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Software Development & Education Center

Inventor 2013
Autodesk Inventor Essential

Objective
To provide students with a thorough understanding of the principal 3D design, validation, and documentation processes that they will use to develop products using Autodesk Inventor.

Upon completion of the course, students will be proficient in 3D part and assembly design, and in documenting those designs using part and assembly drawing creation and annotation techniques.

Learning Path

Course Code
Adsk-Edu-Inv-001

Software
Autodesk Inventor

Level
Basic

Prerequisites
- No previous CAD experience is necessary.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
32-40 hours (4 to 5 days)

Suggested Materials
- Mastering Autodesk Inventor by Sybex

Certification
Autodesk Inventor Associate Exam
(Refer to exam guide at http://www.autodesk.com/certification)
Training Outlines

Getting Started
- Understanding the User Interface
- Designing Parametric Parts
- Using Project Files for Part Design

Sketching, Constraining & Dimensioning
- Creating 2D Sketches
- Constraining the Sketches
- Adding Dimensioning to Sketches

Creating and Editing Placed Features
- Creating and Editing Sketched Features
- Intermediate Sketching
- Editing Parametric Parts
- Creating Work Features
- Creating Basic Swept Shapes
- Creating Chamfers and Fillets
- Creating Holes and Threads
- Patterning and Mirroring Features
- Creating Thin-Walled Parts

Creating and Editing Drawing Views
- Drawing Creation Environment
- Creating Styles
- Setting Drawing Standards
- Drawing Sheet Preparation
- Creating Title Blocks and Borders
- Base and Projected Views
- Section Views
- Detail Views
- Managing Views

Creating and Documenting Assemblies
- Designing Assemblies
- Using Project Files for Assembly Design
- Placing Existing Components in an Assembly
- Constraining Components
- Placing Standard Components Using the Content Center
- Basic Part Design in an Assembly
- Identifying Parts in an Assembly
- Analysis and Motion Tools
- Presenting Your Assembly
- Bill of Materials
- Creating and Customizing Parts Lists
- Creating Balloons

Dimensions, Annotations, and Tables
- Automated Dimensioning Techniques
- Manual Dimensioning Techniques
- Annotating Holes and Threads
- Creating Centerlines, Symbols, and Leaders
- Creating Tables
Autodesk Inventor Advanced

Objective
To build on the skills acquired in Essential training, the course cover higher level of productivity designing part models and creating assemblies. In additional, learn advanced part-modeling techniques and streamline the design and documentation process.

Learning Path

Course Code
Adsk-Edu-Inv-002

Software
Autodesk Inventor

Level
Intermediate to Advanced

Prerequisites
- No previous CAD experience is necessary.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
32-40 hours (4 to 5 days)

Suggested Materials
- Mastering Autodesk Inventor by Sybex

Certification
Autodesk Inventor Professional Exam
(Refer to exam guide at http://www.autodesk.com/certification)
Training Outlines

Getting Started
- Design Philosophies
- Sketching, Modeling, Modification, Display Tips

Multi-Body Tools
- Multi-body Part Modeling

Advanced Work Features
- User Coordinate System
- Grounded Work Points

Lofts & Loft Options
- Area Lofts
- Advanced Sweeps
- Coils
- Analyzing a Model
- Analysis Types, Analysis Procedures

Custom Sketches
- Create Sketch Symbols
- Place Sketched Symbols
- AutoCAD Blocks in Inventor

Engineers Notebook
- Notes

Effective Assembly Tools
- General Assembly Tips
- Constraint Tips
- Motion Constraints
- Transitional Constraints

Introduction to Top-Down Design
- Top-Down Design
- Top-Down Design Technique
- Additional Top-Down Design Tools

Introduction to Surfacing
- Basic Surfaces
- Patch Surfaces
- Stitch Surfaces
- Sculpting with Surfaces
- Thickening and Offsetting a Surface
- Extend and Trim Surface
- Replace Face
- Delete Face
- Copy Surface
- Importing Surfaces
- Repairing Imported Surfaces

