Program Information:

<table>
<thead>
<tr>
<th>Program Assessed</th>
<th>MS in Quantitative Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Finance</td>
</tr>
<tr>
<td>College</td>
<td>Lee Business School</td>
</tr>
<tr>
<td>Department Chair</td>
<td>John Puthenpurackal</td>
</tr>
<tr>
<td>Assessment Coordinator</td>
<td>John Puthenpurackal</td>
</tr>
<tr>
<td>Date Submitted</td>
<td>April 20, 2018</td>
</tr>
</tbody>
</table>

Contact Person for This Plan

<table>
<thead>
<tr>
<th>Name</th>
<th>John Puthenpurackal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone</td>
<td>702-895-1184</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:john.puthenpurackal@unlv.edu">john.puthenpurackal@unlv.edu</a></td>
</tr>
</tbody>
</table>

Please address the following items:

- What are the student learning outcomes? Please provide a numbered list.
- Plans must include a curriculum map showing which courses will address which learning outcomes. Examples can be found here: [http://provost.unlv.edu/Assessment/map.html](http://provost.unlv.edu/Assessment/map.html)
- Which learning outcomes will be assessed in each cycle year (i.e., assessment timeline)?
- How will the learning outcomes be assessed? (Programs must use at least one direct assessment of student learning.)
- Undergraduate programs should assess at least one University Undergraduate Learning Outcome (UULO) each year, which may or may not overlap with a program learning outcome.
- Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:
  - student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.
  - activities requiring originality, critical analysis and expertise.
  - the development of extensive knowledge in the field under study.
- What is your plan for sharing the assessment results and acting on them (i.e., closing the loop)?
What are the student learning outcomes? Please provide a numbered list.

1. Develop strong understanding of key concepts in Finance.
2. Analyze data with advanced statistical and econometric techniques.
3. Apply computer programming and statistical software to analysis of data.
4. Think critically about financial problems and provide potential solutions.
5. Develop the ability to manipulate and analyze large financial datasets.
6. Communicate effectively.

Which learning outcomes will be assessed?

Below is a curriculum map of 5 required courses in the MS in Quantitative Finance program where we will be assessing learning outcomes. The map below shows learning outcomes that will be assessed in each course.

Advanced Corporate Finance (FIN 708)
Investment Management (FIN 710)
Financial Data Modeling I (FIN 7X1)
Financial Data Modeling II (FIN 7X2)
Capstone Project (FIN 7X3)

Curriculum Map

<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>FIN 708</th>
<th>FIN 710</th>
<th>FIN 7X1</th>
<th>FIN 7X2</th>
<th>FIN 7X3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop strong understanding of key concepts in Finance</td>
<td>m</td>
<td>m</td>
<td>m</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td>Analyze data with advanced statistical and econometric techniques</td>
<td>n</td>
<td>n</td>
<td>m</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td>Apply computer programming and statistical software to analysis of data</td>
<td>n</td>
<td>n</td>
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<td>m</td>
</tr>
<tr>
<td>Think critically about financial problems and provide potential solutions</td>
<td>n</td>
<td>n</td>
<td>s</td>
<td>s</td>
<td>m</td>
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<tr>
<td>Develop the ability to manipulate and analyze large financial datasets</td>
<td>n</td>
<td>n</td>
<td>m</td>
<td>m</td>
<td>m</td>
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<tr>
<td>Communicate effectively</td>
<td>n</td>
<td>n</td>
<td>s</td>
<td>s</td>
<td>m</td>
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</tbody>
</table>

m: main purpose of the course is to meet the objective in question
s: secondary purpose of the course is to meet the objective in question
n: not applicable to the course

Learning objectives will be measured using a mix of exams, projects and rubrics
Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:

1. Student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.

This will be assessed through a required capstone project which will serve as the culminating experience. The capstone project will be a group project of 4-5 students working on a company project or research project identified by faculty or the students. All proposed capstone projects will require approval from the graduate coordinator to ensure that the learning objectives will be met. A panel of 3-4 Finance faculty members will grade each capstone project based on a written report and oral presentation using the rubric below.

