

1	<p>Financial Risk Management</p> <p>Unit 1: Introduction to Financial Risk Management (Approx. 14 hours)</p> <p>1.1 Overview of Financial Risk Management: Types and Importance 1.2 Risk Measurement and Assessment 1.3 Value-at-Risk (VaR) and Expected Shortfall (ES) 1.4 Risk Management Frameworks and Regulatory Requirements 1.5 Role of Financial Derivatives in Risk Management</p> <p>Unit 2: Credit Risk Management (Approx. 14 hours)</p> <p>2.1 Credit Risk Assessment and Credit Scoring Models 2.2 Default Probability Estimation 2.3 Credit Portfolio Management 2.4 Counterparty Credit Risk 2.5 Credit Risk Mitigation Techniques</p> <p>Unit 3: Market Risk Management (Approx. 14 hours)</p> <p>3.1 Market Risk Measurement: Delta, Gamma, Vega, Theta 3.2 Value-at-Risk (VaR) for Market Risk 3.3 Stress Testing and Scenario Analysis 3.4 Liquidity Risk Management 3.5 Interest Rate Risk Management</p> <p>Unit 4: Operational Risk Management (Approx. 14 hours)</p> <p>4.1 Operational Risk Framework and Measurement 4.2 Key Risk Indicators (KRIs) 4.3 Risk Control Self-Assessment (RCSA) 4.4 Business Continuity Planning and Crisis Management 4.5 Emerging Risks and Cybersecurity</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the concept of financial risk and its types. 2. Develop skills in credit risk assessment and scoring models. 3. Understand Value-at-Risk (VaR) for market risk and its limitations. 4. Understand the framework and measurement of operational risk. <p>Books:</p> <ol style="list-style-type: none"> 1. "Financial Risk Management: Models, History, and Institutions" by Allan M. Malz 2. "Operational Risk Management: A Complete Guide to a Successful Operational Risk Framework" by Philippa X. Girling
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	3. "Market Risk Analysis: Pricing, Hedging, and Trading Financial Instruments" by Carol Alexander
2	Algorithmic Trading and Quantitative Finance
	<p>Unit 1: Foundations of Algorithmic Trading in FinTech (Approx. 14 hours)</p> <p>1.1 Introduction to Algorithmic Trading in FinTech: Evolution and Significance 1.2 Market Structure and Regulatory Considerations in FinTech 1.3 High-Frequency Trading (HFT) Strategies and Technologies in FinTech 1.4 Algorithmic Trading Platforms and Tools used in FinTech 1.5 Ethical and Compliance Frameworks for Algorithmic Trading in FinTech</p> <p>Unit 2: Quantitative Finance Models for FinTech (Approx. 14 hours)</p> <p>2.1 Application of Quantitative Finance in FinTech: Risk Management and Decision Making 2.2 Portfolio Optimization Techniques for FinTech Platforms 2.3 Factor Models and Machine Learning Applications in FinTech 2.4 Option Pricing Models for FinTech Products and Services 2.5 Cryptocurrency Quantitative Models and Analysis</p> <p>Unit 3: Advanced Algorithmic Trading Strategies for FinTech (Approx. 14 hours)</p> <p>3.1 Sentiment Analysis and Social Media Data in FinTech Trading Strategies 3.2 Market Making and Liquidity Provision in FinTech Markets 3.3 Automated Investment Advisory Services in FinTech 3.4 Algorithmic Execution Strategies for FinTech Platforms 3.5 Regulatory Technology (RegTech) Solutions for Algorithmic Trading Compliance</p> <p>Unit 4: Risk Management and Performance Evaluation in FinTech (Approx. 14 hours)</p> <p>4.1 Risk Management Techniques for Algorithmic Trading in FinTech 4.2 Backtesting and Performance Evaluation of Trading Strategies in FinTech 4.3 Transaction Cost Analysis (TCA) and Slippage Management in FinTech 4.4 Drawdown Analysis and Risk-adjusted Performance Measures in FinTech 4.5 Compliance and Governance Frameworks for Algorithmic Trading in FinTech</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the evolution and significance of algorithmic trading in FinTech. 2. Apply quantitative finance techniques for risk management and decision making in FinTech. 3. Learn about sentiment analysis and the use of social media data in FinTech trading strategies.

