



# PTVA's Institute of Management

(Approved by AICTE, DTE and affiliated to University of Mumbai)  
 Chitrakar Ketkar Marg, Behind M. L. Dahanukar College of Commerce,  
 Vile Parle (East), Mumbai – 400 057.

Tel.: 022-31061594/31099598, Email: [admin@ptvaim.com](mailto:admin@ptvaim.com), Web: [www.ptvaim.ac.in](http://www.ptvaim.ac.in)  
 ISO 9001:2015 Certified Institute & Accredited by NAAC

## SWAYAM/ NPTEL AND MOOCS COURSE ON ARTIFICIAL INTELLIGENCE IN INVESTMENTS 2022-23

PARTICULAR	DETAILS
Course duration	30 hours; (January 2023 to April 2023)
List of students who have enrolled along with name and signature of students	Link to the scanned records:
Course objectives	
Curriculum of the Program	<p><b>Week 1:</b> Introduction to financial markets: Risk-Return Analysis in Investment Decisions – Measures of Risk and Return, understanding value of a firm, goals of a firm, cash flow discounting, making investment decisions, valuation of fixed income securities and common stocks, introduction to portfolio theory and asset pricing models, cost of capital.</p> <p><b>Week 2:</b> Overview of AI and machine learning models: Probability modelling, inferential statistics, Supervised and Unsupervised learning algorithms, regression and classification algorithms.</p> <p><b>Week 3:</b> Introduction to R Programming, R Fundamentals, Exploratory data analysis and data visualization with R. Statistical Analysis with R, Inferential statistics and hypothesis testing with R.</p> <p><b>Week 4:</b> Market Microstructure and Liquidity: Order-driven vs. Quote-driven markets, Market efficiency, Risk preferences, Limit order books, market microstructure types, economic theory of choice, interest rate compounding</p> <p><b>Week 5:</b> Portfolio construction: Portfolio risk and expected returns for two securities and multiple securities, risk diversification with portfolios, correlation structure, mean-variance framework, portfolio construction with R</p> <p><b>Week 6:</b> Portfolio Optimization: Portfolio Possibility curve, Efficient frontier, Minimum Variance portfolios, Introduction to risk-free lending and borrowing, market risk and beta, portfolio optimization with R</p> <p><b>Week 7:</b> Asset Pricing Models: Capital Asset Pricing Model (CAPM), Capital Market Line, Security Market Line, Fallings of CAPM, Single-Index and</p>



*B. Chmukh*  
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	<p>Multi-Index models, Expected Risk and Return with Index models, 3-Factor Fama-French Model</p> <p><b>Week 8:</b> Portfolio Management and Performance Evaluation: Portfolio Management strategies, Active vs Passive Portfolio Management, Value vs Growth investing, One-parameter performance measures Timing &amp; Selection performance measures, application of asset pricing models in performance management</p> <p><b>Week 9:</b> Introduction to Algorithmic Trading: Technical analysis and trend determination, Dow Theory, Moving averages, Momentum indicators, Classical price patterns.</p> <p><b>Week 10:</b> AI and machine learning in Trading execution and portfolio management: Regression and Classification algorithm applications in security analysis, forecasting, and prediction, Case Study examples</p> <p><b>Week 11:</b> 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 with R</p> <p><b>Week 12:</b> Advanced time-series algorithms for financial risk-management: Value-at-risk, Expected Shortfall, ARCH/GARCH models, implementation with R</p>
Assessment Procedure	<p>Average assignment score = 25% of average of best 8 assignments out of the total 12 assignments given in the course.</p> <p>Exam score = 75% of the proctored certification exam score out of 100</p> <p>Final score = Average assignment score + Exam score</p> <p><b>YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE <math>\geq 10/25</math> AND EXAM SCORE <math>\geq 30/75</math>. If one of the 2 criteria is not met, you will not get the certificate even if the Final score <math>\geq 40/100</math></b></p>
Resource Person	Prof. Abhinava Tripathi



*Abhinava Tripathi*  
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