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ANSYS Course Catalog 2026

High-Frequency Devices

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Basic Course.
Introduction to ANSYS HFSS

Duration — 4 days

The course covers the process of setting up a project in ANSYS HFSS for the analysis of basic antennas and microwave (RF) devices.

Participants will become familiar with the graphical user interface of ANSYS Electronics Desktop (AEDT), where the HFSS (High Frequency Structure Simulator) tool is integrated. The course walks through the full HFSS workflow, including geometry creation, definition of boundaries and simulation domains, wave and lumped ports, solution setup, frequency sweeps, and post-processing of results.

Post-processing includes plotting S-parameters and visualizing electromagnetic fields on geometry. The course is practice-oriented, with approximately 60% of the time dedicated to hands-on exercises and 40% to theoretical concepts.

In addition, the course introduces high-performance computing (HPC), parametric studies, and optimization (Optimetrics) in ANSYS HFSS.

Course Outline:

- Boundary conditions and simulation domain
- Project setup: meshing and frequency sweep
- Post-processing: S-parameters and field visualization on geometry
- Geometry creation in ANSYS HFSS
- Wave ports and lumped ports
- High-performance computing (HPC) and optimization analysis (Optimetrics)

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Basic Course.
PCB Analysis in ANSYS HFSS 3D Layout

Duration — 4 days

This is a basic course on printed circuit board (PCB) analysis using ANSYS HFSS 3D Layout within ANSYS Electronics Desktop (AEDT). The course is intended for users who are just starting to work with this software.

It covers the user interface, PCB layer visualization, layout handling, ports, vias (interlayer connections), definition of simulation boundaries, and more. Practical sessions include analysis of a differential via transition, a spiral inductor, a planar antenna array, a PCB section, and a mobile phone example.

Course Outline:

- Working with models in ANSYS HFSS 3D Layout and data visualization
- Solvers, mesh generation, and solution setup
- Types of ports in ANSYS HFSS 3D Layout
- Simulation domain boundaries
- Eye diagram extraction and time-domain reflectometry (TDR)
- Preparing a mobile phone model for analysis

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Basic Course.
Fundamentals of ANSYS SIwave

Duration — 4 days

ANSYS SIwave is an advanced tool for the analysis and design of complex printed circuit boards (PCBs). It enables the extraction of S-parameters and RLCG characteristics. ANSYS SIwave supports a wide range of analyses, including impedance scanning, DC IR drop analysis, and time-domain reflectometry (TDR).

Course Outline:

- Setting up Signal Integrity (SI) analysis, including impedance scanning, SYZ, and TDR
- Setting up Power Integrity (PI) analysis, including SYZ and RLGC
- Configuration of PCB components (R, L, C), ports, and terminations
- Setup of SPICE models and S-parameter components
- DC IR drop analysis of a PCB

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Specialized Course.
Working with 3D Components, Boundaries, Ports, and Mesh in ANSYS HFSS

Duration — 2 days

The course covers full 3D modeling of high-frequency structures using the finite element method (FEM) in ANSYS HFSS. It includes hierarchical placement of 3D components in different coordinate systems within a single HFSS project.

Topics also include working with boundary conditions for 2D surfaces and 3D absorbing boundary conditions for volumetric structures. Special attention is given to wave port setup (including port sizing, 2D field distributions, operating modes, etc.).

In addition, the course covers the operation of the FEM solver, adaptive mesh refinement, meshing strategies for multi-resonant structures, mesh filling, and solution setup.

Course Outline:

- Working with 3D components in ANSYS HFSS
- Boundary conditions
- Port setup in ANSYS HFSS: operation and application of different port types for various problems
- Features of mesh generation using the FEM method

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Specialized Course.
Antenna Analysis in ANSYS HFSS

Duration — 4 days

The course focuses on working in ANSYS HFSS through antenna analysis examples. It covers boundary conditions (Absorbing, Radiation PML/ABC, Radiation, FE-BI), as well as near-field and far-field calculations. The course also includes dynamic linking with the Circuit Design environment and optimization using Optimetrics.

It addresses modeling using the finite element (FE) solver, which generates volumetric meshes based on the finite element method.

