MS Financial Risk Management Degree Program

Program and Course Content Learning Objectives

The MS Financial Risk Management (MsFRM) Degree Program’s major strength and its unique positioning is its dual focus on risk management theory and risk management application. Hence it has broad appeal in the business community due to a “Real World Approach to Risk Management Theory,” as well as due to its STEM designation.

Program Mission

Deliver to its graduate students both a broad perspective on current risk management trends and best practices, as well as knowledge of risk management theories and their applications that is useful in their jobs and that enhances their careers.

Program learning objectives therefore fall into one of those two categories.

Program Level Objectives

Risk Management Theory

1. Using existing risk management theories and tools, fully understand how to identify and manage various types of risk, particularly financial risk. This objective is met by several courses, including:
   - FNCE 5312: Financial Institutions – A Risk Management Approach
   - FNCE 5313: Financial Risk Modeling I
   - FNCE 5321: Financial Risk Modeling II
   - FNCE 5331: Financial Risk Modeling III
   - FNCE 5322: Financial Risk Management I—Equity Markets
   - FNCE 5341: Financial Risk Management III—Advanced Topics

2. Participate in a forum for interaction of academics and practitioners so as to focus on the practice of creating economic value by managing exposure to risk. The following courses contribute to meeting this goal:
   - FNCE 5312: Financial Institutions – A Risk Management Approach
   - FNCE 5333: Seminar: Applications of Risk Management
   - FNCE 5894: Seminar: Special Topics in Risk Management
   - FNCE 5894: Capstone
Risk Management Application

3. Get exposure to and hands on experience with real world risk management problems, both in advanced workshops and business projects involving use and analyses of real time data where students work with business executives to analyze issues and problems in risk management. This objective is fulfilled by many program courses, including:
   - FNCE 5894: Introduction to U.S. Capital Markets
   - FNCE 5312: Financial Institutions – A Risk Management Approach
   - FNCE 5313: Financial Risk Modeling I
   - FNCE 5321: Financial Risk Modeling II
   - FNCE 5331: Financial Risk Modeling III
   - FNCE 5322: Financial Risk Management I—Equity Markets
   - FNCE 5341: Financial Risk Management III—Advanced Topics
   - FNCE 5333: Seminar: Applications of Risk Management
   - FNCE 5443: Legal and Internal Control Issues
   - FNCE 5894: Seminar: Special Topics in Risk Management
   - FNCE 5894: Capstone

4. Fulfill the program’s “experiential learning requirement” to reinforce the above experience (see #3). This objective is met by these courses:
   - FNCE 5312: Financial Institutions – A Risk Management Approach
   - FNCE 5333: Seminar: Applications of Risk Management
   - FNCE 5894: Seminar: Special Topics in Risk Management
   - FNCE 5894: Capstone

5. Provide extensive training in mathematical and statistical modeling and analysis, using current risk management software, including @RISK, Excel VBA, FinCad, and others. This objective is met by these courses:
   - FNCE 5313: Financial Risk Modeling I
   - FNCE 5321: Financial Risk Modeling II
   - FNCE 5331: Financial Risk Modeling III
   - FNCE 5322: Financial Risk Management I—Equity Markets
   - FNCE 5341: Financial Risk Management III—Advanced Topics
6. Understand the basic behavioral issues and human factors in design and implementation of internal control, communication and governance of exposure to risk. This objective is greatly met by:
   - FNCE 5313: Financial Risk Modeling I
   - FNCE 5321: Financial Risk Modeling II
   - FNCE 5443: Legal and Internal Control Issues

7. Gain insight and perspective from those practicing risk management. The following courses contribute to meeting this goal:
   - FNCE 5312: Financial Institutions – A Risk Management Approach
   - FNCE 5333: Seminar: Applications of Risk Management
   - FNCE 5894: Seminar: Special Topics in Risk Management
   - FNCE 5894: Capstone

8. Understand current trends in risk management application. This objective is met by these courses:
   - FNCE 5312: Financial Institutions – A Risk Management Approach
   - FNCE 5322: Financial Risk Management I—Equity Markets
   - FNCE 5341: Financial Risk Management III—Advanced Topics
   - FNCE 5443: Legal and Internal Control Issues

**Assessment Criteria and Procedures**

The assessment of program learning outcomes will be completed in three ways, each at a different time:

1. Faculty-related during course:
   Assessment will consist of individual faculty instructing the course as well as Department Head or designate reviewing student projects and grades. At minimum this review will take place at course mid-point and at course conclusion, and consist of the review of student projects (if any) and grades to insure student comprehension.

2. Student-related post course:
   Students will not only complete an end-semester course evaluation form as required by the university, but they will also be asked to complete a survey that specifically asks about their achieving the course learning objectives.

3. Faculty- and Student-related post program:
Following completion of the program’s required courses, students will be asked to complete a survey that will help assess the effectiveness of the program in terms of learning objectives, and will obtain feedback on how to improve the program for the future. Separately, program faculty will meet twice a year including once soon after graduation, to review and propose improvements in individual courses, course sequencing, and multiple topic emphases within the program.

**Course Content for all program courses**

**FNCE 5894: Seminar - Introduction to U.S. Capital Markets (Instructor: Chinmoy Ghosh)**
This course is designed for students who have limited experience and knowledge about the U.S. capital markets. Students will learn about the U.S. capital markets through classroom lectures, assignments, and corporate visits/presentations. Topics include the development and institutional structure of the US Capital Market, including the role of US Treasury, Federal Reserve, the Banking system, and the mechanics of the capital market, with brief introduction to equity, fixed income, foreign exchange and derivatives market. Students are given an introduction to the overall concept of Risk Management from the corporate perspective, with emphasis on Enterprise Risk Management.