Derived Components
- Derived Component
- Modifying Derived Components

Assembly Parts and Features
- Assembly Parts
- Assembly Features

Skeleton Models and Derived Components
- Working with Skeletons
iFeatures & iParts
• Creating / Inserting / Editing iFeatures
• Table-Driven iFeatures
• Creating / Inserting / Editing iParts
• Table-Driven iParts

Translation
• Import and Export Data
• Import Data Formats
• Importing Solids

Drawing Tools
• Create Hole Tables
• Revision Tables and Tags
• Tables for Factory Members
• Surfaces in Drawing Views

Design Accelerator
• Design Accelerator
• Generators
• Calculators

Inventor Studio
• Introduction to Inventor Studio
• Rendering
• Animation
• Creating a Standard Room

iAssemblies
• Introduction
• Create Basic iAssemblies
• Create Multi-Level iAssemblies

• Derived Components
• Modify Derived Components

Applying Motion with Constraints
• Driving Constraints
• Motion Constraints
• Transitional Constraints

Positional / Level of Detail Representations
• Introduction to Positional representations
• Create and Edit Positional representations
• Using a Positional Representation
• Level of Detail Representations
• System-Defined Level of Detail representations
• User-Defined Level of Detail Representations
• Using Level of Detail Representations

Assembly Duplication Options
• Pattern Components
• Mirror Components
• Copy Components

Assembly Bill of Materials
• Create Virtual Components
• Create Bill of Materials
• Frame Generator
• Frame Generator
• Structural Shape Author
**Autodesk Inventor – Sheet Metal**

**Objective**
Learn the fundamental principles on how to create and manage sheet metal designs. Learn to build basic and complex sheet metal parts, assemblies and drawings.

**Learning Path**

**Course Code**
Adsk-Edu-Inv-003

**Software**
Autodesk Inventor

**Level**
Advanced

**Prerequisites**
- Attended Autodesk Inventor Advanced (Adsk-Edu-Inv-002)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

**Suggested Duration**
16-24 hours

**Suggested Materials**
- Mastering Autodesk Inventor by Sybex
- Autodesk Inventor Essential Plus by Cengage

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Training Outlines

Understanding Sheet Metal Modeling
- Sheet Metal Concepts
- Sheet Metal Terminology
- Sheet Metal Environment
- Sheet Metal Design Process
- Working With Sheet Metal Rules
- Sheet, Bend and Corner Tab Options
- Bend Tables

Creating Sheet Metal Features
- Applying Existing Sheet Metal Defaults
- Creating a Face as a Base Feature
- Creating a Contour Flange as a Base Feature
- Creating a Contour Roll as a Base Feature
- Sheet Metal Parameters
- Bend Relief Shapes
- Faces as Secondary Features
- Contour Flanges as Secondary Features
- Contour Rolls as Secondary Features

Working with Flanges and Rips
- Creating Flanges
- Corner Relief Options
- Lofted Flanges
- Rips

Bending Sheet Metal
- Hems
- Folds
- Bend Features

Sheet Metal Cuts
- Creating Cut Features
- Creating Straight Holes
- Using Punch Tool Features
- Cuts Using Surfaces

Flat Pattern Environment
- Creating Flat Patterns
- Orienting Flat Patterns
- Punch Representations
- Bend Angle
- Flat Pattern Cleanup
- Exporting to DXF/DWG

Documentation
- Documentation and Annotation
- Sheet Metal Drawing Terminology
- Creating Sheet Metal Drawings
- Bend and Punch Notes
- Bend Tables
- Punch Tables
- Bend Order
- Cosmetic Centerlines

Converting Parts to Sheet Metal
- Converting Solid Model to Sheet Metal
- Non-Ruled Surfaces

Corner Rounds, Chamfers and Seams
- Creating Corner Rounds
- Creating Corner Chamfers
- Creating Corner Seams and Miters
- Creating Corner Rips
- Using Corner Seams and Bends
Autodesk Inventor Professional - Cables & Harness Design

Objective
Learn the fundamental and workflows for creating and documenting 3D electrical parts and wire harness design using Autodesk Inventor Professional. This includes how to add electrical components, cables, and wires to a design, route wires through an assembly to create a harness, and create ribbon cables, learn how to document the wire harness assembly in drawings and generate reports used to build the wire harnesses.

