



Industry Orientation Course

CAD & CAE Mastery (Aerospace, Structural & Heavy Engineering)

Duration: 6 Months

(100% Placement assistance)

Empowering students with practical skills through industry-led training and personalized support.

About this course:

Unlock your CAD mastery and CAE prowess with Artem Academy's immersive courses! Designed to empower students with in-depth knowledge and practical skills, we aim to cultivate expertise in CAD software and CAE tools for real-world applications. From mastering Sketching, 2D & 3D modeling, and assembly, to Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), and Multibody Dynamics (MBD), participants gain hands-on experience to conquer tomorrow's design and engineering challenges with confidence. Join us and elevate your skills in engineering, architecture, and beyond.

Gain proficiency in CAD software, mastering real-world modeling by having command of concepts along with functionality from screws to intricate components. Also, Gain expertise in structural, modal, and thermal analysis techniques. Dive into modeling & analysis of components/assemblies such as spanners, gears, bolts, joints, discs, supporting structural, turbine components, engine blocks, bearings, and so on mastering their functional principles and applications in real-world scenarios through comprehensive, hands-on training in industries such as ***Aerospace, Structural, Heavy Engineering, Thermo- fluids, R & D, Academic, and relevant domains.***

Course Curriculum

1. GD & T

- Master geometric dimensioning and tolerancing (GD&T) principles in our comprehensive course. Learn to interpret engineering drawings accurately for precise manufacturing and assembly processes. Gain essential skills for industry success.

- Engaging in projects focused on specific industry domains, such as:
 - Why GD & T?, Terminology
 - Features & Rules of GD & T
 - Datum Controls
 - Add to Design
 - Tolerances – Form, Orientation, Profile, Location & Runout
 - Summary
 - Practical models of 3D, assembly and Sheetmetal

Select any other 1 CAD course based on the domain you wish to master from Series 2 to 6, NX or CATIA are mandatory.

2. AUTOCAD for Mechanical Engineering:

- AutoCAD is a powerful drafting software used by mechanical engineers for designing, analyzing, and documenting mechanical systems and components in 2D and 3D. It streamlines the design process, facilitates collaboration, and enables the precise creation of technical drawings and models.
- CAD tool, editing tool, advanced features, two-dimensional, three-dimensional, isometric modeling, and overview.
- Engaging in projects focused on specific industry domains, such as:
 - Creation of layouts and views
 - Sorting and editing of features with layers
 - GD & T symbols are per drawing
 - 2D & 3D models creation
 - Exploring specialized tools based on industry

3. CATIA V5:

CATIA is a robust CAD software extensively used by mechanical engineers for product design, simulation, and manufacturing. It offers a comprehensive suite of tools for creating 3D models, performing basic finite element analysis, and generating production-ready drawings, enhancing efficiency and innovation in engineering workflows.

- Sketching, Modeling – 3D solid & surface, assembly, drafting, parametric modeling, surface design and sheet metal
- Engaging in projects focused on specific industry domains, such as:

- Creation of sketch for gear, compressor disc & multi-sketch profiles
- 3D models – chassis, clamp
- B-pillar and turbine surface-based models
- Bolted flange Models
- Drafting and detailing for components & sub-assemblies
- Sheet metal - enclosures

4. **SOLIDWORKS:**

- SolidWorks is a popular CAD software among mechanical engineers, providing intuitive tools for 3D modeling, simulation, and documentation. Its user-friendly interface and extensive feature set streamline design processes, fostering creativity and precision in engineering projects.
- Sketching, part modeling, surface modeling, sheet metal modeling, assembly, and drafting.
- Engaging in projects focused on specific industry domains, such as:
 - 3D Models of Brackets & housings
 - Surface modeling of car outer parts, composites
 - Drawing creations
 - Assembly components – Bolted Joints
 - Sheetmetal like frames, closers