The course includes workshops on the Visual Basic for Applications (VBA) computer language. These sessions introduce and explain the basics of VBA. Topics cover modular programming, object-oriented programming, data structures, and interface building.

**FNCE 5312: Financial Institutions – A Risk Management Approach (Instructor: Vaidya Nathan)**
The course provides an overview of risk management in financial institutions and its importance in today’s global marketplace. It examines why understanding, measuring, and managing risk are critical considerations in the financial services industry. The course examines all aspects of financial risk as well as the way financial institutions are regulated, to help students better understand financial markets and potential dangers. The course discusses the activities of different types of financial institutions and the ways in which successful financial institutions identify the attendant risks and manage them. The course analyzes market risk, interest rate risk, credit risk, and foreign exchange risk, apart from allied issues like capital adequacy, securitization and the financial crisis.
The objective of this course is to introduce the basic tools and techniques used in financial risk management. The course covers the Quantitative Analysis portion of the FRM exam curriculum, which focuses on probability, statistics and basic econometrics. The course also reviews a small number of algebra and calculus concepts that will help you handle many of the issues encountered in the day to day work of a risk manager.

This course is designed to provide a graduate level introduction to the fundamental concepts in investments and derivative securities. The first part of this course begins with the asset pricing theory for stocks. Then, it covers the efficient market hypothesis as well as the anomalies, i.e., the patterns in stock returns that contradict this hypothesis. The second part of this course introduces stock options and strategies that involve option trading. It also discusses binomial trees and the Black-Scholes-Merton model as the valuation method for stock options. Finally, the course covers the Greek letters and studies the sensitivity of option prices to a change in underlying parameters.

**FNCE 5321: Financial Risk Modeling II (Instructor: Chanatip Kitwiwattanachai)**
This course provides a background in building advanced financial models. It aims to train students to identify various risks in the financial markets and to acquire the analytical and programming abilities (Excel) to analyze related risks in different financial problems. The course covers the following topics: Financial Time Series, Volatility Models and Risk Estimation, Modeling Risk Exposures with Value at Risk (VaR) and Expected Shortfall (ES), Multivariate Risk Model, Simulation Methods (Monte Carlo Simulation, Historical Simulation), Back-testing and Stress testing.

**FNCE 5332: Financial Risk Management – II (Fixed Income Markets) – (Instructor: David Tyson; Vladimir Ladyzhets)**
The goal of this course is to provide you with an understanding of the common types of fixed income securities and their valuation, the major risks associated with investing in fixed income securities, the standard measures of those risks and approaches to managing those risks. In addition, you will be introduced to the basics of modeling interest rate processes and valuing securities with embedded options.

The course equip students with high-level modelling skills specifically related to financial engineering. The objective of this course is to study the wide array of tools and techniques that have evolved in the financial engineering domain to manage and transfer risks. The course covers the entire suite of financial engineering topics such as cash flow engineering, fixed income engineering, dynamic risk management, and structured product engineering. The course covers the rationale behind their usage, and the modelling process to achieve the desired risk management goals. With the help of a number of fundamental results in modern financial engineering, the course treats modelling of financial instruments, and their usage in risk management, in a unified and conceptually simple framework.

**FNCE 5894: Seminar: Special Topics in Risk Management - Strategies and Risk Management in Alternative Investments** (Instructor: Peter Went; Chris Lewis)
This course is the first part of a two-part seminar series on applications in risk management. The course will introduce students to the current practice in the application of various risk management tools and techniques to real life situations. The material in this class will be delivered through several sections, and include papers and articles written by both academics and practitioners.

**FNCE 5443: Legal and Internal Control Issues** (Instructor: Stephen Park)
This course covers the legal rules, principles, and practices and ethical standards relevant to financial risk management, financial institutions and activities, and risk management functions. Also covered are applicable internal control, external audit, and regulatory compliance issues.

**FNCE 5341: Financial Risk Management – III (Advanced Topics)** (Instructor: Jose Martinez)
The purpose of this course is to study modern credit risk methodology. There are three major steps in modeling credit risk: (1) estimating the probability of default (by a statistical logit regression, a structural approach, or transition matrices), (2) estimating loss given default, and (3) estimating default correlations. After mastering three steps, we learn how to measure credit portfolio risk with the asset value approach by CreditMetrics. A Monte Carlo simulation is used to obtain the portfolio loss distribution. Finally, we examine modeling aspects in CDSs and CDOs.

**FNCE 5333: Seminar: Applications of Risk Management - Strategies and Risk Management in Alternative Investments** (Instructor: Chris Lewis)
Continuation from 3rd Semester. The objective of the second seminar course is to review the theory of risk decision-making at the individual, corporate, and market-level; analyze why risk management matters to corporations; synthesize various theories of
risk intermediation in the development of today’s market; and to illustrate these topics using a number of special sessions focused on both the qualitative and quantitative role of risk management in today’s economy.

**FNCE 5894: Capstone (Instructors: Michel Rakotomavo; Vaidya Nathan)**
This course will serve as a review of the entire program. The Experiential Learning requirement will be graded pass-fail, and is part of this Capstone course. Hence the Experiential Learning requirement must be completed by the end this course. In addition it will review the accounting requirements associated with asset valuation and income recognition of complex portfolios that utilize advanced hedging techniques. The course analyzes an organization’s control environment and processes within COSO and SOX frameworks and examines the control practices that organizations use to help ensure the integrity of information provided by its accounting systems. Finally, tax related issues and Basel II are also discussed.

Experiential Learning (graded as part of Capstone class)
The MSFRM Program is designed to provide a “Real World Approach to Risk Management Theory.” The most important way the Program delivers on this is via its Experiential Learning Requirement, which must be met by each student. Though there is a wide range of options that can be chosen by the student, they all deliver the real world experience that this requirement demands.