



ACADEMIC PROGRAM PROPOSAL FORM

(Revised: November 2016)

DIRECTIONS: Use this form when proposing a new major or primary field of study, new emphasis (BAS only), or new degree program.

DATE SUBMITTED: 05/01/2018

Date of AAC Approval:

September 5, 2018

INSTITUTION: University of Nevada - Las Vegas

REQUEST TYPE: New Degree
 New Major or Primary Field of Study
 New Emphasis (BAS only)

Date of Board Approval:

DEGREE (i.e. Bachelor of Science): Master of Science

MAJOR (i.e. Animal Science): Quantitative Finance

EMPHASIS (BAS only):

INCLUDED IN LAST NSHE PLANNING REPORT: Yes No

(Website for NSHE Planning Reports: <https://www.nevada.edu/ir/Page.php?p=planning>)

CREDITS TO DEGREE: 30

PROPOSED SEMESTER OF IMPLEMENTATION: Fall 2019

Action requested:

Approval of a new M.S. Quantitative Finance.

A. Brief description and purpose of proposed program

The UNLV Lee Business School Master of Science in Quantitative Finance (MSQF) will be a 10-course (30-credit), face-to-face program that can be finished in 12 months. The program will provide advanced education and training on core finance knowledge and skills at the graduate level, with special emphasis on quantitative methods in finance and new financial technologies. These quantitative methods include mathematical finance theories as well as statistical and computer program based techniques to manage and analyze large financial data sets. Examples of finance theories are those related to capital structure, capital budgeting, valuation, stocks, bonds, derivatives, and portfolio management. Examples of empirical quantitative methods are programing and modeling skills using SAS, Stata, Excel, Python etc. to manage and analyze large databases of financial and investment information. Students will be able to choose from a menu of electives to prepare themselves for careers in corporate finance, investment management, and the application of technology to financial applications. The purpose of the program is to prepare successful finance

professionals who are capable of utilizing the latest technologies to perform sophisticated financial analysis and management.

B. Statement of degree or program objectives

The primary objective is to equip students with the latest and most innovative financial techniques and methodology so that they will be successful in the fast-changing finance profession. Finance in recent years has seen a paradigm shift towards big data, quantitative methods, and computer-based technology. The changes have been dramatic and fast. Our program will be highly innovative and incorporate the latest developments in financial technology. Our students will be at the cutting edge of finance theory and practice when they graduate.

C. Plan for assessment of degree or program objectives

The program objectives are to enable students:

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.

These learning outcomes will be assessed based on the attached assessment plan.

D. Plan for assessment of student learning outcomes and the use of this data for program improvement

As described in the attached assessment plan, all the above learning outcomes will be assessed using five required courses. A capstone project will serve as the culminating experience and is one of the five courses from which assessment data will be collected. Assessment data will be obtained using rubrics, answers to questions on exams and projects, targeted at specific learning outcomes.

Assessments will be performed in the courses when they occur in the year. At the end of each year, the program director will collect assessment data from the respective instructors and prepare an annual assessment report that evaluates the outcomes of the assessment efforts. The program director will determine whether learning outcomes are being met and provide instructors feedback so that necessary adjustments are made to rectify any identified issues.

E. Contribution and relationship of program objectives to

i. NSHE Master Plan

The Master of Science in Quantitative Finance furthers the goal of the NSHE Master Plan by developing a program that provides students with specific skills and training which is not currently offered in Nevada. The most similar program is the Master of Science in Finance program offered by the College of Business at UNR. Distinct from that program, our proposed program is at the intersection of finance and data analytics, which gives students the knowledge and tools to solve real world financial problems involving large datasets. The financial industry is becoming more data-centric and the ability to analyze large datasets to help senior management make informed decisions is highly valued. The program will cover topics such as advanced financial data modeling, manipulation and analysis of large financial datasets, and financial applications using the latest technologies. This degree provides an opportunity for students to succeed in fields such as quantitative investing, investment banking, fintech (a term that applies to any innovation in how people transact business), corporate finance, banking, big data, and other related areas. Currently private and public sector employers often recruit

professionals in such areas from outside the state to fill the growing demand for employees with these skill sets.

ii. Institutional mission

The Master of Science in Quantitative Finance combines the knowledge of financial economics with training in advanced investments and corporate finance modeling and financial econometric analysis. This degree contributes to UNLV's mission of concentrating on programs that are student centered, demonstrably excellent, and responsive to the needs of the local and regional community. Specifically, the program will contribute towards UNLV's strategic institutional goals for the Top Tier program (i.e., #1 Become more student focused, #3 Increase research, scholarly activity, and national recognition, and #4 Grow selectively, serve the region, and achieve distinction). It is a student-centered program which will contribute to national recognition for UNLV and attract a diverse and talented pool of students to serve the increasing demand for skilled workers in our region.

iii. Campus strategic plan and/or academic master plan

The Master of Science in Quantitative Finance would not require substantial new resources. Some courses are currently offered by the Finance department in the MBA program and by the Economics department in the MA in Economics program on a regular basis. Additional courses will be offered by existing faculty and a recent hire. We are requesting one more faculty position to support this program.