Learning Path

Course Code
Adsk-Edu-Inv-004

Software
Autodesk Inventor

Level
Advanced

Prerequisites
- Attended Autodesk Inventor Advanced (Adsk-Edu-Inv-002)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
16-24 hours

Suggested Materials
- Mastering Autodesk Inventor by Sybex
Training Outlines

Starting with Creating Cable & Harness Design
- Creating Cable and Harness Designs

Wire a Harness Assembly
- Adding Wires and Cables
- Routing Wires and Cables
- Importing Wire and Cable Data
- Adding Ribbon Cables

Refine a Cable and Harness Design
- Modifying Wires, Cables, Segments, and Ribbon
- Working with Splices
- Working with Virtual Parts

Communicate the Design
- Creating Drawing Views of Cable and Harness Designs
- Annotating Nailboards
- Exporting and Reporting Design Data

Configure Library and Report Configuration Files
- Library Definitions and Library Files
- Configuration Files for Reports, Imports, and Exports

Create, Author and Publish Electrical Content
- Defining Electrical Parts and Connectors
- Managing Libraries
- Creating Library Content
- Managing Library Content
Autodesk Inventor – Simulation

Objective
Learn the fundamental principles and workflows for analyzing designs and creating dynamic simulations of mechanisms. Learn how to validate digital prototypes by simulating the operation of mechanisms and motorized assemblies. Learn to analyze parts and assemblies, perform parametric design studies, and use modal analysis.

Learning Path

Course Code
Adsk-Edu-Inv-005

Software
Autodesk Inventor

Level
Advanced

Prerequisites
● Attended Autodesk Inventor Advanced (Adsk-Edu-Inv-002)
● Experience using Autodesk Inventor.
● Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
16-24 hours

Suggested Materials
● Mastering Autodesk Inventor by Sybex
Training Outlines

Introduction to Engineering Analysis
- Stress Analysis Overview
- Dynamic Simulation Overview

Stress Analysis
- Preparing and Running a Simulation
- Viewing Results
- Analyzing Assemblies
- Performing a Parametric Design Study
- Mesh Control and Convergence
- Performing a Modal Analysis

Dynamic Simulation
- Creating Joints
- Defining Loads and Joint Properties
- Running Simulations and Analyzing Results
- Building Non redundant Models
- Sharing Dynamic Simulation Results with Stress Analysis

Engineering Problems and Solution
- Solving Design Problems
**Autodesk Inventor Tooling**

**Objective**
Learn the fundamental of mold design for plastic parts on how to create a mold cavity and core, design injection feeding systems and components of Mold and Analyze and document the design.

**Learning Path**

**Course Code**
Adsk-Edu-Inv-006

**Software**
Autodesk Inventor

**Level**
Advanced

**Prerequisites**
- Attended Autodesk Inventor Advanced (Adsk-Edu-Inv-002)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.
- Plastic part design and/or injection mold design experience not required, but preferred

**Suggested Duration**
16-24 hours

**Suggested Materials**
- Mastering Autodesk Inventor by Sybex
Training Outlines

Creating Injection Molds
- Plastic Injected Part Design
- Create a Mold Assembly
- Adjust and Pattern a Placed Part

Verify and Communicate the Mold Design
- Analysis for Verification
- Communicating the Mold Design

Designing Mold Core and Cavity
- Gate Position, Material Shrinkage, and Work piece Definition
- Analysis for Optimization
- Parting Design
- Core/Cavity Inserts

Mold Layout and Assembly Design
- Creating Runners, Gates, and Cold Wells
- Creating the Mold Base
- Ejecting the Part
- Spruce Bushings and Locating Rings
- Cooling System
- Lock Sets
- Combining Mold Components
Autodesk Inventor Professional – Tube & Piping Routing

Objective
Learn the fundamental and workflows for creating and documenting rigid tubing, flexible hose, and piping systems using Autodesk Inventor Professional.