	<p>4. Understand risk management techniques tailored for algorithmic trading in FinTech</p> <p>Books:</p> <ol style="list-style-type: none"> 1. "Algorithmic Trading and DMA: An Introduction to Direct Access Trading Strategies" by Barry Johnson 2. "Quantitative Finance For Dummies" by Steve Bell 3. "Sentiment Analysis in Finance: Using Natural Language Processing and Machine Learning" by Rajendra Uppal
3	Cybersecurity in Finance
	<p>Unit 1: Fundamentals of Cybersecurity (Approx. 14 hours)</p> <ol style="list-style-type: none"> 1.1 Introduction to Cybersecurity: Concepts and Terminology 1.2 Understanding Cyber Threats in the Financial Sector 1.3 Regulatory Frameworks and Compliance Standards 1.4 Cybersecurity Best Practices and Frameworks (e.g., NIST Cybersecurity Framework) 1.5 Risk Management and Assessment in Cybersecurity <p>Unit 2: Securing Financial Systems and Infrastructure (Approx. 14 hours)</p> <ol style="list-style-type: none"> 2.1 Secure Network Architecture and Infrastructure 2.2 Encryption Techniques and Data Protection Methods 2.3 Identity and Access Management (IAM) in Finance 2.4 Security in Cloud Computing for Financial Institutions 2.5 Incident Response and Business Continuity Planning <p>Unit 3: Threat Intelligence and Detection (Approx. 14 hours)</p> <ol style="list-style-type: none"> 3.1 Understanding Cyber Threat Intelligence 3.2 Tools and Technologies for Threat Detection and Monitoring 3.3 Intrusion Detection and Prevention Systems (IDPS) 3.4 Security Information and Event Management (SIEM) 3.5 Case Studies on Cyber Attacks in the Financial Sector <p>Unit 4: Emerging Trends and Challenges (Approx. 14 hours)</p> <ol style="list-style-type: none"> 4.1 Emerging Cybersecurity Threats in Finance (e.g., AI-driven attacks, ransomware) 4.2 Blockchain Security and Cryptocurrency Risks 4.3 Regulatory Challenges and Compliance in Cybersecurity 4.4 Cybersecurity Governance and Leadership in Financial Institutions 4.5 Future Directions in Cybersecurity for Finance <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Gain an understanding of fundamental cybersecurity concepts and terminology.

	<ol style="list-style-type: none"> 2. Understand principles of secure network architecture and infrastructure for financial systems. 3. Understand the concept of cyber threat intelligence and its importance. 4. Identify emerging cybersecurity threats in finance, such as AI-driven attacks and ransomware. <p>Books:</p> <ol style="list-style-type: none"> 1. "Cybersecurity Essentials" by Charles J. Brooks 2. "Network Security Essentials: Applications and Standards" by William Stallings 3. "Threat Modeling: Designing for Security" by Adam Shostack 4. "Ransomware: Defending Against Digital Extortion" by Allan Liska and Timothy Gallo
4	Financial Analytics
	<p>Unit 1: Introduction to Financial Analytics (Approx. 14 hours)</p> <ol style="list-style-type: none"> 1.1 Understanding Financial Analytics: Definition and Scope 1.2 Importance and Applications of Financial Analytics in Decision Making 1.3 Data Sources and Collection Methods in Financial Analytics 1.4 Exploratory Data Analysis (EDA) Techniques for Financial Data 1.5 Overview of Statistical Methods and Tools Used in Financial Analytics <p>Unit 2: Financial Modeling and Forecasting (Approx. 14 hours)</p> <ol style="list-style-type: none"> 2.1 Principles of Financial Modeling 2.2 Forecasting Techniques: Time Series Analysis, Regression Analysis 2.3 Building Financial Models in Excel 2.4 Scenario Analysis and Sensitivity Analysis 2.5 Evaluating Model Performance and Accuracy <p>Unit 3: Quantitative Methods in Finance (Approx. 14 hours)</p> <ol style="list-style-type: none"> 3.1 Introduction to Quantitative Finance 3.2 Probability Theory and its Applications in Finance 3.3 Statistical Inference and Hypothesis Testing 3.4 Portfolio Optimization and Asset Allocation Models 3.5 Monte Carlo Simulation in Financial Decision Making <p>Unit 4: Advanced Topics in Financial Analytics (Approx. 14 hours)</p> <ol style="list-style-type: none"> 4.1 Machine Learning Applications in Finance 4.2 Predictive Analytics for Financial Markets 4.3 Text Mining and Sentiment Analysis in Finance 4.4 High-Frequency Trading and Algorithmic Trading Strategies 4.5 Ethical Considerations and Challenges in Financial Analytics