The program will enhance UNLV's relationship with the community in both public and private sectors by equipping workers with valuable skills in finance. Graduates of the program will be placed in mid-level analytical and managerial positions supporting senior executives making decisions about their organizations. In the future, these successful graduates will be potential donors to the university.

iv. Department and college plan

The Lee Business School strategic plan calls for the college to "cultivate student success by identifying relevant and market-driven knowledge areas", and to "nurture excellence and achievement by identifying and enhancing each department's distinctive capabilities in teaching, research and service". Providing this new graduate level degree program is consistent with these goals as it will provide UNLV students the knowledge and skillset to obtain well paying analytical jobs and leverages the strengths of the Finance faculty. See the attached Lee Business School strategic plan for further details.

v. Other programs in the institution

There is no other similar graduate program at UNLV that combines strong conceptual knowledge of Finance, advanced empirical and analytical skills using large financial datasets, and exposure to the latest financial technologies (fintech) applications. The university does not currently have a graduate program in Finance. While some of the analytic tools are covered in the MS in Data Analytics and Applied Economics program, a graduate level understanding of finance is required to formulate the relevant questions and choose the appropriate empirical methodologies to address them. The use of econometric, statistical and modeling tools in financial applications will be a focus of the proposed program.

vi. Other related programs in the System

There is no other similar graduate program in the System.

F. Evaluation of need for the program

i. Intrinsic academic value of program within the discipline

The M.S. in Quantitative Finance program will provide skills for students that emphasize critical thinking, strong conceptual knowledge of finance, advanced statistical and econometric skills to manipulate and analyze large datasets, and exposure to the latest technologies with financial applications. These skills are in strong demand in the private and public sectors such as in analyst roles in hedge funds, risk management, trading, investment management, corporate finance, commercial banking, insurance and regulatory positions.

ii. Evidence of existing or projected local, state, regional, national and/or international need for program

The financial industry is becoming increasingly data-centric and the ability to analyze large datasets to help senior management make informed decisions is highly valued. This program will provide the necessary skillsets needed to succeed in this environment by combining strong conceptual knowledge of finance with advanced statistical and econometric skills. As an example, the Bureau of Labor Statistics (BLS) expects an above-average growth rate in financial analyst positions with approximately 3,220 new jobs to be created each year, through the year 2026. This corresponds to a growth rate of 11% over the 2016-2026 time period, faster than the average growth rate of 7% for all occupations. The growth rate for quantitative financial analyst positions is expected to be even higher given the trend towards using large datasets for decision making. Also attached is a document that provides more information on jobs related to this program and a report by the McKinsey Global Institute titled "Big Data: The Next Frontier in Innovation, Competition, and Productivity", which highlights the trend towards big data and data analytic jobs.

Further evidence of need for the proposed program is provided by the Governor's Task Force on Economic Development. The task force found that UNLV is the major research university in southern Nevada. It is also an important supplier of skilled workers. As a public institution, we have the obligation to develop competent high level analysts and decision makers for local business and government. The program will provide well-trained researchers and managers to this important part of the labor force.

iii. If this or a similar program already exists within the System, what is the justification for this addition

UNLV and UNR offer MBA programs with concentrations in Finance and UNR offers a Master of Science in Finance program. Neither of these programs offers the depth of empirical and analytical skills using large financial datasets, and application of the latest technologies to financial applications that will be obtained from the proposed program as described in (i) above. These skills are needed for decision making in numerous financial contexts and will prepare students for a professional environment that places a premium on employees with those skills.

iv. Evidence of employment opportunities for graduates (state and national). Include information on institutional review of the need for the program based on data from the Nevada P-20 Workforce Research Data System (<https://www.nevada.edu/ir/Page.php?p=workforce>), including the supply/demand reports at <http://npwr.nv.gov/reports/student-completion-and-workforce-part-ii/>.

Graduates of this program will find employment in the private and public sectors nationwide such as in analyst roles in hedge funds, risk management, trading, investment management, banking, insurance, corporate finance, fintech, and regulatory positions. We do not anticipate graduating more than 30 students per year in the first 5 years of the program and do not anticipate difficulty in placing our graduates in relevant, well paying positions. Given the global demand for graduates skilled in finance and data analytics, some international students may

choose to return to their home countries for employment after graduation.

