KAZAKH engineering

ANSYS Course Catalog 2026

Multiphysics Simulations and Optimization

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Basic Course.
Introduction to ANSYS DesignXplorer

Duration — 1 day

The course is designed to familiarize users with methods for solving optimization problems and conducting other parametric studies using ANSYS DesignXplorer within the Workbench environment. The course covers all DX-implemented methods, including design of experiments (DOE), parameter correlation analysis, response surface modeling, optimization, and sensitivity analysis of the model to variations in input parameters. Basic experience with structural or CFD ANSYS packages is recommended.

Course Outline:

- Introduction
- Parameter correlation
- Design of experiments (DOE)
- Response surfaces
- Optimization methods
- Six Sigma analysis

Standard Examples:

- Introductory example
- Parameter correlation
- Optimization of boundary conditions for a mixing device
- Six Sigma analysis

Additional Optional Examples:

- What-if analysis
- Parameter correlation
- Design of experiments (DOE)
- Response surface-based optimization (bracket support)
- Direct optimization — Example No. 1
- Response surface-based optimization (cylindrical support)
- Direct optimization — Example No. 2
- Optimization based on a CFX model (airfoil)
- Sparse grid method
- Using a Python journal in optimization tasks

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Specialized Course.
ANSYS Fluent/Mechanical for Fluid–Structure Interaction (FSI) Simulation

Duration — 2 days

The course is focused on developing practical skills in modeling fluid–structure interaction (FSI), including the interaction between fluid flow (liquids and gases) and structures.It covers both one-way and two-way data coupling between CFD and structural analysis modules, as well as conjugate heat transfer simulations.

The course requires knowledge at the level of basic courses in ANSYS Fluent, DesignModeler, and ANSYS Meshing. Experience with ANSYS Mechanical or ANSYS Structural is recommended.

Course Outline:

- Introduction to FSI
- Overview of system coupling
- Workflow in Workbench for FSI simulation
- Settings for Mechanical, Fluent, and System Coupling modules
- Dynamic mesh model description
- Solution process for coupled problems and results analysis
- Convergence techniques for FSI simulations
- One-way FSI analysis

Standard Examples:

- One-way FSI analysis of a sensor with pressure field transfer
- Two-way FSI analysis of a hyperelastic plate
- Debugging FSI simulations
- Two-way FSI analysis of a fuel injector
- Thermal stress analysis of a T-junction pipe

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Specialized Course.
Acoustic Analysis in ANSYS Mechanical

Duration — 2 days

The course covers both theoretical and practical aspects of acoustic simulation using Workbench Mechanical.It includes the creation of acoustic domains, interaction between acoustic media and structures, natural frequency extraction, harmonic and spectral analyses, as well as transient simulations.

The practical part features simulation problems involving mufflers, loudspeakers, and other engineering structures.

Course Outline:

- Introduction to Acoustics
- Modal Analysis
- Harmonic Analysis

Standard Examples:

- Modal analysis of air in a vehicle cabin
- Sloshing of liquid in a tank
- Loudspeaker and plate
- Sound scattering by a submarine
- Absorptive muffler
- Use of the full admittance matrix

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Specialized Course.
Multiphysics Analysis: Electromagnetics–Structural Coupling for Solving Magnetic Field–Structure Interaction Problems

Duration — 2 days

The course is focused on developing practical skills in modeling the interaction between magnetic fields and deformable structures.

It covers both one-way and two-way iterative data exchange algorithms between ANSYS electromagnetic and structural analysis modules.

The course requires knowledge at the level of basic courses in ANSYS Maxwell 2D/3D, DesignModeler, and ANSYS Meshing. Experience with ANSYS Mechanical is recommended.

Magnetic field problems are solved using ANSYS Maxwell 2D/3D solvers.

Structural analysis is performed using ANSYS Static Structural and ANSYS Transient Structural.

Course Outline:

- Overview of coupled systems to help users select the most suitable ANSYS module for structural analysis
- Solving the electromagnetic problem in ANSYS Maxwell to determine sources of volumetric forces and moments
- Enabling mesh deformation in the electromagnetic model during iterative recalculation
- Workflow in ANSYS Workbench for solving multiphysics problems
- Mesh preparation in ANSYS Meshing
- Setup of ANSYS Static Structural and ANSYS Transient Structural modules
- Element-wise transfer of volumetric heat generation; solution process for coupled problems and results analysis
- Automatic iterative coupling of electromagnetic and structural simulations
- One-way coupling

Standard Examples:

- IGBT (Insulated Gate Bipolar Transistor)
- Current-carrying structural components
- User-defined problems

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Specialized Course.
Multiphysics Analysis: Electromagnetics–Thermal Coupling for Cooling of Electronic and Electromechanical Devices

Duration — 3 days

The course is focused on developing practical skills in modeling heat transfer processes through the interaction of fluid flow (liquids and gases) with structures.

It covers both one-way and two-way iterative data exchange algorithms between ANSYS CFD and electromagnetic modules.

The course requires knowledge at the level of basic courses in ANSYS Maxwell 2D/3D, DesignModeler, and ANSYS Meshing. Experience with ANSYS Fluent or ANSYS IcePak is recommended.

Electromagnetic problems are solved using ANSYS Maxwell 2D/3D solvers.

Thermal analysis is performed using ANSYS Thermal.

For conjugate heat transfer simulations, ANSYS IcePak or ANSYS Fluent may be used.

Course Outline:

- Overview of coupled systems to help users select the most suitable ANSYS module for thermal analysis
- Solving the electromagnetic problem in ANSYS Maxwell to determine heat sources: ohmic losses, eddy current losses, and core (iron) losses
- Use of temperature-dependent properties to update the electromagnetic model during iterative recalculation
- Workflow in ANSYS Workbench for solving multiphysics problems
- Mesh preparation in ANSYS Meshing or ANSYS IcePak
- Setup of ANSYS Thermal, ANSYS Fluent, and ANSYS IcePak modules
- Element-wise transfer of volumetric heat generation; solution process for coupled problems and results analysis
- Automatic iterative coupling of electromagnetic and thermal simulations
- One-way coupling

Standard Examples:

- Cooling of an electric motor and generator (forced convection)
- Induction heating of a workpiece (natural convection)
- Cooling of a current-limiting reactor
- User-defined problems

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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