	<p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the definition and scope of financial analytics. 2. Understand the principles of financial modeling. 3. Understand statistical theories and their applications in finance. 4. Learn about machine learning, predictive technique applications in finance. <p>Books:</p> <ol style="list-style-type: none"> 1. Financial Analytics with R: Building a Laptop Laboratory for Data Science" by Mark J. Bennett and Dirk L. Hugen 2. "Financial Modeling" by Simon Benninga 3. Quantitative Finance For Dummies" by Steve Bell 4. Machine Learning for Finance: Principles and Practice for Financial Insiders" by Jannes Klaas
5	Exploratory Analysis in Python
	<p>Unit 1: Introduction to Exploratory Data Analysis (EDA) in FinTech using Python (Approx. 14 hours)</p> <ol style="list-style-type: none"> 1.1 Introduction to Exploratory Data Analysis (EDA) 1.2 Python Libraries for Data Analysis: Pandas, NumPy, Matplotlib, Seaborn 1.3 Importing and Cleaning Financial Data 1.4 Data Visualization Techniques for Financial Data 1.5 Exploring Financial Time Series Data <p>Unit 2: Analyzing Financial Market Data (Approx. 14 hours)</p> <ol style="list-style-type: none"> 2.1 Introduction to Financial Market Data 2.2 Retrieving Financial Data from APIs 2.3 Analyzing Stock Price Data 2.4 Volatility Analysis and Risk Metrics 2.5 Correlation and Co-movement Analysis <p>Unit 3: Sentiment Analysis and Text Mining in FinTech (Approx. 14 hours)</p> <ol style="list-style-type: none"> 3.1 Introduction to Sentiment Analysis and Text Mining 3.2 Web Scraping for Financial News and Social Media Data 3.3 Preprocessing Text Data: Tokenization, Stopword Removal, Stemming 3.4 Sentiment Analysis Techniques for Financial Text Data 3.5 Case Studies: Analyzing Market Sentiment and Impact on Financial Markets <p>Unit 4: Machine Learning Applications in FinTech (Approx. 14 hours)</p> <ol style="list-style-type: none"> 4.1 Introduction to Machine Learning in FinTech 4.2 Predictive Modeling for Financial Forecasting 4.3 Classification and Regression Models for Financial Data