The skillsets obtained from this program will be valuable in a range of finance related jobs such as financial analysts noted in the Nevada Workforce data. As can be inferred from five letters of support obtained from Las Vegas based employers (MGM Resorts, Southwest Gas, Meadows Bank, and HighTower Advisors), students graduating from the MSQF program will be in demand in a range of finance related businesses in Nevada such as corporate finance, banking, and financial advising. Given the significant number of corporations, banks, and financial advisors in Nevada, the local employment prospects of graduates are good. Students seeking opportunities in areas such as investment and hedge fund management and fintech are more likely to find them outside Nevada and they will be competitive candidates with this training. Starting salaries for financial analysts and quantitative financial analysts with masters degrees typically average over \$65,000 per year. For comparison, the typical starting salary range for finance undergraduate students is \$46,000 - \$50,000 per year.

v. Student clientele to be served (Explain how the student clientele is identified)

The student clientele will be a mix of Nevada residents, non-residents, and international students. We will actively recruit strong undergraduate Finance, Economics, and Management Information Systems majors from UNLV and UNR Business Schools. We will also target Engineering, Physics and Math majors since they will have strong quantitative backgrounds. Our fees for in-state and international students will be extremely cost-competitive which should attract qualified students. Our fees for out-of-state students will also be competitive. We will target international students in China, India and South Korea using faculty in the UNLV Finance department who have connections with universities in these countries. This program will be STEM designated (CIP code 52.1399), which will allow international students to undertake three years of optional practical training after graduation. This will enhance the attractiveness of the program to international students. This program will also prepare students for the Chartered Financial Analyst (CFA) designation, which is highly sought after in the Finance industry. This will be another selling point of the program. Section I (ii, B, 2) provides more details on how we projected program enrollment.

G. Detailed curriculum proposal

i. Representative course of study by year (options, courses to be used with/without modification; new courses to be developed)

Program requirements

A minimum of 30 credit hours of course work is required for the degree, with 18 credits from core courses and 12 credits from electives.

Core Courses:

Econometrics I, Statistical Modeling (ECO 770)

Investment Management (FIN 710)

Advanced Corporate Finance (FIN 708)

Financial Data Modeling I (FINQ 761)*

Financial Data Modeling II (FINQ 762)*

Capstone Project (FINQ 773)*

Electives:

Financial Statement Analysis and Valuation (FINQ 754)*

Special Topics in Corporate Finance (FINQ 757)*

Fixed Income Securities (FINQ 765)*

Derivatives and Risk Management (FINQ 764)*
Econometrics II (ECO 772)
Quantitative Investment Strategies (FINQ 763)*
CFA Level I Prep (FINQ 721)*
Fintech (Financial Technology) (FINQ 766)*
Finance Internship (FINQ 781)*
Finance Independent Study (FINQ 790)*

At Most One Elective from the Following Existing MBA Courses:

Applied Topics in Finance (FIN 709)
Financial Markets and Institutions (FIN 712)
Risk Management (FIN 740)
International Financial Management (FIN 750)

* New courses to be developed.

Note that not all elective courses will be offered each year and the number of electives offered will depend on program enrollment. However, sufficient electives will be offered within appropriate time frames to maximize students' ability to graduate in a timely manner. ECO 770 and ECO 772 are courses regularly offered by the Economics department in the fall and spring, respectively. The Fintech course will likely be team taught by faculty in Computer Science and Economics/Finance and guest speakers. The CFA Level I Prep course will likely be taught by a part time instructor with the CFA designation and a master's degree.

Course Descriptions:

Econometrics I, Statistical Modeling (ECO 770) 3 credits

This 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. Students will understand empirical model building, estimation, and specification and data problems.

Prerequisites: Graduate Standing and ECON 261 and ECON 262/ECON 441 (or equivalent) or consent of instructor.

Investment Management (FIN 710) 3 credits

This course provides a theoretical and practical analyses of the investment environment and process. It focuses on characteristics, valuation, and management of various financial instruments, such as common stock, corporate bonds, options, and futures. Students will learn how to establish appropriate investment objectives, develop optimal portfolio strategies, estimate risk-return trade-offs, and evaluate investment performance.

Prerequisites: Graduate Standing and one introductory finance course (FIN 301 or equivalent), or approval by Director of MSQF program.

Advanced Corporate Finance (FIN 708) 3 credits

This course covers major decision-making areas of managerial finance and some selected topics in financial theory. Students will be exposed to the application of the theory and practice of business asset management, financing choice, capital structure, cost of capital, and dividend policy. Students will learn about current topics such as corporate acquisitions and restructuring.

Prerequisites: Graduate Standing and one introductory finance course (FIN 301 or equivalent), or approval by Director of MSQF program.

Financial Data Modeling I (FINQ 761) 3 credits

This course will teach students how to use statistical software to retrieve, organize, and analyze large financial databases to facilitate corporate financial decision making. The course covers statistical softwares such as Excel, SAS, and Stata and uses financial databases like Compustat, ExecuComp, and Factset. Students will learn a wide range of advanced statistical and econometric methods 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; FIN 301 (or equivalent), and two statistics courses ECON 261 and ECON 262/441 (or equivalent). Special course fee will apply.

Financial Data Modeling II (FINQ 762) 3 credits

This course will provide a strong knowledge of econometric techniques as well as the computer programming skills needed to manipulate large data sets. Students will be 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 modeling; 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. Students will learn to analyze large datasets of U.S. and foreign market data using SAS programming.

