Mandatory Course 2: Operation Analytics

Course Type:	SE: Skill Enhancement Course	Course Credits:	4
Course Code:	O3SE508	Course Duration:	60 Hours

Course Objectives:

- To introduce analytical techniques and tools applied in operational decision-making.
- To equip students with practical skills in predictive modelling, optimization, and forecasting within operations.
- To develop capabilities for analysing operational data to enhance process efficiency and performance.
- To foster understanding of analytical software and technology solutions widely used in operations management.
- To cultivate strategic insight into data-driven operational improvements and innovation.

Course Outcomes:

- CO1: Recall fundamental concepts of data-driven decision-making in operations
- CO2: Understand key analytical techniques used in operations
- CO3: Implement data analytics in real-world operational scenario
- CO4: Analyse & assess the impact of operational efficiency using quantitative models and optimization techniques
- CO5: Evaluate the impact of operational efficiency using appropriate data and optimization techniques for decision making
- CO6: Design innovative data-driven solutions for operations challenges

Unit / Module	Content	CO Mapping	Hours Assigned
1	Introduction to Analytics Gaining data insights and Predictive Analytics Demand analytics-Qualitative forecasting	CO1, CO2	6
2	Demand Analytics Forecasting and time series analysis. Regression	CO2, CO3	6

	Analysis for Operations		
3	Demand Analytics Regression Analysis for Operations	CO2, CO3	6
4	Quality Control Statistical Quality Control Various types of Control Charts (Mean Chart, Variation Charts …)	CO3, CO4	6
5	Machine Learning Block chain in operations. Predictive Maintenance & Failure Analysis	CO3, CO4	6
6	Performance Metrics Inventory, Fulfillment, Alerts, and Flagging etc. Dashboard Designing, Balanced Scorecard Kaplan and Norton Framework, Strategy Map	CO4, CO6	6
7	Introduction to Probabilistic Inventory Control Models. Instantaneous and Continuous demand.	CO4, CO5	6
8	Introduction to Probabilistic Inventory Control Models. Inventory Control Models with and without set-up cost	CO4, CO5	6
9	Introduction to Non-Linear Programming. Lagrange Multiplier	CO4, CO5	6
10	Introduction to Non-Linear Programming. Graphical Method	CO4, CO5	6

Textbooks:

1. “Operations Research: Theory and Applications” by J.K Sharma
2. “Machine Learning for Business Analytics” by Shmueli

Reference Books:

1. “Business Analytics: Practitioner’s Guide” by Rahul Saxena & Anand Srinivasan

2. “Manufacturing Planning and Control” by Volmann, Berry, Whybark
3. “Quantitative Techniques in Management” by N.D Vohra