**Culminating Experience**

**Capstone Project (FIN 7X3) Rubric**

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Above Average</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding of financial concepts</td>
<td></td>
<td></td>
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<tr>
<td>Utilize advanced statistical and econometric techniques</td>
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<tr>
<td>Use computer programing and statistical software for data analysis</td>
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<td></td>
<td></td>
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<tr>
<td>Use critical thinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulate and analyze large financial datasets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicate effectively</td>
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<tr>
<td>Appropriateness, clarity, organization and professionalism of the written final report</td>
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<tr>
<td>Demonstrate logic and reasoning while orally presenting and defending the final work</td>
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</tbody>
</table>
Assessment of learning outcomes using Advanced Corporate Finance (FIN 708), Investment Management (FIN 710), Financial Data Modeling I (FIN 7X1) and Financial Data Modeling II (FIN 7X2) will be assessed using a similar rubric based on questions on exams and projects targeted at specific learning outcomes.

What is your plan for sharing the assessment results and acting on them (i.e., closing the loop)?

Assessments will be performed in the courses when they occur in the year. At the end of each year, the graduate coordinator will collect assessment data from the respective instructors and prepare an annual assessment report that evaluates the outcomes of the assessment efforts. The graduate coordinator will determine whether learning outcomes are being met and provide instructors feedback so that necessary adjustments are made to rectify any identified issues.
MSQF PROGRAM (Tentative Curriculum) -- 30 credits

**PREREQUISITES**
- FIN 301/MBA 765 (Principles of Managerial Finance)
- ACC 201/MBA 761 (Financial Accounting)
- ECON 302/MBA 769 (Intermediate Micro)
- ECON 262 (Statistics II)

**Fixed**
- Quantitative Derivatives

**Core (required) -- 18 credits**
- Econometrics I (ECO 770)
- Investments (FIN 710)
- Advanced Corporate Finance (FIN 708)
- Financial Big Data Modeling I
- Financial Big Data Modeling II
- Capstone Project

**Electives -- 12 credits**
- Financial Statement Analysis and Valuation
- Fixed Income Securities
- Derivatives and Risk Management
- Quantitative Investment Strategies
- FIN-TECH course
- Internship

**At Most One Elective from the following existing MBA courses:**
- Applied Topics in Finance (FIN 709) - Spring Odd Year
- Financial Markets and Institutions (FIN 712) - Fall Even Year
- Risk Management (FIN 740) - Spring Even Year, potentially can be offered every year
- International Financial Management (FIN 750) - Fall Odd Year

**Tracks are only suggestive, not official**

<table>
<thead>
<tr>
<th>INVESTMENT TRACK</th>
<th>CORP TRACK</th>
<th>FIN-TECH TRACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derivatives and Risk Management</td>
<td>Special Topics in Corp Finance</td>
<td>Econometrics II (ECO 772)</td>
</tr>
<tr>
<td>Fixed Income Securities</td>
<td>FIN-TECH course</td>
<td>FIN-TECH course</td>
</tr>
<tr>
<td>Quantitative Investment Strategies</td>
<td>FIN-TECH course</td>
<td>Quantitative Investment Strategies</td>
</tr>
<tr>
<td>CFA I Prep</td>
<td></td>
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</tr>
</tbody>
</table>

**12 MONTH SEQUENCE: FALL-SPRING-SUMMER**

**FALL**
- Econometrics I (ECO 770) - Required
- Investments (FIN 710) - Required
- Advanced Corporate Finance (FIN 708) - Required
- Financial Big Data Modeling I - Required

**SPRING**
- Financial Big Data Modeling II - Required
- 3 from the following:
  - Financial Statement Analysis and Valuation
  - Fixed Income Securities
  - Derivatives and Risk Management
  - Quantitative Investment Strategies
  - FIN-TECH course
  - Special Topics in Corp Finance
  - Econometrics II (ECO 772)

**SUMMER**
- Capstone Project - Required
- 1 elective from the following:
  - Independent Study
  - Internship
  - FIN 712 or 750 alternate every other year
  - CFA I Prep

Note: Not all spring electives will be offered every year.

**16 MONTH SEQUENCE: FALL-SPRING-FALL**

**1st FALL**
- Econometrics I (ECO 770) - Required
- Investments (FIN 710) - Required
- Advanced Corporate Finance (FIN 708) - Required
- Financial Big Data Modeling I - Required

**SPRING**
- Financial Big Data Modeling II - Required
- 3 from the following:
  - Financial Statement Analysis and Valuation
  - Fixed Income Securities
  - Derivatives and Risk Management
  - Quantitative Investment Strategies
  - FIN-TECH course
  - Special Topics in Corp Finance
  - CFA I Prep
  - Econometrics II (ECO 772)

**SUMMER**
- Summer off OR Internship

Note: Not all spring electives will be offered every year.