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

Capstone Project (FINQ 773) 3 credits

This is a required culminating experience for the M.S. Quantitative Finance program and should apply knowledge obtained from the coursework to a project involving significant data analysis using large financial datasets. 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 program director to ensure that the learning objectives will be met. 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 fee will apply.

Financial Statement Analysis and Valuation (FINQ 754) 3 credits

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. Students will understand the major items on the assets and liabilities side of the balance sheet and how different accounting methods impact other financial statements. Students will also learn to value stocks using various valuation techniques such as the 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 fee will apply.

Special Topics in Corporate Finance (FINQ 757) 3 credits

This course will focus on selected topics in corporate finance such as mergers & acquisitions, corporate governance, and executive compensation. Students will be exposed to empirical research that will help them generate ideas and execute their capstone projects.

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

Fixed Income Securities (FINQ 765) 3 credits
This course covers the unique features and concepts related to the valuation and risk- return of fixed income securities and structured notes. Students will be exposed to topics such as fixed and floating rate loans with embedded options, interest rate derivatives, credit default swaps, and mortgage-backed securities. In addition, techniques for fixed income portfolio construction will be discussed in the course.

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

Derivatives and Risk Management (FINQ 764) 3 credits
This course provides an introduction to the pricing and use of financial derivatives - options, futures and swaps. Students will learn the fundamental concepts and techniques that are essential for understanding financial derivatives and developing financially engineered products. They will also learn how to use derivatives as effective tools for financial risk management in business.

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

Econometrics II (ECO 772) 3 credits
Building on Econometrics I, this course extends econometric/quantitative skills in the estimation and testing of economic theory. Students will learn about topics such as 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 (FINQ 763) 3 credits
This course provides an introduction to quantitative techniques of selecting equities, as used commonly among long-short equity hedge funds and other quantitative equity asset management companies. It develops statistical factor models to identify stocks with higher expected returns, based on the observable characteristics of the stocks or market information on the stocks. Students will learn about implementation issues, including statistical estimation, back-testing, portfolio construction, performance evaluation and attribution. The course will use Harvard, INSEAD, and/or Darden cases as well as financial market 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 fee will apply.

CFA Level I Prep (FINQ 721) 3 credits
This course will prepare students for the Chartered Financial Analyst Level I examination. It will review topics such as 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 also 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. Special course fee will apply.

Fintech (Financial Technology) (FINQ 766) 3 credits
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 and non-numerical data (textual analysis). 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, FIN 710 and ECO 770. Special course fee will apply.

Finance Internship (FINQ 781)

3 credits

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; FIN 708, FIN 710, Financial Data Modeling I and Financial Data Modeling II. Special course fee will apply.

Applied Topics in Finance (FIN 709)

3 credits

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. Students will learn about capital budgeting, cost of capital, capital structure, risk analysis, financial statement analysis, options, and mergers and acquisitions.

Prerequisites: Graduate Standing and FIN 301 (or equivalent), or approval by Director of MSQF program.

Financial Markets and Institutions (FIN 712)

3 credits

This course provides a comparative study of the diverse financial instruments and intermediaries existing in today's financial sector. Student will be exposed to 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 FIN 301 (or equivalent) and ECON 302 (or equivalent), or approval by Director of MSQF program.

Risk Management (FIN 740)

3 credits

This course develops an integrated risk management approach to managing various risks such as financial, credit and insurable risks. It emphasizes a financial perspective on the corporate risk management function using financial tools of risk management.

Prerequisites: Graduate Standing and FIN 301 (or equivalent), or approval by Director of MSQF program.

International Financial Management (FIN 750)

3 credits

This course covers a broad range of issues related to international financial markets and conducting business in an international environment. Students will learn about 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 FIN 301 (or equivalent), or approval by Director of MSQF program.

ii. Program entrance requirements

Admission to the Master of Science in Quantitative Finance program

Students must:

1. Meet the general requirements for admission to graduate instruction at the University of Nevada, Las Vegas, as described by the Graduate College.

2. Complete the prerequisite or equivalent courses listed below with at least a B grade. Principles of Finance (FIN 301 or equivalent), Financial Accounting (ACC 201 or equivalent), Microeconomics (ECO 302 or equivalent), two statistics course (ECON 261 and ECON 262/ECON 441 or equivalent), and two calculus courses (MATH 181 and MATH 182 or equivalent) or one calculus and one linear algebra course (MATH 181 and MATH 330 or equivalent).
3. Conform to regulations outlined by the Graduate College of UNLV regarding the TOEFL or other equivalent certifications of English fluency.
4. Obtain satisfactory GMAT or GRE scores. Preference is given to applicants with GMAT scores above 550 (or the GRE equivalent).
5. Complete Graduate-College application online and submit a nonrefundable admission application fee. Mail official transcripts to the Graduate College. Send two letters of recommendation, a resume, a letter of intent and official test scores, including the GMAT or GRE to the Graduate College.

