

MB580 AI in Finance

Course Layout:

Introduction to financial markets and trading instruments. Valuation of fixed income securities and common stocks, introduction to portfolio theory and asset pricing models, cost of capital.

Market efficiency and risk preferences Introduction to portfolio management. Modern portfolio theory. Capital Asset Pricing Model (CAPM) and Factor Models. Portfolio management strategies and performance measures.

Introduction to Algorithmic Trading, technical analysis and trend determination, Dow theory, moving averages, momentum indicators, classical price patterns. AI and machine learning in trading, and portfolio management, regression and classification algorithm applications in security analysis, forecasting, and prediction. Introduction to HFT. Algorithmic trading with Machine Learning and Technical analysis strategies. Advanced time-series regression algorithms, panel regression, quantile regression, ARMA/ARIMA models, mean reverting trading strategies with vector error correction models and cointegration, model risk management, back testing, model validation, and stress testing. Advanced time-series algorithms for financial risk-management, Value-at-risk, Expected Shortfall, coherent risk measures.

Books and references

1. **Machine Learning in Finance by M. Dixon, I Halperin, and P. Bilokon, Springer, 1st Edition**
2. **Advances in Financial Machine Learning, Marcos Lopez, Wiley, 1st Edition**
3. **Machine Learning for Asset Managers, Marcos Lopez, Cambridge University Press, 1st Edition**
4. **Machine Learning for Algorithmic Trading, Stefan Jansen, 2nd Editio**
5. **Elton & Gruber, "Modern Portfolio Theory", Wiley, 9th Edition**
6. **Reilly, Frank,K., "Investment Analysis and Portfolio Management," 5th Edition, Dryden.**