	<p>4.4 Time Series Forecasting using Machine Learning 4.5 Evaluating Model Performance and Deployment Considerations</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the concept of Exploratory Data Analysis (EDA). 2. Understand the characteristics of financial market data. 3. Learn about sentiment analysis and text mining concepts. 4. Understand the basics of machine learning in FinTech. <p>Books:</p> <ol style="list-style-type: none"> 1. "Python for Data Analysis" by Wes McKinney 2. "Python for Finance" by Yves Hilpisch 3. "Text Analytics with Python" by Dipanjan Sarker 4. "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron
6	Business Research and Data Warehousing
	<p>Unit 1: Introduction to Business Research in FinTech (Approx. 14 hours)</p> <ol style="list-style-type: none"> 1.1 Understanding Business Research: Objectives and Methodologies 1.2 Importance of Research in the FinTech Industry 1.3 Research Design and Data Collection Methods 1.4 Data Sources in FinTech: Transactional Data, Market Data, Customer Data 1.5 Ethical Considerations in Business Research <p>Unit 2: Data Warehousing Fundamentals (Approx. 14 hours)</p> <ol style="list-style-type: none"> 2.1 Introduction to Data Warehousing 2.2 Data Warehousing Architecture and Components 2.3 Dimensional Modeling and Data Modeling Techniques 2.4 Extract, Transform, Load (ETL) Processes in Data Warehousing 2.5 Data Quality and Governance in Data Warehousing <p>Unit 3: Data Analytics for FinTech (Approx. 14 hours)</p> <ol style="list-style-type: none"> 3.1 Introduction to Data Analytics in FinTech 3.2 Exploratory Data Analysis (EDA) Techniques 3.3 Predictive Analytics Models for Financial Data 3.4 Customer Segmentation and Behavioral Analysis 3.5 Fraud Detection and Risk Management <p>Unit 4: Advanced Topics in Business Research and Data Warehousing (Approx. 14 hours)</p> <ol style="list-style-type: none"> 4.1 Big Data and Distributed Computing in FinTech 4.2 Real-time Data Warehousing and Streaming Analytics 4.3 Data Visualization Tools and Techniques

	<p>4.4 Blockchain and Distributed Ledger Technology in Data Warehousing 4.5 Case Studies and Practical Applications in FinTech</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the objectives and methodologies of business research. 2. Understand the basics of data warehousing. 3. Learn about data analytics in the FinTech industry 4. Understand big data and distributed computing in FinTech. <p>Books:</p> <ol style="list-style-type: none"> 1. Business Research Methods" by Donald R. Cooper and Pamela S. Schindler 2. "The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling" by Ralph Kimball and Margy Ross 3. Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking" by Foster Provost and Tom Fawcett 4. "Big Data: A Revolution That Will Transform How We Live, Work, and Think" by Viktor Mayer-Schönberger and Kenneth Cukier
<p>Sem 4 1</p>	<p>Machine Learning System Design in Finance</p>
	<p>Unit 1: Introduction to Machine Learning in Finance (Approx. 14 hours)</p> <p>1.1 Overview of Machine Learning and its Applications in Finance 1.2 Types of Machine Learning Algorithms: Supervised, Unsupervised, and Reinforcement Learning 1.3 Data Preprocessing Techniques for Financial Data 1.4 Evaluation Metrics for Machine Learning Models in Finance 1.5 Ethical Considerations and Bias in Machine Learning</p> <p>Unit 2: Building Predictive Models for Financial Markets (Approx. 14 hours)</p> <p>2.1 Time Series Forecasting Techniques 2.2 Predictive Modeling for Stock Price Prediction 2.3 Volatility Modeling and Risk Management 2.4 Portfolio Optimization using Machine Learning 2.5 High-Frequency Trading Strategies</p> <p>Unit 3: Machine Learning for Credit Risk Assessment (Approx. 14 hours)</p> <p>3.1 Credit Scoring Models and Credit Risk Assessment 3.2 Default Prediction using Machine Learning 3.3 Loan Underwriting and Approval Models 3.4 Fraud Detection in Lending and Financial Transactions 3.5 Regulatory Compliance and Model Interpretability</p>

