

Autodesk Factory Design Utilities: Essentials

Course Table of Contents

Target Audience

This course is designed for new or novice CAD users — such as manufacturing engineers, plant layout planners, facility designers, and CAD drafters — who need to develop factory layouts combining architectural and manufacturing data. It assumes no prior 3D modeling or CAD software experience, though familiarity with basic AutoCAD commands and comfort with the Windows operating system are expected; a background in drafting or 3D parts is recommended but not mandatory. Professionals transitioning into facility/plant layout roles, or existing AutoCAD/Inventor users who need to extend their skills into factory design workflows, will benefit most from this course.

Course Outcomes

- Understand the end-to-end Factory Design Utilities workflow linking AutoCAD Architecture, Autodesk Inventor, Factory Design Utilities, and Navisworks.
- Create 2D architectural base layouts representing building shells, walls, and facility structure.
- Apply the Factory Asset Library to populate a floor plan with manufacturing and material-handling equipment.
- Design and generate 3D factory layouts synchronized bidirectionally with 2D drawings.
- Optimize layouts by identifying bottlenecks and inefficiencies through process/material-flow analysis.
- Troubleshoot synchronization issues between 2D AutoCAD and 3D Inventor factory models.
- Prepare coordinated models for construction-phase review using Navisworks.
- Analyze facility layouts for interferences using clash detection tools.
- Design custom factory assets not available in the standard library.
- Evaluate layout alternatives using scheduling and simulation outputs to support decision-making.

Course Objectives

- Provide a structured, hands-on progression from 2D architectural layout through 3D factory modeling to coordination and simulation.
- Build proficiency in each of the four core applications (AutoCAD Architecture, Inventor, Factory Design Utilities, Navisworks) as they apply specifically to factory layout tasks.

- Develop workflow readiness for real-world facility design projects, including asset placement, layout synchronization, and interference checking.
- Reinforce every concept through hands-on lab exercises that mirror actual factory design scenarios.
- Familiarize students with the Factory Asset Library and the process for creating and managing custom assets.
- Establish a foundation for later use of process simulation and scheduling tools in facility planning.

Course Outline

The course comprises [32](#) hours of theory and labs and is divided into [8](#) different chapters. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.

Table of Contents (TOC)

Chapter 1: Introduction to Factory Design Utilities

- Overview of the Factory Design Utilities workflow and its role across the Product Design & Manufacturing Collection
- Understanding how AutoCAD Architecture, Inventor, Factory Design Utilities, and Navisworks interconnect
- Reviewing typical factory design project scenarios and deliverables
- Navigating the Factory Design Utilities interface and add-in tools
- Setting up a project environment and file structure for a factory layout project
- Understanding the one-to-one synchronization concept between 2D and 3D models

Chapter 2: Building the 2D Architectural Base Layout (AutoCAD Architecture)

- Creating and editing building shell geometry, walls, and structural elements
- Applying architectural styles and construction elements relevant to factory shells
- Working with layers, annotation, and drafting standards for facility drawings
- Importing existing site or building data as a layout foundation
- Placing doors, windows, and structural columns within the facility outline
- Preparing the 2D drawing for handoff into the factory layout workflow

Chapter 3: Introduction to the Factory Asset Library

- Understanding the structure and organization of the Factory Asset Library

- Browsing and searching for manufacturing and material-handling assets
- Placing, moving, and rotating assets within a 2D layout
- Editing asset properties and parametric dimensions
- Grouping and organizing assets by department or process area
- Managing asset catalogs and content libraries

Chapter 4: Creating 2D Factory Layouts

- Schematically laying out the factory floor using AutoCAD-based tools
- Populating the floor plan with equipment, conveyors, and material-handling assets
- Checking for bottlenecks and inefficiencies in the manufacturing process flow
- Annotating and dimensioning the factory layout for review
- Iterating on layout alternatives using familiar AutoCAD editing commands
- Validating layout accuracy against building constraints

Chapter 5: Generating and Working with 3D Factory Models (Autodesk Inventor)

- Converting a 2D factory layout into a 3D Inventor assembly model
- Exploring the synchronized relationship between 2D drawings and 3D models
- Navigating and reviewing the 3D factory model for spatial accuracy
- Editing 3D assets and propagating changes back to the 2D layout
- Adding custom objects and equipment unique to the layout
- Applying materials and visual properties to improve model communication

Chapter 6: Developing Custom Factory Assets

- Understanding when and why to create custom assets beyond the standard library
- Building parametric Inventor components for use as factory assets
- Configuring asset behavior, connection points, and metadata
- Publishing custom assets into the Factory Asset Library
- Testing custom assets within a live factory layout
- Maintaining and versioning custom asset content

Chapter 7: Model Coordination and Clash Detection (Autodesk Navisworks)

- Importing and aggregating AutoCAD and Inventor factory models into Navisworks
- Reviewing the combined model for spatial coordination
- Running clash detection between architectural, structural, and equipment elements

- Interpreting clash reports and prioritizing resolution
- Creating construction-phase simulations and scheduling sequences
- Communicating coordination findings to stakeholders using Navisworks review tools

Chapter 8: Process Analysis and Layout Optimization

- Introduction to process/material-flow analysis concepts for factory layouts
- Referencing Factory Design Utilities assets within process analysis workflows
- Running process simulations and reviewing throughput and bottleneck results
- Comparing layout alternatives using simulation outputs
- Applying findings to refine and finalize the factory layout
- Documenting the final layout and preparing project handoff deliverables

Required Software & Tools

Software/Tool	Purpose	Availability	Cost
AutoCAD Architecture	2D architectural base drawings (building shell, walls) for the factory floor plan	Included in AutoCAD subscription / AEC Collection	Paid subscription, free for qualified students/educators
Autodesk Inventor	3D mechanical modeling — builds the 3D factory layout and equipment assets	Included in Product Design & Manufacturing Collection	Paid subscription, free for qualified students/educators
Autodesk Factory Design Utilities	Core toolset — creates/edits 2D-3D factory layouts, asset libraries, process/material-flow analysis	Included in PD&M Collection (add-in for AutoCAD and Inventor)	Included with Product Design & Manufacturing Collection or available as a standalone tool
Autodesk Navisworks	Model coordination, clash detection, and construction-phase scheduling/simulation	Included in AEC Collection / PD&M Collection (Navisworks Manage)	Paid subscription, free for qualified students/educators
Windows OS	Required host platform for all of the above	N/A	Licensed software

This course requires four Autodesk applications working together — AutoCAD Architecture for 2D building geometry, Inventor for 3D assets and layout, Factory Design Utilities as the bridging toolset that keeps 2D and 3D in sync, and Navisworks for coordination and clash detection — all of which ship together in Autodesk's Product Design & Manufacturing Collection (with AutoCAD Architecture also available via the AEC Collection). Students and educators can access the full stack free through Autodesk's education plan; production use requires a paid Collection subscription and per-seat licensing.