STAT-815 Statistical Methods in Risk Management (3 Credit Hours)

1. Objectives

This course aims at introducing students to the concepts of statistical methods, techniques and models with a focus on risk management.

2. Course Contents

Risk in Perspective, Brief History of Risk Management, The New Regulatory Framework, Why Manage Financial Risk?, Quantitative Risk Management, Risk Factors, and Loss Distributions, Risk Measurement, Standard Methods for Market Risks, Normal Mixture Distributions, Spherical and Elliptical Distributions, Dimension Reduction Techniques, Empirical Analyses of Financial Time Series, Fundamentals of Time Series Analysis, GARCH Models for Changing Volatility, GARCH Models for Changing Volatility, Fundamentals of Multivariate Time Series, Multivariate GARCH Processes, Copulas, Dependence Measures, Normal Mixture Copulas, Archimedean Copulas, Fitting Copulas to Data, Coherent Measures of Risk, Bounds for Aggregate Risks, Capital Allocation, Maxima, Threshold Exceedances, Tails of Specific Models, Credit Risk Modelling, Thresholding, and Mixture models. Related applications/computations with R.

3. Recommended Books

i. McNeil, A. J., Frey, R., & Embrechts, P. Quantitative risk management: Concepts, techniques, and tools (Vol. 3). Princeton: Princeton university press, (2005).

ii. Burney, S.M.A., Risk Theory and Insurance, KU Press, (2003).

iii. Lai, T. L., & Xing, H. Statistical models and methods for financial markets. New York: Springer, (2008).

iv. Lee, C. F., & Lee, J. C. (Eds.). Handbook of financial econometrics and statistics. Springer New York, (2015).

4. Outcomes

On successful completion of this course, students will know statistical methods and models for risk management.