



School of Pharmaceutical Sciences & Technology

Curriculum for
Fellowship Program in

Pharmaceutical Logistic Management



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Course Title: PHARMACEUTICAL LOGISTICS MANAGEMENT

Course Type: FELLOWSHIP

Duration: 360 Hours (can be structured as 24 Credits)

Mode: Lectures, Practicals/Hands-on, Internship, Project

Overview

Pharmaceutical Logistics Management is a specialized field focusing on the efficient planning, coordination, and control of the movement and storage of medicines, vaccines, and other healthcare products. The course equips learners with knowledge of **supply chain processes, cold chain management, regulatory compliance, and quality assurance** to ensure that pharmaceutical products are delivered safely, on time, and in optimal condition.

It covers topics such as:

- Pharmaceutical supply chain structure and stakeholders
- Storage and distribution requirements for temperature-sensitive products
- Good Distribution Practices (GDP) and Good Manufacturing Practices (GMP)
- Inventory control, demand forecasting, and risk management
- Use of technology in tracking and monitoring shipments

Objectives of the Course

By the end of the course, learners should be able to:

- Understand the end-to-end pharmaceutical supply chain and logistics framework.
- Apply best practices for handling, storing, and transporting pharmaceutical products, including cold chain management.
- Ensure compliance with national and international regulatory standards.
- Optimize inventory and distribution strategies to reduce costs and wastage.
- Leverage technology for real-time tracking, quality control, and process efficiency.
- Manage risks and develop contingency plans for supply chain disruptions.

Course Outcomes:

CO No.	Course Outcome Description
CO1	Analyze inventory control techniques and distribution logistics to optimize the pharmaceutical supply chain.
CO2	Evaluate and implement pharmaceutical safety, risk management, and information systems to enhance supply chain efficiency and regulatory compliance.
CO3	Develop expertise in optimizing pharmaceutical supply chains for improved operational efficiency and cost-effectiveness.
CO4	Leverage advanced technologies such as artificial intelligence, blockchain, and big data to enhance supply chain visibility and traceability.
CO5	Implement risk mitigation strategies to identify, analyze, and reduce risks in global pharmaceutical logistics.



CO6	Contribute to global pharmaceutical operations by adapting to dynamic demands in international supply networks, ensuring sustainability and innovation.
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Teaching learning methods:

- Interactive sessions: Engage in lively discussions and collaborative problem solving.
- Case based learning: Apply theoretical knowledge to real world scenarios through internship and case studies.
- Role playing: Enhance decision making skills through simulated scenarios
- Practical workshops: Gain hands on experience in key aspects of Supply chain and logistics management

Syllabus:

Theory - 10 Credits (150 Lecture Hours)

MODULE 1: INTRODUCTION TO LOGISTICS AND SUPPLY CHAIN (25hrs)

- Definition and Importance of Supply Chain Management, Evolution of Supply Chain Management, Logistics - definition and scope of Logistics, activities of Logistics, Inbound and Outbound Logistics, Flows in a supply chain, Entities in a supply chain, Discussion with Case Studies.
- Customer service and cost trade-offs - dimensions, customer value, total cost of ownership, Porter's generic competitive strategies, Decision phases in a supply chain, process views in a supply chain, competitive and supply chain strategies, responsive and efficient supply chain, supply chain drivers, role of each driver in supply chain and their related performance metrics.
- Outsourcing and Third-Party Logistics (3PL), make versus buy decisions, core competencies, sourcing strategy, supplier selection using Multi-criteria decision methods.
- Role of distribution - design options for a distribution network, Network design - models for facility location and capacity allocation - data for network design spreadsheet-based modelling and analysis.
- Vehicle Routing Problems. Sustainable Supply Chain Practices, Environmental Impact of Logistics Operations, Climate Change and Its Effect on Global Supply Chains, Green Logistics and Environmental Regulations Emerging Trends in Logistics and Supply Chain - Digital Transformation and Industry 4.0, Internet of Things (IoT) in Supply Chain, Blockchain Technology in Supply Chain, Future Trends and Innovations, Real-World Supply Chain
- Logistics Case Studies, Best Practices in Various Industries through discussions with practising managers and industry experts

MODULE 2: INVENTORY MANAGEMENT

(25hrs)



- Introduction to Inventory Management: Concepts and issues, Inventory – who needs it, Inventory costs, Purpose of inventory, Types of stocks.
- Inventory as Money: Accounting for inventories, how inventory is valued, Inventory on the balance sheet, Inventory on the income statement, Inventory measure using ratio analysis, Profit margins, Merchandise metrics, Obsolete stock, Methods of disposal, Determination of carrying cost.
- Physical Location and Control of Inventory: Common locator systems, Common item-placement theories, Location addresses and SKU identifiers, Inventory distribution considerations, Automatic identification, Basics of bar coding, scanning basics, RFID.
- Inventory Planning and Replenishments: Selective inventory control systems, Replenishment costs, Independent demand inventory, Types of inventory control systems – Continuous review inventory control systems and periodic review inventory control systems, Various models – EOQ, Quantity discounts, Batch production systems, Economic order interval, Order up to level inventory systems, Safety stocks in different inventory control systems, Single order quantity systems, Dependent demand inventory – Material requirements planning, Just-in-time control systems – milk runs, Point-of-use supply, small lot production/supply enablers, Enterprise resource planning.
- Why Inventory System Fail and How to Fix Them: Metrics – Fill rate, and Inventory record accuracy, Tools to uncover system dysfunction – Run charts, flow charts, Location charts, Variance reports, Cycle counting – Different methodologies, A-B-C analysis cycle count method. Discussion of different cases related to inventory management.

