Training Course on Data Science for Supply Chain Optimization

Professional Development Training Course Outline

Category	Logistics and Supply Chain Management	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Training Course on Data Science for Supply Chain Optimization offers a deep dive into leveraging **data science** and **machine learning (ML)** to revolutionize modern **supply chain operations**. Participants will gain cutting-edge skills in **logistics optimization**, **predictive forecasting**, and intelligent **inventory management**, enabling them to drive unprecedented efficiencies and build truly **resilient supply chains**. The curriculum is designed to equip professionals with the practical expertise to transform raw data into actionable insights, addressing critical challenges from demand volatility to operational bottlenecks.

The course emphasizes a hands-on, project-based learning approach, integrating real-world **case studies** and practical exercises. Through mastering key **data analytics** techniques, participants will learn to implement **AI-powered solutions** for strategic decision-making, cost reduction, and enhanced customer satisfaction. This program is essential for organizations aiming to embrace **Supply Chain 4.0** and achieve a competitive edge through **digital transformation** and **data-driven strategies**.

Programme Curriculum

Training Course on Data Science for Supply Chain Optimization

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Course Duration

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Course Objectives

1. Develop proficiency in applying **machine learning algorithms** for highly accurate **demand forecasting** and **predictive maintenance** in complex supply networks.
2. Learn to utilize **data science models** for **route optimization**, **fleet management**, and **warehouse efficiency**, minimizing transportation costs and improving delivery timelines.
3. Implement **AI-driven inventory strategies** to achieve **optimal stock levels**, reduce carrying costs, and prevent stockouts or overstock situations.
4. Employ **risk analytics** and **disruption prediction models** to enhance supply chain robustness and develop proactive mitigation strategies.
5. Understand how to integrate and analyze **big data** from diverse sources, including **IoT sensors**, for real-time visibility and informed decision-making.
6. Apply data-driven approaches to **supplier relationship management (SRM)**, evaluating performance and mitigating risks.
7. Transition from descriptive and predictive to **prescriptive analytics** to automate decision-making processes in the supply chain.
8. Identify and implement strategies for **cost reduction** across the supply chain through data-backed optimization.
9. Utilize **customer analytics** and **demand sensing** to enhance service levels and build customer loyalty.
10. Explore the deployment of **ML models** and data platforms within **cloud computing environments** for scalability and accessibility.
11. Gain insights into building transparent and interpretable **AI models** for greater trust and adoption in supply chain operations.
12. Develop skills in presenting complex **supply chain data** and **ML insights** clearly and effectively to stakeholders.
13. Lead initiatives for **digital transformation** within supply chain and logistics functions through data-centric approaches.

Target Audience

1. Supply Chain Managers and Directors
2. Logistics and Operations Managers
3. Inventory Planners and Analysts
4. Procurement and Sourcing Specialists
5. Data Analysts and Scientists working in supply chain or operations
6. IT Managers involved in supply chain systems and data infrastructure
7. Business Intelligence Professionals focusing on supply chain metrics

8. Consultants specializing in supply chain optimization and digital transformation

Course Outline

Module 1: Introduction to Data Science in Supply Chain

- Understanding the **Digital Supply Chain** landscape.
- The role of **Big Data** and **IoT** in modern logistics.
- Foundational concepts of **data science** and **machine learning**.
- Identifying key **supply chain challenges** solvable by data.
- *Case Study: How a major retailer leveraged historical sales data to identify seasonal demand patterns for perishable goods, reducing waste by 15%.*

Module 2: Data Acquisition, Preparation, and Management

- Sources of **supply chain data** (ERP, TMS, WMS, sensors).
- Techniques for **data cleaning** and **preprocessing**.
- **Data warehousing** and **data lake** concepts for supply chain.
- Ensuring **data quality** and **data governance** in logistics.
- *Case Study: A manufacturing company's journey in integrating disparate data sources across its global supply chain to create a unified view for analytics.*

Module 3: Exploratory Data Analysis for Supply Chain Insights

- Statistical methods for understanding **supply chain performance**.
- **Data visualization** techniques for identifying trends and anomalies.
- Identifying key **performance indicators (KPIs)** in logistics.
- Segmentation and clustering of **supply chain entities** (suppliers, customers).
- *Case Study: Visualizing transportation network data to uncover bottlenecks in delivery routes and identify underutilized assets.*

Module 4: Fundamentals of Machine Learning for Supply Chain

- Overview of **supervised** and **unsupervised learning**.
- Regression models for **continuous predictions** (e.g., lead times).
- Classification models for **categorical outcomes** (e.g., supplier risk).
- Introduction to **model evaluation metrics** and **cross-validation**.
- *Case Study: Using linear regression to predict optimal order quantities based on historical demand and lead time variability.*

Module 5: Advanced Demand Forecasting with ML

- Time series forecasting models: ARIMA, Prophet, Neural Networks.
- Incorporating external factors: seasonality, promotions, economic indicators.
- Ensemble methods for improved **forecast accuracy**.
- Measuring and mitigating **forecast error**.
- *Case Study: A consumer goods company using Prophet to forecast demand for new product launches, adapting quickly to initial sales data and improving inventory planning.*

Module 6: Inventory Optimization with Machine Learning

- Predicting **optimal reorder points** and **safety stock levels**.
- Applying **ML for inventory segmentation** (ABC, XYZ analysis).
- Dynamic inventory policies based on real-time data.