	<p>Unit 4: Advanced Topics in Machine Learning System Design (Approx. 14 hours)</p> <p>4.1 Deep Learning Applications in Finance 4.2 Ensemble Learning Techniques 4.3 Reinforcement Learning for Algorithmic Trading 4.4 Explainable AI and Interpretable Machine Learning Models 4.5 Case Studies and Project Work in Machine Learning for Finance</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the applications of machine learning in finance. 2. Learn time series forecasting techniques for financial data. 3. Understand credit scoring models and their role in credit risk assessment. 4. Learn about deep learning applications in finance. <p>Books:</p> <ol style="list-style-type: none"> 1. "Machine Learning for Finance" by Jannes Klaas 2. "Advances in Financial Machine Learning" by Marcos Lopez de Prado 3. "Credit Risk Analytics: Measurement Techniques, Applications, and Examples in SAS" by Bart Baesens, Daniel Roesch, and Harald Scheule 4. "Interpretable Machine Learning: A Guide for Making Black Box Models Explainable" by Christoph Molnar
2	<p>Predictive Modelling in Python</p>
	<p>Unit 1: Introduction to Predictive Modeling in FinTech using Python (Approx. 14 hours)</p> <p>1.1 Overview of Predictive Modeling in Finance 1.2 Python Libraries for Predictive Modeling: NumPy, Pandas, Scikit-learn 1.3 Data Preprocessing Techniques for Financial Data 1.4 Exploratory Data Analysis (EDA) for Predictive Modeling 1.5 Evaluation Metrics for Predictive Models in Finance</p> <p>Unit 2: Predictive Modeling Techniques for Financial Markets (Approx. 14 hours)</p> <p>2.1 Time Series Forecasting Techniques 2.2 ARIMA and Exponential Smoothing Models 2.3 Machine Learning Models for Stock Price Prediction 2.4 Volatility Modeling and Risk Management 2.5 Ensemble Learning Techniques</p> <p>Unit 3: Credit Risk Modeling and Loan Underwriting (Approx. 14 hours)</p> <p>3.1 Credit Scoring Models and Credit Risk Assessment 3.2 Default Prediction using Machine Learning</p>

	<p>3.3 Loan Underwriting Models 3.4 Fraud Detection in Lending 3.5 Regulatory Compliance in Credit Risk Modeling</p> <p>Unit 4: Advanced Topics in Predictive Modeling for FinTech (Approx. 14 hours)</p> <p>4.1 Deep Learning Applications in Finance 4.2 Reinforcement Learning for Algorithmic Trading 4.3 Sentiment Analysis for Market Prediction 4.4 Feature Engineering Techniques 4.5 Case Studies and Project Work in Predictive Modeling for FinTech</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the concept of predictive modeling in finance. 2. Learn time series forecasting techniques for financial data. 3. Understand credit scoring models and their role in credit risk assessment. 4. Learn about deep learning applications in finance. <p>Books:</p> <ol style="list-style-type: none"> 1. Python for Data Analysis" by Wes McKinney 2. Forecasting: Principles and Practice" by Rob J Hyndman and George Athanasopoulos 3. "Credit Risk Analytics: Measurement Techniques, Applications, and Examples in SAS" by Bart Baesens, Daniel Roesch, and Harald Scheule 4. Deep Learning for Finance: Predictive Modeling with Python" by Igor Halperin and Harish Chandran
3	Science and Management of Big Data
	<p>Unit 1: Introduction to Big Data in FinTech (Approx. 14 hours)</p> <p>1.1 Overview of Big Data: Definition, Characteristics, and Importance in FinTech 1.2 Challenges and Opportunities of Big Data in the Financial Industry 1.3 Technologies for Big Data Storage and Processing 1.4 Data Governance and Regulatory Compliance in Big Data 1.5 Ethical Considerations in Big Data Management</p> <p>Unit 2: Big Data Technologies and Infrastructure (Approx. 14 hours)</p> <p>2.1 Distributed Computing Frameworks: Hadoop, Spark, and Flink 2.2 NoSQL Databases for Big Data Management 2.3 Data Lakes and Data Warehouses in FinTech 2.4 Real-time Stream Processing with Kafka and Storm 2.5 Cloud Computing Solutions for Big Data</p>

