

Mechanical CFD & Simulation Certification Program

Welcome to our comprehensive Mechanical CFD & Simulation certification program. This curriculum is designed to transform you into a Simulation Expert through three specialized courses: AutoCAD Electrical, Ansys Foundation, and Ansys FEA.

Over 135 hours of training, you'll master essential skills in electrical design, computational fluid dynamics, and finite element analysis—becoming proficient in the simulation tools that drive innovation across automotive, aerospace, energy, and manufacturing industries.



AutoCAD Electrical: Course Overview



Core Drawing Skills

Master AutoCAD Mechanical fundamentals, basic drawing and editing tools, and layer management to create professional electrical designs.



Specialized Features

Learn mechanical-specific features, parametric drawing, constraints, and annotation techniques for precise documentation.



Advanced Applications

Develop skills in assembly design, component reuse, and professional printing and plotting, culminating in hands-on project work.



AutoCAD Electrical: Career Pathways

Industry Relevance

AutoCAD Electrical certification is highly valued in electrical engineering, automation, construction, manufacturing, and design industries. The skills you'll develop are directly applicable to real-world design challenges.

While certifications have no fixed validity period, ongoing learning is recommended as software updates and new features are released.

Career Opportunities

- Electrical CAD Designer
- Electrical Engineer
- AutoCAD Specialist
- Design Drafter

These roles are recognized by industries and employers using AutoCAD Electrical for electrical system design and drafting.



Ansys Foundation: Course Overview



Fundamentals

Introduction to Ansys and simulation principles, CAD import techniques, and geometry cleanup methods.



Analysis Techniques

Master meshing fundamentals, static structural analysis, and thermal analysis methodologies.



Advanced Simulation

Learn modal and vibration analysis, introduction to Ansys Fluent for fluid dynamics, and result interpretation.

4

Application

Apply knowledge through comprehensive project work, developing real-world simulation solutions.



Ansys Foundation: Career Impact

Job Opportunities

- Mechanical Engineer
- CFD Engineer
- Simulation Engineer
- Design Engineer

Industry Relevance

Highly applicable to mechanical engineering, aerospace, automotive, energy, and manufacturing sectors where simulation drives innovation.

Recognition

Widely recognized by industries using advanced simulation and computational fluid dynamics (CFD) for product design and optimization.

Ansys FEA: Course Curriculum

1

Core Concepts

Fundamentals of Finite Element Analysis, introduction to Ansys Workbench and Mechanical, and mastery of meshing techniques and best practices.



Structural Analysis

Static structural analysis, advanced contact & assembly modeling, and material nonlinearity and plasticity simulations.



Thermal & Dynamic Analysis

Thermal and thermo-structural analysis, modal and harmonic analysis, and buckling and fatigue analysis techniques.



Advanced Applications

Design optimization & parametric studies culminating in comprehensive capstone projects that demonstrate mastery.



Ansys FEA: Professional Applications

Automotive

Crash simulations, structural integrity testing, and component optimization for vehicle design.



Aerospace

Aircraft structural analysis, material fatigue testing, and thermal stress evaluations.



Manufacturing

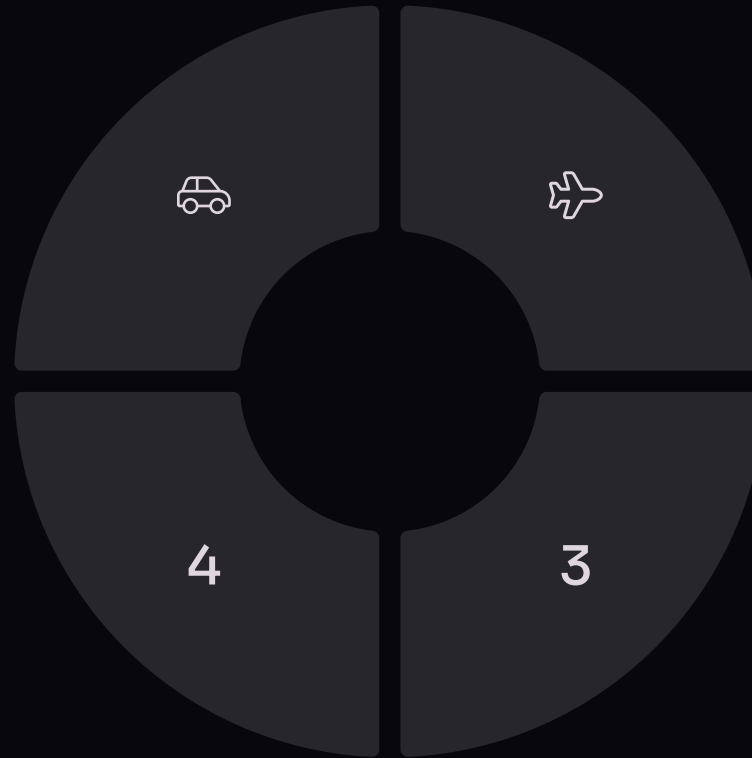
Production equipment optimization, tooling design, and process improvement simulations.