iii. Program completion requirements (credit hours, grade point average; subject matter distribution, preprogram requirements)

A minimum of 30 credit hours of program course work (18 core credit hours and 12 elective credit hours) with an overall GPA of at least 3.00 for course work that is part of the M.S. in Quantitative Finance degree program.

iv. Accreditation consideration (organization (if any) which accredits program, requirements for accreditation, plan for attaining accreditation - include costs and time frame)

The Lee Business School is accredited by the Association to Advance Collegiate Schools of Business (AACSB). Upon final approval of this degree, it will be submitted to AACSB and the Northwest Commission on Colleges and Universities for inclusion.

v. Evidence of approval by appropriate committees of the institution

Routing and Approval Process:

This proposal was be routed through the Department of Finance and the Dean's office at the Lee Business School. Upon approvals, it was approved by the Graduate College Programs Committee and then submitted to the Vice Provost for Academic Affairs and the Executive Vice President and Provost.

H. Readiness to begin program

i. Faculty strengths (specializations, teaching, research, and creative accomplishments)

There are sufficient qualified faculty with Ph.D.s in appropriate fields at UNLV ready to support the proposed program. Faculty teaching in the program have Ph.D. degrees with outstanding research records or have extensive professional experience. The finance faculty have published in top-tier finance journals on a wide range of advanced corporate finance and investing topics using cutting edge methodologies. They are well qualified to offer the proposed courses. The bulk of the program will be taught by finance faculty. We have discussed with, and received support from, the Economics Department and Computer Science Department to utilize their expertise on one econometrics course and one fintech course.

ii. Contribution of new program to department's existing programs (both graduate and undergraduate) and contribution to existing programs throughout the college or university

UNLV Department of Finance does not currently offer a graduate program. The MSQF program will significantly enhance the department's offerings to our students and better prepare them for the competitive job market. Undergraduate finance and business majors would obtain significant

value addition from this graduate program. There is also potential to develop joint programs with other disciplines within and outside the Lee Business School, for example with the MBA, M.S. in Accounting, M.S. in Management Information System, the graduate program in Hotel Management, and the Computer Science department in the College of Engineering.

iii. Completed prior planning for the development of the program (recent hires, plans for future hires, securing of space, curricular changes, and reallocation of faculty lines)

The Department of Finance recently hired a new Lee Professor of Finance for the purpose of supporting the proposed MSQF program. We have requested one more faculty position to be able to offer several electives. There is no significant need for new space other than perhaps a shared office for Graduate Assistants. There will be no change to the existing Finance curriculum for the undergraduate and MBA program. The proposed MSQF curriculum has been developed and attached to this proposal. One faculty member will become the program director with one course release and a stipend.

iv. Recommendations from prior program review and/or accreditation review teams

The pre-proposal for this program has been approved by the Provost's office. The Lee Business School Dean approved the hiring of one Lee Professor of Finance to support this program. Identifying relevant and market driven knowledge areas and development of programs that help students gain these market driven skills are strategic planning goals of the Lee Business School. The strategic plan of the Lee Business School is attached.

v. Organizational arrangements that must be made within the institution to accommodate the program

There is no organizational arrangement needed other than the appointment of a current faculty member to serve as the program director.

I. Resource Analysis

i. Proposed source of funds (enrollment-generated state funds, reallocation of existing funds, grants, other state funds)

A Lee Professor of Finance has been hired to support this program. This position consists of a state supported \$175,000 9-month salary plus an annual salary supplement (\$25,000) and an annual research budget (\$5,000) supported by a Lee Professorship. Seven other finance faculty members will teach one course each in the program. Additional funds will be needed for the program director stipend, instructor salaries for the two classes taught by non-full time finance faculty members, advertising and branding expenses, internship and placement related expenses, student and speaker events, software and financial datasets. To create a proper long term funding structure for the program, we are proposing a differential fee for FINQ courses of \$375 per credit. As shown in the attached file, our program cost will continue to be competitive compared to similar programs in the region. The attached file also highlights the various items that will be funded by the differential fee. Fifteen percent of the differential fee will be used to provide need-based scholarships to qualified applicants.

ii. Each new program approved must be reviewed for adequate full-time equivalent (FTE) to support the program in the fifth year. Indicate if enrollments represent 1) students formally admitted to the program, 2) declared majors in the program, or 3) course enrollments in the program.

a. (1) Full-time equivalent (FTE) enrollment in the Fall semester of the first, third, and fifth year.

1st Fall semester 20

3rd Fall semester 26.6

5th Fall semester 40

(2) Explain the methodology/assumptions used in determining projected FTE figures.

We anticipate most of our students will be full time students taking twelve credits (four courses) per semester and will complete the program in 12 months (Students needing to complete prerequisites will start in the summer semester prior to the fall start). The assumptions for headcount figures are reported below. Students will enroll at least 12 credit hours a semester, leading to a higher FTE count than headcount.

b. (1) Unduplicated headcount in the Fall semester of the first, third, and fifth year.