	<p>Unit 3: Data Analytics and Machine Learning in Big Data (Approx. 14 hours)</p> <p>3.1 Exploratory Data Analysis (EDA) Techniques for Big Data 3.2 Predictive Analytics Models for Financial Forecasting 3.3 Machine Learning at Scale: Distributed Machine Learning Algorithms 3.4 Deep Learning and Neural Networks for Big Data 3.5 Case Studies: Applications of Data Analytics in FinTech</p> <p>Unit 4: Advanced Topics in Big Data Management and Analysis (Approx. 14 hours)</p> <p>4.1 Blockchain Technology and Distributed Ledger Technology (DLT) in FinTech 4.2 Internet of Things (IoT) and Sensor Data in Finance 4.3 Data Privacy and Security in Big Data 4.4 Data Monetization Strategies in FinTech 4.5 Future Directions and Emerging Trends in Big Data and FinTech</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Identify challenges and opportunities associated with big data in the financial industry. 2. Learn about distributed computing frameworks such as Hadoop, Spark, and Flink. 3. Understand machine learning at scale with distributed machine learning algorithms. 4. Understand the role of blockchain technology and distributed ledger technology (DLT) in FinTech. <p>Books:</p> <ol style="list-style-type: none"> 1. Big Data: A Revolution That Will Transform How We Live, Work, and Think" by Viktor Mayer-Schönberger and Kenneth Cukier 2. "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems" by Martin Kleppmann 3. Python for Data Science Handbook" by Jake VanderPlas 4. Blockchain Basics: A Non-Technical Introduction in 25 Steps" by Daniel Drescher
4	Product Innovation and Management
	<p>Unit 1: Introduction to Product Innovation in Finance (Approx. 14 hours)</p> <p>1.1 Overview of Product Innovation in the Financial Industry 1.2 Importance and Drivers of Product Innovation in Finance 1.3 Understanding Customer Needs and Market Trends 1.4 Design Thinking and Ideation for Financial Products 1.5 Market Research and Validation</p>

	<p>Unit 2: Product Development Process (Approx. 14 hours)</p> <p>2.1 Conceptualization and Idea Generation 2.2 Product Design and Prototyping 2.3 Agile and Lean Product Development Methodologies 2.4 User Experience (UX) Design in Financial Products 2.5 Testing and Iteration</p> <p>Unit 3: Product Management in Finance (Approx. 14 hours)</p> <p>3.1 Product Lifecycle Management 3.2 Pricing Strategies for Financial Products 3.3 Go-to-Market Strategies and Launch Planning 3.4 Customer Relationship Management (CRM) in Finance 3.5 Product Performance Measurement and Optimization</p> <p>Unit 4: Innovation in Financial Services (Approx. 14 hours)</p> <p>4.1 Disruptive Innovation and its Impact on Financial Services 4.2 Open Banking and API Economy 4.3 Digital Transformation in Banking and Insurance 4.4 Fintech Partnerships and Collaboration 4.5 Regulatory Considerations and Compliance</p> <p>Course Outcome:</p> <ol style="list-style-type: none"> 1. Understand the concept and significance of product innovation in the financial industry. 2. Understand the stages of the product development process. 3. Understand the concept of product lifecycle management. 4. Understand the concept of disruptive innovation and its impact on financial services. <p>Books:</p> <ol style="list-style-type: none"> 1. "The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail" by Clayton M. Christensen 2. "Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" by Eric Ries 3. "Inspired: How To Create Products Customers Love" by Marty Cagan 4. "The Fintech Book: The Financial Technology Handbook for Investors, Entrepreneurs, and Visionaries" edited by Susanne Chishti and Janos Barberis
5	SQL for Data Analysis
	<p>Unit 1: Introduction to SQL and Relational Databases (Approx. 14 hours)</p> <p>1.1 Overview of SQL: Definition, Purpose, and Importance in Finance 1.2 Relational Databases and Structured Query Language (SQL)</p>

- 1.3 Basic SQL Syntax: SELECT, FROM, WHERE, ORDER BY
- 1.4 Filtering Data with WHERE Clause
- 1.5 Sorting and Limiting Results

Unit 2: Data Manipulation with SQL (Approx. 14 hours)

- 2.1 Aggregating Data with GROUP BY and Aggregate Functions (SUM, AVG, COUNT, etc.)
- 2.2 Joining Tables: INNER JOIN, LEFT JOIN, RIGHT JOIN
- 2.3 Subqueries and Derived Tables
- 2.4 Conditional Logic with CASE Statements
- 2.5 Modifying Data with INSERT, UPDATE, DELETE