MODULE 3: WAREHOUSE PLANNING AND OPERATIONS (25hrs)

- Understanding Warehouse Management Function and Operations - Role of a Warehouse and a Warehouse Manager, Major Warehouse Processes and End-to-End Warehouse Operations.
- Warehouse operations: Receiving, Put-away, Order-picking, Sharing the work of order-picking, Checking and packing, Shipping. Warehouse Layout and Material Handling - Order picking methods, Warehouse Layout, Material Handling Systems in a Warehouse and Other Resources, Storage and handling equipment -Types and their purposes.
- People Aspects in a Warehouse and Warehouse Safety - People management in a Warehouse, Health and Safety issues in a Warehouse. Cost Analysis and Performance Management - Warehouse performance, Key Performance Indicators, Benchmarking.
- Policy and Regulatory framework in warehouse management: Warehousing Development and Regulatory Authority (WDRA) certification and Quality Council of India (QCI) ratings of warehouses.
- Warehouse Automation - Smart Warehouses, Use of AI in warehouses, Mechanization and Automation of warehouse – RFID leveraged warehouse systems, Application areas and technological advancements in Warehouse automation, Latest trends in Warehouse Automation, Warehouse operations simulations.

MODULE 4: PRODUCTION PLANNING AND FREIGHT MANAGEMENT (25hrs)



- Introduction to Forecasting techniques - time series analysis: components of time series, moving average, simple exponential smoothing, simple regression. Aggregate production planning, master production scheduling, production activity control, types of Gantt chart, Principles of Just-in-Time (JIT) - push and pull systems, Kanban systems, setting number of Kanbans, Lean Engineering concepts and practices.
- Logistics documentation: Bill of Lading (B/L) - Types Straight, Shipped, Through, Air Waybill, etc., Commercial Invoice- contents and formats, Packing List, Certificate of Origin, Insurance Certificate: Coverage and requirements. Regulatory and Compliance Documents, Automation in logistics documentation - Blockchain technology and its role in securing document integrity Specialized vehicles for freight movement – Types and carrying capacities, Rate circulars and comparative insights from other countries
- Overview of FIOS (Freight Operations Information System), In motion weigh bridges and punitive charges, Off Season and Peak season in freight movements, Bulk and bag handling in warehouses and Silos (Hub and Spoke silos), Specialized containers for silo-based freight transport, Cases in Rail mode of transport.

MODULE 5: PORT OPERATIONS AND MANAGEMENT (25hrs)

- Port terminologies: cargo owner, shipper, vessel operators, charterers, consignee, notify party, liners, stevedore, ship chandlers, berth, terminal, forklift, customs, immigration etc.
- Port - roles and functions including Customs and DG shipping; Port organizational structure. Port facilities and layout – Berths and terminals; Berth allocation problem; Quay crane assignment problem; Quay crane scheduling problem; Stowage planning problem; Yard management; Yard crane scheduling; Horizontal transportation.
- Landside operations planning; Workforce planning; Cargo and cargo handling; Port capacity planning; Port pricing strategies; Port and logistics systems; Port and Supply chain networks; Environmental principles of port operations; Principles and procedures for environmental management in ports; Port performance and benchmarking.
- Port Authorities and Regulatory Framework; Port safety management. Containerisation – types, design and specifications, container tracking and security, types of ships used in maritime transport.
- Evaluation and Quality Control (EQC) of global products – documentation. An overview about multimodal transportation including Inland water ways – challenges and opportunities, Inland Waterways – operations for shipping and navigation

MODULE 6: MATHEMATICS AND MEASUREMENTS FOR TRADE (25hrs)

- Arithmetic Operations, Percentages, Ratios and Proportions, Basic Algebraic Concepts. Measurement Systems and Units - Standard Units of Measurement: Metric and Imperial Systems, Converting Units of Measurement, Linear measurements, Weight measurements, Temperature measurements, Pressure measurements
- Common Measurements in Supply Chain: Perimeter, Area, Volume and Weight measurements. Accuracy and Precision in Measurements, Transportation and Logistics Mathematics - Distance and Time Calculations.



- Use of Technology in Measurements - Introduction to Measurement Tools and Technologies, Barcodes and RFID in Inventory Management, GPS and Telematics in Transportation.
- Overview of Data Analysis and Statistics - Descriptive Statistics: Mean, Median, Mode, Standard Deviation and Variance, Probability Concepts, Basic Data Visualization Tools and use of spreadsheets for calculation and analysis. Load Planning, Fuel Consumption and Cost Analysis

Practical/Hands-on Component: 8 Credits (120 Lab Hours)

A SUPPLY CHAIN OPERATIONS SIMULATION LABORATORY

1. Experiential learning, Roleplay game, general supply chain structures, Operational performance measures, order cost and carrying costs;
2. Roleplay based operation simulation under different supply chain parameters such as lead times, lost sales and backorder;
3. Evaluation of fill rate, total supply chain inventory costs, and bullwhip effect;
4. System dynamics;
5. Coordination analysis, comparison of performance of supply chain under different scenarios.
6. Application of machine learning models based on the data generated by the role play games, blockchain, IoT, smart contract application uses cases.

INTERNSHIP: (90hrs) (6credits)

An internship with a total duration of 4-6 weeks after the completion of classes is mandatory.

It should preferably be done in an Industry in the field of Logistics and Supply Chain.

The objective of the course is to enable the students to develop work culture, attitudes, as well as, communication and interpersonal skills necessary for job success. The students are made proficient to make proper technical documentation on the work done.

Moreover, the course would train the students to make effective technical presentations. Evaluation of the work done and awarding the credit for the same are to be done on successful completion of the internship and submission of report.

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