Training Course on Big Data and Machine Learning in Central Banking

Professional Development Training Course Outline

Category	Banking Institute	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In the era of digital transformation and financial innovation, central banks are increasingly turning to big data analytics and machine learning (ML) to enhance decision-making, manage risks, and foster economic stability. Training Course on Big Data and Machine Learning in Central Banking provides central banking professionals with a deep dive into the tools, technologies, and frameworks that drive data-driven monetary policy, regulatory supervision, and financial forecasting. With real-world case studies, hands-on exercises, and expert-led modules, this course equips participants with the skills to apply AI-powered insights to macroeconomic challenges.

As global finance evolves rapidly, the intersection of artificial intelligence, predictive analytics, and real-time data processing becomes critical. This training not only covers foundational and advanced concepts but also focuses on regtech, suptech, natural language processing, and central bank digital currencies (CBDCs). Whether you're looking to modernize your regulatory approach or integrate AI into your economic models, this course offers practical, forward-thinking solutions aligned with current industry trends.

Programme Curriculum

Training Course on Big Data and Machine Learning in Central Banking

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Course Objectives

1. Understand the role of big data in monetary policy formulation.
2. Apply machine learning algorithms for economic forecasting.
3. Leverage AI-driven analytics for regulatory compliance and supervision.
4. Explore the integration of real-time data pipelines in central bank operations.
5. Utilize predictive modeling for financial risk assessment.
6. Analyze macroeconomic trends using unsupervised learning techniques.
7. Investigate the use of natural language processing (NLP) in analyzing central bank communications.
8. Examine deep learning applications in fraud detection and credit risk monitoring.
9. Implement data governance and ethical AI frameworks within financial institutions.
10. Deploy cloud-based AI platforms for scalable analytics.
11. Understand the implications of CBDCs and digital innovation.
12. Enhance transparency with data visualization and BI tools.
13. Evaluate the impact of suptech and regtech on policy enforcement.

Target Audience

1. Central Bank Economists
2. Financial Risk Analysts
3. Regulatory Policy Makers
4. Data Scientists in Finance
5. IT Professionals in Central Banks
6. Fintech & Regtech Specialists
7. Compliance and Supervision Officers
8. AI and Analytics Consultants for Public Sector

Course Duration: 10 days

Course Modules

Module 1: Introduction to Big Data in Central Banking

- Overview of big data ecosystems
- Importance of data in monetary policy
- Types of big data sources in banking
- Challenges in central bank data adoption
- Data architecture for financial institutions
- **Case Study**: The Bank of England’s Data Strategy

Module 2: Fundamentals of Machine Learning in Finance

- Supervised vs unsupervised learning
- Key ML algorithms used in economics
- Model evaluation techniques
- AI for early warning systems
- Overfitting and bias in economic models
- **Case Study**: ML for Inflation Forecasting in the ECB

Module 3: Predictive Analytics for Risk Assessment

- Risk modeling in central banking
- Time series forecasting techniques
- Ensemble methods in financial prediction
- Feature engineering for economic indicators
- Model deployment in production environments
- **Case Study**: IMF Use of AI in Risk-Based Surveillance

Module 4: Natural Language Processing in Economic Intelligence

- Text mining for central bank reports
- Sentiment analysis of financial statements
- Topic modeling in monetary communication
- Real-time media tracking using NLP
- Automating speech/text analysis
- **Case Study**: Federal Reserve's Analysis of FOMC Statements

Module 5: Data Governance and Ethics

- Data privacy in public institutions
- Ethical use of AI in finance
- Regulatory frameworks for data governance
- Data lineage and transparency
- Bias mitigation in algorithmic models
- **Case Study**: Basel Committee on AI Risk Guidelines

Module 6: Deep Learning in Financial Supervision

- Neural networks for anomaly detection
- Credit risk classification models
- Autoencoders for fraud detection
- LSTM models for economic prediction
- Advanced model interpretability tools
- **Case Study**: Deep Learning at the Monetary Authority of Singapore

Module 7: Real-Time Analytics and Streaming Data

- Real-time data architecture
- Use of Apache Kafka and Spark
- Stream processing for financial alerts
- Economic nowcasting with streaming inputs
- Integrating IoT and satellite data
- **Case Study**: Real-Time Surveillance at Norges Bank

Module 8: Suptech and Regtech Innovation

- Definitions and frameworks
- Use cases in supervisory technology
- AI for compliance automation
- Dashboard development for regulators
- Mobile suptech tools for field agents
- **Case Study**: Regtech Sandbox at the Reserve Bank of India

Module 9: Visualization and Business Intelligence

- Tools: Power BI, Tableau, Qlik

- Dashboard design for decision-makers
- Interactive reports for central banks
- Communicating uncertainty visually
- Advanced charting for macro trends
- **Case Study**: Visualization Strategy by the Bank of Canada

Module 10: Economic Forecasting with AI

- Forecasting GDP, CPI using AI
- Model comparison: ML vs traditional econometrics
- Forecasting accuracy metrics
- Scenario simulation with AI
- Machine learning interpretability
- **Case Study**: AI-Powered Forecasting by South African Reserve Bank

Module 11: Infrastructure for Scalable AI

- Cloud infrastructure (AWS, Azure, GCP)
- On-premise vs cloud comparison
- Data lake and warehouse integration
- ML Ops and continuous integration
- Security in AI deployment
- **Case Study**: Cloud Adoption by Bank of Thailand

Module 12: CBDCs and Digital Transformation

- Understanding CBDCs
- Blockchain and distributed ledgers
- Data implications of digital currencies
- Risk modeling for CBDC adoption
- AI and fintech convergence
- **Case Study**: Digital Yuan and the People's Bank of China

Module 13: AI Strategy in Central Banks

- Creating an AI roadmap
- Building AI talent and capabilities
- AI project governance and risk
- Public trust and transparency
- Measuring AI ROI in policy outcomes
- **Case Study**: Bank of Finland’s AI Implementation Strategy

Module 14: Hands-on with Python for Economic Modeling

- Python basics for financial analysts
- Pandas and NumPy for economic data
- Building regression models in scikit-learn
- Data visualization with matplotlib/seaborn
- Working with economic datasets (e.g., FRED)
- **Case Study**: Python-Driven Economic Simulations at BIS

Module 15: Final Capstone Project & Presentation

- Team-based real-world simulation
- Solving a central bank challenge using ML
- Presentation of project findings

- Feedback and peer review
- Certification ceremony and summary
- **Case Study**: Capstone Simulation Based on Real IMF Data

Training Methodology

- Expert-led live interactive lectures
- Real-world case study analysis
- Practical labs using open-source tools
- Hands-on coding and data exercises
- Group collaboration and peer learning
- Continuous assessments and feedback

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

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