Unit 3: Advanced SQL Techniques for Data Analysis (Approx. 14 hours)

- 3.1 Window Functions for Analytical Queries
- 3.2 Common Table Expressions (CTEs)
- 3.3 Working with Date and Time Data
- 3.4 Creating and Managing Views
- 3.5 Performance Optimization Techniques

Unit 4: Practical Applications of SQL in Finance (Approx. 14 hours)

- 4.1 Financial Data Analysis Queries: Calculating Metrics, Trends, and Patterns
- 4.2 Portfolio Analysis and Performance Measurement
- 4.3 Risk Analysis and Stress Testing
- 4.4 Regulatory Reporting and Compliance
- 4.5 Case Studies and Project Work

Course Outcome:

1. Understand the purpose and importance of SQL in finance.
2. Learn to aggregate data using GROUP BY and aggregate functions (SUM, AVG, COUNT, etc.).
3. Learn advanced techniques such as window functions for analytical queries.
4. Learn to perform portfolio analysis and measure performance using SQL.

Books:

1. "SQL QuickStart Guide: The Simplified Beginner's Guide to Managing, Analyzing, and Manipulating Data With SQL" by Walter Shields
2. "SQL Cookbook: Query Solutions and Techniques for Database Developers" by Anthony Molinaro
3. "SQL Performance Explained" by Markus Winand
4. "Practical SQL: A Beginner's Guide to Storytelling with Data" by Anthony DeBarros

Unit 1: Introduction to Spreadsheet Modeling and Decision Analysis (Approx. 14 hours)

- 1.1 Overview of Spreadsheet Modeling in Finance
- 1.2 Importance and Applications of Decision Analysis in Financial Decision Making
- 1.3 Spreadsheet Fundamentals: Excel Basics and Functions
- 1.4 Data Management and Visualization in Excel
- 1.5 Introduction to Decision Trees and Sensitivity Analysis

Unit 2: Financial Modeling Techniques (Approx. 14 hours)

- 2.1 Building Financial Models: Income Statements, Balance Sheets, Cash Flow Statements
- 2.2 Forecasting Techniques: Time Series Analysis, Regression Analysis
- 2.3 Financial Ratios and Key Performance Indicators (KPIs)
- 2.4 Valuation Models: Discounted Cash Flow (DCF), Dividend Discount Model (DDM)
- 2.5 Monte Carlo Simulation for Financial Risk Analysis

Unit 3: Optimization and Simulation in Finance (Approx. 14 hours)

- 3.1 Linear Programming Models for Portfolio Optimization
- 3.2 Capital Budgeting and Investment Analysis
- 3.3 Risk Management Techniques using Excel Solver
- 3.4 Scenario Analysis and Decision-Making under Uncertainty
- 3.5 Simulation Modeling for Financial Planning

Unit 4: Advanced Topics in Spreadsheet Modeling for Finance (Approx. 14 hours)

- 4.1 VBA Programming for Automation and Customization in Excel
- 4.2 Advanced Data Analysis Techniques: Pivot Tables, Power Query, Power Pivot
- 4.3 Building Dashboards and Interactive Reports in Excel
- 4.4 Integrating Excel with External Data Sources
- 4.5 Case Studies and Project Work in Spreadsheet Modeling for Finance

Course Outcome:

- 1. Understand the role of spreadsheet modeling in finance.
- 2. Learn to build financial models including income statements, balance sheets, and cash flow statements in Excel.
- 3. Understand linear programming models for portfolio optimization.
- 4. Learn VBA programming for automation and customization in Excel

Books:

- 1. "Financial Modeling in Excel For Dummies" by Danielle Stein Fairhurst
- 2. "Financial Modeling" by Simon Benninga
- 3. Excel VBA Programming For Dummies" by Michael Alexander and John Walkenbach

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| | <ol style="list-style-type: none">4. "Simulation Modeling and Analysis" by Averill M. Law and David Kelton5. "Financial Analysis and Modeling Using Excel and VBA" by Chandan Sengupta |
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