1st Fall semester 15

3rd Fall semester 20

5th Fall semester 30

(2) Explain the methodology/assumptions used in determining projected headcount figures.

We estimate about 15 students will enroll in the first year, 20 students will enroll in the third year, and 30 students will enroll in the fifth year. Given our student clientele of Nevada residents, out-of-state residents and international students, and the program's multiple selling points, we think this is achievable. We expect about 40% of each class will be Nevada residents and 60% of each class will be international students. Based on informal polling of interest among UNLV undergraduate business students, enrolling 6-10 students per year from our undergraduate programs appears realistic and achievable. 3-5 undergraduate students per year from UNR also appears possible. We expect 10-15 foreign students per year from countries such as China, India and South Korea who are likely to be attracted by the STEM designation of the program. Other M.S. Finance programs in the U.S. such as at the University of Arizona, Arizona State University and University of Utah, often exceed 50 intakes in a given year. Based on our conservative estimates, we believe our projections are achievable.

iii. Budget Projections – Complete and attach the Five-Year Budget Projection Table.

See attached five year budget projection excel file.

J. Facilities and equipment required

i. Existing facilities: type of space required, number of assignable square feet, space utilization assumptions, special requirements, modifications, effect on present programs

The program will use existing classrooms and computer labs. Given the modest enrollment figures, it should not have any adverse effect on present programs.

ii. Additional facilities required: number of assignable square feet, description of space required, special requirements, time sequence assumed for securing required space

Space for graduate assistants would be helpful (but not critical) since it would make them easily accessible to faculty.

iii. Existing and additional equipment required

The use of existing computer labs and other facilities such as libraries and databases will be utilized by the program.

K. Student services required – Plans to provide student services, including advisement, to accommodate the program, including its implications for services to the rest of the student body

The program director for the program will provide advising to students regarding prerequisites and course scheduling. Students will also seek advice regarding internships and placements from the Lee Business School Career and Professional Development center. Given the expected size of the program in the initial years, it should not negatively impact the services to the rest of the student body.

L. Consultant Reports – If a consultant was hired to assist in the development of the program, please complete subsections A through C. A copy of the consultant’s final report must be on record at the requesting institution.

i. Names, qualifications and affiliations of consultant(s) used

N/A

ii. Consultant’s summary comments and recommendations

N/A

iii. Summary of proposer's response to consultants

N/A

M. Articulation Agreements

i. Articulation agreements were successfully completed with the following NSHE institutions. (Attach copies of agreements)

N/A

ii. Articulation agreements have not yet been established with the following NSHE institutions. (Indicate status)

N/A

iii. Articulation agreements are not applicable for the following institutions. (Indicate reasons)

N/A

N. Summary Statement

The proposed Master of Science in Quantitative Finance will provide students with a unique combination of graduate level understanding of core finance knowledge, advanced quantitative skills, ability to analyze large financial datasets for decision making, familiarity with major financial databases, and exposure to financial applications of new technologies. This will enable graduates of this program to find well-paying, relevant jobs in the public and private sectors. It will be extremely cost effective for Nevada residents since it would cost almost three times as much if they were to attend similar programs in other states as out-of-state students. For example, the out-of-state tuition

and fees for MS Finance programs at University of Arizona, Arizona State University and University of Utah are \$51,185, \$52,900 and \$46,000, respectively. In comparison, the in-state tuition and fees for our proposed program is \$17,468. Our program thus fills an important need for Nevada students. Overall, we expect the program to attract quality students, achieve strong job placements for graduates, enhance the reputation of the Finance department and Lee Business School, and make UNLV more attractive to prospective faculty.

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements

Enter N/A if the information is not applicable to the program proposal

Program Resource Requirements. Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first, third and fifth fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Third and fifth year estimates should be in dollars adjusted for inflation. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Note: This form reflects the NWCCU's Substantive Change Budget Worksheet as of 8/28/17.

College/University: Lee Business School, UNLV				Program: MS in Quantitative Finance			
I. PLANNED STUDENT ENROLLMENT							
		FY 1: FY 2019		FY 3: FY 2021		FY 5: FY 2023	
		FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments to the Institution		20	15	27	20	40	30
B. Enrollments from Existing Programs							
II. REVENUE							
		FY 1: FY 2019		FY 3: FY 2021		FY 5: FY 2023	
		On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request							
2. Institution Funds (Funding formula)		\$423,822		\$372,298		\$231,053	
3. Federal (e.g. grant, appropriation)							
4. New Tuition Revenues from Increased Enrollments		\$215,420		\$287,226		\$445,311	
6. Student Fees		\$6,300		\$8,400		\$12,600	
7. Other (Differential fees)		\$127,125		\$169,500		\$254,250	
Total Revenue		\$772,667	\$0	\$837,424	\$0	\$943,214	\$0

