: layout, circuit simulation, electrical extraction, and scripting.

A prerequisite for this course is a knowledge of Microwave Office at the level of the material in Microwave Office for Designers. (We will be happy to advise you which is the right course for you.)

Day 1: Layout

- Essential layout concepts
- Control of schematic layout and PCells
- Advanced artwork cells and library control
- Negative layers and ground floods
- Layout user interface and control
- Layout tips and tricks
- EM layout concepts

Day 2: Circuit simulation

- Essential circuit simulation concepts
- Advanced harmonic balance control in APLAC® and MWO HB
- Transient setup and control using APLAC and HSPICE
- Simulation control: simulation filters and switch views
- Port control
- XML library control

Day 3: Extraction and scripting

- iNets™
- Electrical extraction: including ACE – Automated Circuit Extraction
- Equations and scripting

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VSS FOR DESIGNERS - 2 DAYS

Intended audience:

This 2-day course is intended for designers who desire a working knowledge of system simulation. Attendees will explore the concepts of sampling frequency, data rate, and center frequency as well as how to make accurate spectral measurements in VSS while keeping in mind resolution bandwidth (RBW) and sampling frequency. In-depth looks into RF models and overviews of Adjacent Channel Power (ACPR), Error Vector Magnitude (EVM), and RF budget analysis measurements will also be covered. Throughout the course various "hands-on" examples will be used to illustrate and reinforce the above mentioned concepts and topics.

Day 1: Overview of VSS

- VSS user environment
- Sampling, frequency, and data rate
- RF budget analysis
- Spectral measurements

Day 2: System analysis with VSS

- ACPR, and EVM examples
- Complete end-to-end BER example
- Filters in VSS
- Phase noise modeling
- File based RF models

ANALOG OFFICE FOR DESIGNER - 3 DAYS

Intended audience:

This 3-day course gives a working knowledge of Analog Office (AO), the tool of choice for RF and high performance analog integrated circuits (IC). The course emphasizes how IC design, simulation, and layout are carried out in the AO environment. Topics covered include iNet layout technology, and electrical extraction methodologies. Detailed, hands-on examples are used throughout the course to reinforce important concepts.

Day 1: Overview of Analog Office

- An overview of Analog Office
- Analog and RFIC design methodology
- Library Process Design Kits (PDK) fundamentals

Day 2: Circuit simulation and user environment

- Transient setup and control using APLAC and HSPICE
- Harmonic balance: setup and control
- UI control: switch views, simulation filters, tuning, and optimization
- Managing large projects: team design environment

Day 3: Layout

- Layout fundamentals
- iNets
- Electrical extraction: lumped element models and EM extraction
- Interconnect models: inductors
- Finishing the layout: DRC, LVS, import/export

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EM SIMULATION FOR DESIGNERS- 2 DAYS

Intended audience:

If you have ever wanted to try an EM simulator, or want to become a more powerful user of the simulator you already have, this course is for you.

The focus of this course is on understanding important EM simulation concepts, not just on "driving" the software.

Important EM concepts are illustrated using AWR's AXIEM and EMSight, the built-in method of moments simulators in Microwave Office. The topics discussed will be valuable for designers using other EM tools.

The topics covered include:

- Ports: proper use and calibration. When is calibration necessary?
- Fine control of EM simulation: mesh control
- EM optimization
- Understanding grounding issues in EM Simulators
- Simulating lossy metal, impedance boundary conditions and thick metal issues.
- Simulation control: direct and iterative solver issues.
- Understanding the issues in common geometries: package and board transitions, spiral inductors, and distributed filters.

Day 1: Overview

- EM in modern high-frequency circuit simulation
- The EM simulation environment in MWO
- Ports: proper use, calibration
- Grounding concepts in EM simulators

Day 2: EM modeling and simulation

- Modeling loss and impedance boundary conditions
- Approaches to Thick Metal
- Fine control of EM simulations: mesh control
- Simulation issues in modeling interconnects: inductors, packages, boards, distributed filters.
- EM optimization

ON-SITE CUSTOMIZED TRAINING

We appreciate that you and your colleagues may prefer training at your job site. No problem. We can also customize the content of any course to meet your specific interests. Maybe you wish to emphasize layout, EM simulation, or circuit simulation in a training course more than other material. As our material is designed to be modular, it is quickly and easily customizable by you and for you. Our expert trainers will help you select the right combination of modules that best meet your needs.

Here's how it works. We have configured our training material into multiple ½ day modules. You simply pick the modules you need, and leave the rest to us.

Some of our more popular ½ day modules are:

Overview/Introductory: (These modules do not require any prior experience with MWO)

- An introduction to Microwave Office
- An introduction to EM simulation in Microwave Office
- An introduction to layout in Microwave Office

Circuit simulation: (Pre-requisite knowledge of MWO)

- Linear / Harmonic Balance simulation for Designers
- Time – Domain simulation (APLAC/HSPICE)
- EM Simulation: How to effectively use a moment method simulator. (Assumes knowledge of Introduction to EM simulation in MWO.)

Layout: (Pre-requisite knowledge of Layout)

- Layout for designers
- Layout setup and library maintenance and control
- iNets and extraction

User Environment

- Scripting

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