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3

Civil Engineering

Building structural analysis, seismic response simulations, and material performance testing.



Ansys FEA: Career Pathways



FEA Engineer

Specialize in creating and analyzing finite element models to predict structural behavior and optimize designs.



Structural Engineer

Apply FEA techniques to ensure structural integrity and safety in buildings, bridges, and infrastructure.



Mechanical Engineer

Utilize simulation tools to design, analyze, and improve mechanical systems and components.



Simulation Analyst

Focus on interpreting simulation results and providing design recommendations across industries.



Simulation Expert: Exit Profile



A Simulation Expert specializes in using advanced simulation tools and software to model and analyze real-world systems, structures, and processes. Their work involves creating virtual models to test and predict the behavior of systems under various conditions.

These experts utilize tools like finite element analysis (FEA), computational fluid dynamics (CFD), and multi-body dynamics (MBD) to simulate complex scenarios across multiple industries, providing valuable insights before physical prototypes are created.

Industry Applications: Automotive

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Vehicle Design

Optimize aerodynamics and structural integrity



Crash Simulations

Test safety performance virtually



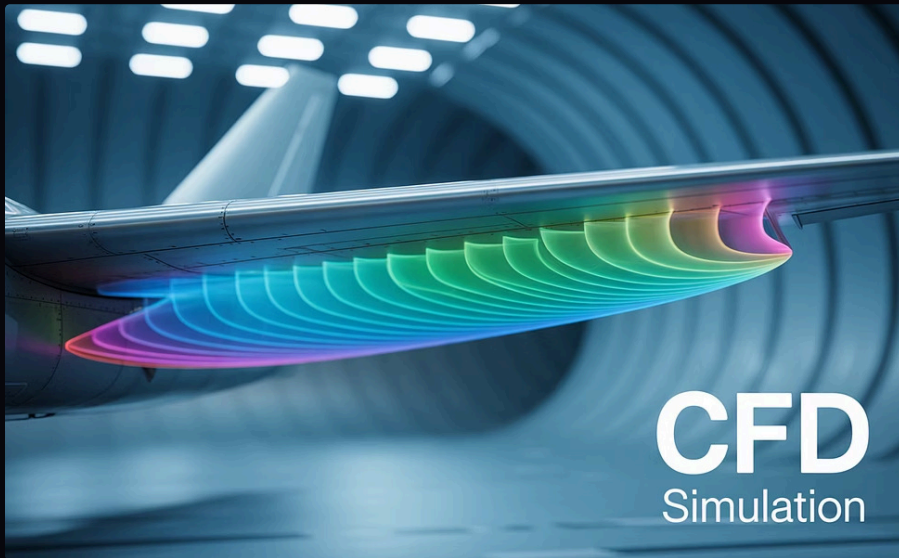
Powertrain Analysis

Improve efficiency and performance

In the automotive industry, simulation experts play a crucial role in the entire vehicle development process. By creating detailed virtual models, they can predict how vehicles will perform in real-world conditions without building costly physical prototypes.

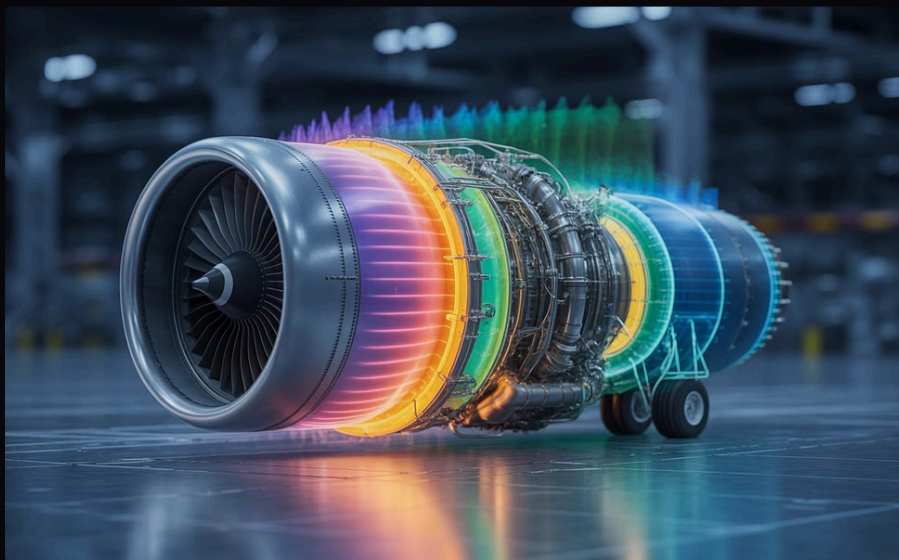
From aerodynamic optimization that improves fuel efficiency to crash simulations that enhance safety features, these specialists help manufacturers design better vehicles faster and at lower costs. Their expertise directly contributes to innovations in electric vehicles, autonomous driving systems, and lightweight materials.