5. **NX SIEMENS**

- NX CAD offers advanced capabilities for designing complex products, from concept to manufacturing. With its robust tools for modeling, simulation, and collaboration, NX CAD empowers engineers to innovate efficiently and bring high-quality products to market faster.
- Designing with NX, Getting Started with NX, Sketcher Module, Layers & Datums, Surface Modeling & Features, Assembly, Drafting, Sheet Metal Module.
- Engaging in projects focused on specific industry domains, such as:
 - Creation of sketch for gear assembly
 - Parametric modeling for optimization
 - Complex Surface creation of solid models
 - Gas turbine components and Surface-based Automotive features
 - Assembly of Bolted Joint Model and Drafting booklet
 - Sheetmetal Models of the enclosures

6. CREO CAD

- CREO CAD is a versatile software for mechanical engineers, providing powerful tools for 3D modeling, simulation, and product development. With its parametric design capabilities and integrated applications, CREO streamlines the design process and enables collaboration, facilitating the creation of innovative and manufacturable products
- Engaging in projects focused on specific industry domains, such as:
 - Creation of Solid modeling
 - Pipe connections in 3D
 - Complex casing parts
 - Assembly structures
 - Car Surface Modeling
 - Drawing & Drafting all components & assemblies
 - Sheetmetal features

7. SoM & FEA Concepts:

- Strength of Materials deals with understanding how materials behave under various loads and stresses, while Finite Element Analysis (FEA) is a computational method for simulating and analyzing the behavior of structures and components under different conditions by dividing them into finite elements.
- Connecting the concepts to the industry's real-world projects in a way with the following:
 - Material Properties
 - Shear Force and Bending Moments
 - Stress & Strain
 - Deflection and Von-Mises
 - St. venant's Rule
 - Moment of Inertia
 - Finite Element Theory
 - Displacement Method
 - Numerical Methods

Select any other 1 CAE courses based on the domain you wish to master from Series 8 to 13, Ansys APDL & Ansys Workbench are mandatory.

8. ANSYS WORKBENCH

- The Ansys Workbench simulation course imparts comprehensive skills in finite element analysis, enabling engineers to tackle intricate structural, thermal and Modal challenges. Participants gain proficiency in utilizing Workbench's intuitive interface for conducting simulations, enhancing product performance and design robustness.
- Fundamentals of FEM/FEA, Design Module, Mechanical Meshing, Loads, Boundary Conditions, Analysis Settings, and Analysis.
- Engaging in projects focused on specific industry domains, such as:
 - Project Schematic
 - Modeling – DM & SpaceClaim
 - Accuracy of the meshing
 - Meshing Connectivity & Quality
 - Results interpretation
 - Linear, Static, Modal and thermal analysis

9. ANSYS APDL

- Ansys APDL simulation course equips engineers with expertise in finite element analysis, enabling them to solve complex structural, thermal, and fluid dynamics problems. Through hands-on training, participants learn to leverage APDL's powerful scripting language for customizable simulations, optimizing product performance and design reliability.
- General Analysis Procedure, Meshing Module, Modeling, Material Properties, Model Setup, Solver Settings, Post-Processing.
- Engaging in projects focused on specific industry domains, such as:
 - Modeling
 - Meshing – 1D, 2D , 3D & special elements
 - Loads and Boundary conditions
 - Solution Options
 - Post processing
 - Verification & Validation
 - structural, thermal, and modal analysis

10. ANSYS FLUENT

- One of the key ANSYS products focused on fluid dynamics is ANSYS Fluent. Participants learn to utilize Fluent's features and solvers to model and simulate diverse engineering applications, optimizing designs and performance.
- Its interactive solver setup, solution process, and post-processing capabilities make it straightforward to pause a calculation.
- Engaging in projects focused on specific industry domains, such as:
 - Modeling: Design Modular
 - Meshing: Mesh Module
 - Setup: Setup Module
 - Solution
 - Results: Fluent & CFD

