

CONTENTS

Chapter 1: Foundations of Risk Management	01-23
1.1 Definition of Risk and Uncertainty	
1.2 Types of Risks (Strategic, Operational, Financial, Hazard)	
1.3 Risk vs Uncertainty (Knightian concept)	
1.4 Risk Management Process Lifecycle	
1.5 Role of Risk in Engineering and Business Systems	
Chapter 2: Risk Identification Techniques	24-44
2.1 Hazard Identification Methods (HAZID)	
2.2 Failure Modes and Effects Analysis (FMEA)	
2.3 Fault Tree Analysis (FTA)	
2.4 Event Tree Analysis (ETA)	
2.5 Brainstorming, Delphi Method, Checklists	
Chapter 3: Qualitative Risk Analysis	45-60
3.1 Risk Probability and Impact Matrix	
3.2 Risk Categorization and Prioritization	
3.3 Expert Judgment and Bias Handling	
3.4 SWOT and PESTLE Analysis	
3.5 Risk Heat Maps	
Chapter 4: Quantitative Risk Analysis	61-72
4.1 Probability Theory Fundamentals	
4.2 Statistical Distributions in Risk (Normal, Poisson, Exponential)	
4.3 Expected Value and Variance	
4.4 Sensitivity Analysis	
4.5 Decision Trees and Bayesian Analysis	
Chapter 5: Simulation and Modeling Techniques	73-87
5.1 Monte Carlo Simulation	
5.2 Scenario Analysis	
5.3 System Dynamics Modeling	
5.4 Risk Modeling using MATLAB/Python	
5.5 Uncertainty Propagation	
5.6 Model Validation and Verification in Risk Simulation	
Chapter 6: Financial Risk Management Tools	88-108
6.1 Market Risk (VaR, CVaR)	
6.2 Credit Risk Models	
6.3 Derivatives for Risk Hedging (Options, Futures, Swaps)	
6.4 Portfolio Risk Management	

- 6.5 Stress Testing and Backtesting
- 6.6 Integrated Risk Management Systems (IRMS)
- 6.7 Risk Reporting and Communication
- 6.8 Regulatory Frameworks and Compliance in Financial Risk Management

Chapter 7: Operational and Engineering Risk **109-122**

- 7.1 Reliability Engineering Concepts
- 7.2 Maintainability and Availability Analysis
- 7.3 Risk in Power Systems and Infrastructure
- 7.4 Human Factors and Safety Engineering
- 7.5 Case Studies (Industrial Failures)
- 7.6 Emerging Risks in Engineering Systems

Chapter 8: Risk Mitigation and Control Strategies **123-140**

- 8.1 Risk Avoidance, Reduction, Transfer, Acceptance
- 8.2 Control Measures and Safety Barriers
- 8.3 Business Continuity Planning (BCP)
- 8.4 Disaster Recovery Planning (DRP)
- 8.5 Resilience Engineering
- 8.6 Integrated Risk Control Systems (IRCS)
- 8.7 Risk Communication and Reporting Systems

Chapter 9: Enterprise Risk Management (ERM) Frameworks **141-159**

- 9.1 ERM Overview
- 9.2 COSO Framework
- 9.3 ISO 31000 Principles
- 9.4 Governance, Risk, and Compliance (GRC)
- 9.5 Risk Culture and Organizational Integration

Chapter 10: Emerging Trends and Digital Risk Management **160-176**

- 10.1 AI and Machine Learning in Risk Prediction
- 10.2 Cybersecurity Risk Management
- 10.3 Risk in IoT and Smart Systems
- 10.4 ESG (Environmental, Social, Governance) Risks
- 10.5 Real-time Risk Monitoring Systems
- 10.6 Risk Management in Media and Entertainment Industry