Additionally, the course introduces Boundary Integral (BI) methods for creating 2D surface meshes and analyzing large electromagnetic structures, including IE regions, Physical Optics (PO), and the SBR+ method.

The final sections cover hybrid FE-BI approaches (Finite Element – Boundary Integral).

Course Outline:

- Near-field and far-field analysis
- Excitations and various types of polarization
- Boundary conditions for antenna analysis
- Dynamic linking with the circuit editor (matching problem example)
- Solving optimization problems
- Integral Equation (IE) region
- Antenna analysis using hybrid regions and boundary integral methods (IE, PO, SBR+)
- Solving problems using hybrid regions

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Specialized Course.
ANSYS HFSS SBR+: Antenna Placement Analysis on Platforms

Duration — 2 days

The course focuses on the SBR+ method in ANSYS HFSS. It covers antenna placement on electrically large platforms and the calculation of antenna coupling.

Practical sessions include analysis of an antenna mounted in a vehicle side mirror and the influence of the car body on antenna performance. The course also examines coupling between a mobile antenna inside the vehicle and an antenna in the rear-view mirror, as well as coupling between an in-cabin Wi-Fi antenna and an external antenna located in a garage, taking into account the material properties of the garage and road surface.

Course Outline:

- Use of 3D components
- Antenna placement on electrically large platforms
- Antenna coupling analysis
- Use of SBR+ for coupling analysis between antennas in a vehicle and in a garage

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Specialized Course.
Analysis of Layered Structures in ANSYS HFSS 3D Layout

Duration — 3 days

The course covers the analysis of layered structures using ANSYS HFSS 3D Layout within the ANSYS Electronics Desktop (AEDT) environment.

It includes integration of 3D components and PCB elements in HFSS 3D-Layout, as well as optimization and analysis of passive and active circuits.

Course Outline:

- 3D components in ANSYS HFSS 3D Layout
- Optimization of via (interlayer transition) structures
- Modeling and analysis of a microstrip filter
- Dynamic linking between ANSYS HFSS 3D Layout and the Circuit editor
- ECAD Xplorer: preprocessing large GDSII files before importing into ANSYS HFSS 3D Layout

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Specialized Course.
PCB Analysis in ANSYS HFSS 3D Layout

Duration — 3 days

The course covers high-speed PCB analysis using ANSYS HFSS 3D Layout. It includes working with Padstack to define PCB layer structures and creating differential via transitions with ground planes across multiple layers.

It also demonstrates integration of a package model, PCB, and IBIS model within a single environment using the Nexxim transient simulator in ANSYS Electronics Desktop (AEDT).

The course includes configuring a PCB model for eye diagram analysis and covers device optimization techniques.

In addition, participants will set up connectors, packages, and PCB models within one environment, select appropriate solvers, and perform DC IR drop analysis.

Course Outline:

- ANSYS HFSS 3D Layout: Working with the Padstack tool for PCB layer configuration
- PCB assembly process and integration of IBIS controllers
- PCB setup for eye diagram analysis
- Connector analysis on a PCB
- DC IR drop analysis of a PCB

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Specialized Course.
EM Analysis in ANSYS SIwave

Duration — 3 days

The course covers the analysis of electromagnetic compatibility (EMC) issues in printed circuit boards (PCBs) and methods for mitigating them using the EM analysis capabilities of ANSYS SIwave.

It includes an example of analyzing a memory interface system for compliance with DDR4 electrical standards. The course also covers power integrity analysis of packages and PCBs using the SIwave-PSI solver.

Course Outline:

- Electromagnetic interference (EMI)
- EMI scanner
- Induced voltage and resonant modes
- Near-field and far-field extraction
- DDR4 channel setup and analysis
- SIwave PSI: full-wave solution for PCB power integrity analysis

About us

- **KazakhEngineering** is a certified official partner of **ANSYS** in the Republic of Kazakhstan.
- We implement advanced digital engineering technologies, develop and adapt solutions tailored to the specific needs of each enterprise, enhancing the efficiency of simulation, modeling, and technical decision-making.
- We also provide specialist training and comprehensive support at every stage of using engineering software.

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