Learning Path

Course Code
Adsk-Edu-Inv-007

Software
Autodesk Inventor

Level
Advanced

Prerequisites
- Attended Autodesk Inventor Advanced (Adsk-Edu-Inv-002)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
16-24 hours

Suggested Materials
- Mastering Autodesk Inventor by Sybex
Training Outlines

Introduction to Tube and Pipe
- Introduction to Tube and Pipe

Setup for Routes and Runs
- Setup for Routes and Runs
- Placing Initial Fittings

Routes and Run
- Creating Rigid Routes
- Sketching Rigid Routes
- Editing Rigid Routes
- Working with Fittings in Rigid Routes
- Leveraging Routes and Runs

Fittings and Components
- Managing Libraries
- Creating Library Content
- Managing Library Content
- Creating Tube and Pipe Styles

Documenting Tube and Pipe Assemblies
- Representing Tube and Pipe Designs
- Documenting Routes and Runs
- Exporting Tube and Pipe Design Data
Autodesk Vault

Objective
Learn how to organize, share files, manage file versions, work in multi-user environment and integrate Autodesk Vault with various Autodesk products.

Learning Path

Course Code
Adsk-Edu-Inv-008

Software
Autodesk Inventor

Level
Advanced

Prerequisites
- Attended Autodesk Inventor Advanced (Adsk-Edu-Inv-002)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
8 - 16 hours

Suggested Materials
- Mastering Autodesk Inventor by Sybex
- Autodesk Inventor Essential Plus by Cengage
Training Outlines

Introduction to Autodesk Vault
- Autodesk Vault Features
- Autodesk Vault Environment
- Vault Workflow
- Terms and Definitions
- User Permissions

Basic Vault Tasks
- Accessing the Vault
- Logging into the Vault with Vault Explorer
- Folder Structure
- Set Up the Vault Folder Structure
- Navigation Pane
- Main Table
- Preview Pane
- Toolbars

Working with Vault
- Adding Inventor Models to a Vault
- Common Vault Tasks in Inventor
- Working with Vault in Inventor
- Searching the Vault
- Overview of Search Methods
- Browsing Folder Structure
- Basic Find
- Search Tools
  Saving Searches
Implement Project with Inventor

Objective
The aim of the project is to provide the students to take design decisions based on engineering calculations. Design project using Inventor help the students to experience the design before it is real through "Autodesk's Digital Prototyping"

Project requirements
The project should be based on a design assignment with
- Problem definition
- Understanding design constraints
- A specific Duration (minimum of 1 semester)

Learning Path

Course Code
Adsk-Edu-Inv-009

Software
Autodesk Inventor

Level
Intermediate

Prerequisites
- Attended Autodesk Inventor Essential (Adsk-Edu-Inv-001)
- Pass Autodesk Inventor Associate Certification
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
40 - 42 hours
The success of the project would require ATC trainers or Autodesk Education solution specialist to be attached to the design projects for a minimum of 1 day per week bracket over a span of 2 months equating to a total of 40 - 42 hrs. The role of the trainers is to provide assistance to the student participants in the course of the design.
Autodesk Inventor Associate Preparation

Objective
The primary objective of this course is to prepare students to sit for the Autodesk Inventor Associate Certification.

Learning Path

Course Code
Adsk-Edu-Inv-011

Software
Autodesk Inventor

Level
Associate

Prerequisites
- Attended Autodesk Inventor Essentials Training (Adsk-Edu-Inv-001)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

Suggested Duration
8 hours

Suggested Materials
- Mastering Autodesk Inventor by Sybex

Certification
Autodesk Inventor Associate Exam
Training Outlines

User Interface
- Describe how to use the heads up display (HUD) to create and edit features
- Identify how to use visual styles to control the appearance of a model

Project Files
- Describe the options for controlling a project file

Sketching
- Recall the function of each sketch constraint
- Demonstrate how to create dynamic input dimensions