Industry Applications: Aerospace



Aerodynamic Analysis

Simulation experts optimize aircraft designs by analyzing airflow patterns, reducing drag, and improving lift characteristics through sophisticated CFD models.



Propulsion Systems

Advanced thermal and fluid simulations help engineers design more efficient and reliable jet engines by predicting performance under various operating conditions.



Structural Integrity

FEA simulations ensure aircraft structures can withstand extreme conditions, from takeoff and landing stresses to high-altitude pressure differentials.

Industry Applications: Energy & Manufacturing

Energy Systems

Optimize power generation through thermal and fluid flow simulations of turbines, reactors, and renewable energy technologies

Process Optimization

Reduce waste and energy consumption by modeling and refining industrial processes before implementation



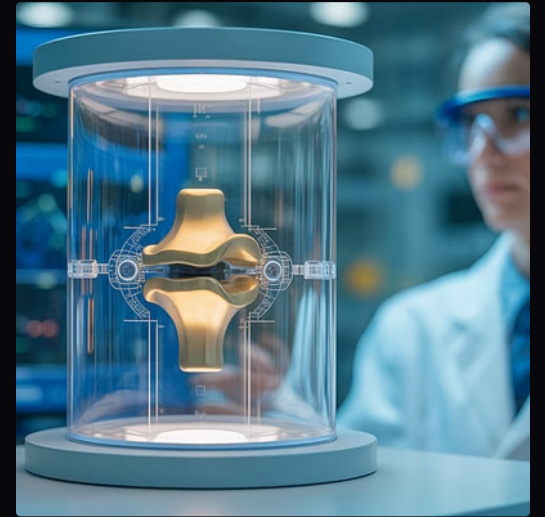
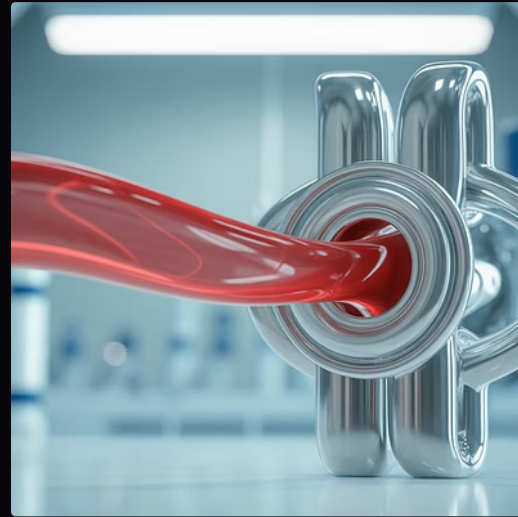
Production Processes

Improve manufacturing efficiency by simulating material flows, equipment performance, and production line operations

Equipment Design

Enhance machinery reliability through structural, vibration, and fatigue analysis of critical components

Industry Applications: Civil Engineering & Medical



Simulation experts in civil engineering create models that predict how structures respond to earthquakes, wind loads, and other environmental factors. These simulations help engineers design safer buildings, bridges, and infrastructure while optimizing material usage and reducing costs.

In the medical field, simulation specialists develop models of human anatomy and medical devices to improve treatment outcomes. From analyzing blood flow through artificial heart valves to testing the durability of orthopedic implants, these simulations advance healthcare technology while reducing the need for animal testing.