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements

Enter N/A if the information is not applicable to the program proposal

III. EXPENDITURES		FY 1: FY 2019		FY 3: FY 2021		FY 5: FY 2023	
		On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs							
1. FTE (Total FTE for all personnel types)		7.75		8.75		8.75	0
	Faculty	2.75		2.75		2.75	
	Adjunct Faculty (one course each)	2		2		2	
	Grad Assts	1		2		2	
	Research Personnel						
	Directors/Administrators	1		1		1	
	Administrative Support Personnel	1		1		1	
	Other: _____						
Expenditures for personnel type below must reflect FTE levels in Section A.1.							
2. Faculty		\$490,499		\$490,499		\$490,499	
3. Adjunct Faculty		\$25,000		\$25,000		\$25,000	
4. Graduate Assistants						\$12,000	
5. Research Personnel							
6. Directors/Administrators		\$10,000		\$10,000		\$10,000	
7. Administrative Support Personnel				\$12,000		\$12,000	
8. Fringe Benefits (@ 20%)		98,100		100,500		102,900	
9. Other (Scholarships) - 15% of Differential Fees		\$19,068		\$24,425		\$38,138	
Total Personnel Costs		\$642,667	\$0	\$662,424	\$0	\$690,537	\$0

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements

Enter N/A if the information is not applicable to the program proposal

	FY 1: FY ____		FY 3: FY ____		FY 5: FY ____	
	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures						
1. Travel (Students and Faculty) related to program.	\$10,000		\$10,000		\$10,000	
2. Professional Services						
3. Other Services (Student and Speaker events)	\$15,000		\$15,000		\$15,000	
4. Communications						
5. Materials and Supplies (Financial Databases)	\$75,000		\$125,000		\$202,677	
6. Rentals						
7. Marketing materials, Advertising and Branding	\$20,000		\$15,000		\$15,000	
8. Miscellaneous (Placement and Internship)	\$10,000		\$10,000		\$10,000	
Total Operating Expenditures	\$130,000	\$0	\$175,000	\$0	\$252,677	\$0

NSHE Academic Program Proposal - Five-Year Program Cost Estimate and Resource Requirements

Enter N/A if the information is not applicable to the program proposal

	FY 1: FY ____		FY 3: FY ____		FY 5: FY ____	
	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay						
1. Library Resources						
2. Equipment						
Total Capital Outlay	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL EXPENDITURES (IIIA + IIIB + IIIC):	\$772,667	\$0	\$837,424	\$0	\$943,214	\$0

Budget Notes (optional):

Students will enroll at least 12 credit hours a semester, leading to a higher FTE count than headcount.

We are assuming 40% of each class will be Nevada residents and 60% non-resident/international students.

Proposed \$375 per credit differential fee for FINQ 700 level courses.

Students will take 2-3 FIN 700 level courses, 6-7 FINQ 700 level course and 1 ECO 700 level course. Reported numbers are based on 2 FIN 700 level courses and 7 FINQ 700 level courses.

Item II (2) is based on the new funding formula where state support for Finance (Economics) 700 level courses has a weight of 4.4 (4) for resident credits. The per credit support was recently \$150. For the 9 FIN/FINQ 700 level courses and 1 ECON 700 level course taken as part of the MSQF program, it will be \$19,620 per resident student.

Sheet 2 has the breakdown of the cost of faculty teaching in the program.

Date: April 27, 2018
To: Diane Chase, Executive Vice President and Provost
From: Brent Hathaway, Dean of Lee Business School
RE: Masters in Quantitative Finance Degree Proposal

The Department of Finance in the Lee Business School is proposing an MS in Quantitative Finance degree program. This program will enable students to acquire a strong conceptual understanding of finance and develop the advanced empirical and analytical skills required to conduct analysis using large financial datasets.

The financial industry is becoming more data-centric and the ability to analyze large datasets to help senior management make informed decisions is highly valued. However, effective analysis requires a strong and intuitive understanding of finance. In addition, new technologies such as machine learning and artificial intelligence have several financial applications which could potentially disrupt parts of the financial sector. This Master of Science in Quantitative Finance program aims to prepare graduates for these opportunities and challenges. Since the demand for these skills is strong globally, the expectation is that the program will attract quality domestic and international students.

The addition of the MS in Quantitative Finance is consistent with the LBS Strategic Plan. The plan calls for the college to “cultivate student success by identifying relevant and market-driven knowledge areas”, and to nurture excellence and achievement by identifying and enhancing each department’s distinctive capabilities in teaching, research and service. Providing this new graduate level degree program is consistent with these goals and will provide significant value addition for strong undergraduate finance and business majors as well as non-business undergraduate majors.

Sincerely,



Brent Hathaway, Dean
Lee Business School



HIGHTOWER

LAS VEGAS

4/23/18

To the Office of the Provost:

I am writing to demonstrate my support for the Masters in Quantitative Finance program at the Lee Business School. As a UNLV business school graduate and a former adjunct professor at the college, I am deeply aware of both the positive and negative aspects of the business school. Over the past decade, the business school has made tremendous improvements to close some of its deficiencies. Gaining the support of the Lee family is certainly one highlight that stands out. In order to take the program to the next level, we need graduate level programs that attract top talent from around the country and globe. I believe the Masters in Quantitative Finance program has that potential.