Part Modeling
- Create extrude features
- Create fillet features
- Create hole features
- Create a pattern of features
- Describe how to use the Project Geometry and Project Cut Edges commands
- Create revolve features
- Create a shell feature
- Create work features and a UCS

Drawing
- Explain how to edit a base and projected views
- Describe how to create a slice view in a drawing
- Demonstrate how to create and edit dimensions in a drawing
- Describe how to edit a hole table
- Describe how to modify a parts list
- Demonstrate how to edit a section view

Assembly Modeling
- Describe the process of finding the minimum distance between parts and components
- Describe the function of the different assembly constraints
- Describe how to modify a bill of materials
- Explain the method of creating a frame using the frame generator command
- Identify uses for surfaces in the modeling process

Presentation Files
- Describe how to animate a presentation file

Advanced Modeling
- Describe the process to emboss text and a profile
- Create and constrain sketch blocks
- Describe the process of creating an iAssembly
- Describe the process to create an iPart

Sheet Metal
- Demonstrate how to create and edit a sheet metal flat pattern
- Describe the different types of sheet metal flanges that Inventor can create
- Demonstrate how to annotate a sheet metal part in a drawing
**Autodesk Inventor Professional Preparation**

**Objective**
The primary objective of this course is to prepare students to sit for the Autodesk Inventor Professional Certification.

**Learning Path**

**Course Code**
Adsk-Edu-Inv-012

**Software**
Autodesk Inventor

**Level**
Advanced

**Prerequisites**
- Attended Autodesk Inventor Advanced and Sheet Metal Training (Adsk-Edu-Inv-002/003)
- Experience using Autodesk Inventor.
- Working knowledge on drafting, design, or mechanical engineering principles.

**Suggested Duration**
8 hours

**Suggested Materials**
- Mastering Autodesk Inventor by Sybex

**Certification**
Autodesk Inventor Professional Exam
Training Outlines

Part Modeling
- Create extrude features
- Create hole features

Drawing
- Demonstrate how to edit a section view
- Create a slice view in a drawing
- Demonstrate how to modify a style in a drawing

Assembly Modeling
- Apply assembly constraints
- Create a part in the context of an assembly
- Create components using the Design Accelerator commands
- Create and edit a frame using the Frame Generator command
- Create a level of detail
- Create a positional representation

Advanced Modeling
- Create a 3D path using the Intersection Curve and the Project to Surface commands
- Create a multi-body part
- Create a part using surfaces
- Create an iPart
- Create a loft feature
- Create plastic part features
- Create a sweep feature

Sheet Metal
- Create flanges using the Flange, Contour Flange, and Lofted Flange commands

Weldments
- Create a weldment
Training & Performance Tracking

Knowledge related to current technology aspects and corporate level deliverable & Continuous training and assessment to make you industry ready. Throughout the Training Curriculum Candidate will go through a Scheduled Assessment Process as below:

- Continues Assessments
- Practical Workshops
- Modular Assignments
- Case Studies & Analysis
- Presentations (Latest Trends & Technologies)
- Tech Seminars
- Technical Viva
- Observing live Models of various projects
- Domain Specific Industry Projects
Skills Development Workshop

Communication is something which all of us do from the very first day of our life, yet there is a question that haunts us most of the time “Did I express myself correctly in such and such situation?” The answer to this question is really tricky, because in some cases we leave our signatures and good impression but in some others we even fail to get our idea clearly. It happens mostly because we don’t know how to act in certain situations. Every time we fail we don’t lose completely, we do learn something, but prior knowledge of the same thing could be more beneficial because then we could have turned that failure into success.

The course / workshop would focus at many aspects of personality, like:

- Building positive relationships with peers & seniors
- Building self-confidence & Developing clear communication skills
- Exploring and working on factors that help or hinder effective interpersonal communication
- Learning impacts of non-verbal behavior & Dealing with difficult situations and difficult people

Workshops Consists of Following Activities:

- Personality Development
- Group Discussions & Debates
- Seminars & Presentations
- Case Studies & Analysis
- Corporate Communication Development
- HR & Interview Skills
- Management Games & Simulations
- Aptitude, Logical & Reasoning Assessments & Development