11. HYPERMESH

- The Hypermesh simulation course provides engineers with comprehensive training in pre-processing for finite element analysis (FEA). You can learn to efficiently mesh complex geometries and prepare models for accurate simulations, optimizing product design and performance.
- General Meshing, 2D and 3D Meshing, Loads, Boundary Conditions, and Analysis Settings.
- Engaging in projects focused on specific industry domains, such as:
 - Introduction interface and workflow
 - Mesh generation for simple geometries like beams, plates, and solid structures
 - Boundary conditions and loads
 - Mesh refinement techniques for improving solution accuracy
 - Basics of linear static
 - Post-processing results and extracting relevant engineering data
 - Surface with Shell and Solid with mixed elements

12. ANSA:

- The ANSA structural analysis simulation course equips engineers with essential skills in pre-processing for finite element analysis (FEA) and structural simulations. Participants learn to efficiently prepare models, mesh complex geometries, and apply boundary conditions, ensuring accurate and reliable structural analysis results.

- Engaging in projects focused on specific industry domains, such as:
 - Meshing creation & optimization
 - Existing Mesh editing
 - Mesh Connections
 - Loads & BC
 - Surface shell meshing
 - Linear static analysis

13. **Mat Lab:**

- A MATLAB course typically covers fundamental concepts such as programming basics, data manipulation, visualization, and numerical computation using MATLAB's powerful tools and functions.
- Basic Operations and Variables, Mathematical Functions, Vectors/Arrays, Matrices, Importing Data (Tables), Conditional Operations, Looping Systems, Plots, Equational Functions, Differential Equations, Functions, Importing and Exporting Data.
- Engaging in projects focused on specific industry domains, such as:
 - Pendulum Movement calculations coding
 - Finding Shear force & Bending moment of Frame structure
 - We do provide industry-customized models

Select any other 1 CAD & 1 CAE courses based on the domain you wish to master from Series 2 to 13, NX or CATIA, Ansys APDL & Ansys Workbench are mandatory (Total – 2 CAD & 3 CAE Course).

Course no. 1& 7 concepts are also mandatory.

14. **Soft Skills:**

- ✓ **Presentation Skills:** Engage confidently with visuals, conveying ideas effectively to captivate audiences and leave lasting impressions.
- ✓ **Leadership Skills:** Inspire teams, making decisive decisions, fostering growth, and leading by example with empathy and integrity.
- ✓ **Time Management:** Prioritize tasks, set goals, and maintain focus to achieve objectives efficiently within designated timeframes.
- ✓ **Communication:** Articulate thoughts clearly, actively listen, and adapt communication styles to effectively convey messages and build rapport.

- ✓ **Documentation:** Maintain meticulous records, ensuring accuracy and organization for clarity, accountability, and efficient workflow management.
- ✓ **Interview Answering:** Showcase skills and experiences succinctly, confidently articulating achievements and aligning strengths with employer needs.
- ✓ **Mock Interviews:** Simulate real-world scenarios, refining interview techniques, and building confidence through practice and constructive feedback.
- ✓ **Problem-solving:** Analyze challenges, devise creative solutions, and persevere with determination, leveraging critical thinking and resilience to overcome obstacles.

Streamline Deliveries and Tracking milestones:

1. Explore technical workshops led by industry and academic experts covering engineering design, materials, drawing, and GD&T.
2. Gain insights and soft skills guidance through seminars facilitated by industry professionals.
3. Engage with weekly assignments tailored to real-world scenarios for hands-on learning.
4. Your progress will be tracked weekly with proactive support for success.
5. Dive into practical, skill-building tasks in each course for dynamic learning experiences.

Benefits:

- Industry-led training with practical skills.
- Personalized support for student success.
- Cutting-edge tools and technologies access.
- Mentorship by experienced professionals.
- Networking with industry leaders.
- Internship/job placement assistance.
- Updated curriculum reflecting industry trends.

"Unlock your potential, embrace challenges, and become the architect of your extraordinary future. Dream big!"

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