Throughout my career I have seen the need for quantitative finance experts grow. Data is becoming a bigger and bigger part of the world in which we live. The financial services industry continues to move to a more data-centric business. This trend will only increase in pace as technology continues to evolve. The industry needs quantitative experts to handle the increased demand for data analytics. As such, educational programs focused on data analytics will become more and more important for a business school in order to attract top talent.

I believe UNLV is well-positioned to capture a share of this demand and at the same time enhance its reputation as a destination of choice. I recommend approving this program.

Sincerely,

Adam Thurgood, CFA
Managing Director, Partner



April 18, 2018

John Puthenpurackal
Professor and Chair of Finance
Lee Business School
Box 456008
4505 S. Maryland Parkway
Las Vegas, NV 89154-6008

Dear Professor Puthenpurackal:

My team and I are very pleased to learn of the Masters in Quantitative Finance program that you are creating. The asset management process that we employ in our wealth management practice is heavily reliant on quantitative skills and we would benefit from having access to the graduates of this program.

I believe that this program would significantly elevate the reputation of the Lee Business School within the finance community and would enhance the recruiting and career prospects of its graduates. Please keep us informed of the progress of the program. Many thanks.

Regards,

A handwritten signature in black ink, appearing to read "Mike PeQueen", is written over a light blue circular stamp.

Mike PeQueen, CFA, CFP, AIF
Managing Director, Partner
HighTower Las Vegas

April 20, 2018

Mr. John Puthenpurackal
Professor and Chair of Finance
Lee Business School
University of Nevada Las Vegas
4505 S. Maryland Parkway
Las Vegas, Nevada 89154-6008

Re: Master's in Quantitative Finance

Dear John,

I am very happy to hear that the Department of Finance at UNLV is proposing to start a new graduate degree program in Quantitative Finance.

As a finance professional with over 35 years in banking, I am a strong believer that the skills acquired through this field of study will prepare students for higher level jobs in finance, commercial and investment banking, asset management, public finance, and risk management among others.

As financial managers play an increasingly prominent role in global expansion, mergers, acquisitions, and consolidations, it is becoming more important to have extensive specialized knowledge in quantitative finance to help an organization balance the risks while maximizing the return on its investment. A degree with a specialization in quantitative finance will bring awareness of risk management and applied economics while gaining an understanding of financial markets from a statistical standpoint.

While several universities offer a tailored degree in this field, I believe the demand for such a program will continue to increase and UNLV will be able to attract top talent and carve a niche in this burgeoning field.

Congratulations on your progressive outlook regarding the field of financial mathematics and best wishes for your success.

Sincerely,



Arvind Menon
President & CEO

ORGANIZERS/
DIRECTORS

Andre Agassi

Daniel Ayala

Thomas Breitling

William Bullard

Roger Bulloch

Lorenzo Fertitta

Brian Greenspun

Paul Huygens

Jim King

Arvind Menon

Steve Miller

Timothy Poster

Key Reid

Perry Rogers



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April 26, 2018

The Provost's Office
University of Nevada, Las Vegas

To the Office of the Executive Vice President and Provost:

I am writing this letter on behalf of the Finance Department in support of the proposed Masters in Quantitative Finance program at UNLV.

I strongly support this program and its goal of providing practical financial knowledge—a valuable asset to both the students and employers in the local business community. The program's emphasis on advanced analytical skills coupled with applied financial theory presents a cohesive curriculum that will provide graduates with the necessary capabilities to become competitive additions to the workforce.

As an organization that consistently supports growth in the communities we operate in through job creation and continuing education, we look forward to the successful implementation of a Masters in Quantitative Finance program.

Sincerely,

Jim Freeman
Senior Vice President of Capital Markets and Strategy
MGM Resorts International



KENNETH J. KENNY, CPA, Vice President/Finance/Treasurer

April 24, 2018

Dr. Diane Chase
Executive Director and Provost
University of Nevada, Las Vegas
Box 451002
4505 S. Maryland Parkway
Las Vegas, NV 89154-1002

Dear Dr. Chase,

I am in strong support for the Masters in Quantitative Finance Program (MSQF).

In today's corporate world, finance departments are being asked to analyze large amounts of data with fewer personnel. The knowledge learned through taking the MSQF Program would give an individual strong conceptual understanding of finance coupled with analytical skills to meet the requirement to succeed as an analyst in the corporate world. Whether working with 10-year budgets, valuing the company or understanding the latest in corporate restructuring and governance, and new technologies such as blockchain, a student who has successfully completed the MSQF Program will be prepared to manage the everchanging corporate finance landscape.

I therefore, as mentioned previously, support the MSQF Program.

Sincerely,

A handwritten signature in blue ink, appearing to read "K. J. Kenny", is written below the word "Sincerely,".