Program Duration & Structure

135

Total Hours

Comprehensive training across three specialized courses

3

Courses

AutoCAD Electrical, Ansys Foundation, and Ansys FEA

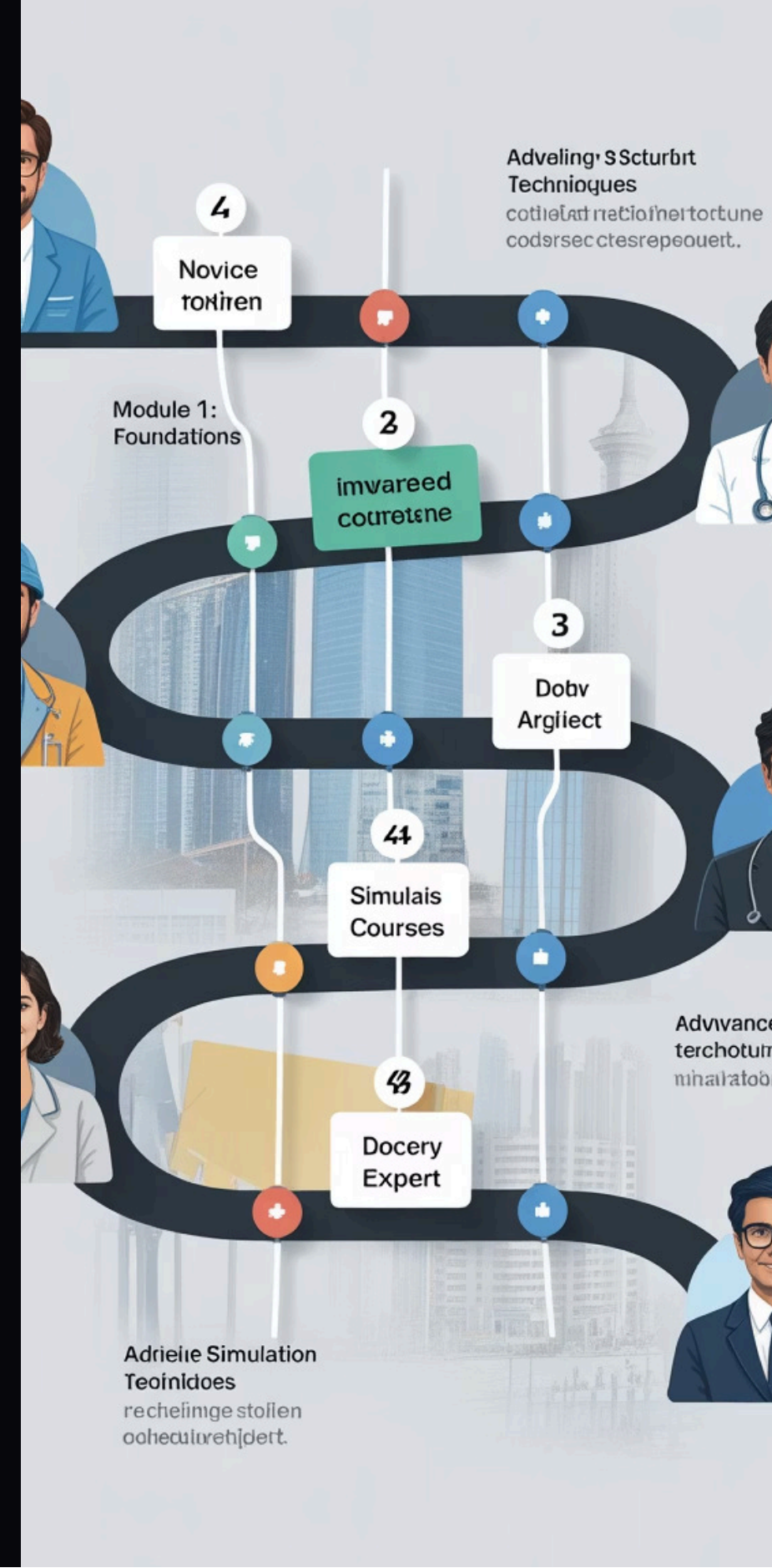
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Hands-On

Practical project work in every course module

Our program is structured to provide a logical progression from foundational CAD skills through increasingly advanced simulation techniques. Each course builds upon previous knowledge, culminating in the comprehensive skill set of a Simulation Expert.

The curriculum balances theoretical knowledge with extensive hands-on practice, ensuring graduates can immediately apply their skills in professional settings. Project work throughout the program mirrors real-world challenges faced by simulation specialists across industries.



Your Path to Becoming a Simulation Expert

Master the Fundamentals

Begin with AutoCAD Electrical to build a strong foundation in CAD principles and electrical design techniques. These skills form the basis for more advanced simulation work.

Upon completion of this 135-hour program, you'll emerge as a qualified Simulation Expert ready to tackle complex engineering challenges across multiple industries. Your skills will be in high demand as companies increasingly rely on virtual testing to drive innovation and efficiency.

Develop Simulation Expertise

Progress to Ansys Foundation and Ansys FEA courses, where you'll learn to create, analyze, and optimize complex simulations across multiple engineering disciplines.

Apply Your Knowledge

Complete capstone projects that demonstrate your ability to solve real-world engineering challenges using advanced simulation techniques, preparing you for professional success.