**2nd FALL**
- Capstone Project - Required
- One elective:
  - Independent Study
  - Internship
- FIN 712 or 750

Note: For 712 or 750, will offer the one that was not offered in
MSQF Catalog Course Description

Core Courses

**Econometrics I**, Statistical Modeling (ECO 770)

The course reviews fundamentals of mathematical statistics that are used in econometric analysis. It integrates mathematical models and statistical techniques to perform regression analysis of cross-sectional data with a policy focus. Topics include empirical model building, estimation, and specification and data problems.

*Prerequisites:* Graduate Standing and ECON 261 and ECON 262 or consent of instructor.

**Investment Management** (FIN 710)

Theoretical and practical analyses of investment environment and process. Focuses on characteristics, valuation, and management of various financial instruments, such as common stock, corporate bonds, options, and futures. Students learn how to establish appropriate investment objectives, develop optimal portfolio strategies, estimate risk-return trade-offs, and evaluate investment performance.

*Prerequisites:* Graduate Standing and MBA 765 or FIN 301, or approval by Director of MSQF program.

**Advance Corporate Finance** (FIN 708)

Studies major decision-making areas of managerial finance and some selected topics in financial theory. Emphasis on the application of the theory and practice of business asset management, financing choice, capital structure, cost of capital, and dividend policy. Current topics, such as corporate acquisitions, restructuring, and underwriting covered as appropriate.

*Prerequisites:* Graduate Standing and MBA 765 or FIN 301, or approval by Director of MSQF program.

**Financial Data Modeling I**

This course will teach how to use statistical software to retrieve, organize, and analyze large financial databases to facilitate corporate financial decision making. Examples of statistical software include Excel, SAS, and Stata. Examples of financial databases include Compustat, ExecuComp, and Factset. A wide range of advanced statistical and econometric methods will be covered, such as univariate analysis, regression methods, panel data analysis, statistical prediction, and Monte Carlo simulation.

*Prerequisites:* Admission in MSQF program or approval by Director of MSQF program;
MBA 765 or FIN 301, and two statistics courses such as ECON 261 and 262. *Special course/program fee will apply.*
Financial Data Modeling II

This course is to provide a strong knowledge of econometric techniques as well as the computer programming skills needed to manipulate large data sets. Students are introduced to recent empirical findings based on asset pricing models. The course includes a selection of the following topics: multivariate regression; maximum likelihood (MLE) and methods of moments estimation (MME); generalized method of moments estimation (GMM); hypothesis testing; time-series modelling; predictability of asset returns; econometric tests of the CAPM and multifactor models; the analysis of high frequency financial data; the modeling of volatility in financial returns. Special emphasis is placed upon empirical work and applied analysis of real market data using SAS programming on major US and foreign country financial data.

Prerequisites: Admission in MSQF program or approval by Director of MSQF program; FIN 710 and ECO 770. Special course/program fee will apply.

Capstone Project/Professional Paper

This is a required culminating experience for the MSQF program and should apply knowledge obtained from the MSQF coursework to a project involving significant data analysis using large financial datasets. The topic can be in any area of finance and requires approval and supervision by a committee of two finance faculty members. An oral presentation and written report of the project is required.

Prerequisites: Admission in MSQF program and completion of at least 24 credit hours of MSQF coursework including Financial Data Modeling I and Financial Data Modeling II, or approval by Director of MSQF program. Special course/program fee will apply.
Electives

Financial Statement Analysis and Valuation

This course develops a strong understanding of how to interpret financial statements: the income statement, balance sheet and statement of cash flows. It examines how cash flows provide a vital link between the income statement and balance sheet, and how to use financial ratios to compare financials across firms as well as the performance of a firm over time. Major items on the assets and liabilities side of the balance sheet and how different accounting methods impact other financial statements will be studied. Students will learn to value stocks using various valuation techniques such as discounted free cash flow method and valuation multiples.

Prerequisites: Admission in MSQF program or approval by Director of MSQF program;
FIN 708 and FIN 710. Special course/program fee will apply.

Special Topics in Corporate Finance

The course focuses on selected topics in corporate finance: including mergers & acquisitions, other corporate restructuring, corporate governance, and executive compensation. Classical studies, as well as recent development in these areas are reviewed. Students will be exposed to both theory and empirical research that can help them develop professional papers and capstone projects.

Prerequisites: Admission in MSQF program or approval by Director of MSQF program;
FIN 708 and ECO 770. Special course/program fee will apply.

