Approval : 8th Senate Meeting.

IIT Mandi

Proposal for a New Course

Course Name: Computational Financial Modelling Lab

Course Number: MA653P

Credit: 0-0-2-1

Students intended for: 3rd and 4th Year UG/PG

Semester:Even/Odd

Elective or Compulsory: Elective

Prerequisites: MA 653 Computational Financial Modelling should be taken concurrently or earlier. Some programming knowledge in C/MATLAB/R/Spread sheets Packages.

Course Preamble: This course is intended to provide in-depth hands on experience of the techniques introduced in MA-653. Thus giving necessary exposure of some practical algorithms and techniques used in financial institutions. A considerable attention is devoted to address computational issues in financial problems. Students interested in financial modeling are provided with necessary tools for implementation of models, thereby, enabling them to extract information of practical importance for the finance industry.

Course Outline:

1. **[2 Lectures]**

Introduction to R statistical software.

2. **[3 Lectures]**

Classical Markowitz portfolio model, portfolio under higher order moments and fuzzy portfolio models in R.

3. **[5 Lectures]**

Financial Time series analysis, stochastic volatility models and non parametric time series and technical analysis using R.

4. **[4 Lectures]**

Factor Models, Regression, classification and clustering analysis of financial data in R.

Text books:

1. Tsay, Ruey S., *Analysis of financial time* series, Vol. 543. John Wiley & Sons, 2005.

2. Würtz, Diethelm, Yohan Chalabi, William Chen, and Andrew Ellis, *Portfolio optimization with R/Rmetrics*, Rmetrics, 2009.
3. Sheather, Simon, *A modern approach to regression with R,* Vol. 58. Springer, 2009.
4. Pfaff, Bernhard, *Financial risk modelling and portfolio optimization with R*, John Wiley & Sons, 2012.