

FlexSim Fundamentals: Manufacturing, Warehouse & Logistics Simulation

Target Audience

This course is designed for manufacturing engineers, industrial engineers, production engineers, warehouse professionals, logistics analysts, operations managers, Lean Six Sigma professionals, process improvement teams, supply chain professionals, simulation beginners, engineering students, and business analysts who want to develop practical skills in industrial simulation using FlexSim.

It is suitable for professionals looking to model manufacturing systems, warehouse operations, logistics workflows, and service processes to improve operational efficiency through simulation-driven analysis, digital transformation, and data-driven decision making.

Course Outcomes

After completing this course, learners will be able to:

- Understand Discrete Event Simulation (DES) concepts and industrial simulation workflows
 - Navigate the FlexSim modeling environment confidently
 - Build interactive 3D simulation models using FlexSim standard objects
 - Model manufacturing, warehouse, logistics, and service operations
 - Simulate production lines and material handling systems
 - Configure operators, transporters, and resource-based workflows
 - Build Process Flow models for workflow automation
 - Apply labels and routing logic to control simulation behavior
 - Analyze operational performance using dashboards and KPIs
 - Validate simulation models and identify production bottlenecks
 - Develop complete manufacturing or warehouse simulation projects using industry best practices
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Course Objectives

Upon completion of this course, participants will be able to:

- Understand the fundamentals of industrial simulation and Digital Twin concepts
- Create practical 3D simulation models using FlexSim
- Develop manufacturing, warehouse, logistics, and service operation models
- Simulate production lines, material handling systems, and workforce activities
- Implement workflow automation using Process Flow
- Collect and visualize operational performance data
- Perform simulation validation and process optimization
- Build confidence for implementing real-world industrial simulation projects
- Prepare for advanced FlexSim modeling and optimization courses

Course Outline

The course comprises **32 hours of instructor-led theory, demonstrations, guided labs, and practical exercises.**

Each module concludes with a hands-on lab based on manufacturing, warehouse, logistics, or service industry scenarios to reinforce practical understanding.

Table of Contents

Module 1. Introduction to Industrial Simulation & FlexSim Fundamentals

Topics

- Introduction to Discrete Event Simulation (DES)
- Industrial Simulation Fundamentals
- Business Applications of Simulation
- Introduction to Digital Twin Concepts
- Industry 4.0 Manufacturing Overview
- Manufacturing, Warehouse & Logistics Simulation
- Simulation Modeling Concepts
- Introduction to FlexSim 2026
- Understanding the FlexSim Interface

- Object Library Overview
- Navigating the 3D Workspace
- Working with Model Views
- Creating and Managing Projects

Lab

Create your first FlexSim simulation model.

Module 2. Building Your First 3D Simulation Model

Topics

- Understanding Flow Items
- Working with Sources
- Creating Queues and Buffers
- Configuring Processors
- Connecting Simulation Objects
- Managing Material Flow
- Input and Output Logic
- Basic Routing Strategies
- Model Reset and Run Controls
- Simulation Speed Management
- Model Execution
- Debugging Simulation Models

Lab

Develop a basic manufacturing production line simulation.

Module 3. Manufacturing Process & Production Line Simulation

Topics

- Manufacturing Workstation Modeling
- Production Line Design
- Process Sequencing

- Buffer Management
- Machine Utilization
- Work-in-Progress (WIP)
- Routing Strategies
- Cycle Time Analysis
- Throughput Improvement
- Workstation Balancing
- Multi-Stage Production Systems

Lab

Build a multi-stage manufacturing production system.

Module 4. Material Handling & Conveyor System Simulation

Topics

- Material Handling Fundamentals
- Conveyor System Fundamentals
- Conveyor Configuration
- Product Accumulation
- Merge Logic
- Split Logic
- Transfer Points
- Conveyor Sensors
- Material Flow Control
- Conveyor-Based Production Systems

Lab

Create a conveyor-driven manufacturing model.

Module 5. Resource Utilization & Workforce Simulation

Topics

- Operators

- Transporters
- Basic Crane Operations
- Resource Assignment
- Task Sequences
- Resource Scheduling
- Material Transport
- Workforce Coordination
- Resource Utilization Analysis
- Improving Resource Efficiency

Lab

Simulate operator-based manufacturing and warehouse activities.

Module 6. Process Flow & Workflow Automation

Topics

- Introduction to Process Flow
- Process Flow Interface
- Activities
- Tokens
- Decision Logic
- Process Automation
- Resource Allocation
- Linking Process Flow with 3D Models
- Workflow Synchronization
- Business Process Simulation

Lab

Develop a warehouse order fulfillment workflow.

Module 7. Warehouse & Logistics Operations Simulation

Topics

- Warehouse Operations
- Receiving Processes
- Storage Strategies
- Picking Operations
- Packing Processes
- Shipping Operations
- Inventory Movement
- Logistics Workflow Simulation
- Service Process Simulation
- Warehouse Performance Analysis

Lab

Develop a warehouse and logistics simulation model.

Module 8. Simulation Analytics, KPIs & Business Dashboards

Topics

- Simulation Statistics
- Key Performance Indicators (KPIs)
- Dashboard Development
- Pie Charts
- Bar Charts
- Time-Based Charts
- Throughput Analysis
- Staytime Analysis
- Resource Utilization Reports
- Flow Analysis Dashboards
- Operational Performance Monitoring
- Reporting Simulation Results

Lab

Create operational dashboards and KPI reports.

Module 9. Simulation Validation, Bottleneck Analysis & Process Optimization

Topics

- Model Validation Techniques
- Error Detection
- Bottleneck Identification
- Constraint Analysis
- Scenario Comparison
- Sensitivity Analysis
- Basic Optimization Techniques
- Process Improvement
- Operational Efficiency Analysis
- Simulation Best Practices

Lab

Validate and optimize a manufacturing simulation model.

Module 10. Industry Simulation Capstone Project

Topics

- Understanding Business Requirements
- System Mapping
- Developing the Simulation Model
- Configuring Resources
- Integrating Process Flow
- Dashboard Development
- Performance Measurement
- Model Validation
- Scenario Comparison
- Process Optimization
- Project Documentation

- Final Presentation

Capstone Project Options

- Manufacturing Production Line Simulation
 - Warehouse Distribution Center Simulation
 - Logistics Material Handling System
 - Service Operations Simulation
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