Fixed Income Securities

The unique features and concepts related to valuation and risk-return of fixed income securities and structured notes. Topics include fixed and floating rate loans with embedded option, interest rate derivatives, credit default swaps, and mortgage-backed securities. In addition, techniques for fixed income portfolio construction are discussed.

Prerequisites: FIN 710

Derivatives and Risk Management

An introduction to the pricing and use of financial derivatives - options, futures and swaps. This course covers the fundamental concepts and techniques that are essential for understanding financial derivatives and developing financially engineered products, focusing on derivatives usages as effective tools and strategies for financial risk management in business.

Prerequisites: FIN 708 and FIN 710.
Econometrics II (ECO 772)

Building on Econometrics I, this course extends econometric/quantitative skills in the estimation and testing of economic theory. Topics include instrumental variables and two stage least squares estimations, simultaneous equation models, qualitative dependent variable models and sample selection corrections, measurement error issues, introduction to time series and panel data methods.

Prerequisites: Graduate standing, ECO 740, and ECO 770.

Quantitative Investment Strategies

An introduction to quantitative techniques of selecting equities, as used commonly among long-short equity hedge funds and other quantitative equity asset management companies. Statistical factor models are developed to locate stocks with higher expected returns, based on the observable characteristics of the stocks or market information on the stocks. Implementation issues, including statistical estimation, back-testing, and portfolio construction, are covered, as is performance evaluation and attribution. Specifically, my objective is to provide masters-level instruction in the following topics, both in theory and in practice. We will also use Harvard, INSEAD, and/or Darden cases as well as financial markets data to apply some of the lessons.

Prerequisites: Admission in MSQF program or approval by Director of MSQF program; FIN 710 and ECO 770. Special course/program fee will apply.

CFA Level I Prep

This course is to prepare students for the Chartered Financial Analyst Level I examination. Topics covered include ethics and profession standards, economics and quantitative methods, financial reporting and analysis, corporate finance, equity and fixed income investments, portfolio analysis, derivatives and alternative investments. Students will be exposed to sample questions from past CFA Level I tests.

Prerequisites: Admission in MSQF program or approval by Director of MSQF program; and completion of at least 24 credit hours of MSQF course work.

Fintech (Financial Technology)

This course will expose students to technologies such as blockchain and new business models facilitated by technology that are impacting the financial industry. Students will learn how to organize and analyze financial big data. Analysis of non-numerical data (textual analysis) will also be covered. Finally, students will be exposed to various machine learning techniques such as random forests, regression trees and LASSO which are useful in applications where predictive performance is important.

Prerequisites: Admission in MSQF program or approval by Director of MSQF program; FIN 708 and FIN 710 and ECO 770. Special course/program fee will apply.
Finance Internship

The internship should be a finance related one with significant analytical content and can be with corporations, non-profit organizations or government agencies. The internship should be at least 150 hours long. A written report about the internship is required to receive a grade. Students will receive S/F for final grade.

Prerequisites: Admission in MSQF program and approval by Director of MSQF program, and FIN 708 and FIN 710 and Financial Data Modeling I and Financial Data Modeling II.

Applied topics in Finance (FIN 709)

This course focuses on the application of theory in finance through some combination of case analysis, the use of spreadsheets to assist in financial analysis and simulations. Topics covered may include capital budgeting, cost of capital, capital structure, risk analysis, financial statement analysis, options, and mergers and acquisitions.

Prerequisites: Graduate Standing and MBA 765 or FIN 301, or approval by Director of MSQF program.

Financial Markets and Institutions (FIN 712)

Comparative study of the diverse financial instruments and intermediaries existing in today’s financial sector. Topics include: the structure of interest rates, relative costs and benefits of each instrument, financial innovation and financial “engineering,” the role of banks, thrifts and other intermediaries, and current and future trends in the financial sector.

Prerequisites: Graduate Standing and (MBA 765 or FIN 301) and (MBA 769 or ECON 302), or approval by Director of MSQF program.

Risk Management (FIN 740)

Develops an integrated risk management approach to managing various risks such as financial, credit and insurable risks. Financial perspective on the corporate risk management function is emphasized, using the financial tools of risk.

Prerequisites: Graduate Standing and MBA 765 or FIN 301, or approval by Director of MSQF program.

International Financial Management (FIN 750)

Covers a broad range of issues related to international financial markets and conducting business in an international environment. Topics include international parity relationships, international capital budgeting, hedging risks associated with exposure to exchange rate fluctuations using forwards and options, and interest rate and foreign currency swaps.

Prerequisites: Graduate Standing and MBA 765 or FIN 301, or approval by Director of MSQF program.