- Minimizing holding costs and stockout costs using **AI**.
- *Case Study: An e-commerce platform using reinforcement learning to dynamically adjust inventory levels for thousands of SKUs, balancing service levels and carrying costs.*

Module 7: Logistics and Transportation Optimization

- **Route optimization** algorithms (TSP, VRP) and their ML extensions.
- Predictive models for **delivery time estimation** and **delays**.
- Optimizing **fleet utilization** and **dispatching**.
- Location intelligence and network design using spatial analytics.
- *Case Study: A logistics provider implementing an ML-powered route optimization system, resulting in a 20% reduction in fuel costs and 15% faster deliveries.*

Module 8: Warehouse Management and Automation

- Optimizing **warehouse layout** and storage strategies.
- Predictive analytics for **picking path optimization**.
- Utilizing ML for **labor forecasting** and scheduling in warehouses.
- Integration of **AI-powered automation** (robotics, AGVs).
- *Case Study: An automotive parts distributor using ML to optimize warehouse slotting, reducing picking times by 25% and improving order fulfillment accuracy.*

Module 9: Supplier Relationship Management & Risk Assessment

- Predictive models for **supplier performance** and reliability.
- Identifying and quantifying **supply chain risks** (geopolitical, natural disasters).
- Developing **risk mitigation strategies** using analytics.
- Building a resilient supplier network with **AI**.
- *Case Study: A global electronics manufacturer using ML to assess supplier financial stability and predict potential disruptions in raw material supply, diversifying its supplier base proactively.*

Module 10: Supply Chain Disruption Prediction and Resilience

- Anomaly detection in supply chain data for early warning.
- Predicting and responding to supply chain disruptions (e.g., port congestion).
- **Scenario planning** and simulation using ML.
- Building agile and adaptive supply chain models.
- *Case Study: A food and beverage company leveraging real-time weather data and geopolitical indicators with ML to anticipate and mitigate potential supply chain disruptions, ensuring continuous product availability.*

Module 11: Prescriptive Analytics and Optimization Techniques

- Introduction to **operations research** techniques (linear programming).
- Applying **optimization algorithms** to complex supply chain problems.
- Recommender systems for supply chain decision support.
- Building **decision intelligence** systems.
- *Case Study: An industrial manufacturer using prescriptive analytics to optimize production schedules and raw material procurement, leading to a 10% reduction in production costs.*

Module 12: Real-time Analytics and IoT Integration

- Processing **streaming data** from IoT devices in supply chain.

- Real-time monitoring of **shipment tracking** and asset conditions.
- Building **supply chain digital twins**.
- Edge computing applications for localized data processing.
- *Case Study: A cold chain logistics company using IoT sensors and real-time analytics to monitor temperature and humidity of sensitive goods in transit, preventing spoilage and ensuring quality.*

Module 13: Implementing and Deploying ML Models

- **MLOps** principles for deploying and managing models in production.
- Building scalable **data pipelines** for supply chain applications.
- Monitoring model performance and **model retraining**.
- Ethical considerations and **Explainable AI (XAI)** in practice.
- *Case Study: A pharmaceutical company deploying an AI-powered demand forecasting model into their ERP system, enabling automated inventory adjustments and order placement.*

Module 14: Capstone Project & Real-World Application

- Participants work on a comprehensive **supply chain optimization project**.
- Applying learned techniques to a real-world dataset.
- Project presentation and peer feedback.
- Best practices for communicating **data science insights** to business stakeholders.
- *Case Study: Participants apply all learned concepts to optimize a simulated supply chain for a fictional company, presenting their methodology, findings, and business impact.*

Module 15: Future Trends & Emerging Technologies

- **Generative AI** for data synthesis and scenario generation.
- **Quantum Computing**'s potential impact on supply chain optimization.
- **Blockchain** for enhanced supply chain transparency and traceability.
- The evolving role of the **Data Scientist in Supply Chain**.
- *Case Study: Exploring how a major logistics firm is experimenting with blockchain for secure and transparent tracking of high-value goods.*

Training Methodology

This course adopts a highly interactive and practical **blended learning** approach, combining:

- **Interactive Lectures & Presentations:** Core concepts are delivered with clear explanations and real-world examples.
- **Hands-on Workshops:** Participants will engage in practical coding sessions (Python, R) and utilize industry-standard data science tools and platforms.
- **Case Studies & Real-World Scenarios:** In-depth analysis of successful implementations and challenges in diverse supply chain contexts.
- **Project-Based Learning:** A significant portion of the course involves developing and presenting a capstone project.
- **Group Discussions & Collaborative Exercises:** Fostering peer learning and diverse perspectives on problem-solving.
- **Expert-Led Demonstrations:** Live coding and tool demonstrations by experienced data scientists and supply chain professionals.
- **Q&A and Personalized Mentorship:** Opportunities for participants to clarify doubts and receive individualized guidance.

- **Access to Online Resources:** Supplementary materials, datasets, and code repositories for continued learning.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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