



Madras School of Economics

Post Graduate Teaching & Research in Economics & Finance

Certificate Program in Data Science and Financial Engineering

(June-August 2018)

Syllabus and Curriculum

This 3 month course is a part of a 11 month PGD Program in Data Science and Financial Engineering started in February 2018. It is a part time program offered during weekend (Saturday and Sunday). It provides a rigorous **hands-on training** in analyzing large amounts of data and formulating sophisticated analytical models. The uniquely designed program starts from the basics, and culminates in cutting edge material and concepts. Experts from industry and research labs further enrich the participants understanding by exposing them to state of the art topics. This will surely enhance the participants skills in data science and financial engineering, which are a must for future research and employment.

In this program, 4 topics will be taught with rigorous practical applications on computers. As it is a part time diploma program, for each subject the concerned teacher will decide evaluation strategy (mostly projects, seminars, assignments). Learning is the main objective and this course is not based on exam evaluation system. After successful completion, MSE will provide course completion certificate.

Contents

1. Econometrics for Finance and Decision Science

- Regression, Dummy dependent variable models, Simultaneous equation models, panel data models with computer applications

2. Topics in Financial Engineering

- Discrete time Binomial Model to price derivatives, Arbitrage, Replicating Portfolio, Black Scholes Equation and its solution, Numerical and Simulation techniques

3. Operations Research

- Non linear and Dynamic Programming, Quadratic Programming, KKT conditions, Network Flows, Queueing theory

4. Artificial Intelligence and Machine Learning

- Search, Supervised Learning, Linear Gaussian Discriminant Analysis, SVM, Unsupervised Learning, EM algorithm, Clustering, PCA

Note: The candidate may choose all four topic or only a few topics on their choice. For full course the fees is Rs. 1 lakh. For 1 topic the fees is Rs. 25,000.

Time Table

Venue: Conference Room, First Floor, Admin Building

Day/Timing	Day 1	Day 2
9.30 a.m - 1.00 p.m	<i>Econometrics for Finance and Decision Science</i>	<i>Artificial Intelligence and Machine Learning</i>
2.00 p.m - 5.30 pm	<i>Operations Research</i>	<i>Topics in Financial Engineering</i>

Classes will start from June 9, 2018.

How to apply:

Please write to the Director with a brief CV and topics to be attended