



FOR APPROVAL

PUBLIC

OPEN SESSION

TO: Academic Board

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DATE: May 13, 2015 for June 1, 2015

AGENDA ITEM: 5

ITEM IDENTIFICATION:

Proposal for a new professional graduate degree program Master of Financial Risk Management (M.F.R.M.), Rotman School of Management

JURISDICTIONAL INFORMATION:

Section 5.3.1. of the Terms of Reference for the Academic Board states that academic program proposals coming from the Board's committees, including the new graduate programs and degrees, require Executive Committee confirmation.

GOVERNANCE PATH:

1. Committee on Academic Policy and Programs [for recommendation] (May 12, 2015)
2. **Academic Board [for approval] (June 1, 2015)**
3. Executive Committee [for confirmation] (June 15, 2015)

PREVIOUS ACTION TAKEN:

The proposal for the Master of Financial Risk Management received approval from the Rotman School of Management Faculty Council on April 22, 2015.

HIGHLIGHTS:

This is a proposal for a two session Master of Financial Risk Management (M.F.R.M.) which will confer a new degree. The professional M.F.R.M. degree program will be offered over 8 months using a cohort-based model. The target audience is students with strong quantitative skills who have recently completed their undergraduate studies in business, commerce, economics, math, engineering or actuarial science, who have little or no work experience, and who wish to pursue a career in financial risk management. The program will consist of ten required half courses (5.0 FCEs) and a 1 week experiential component held during each of the two sessions.

Financial risk management is concerned with the way in which financial institutions manage risks and regulatory requirements and it has become an emerging academic discipline as a subfield of finance. Students in this program will acquire advanced analytical skills and judgement to enable better management of risk and opportunity in the finance sector. The M.F.R.M. will be the only masters-level program specializing in financial risk management in Ontario.

The curriculum will feature a strong experiential component to provide graduates with hands-on experience in applying judgment to risk challenges facilitated by the state-of-the-art BMO Financial Group Finance Research and Trading Lab at Rotman. The M.F.R.M. will also include a one-week industry session per session where students will interact with and learn from practitioners working in different areas of risk management at institutions such as banks, insurance companies, pension funds, mutual funds and government regulatory bodies. In addition, there will be integrative projects, chosen and overseen by faculty, that offer students opportunities to work on issues relevant to, and involving, industry and that bridge materials across different courses.

The proposed program is the result of a highly consultative process involving UTM and UTSC management cognate units. The Faculty of Arts and Science, has been consulted, especially in relation to the existing Master of Financial Economics and Master of Mathematical Finance and proposed Master of Financial Insurance proposal currently moving through governance to ensure there is no overlap.

The program was subject to external appraisal on March 19 and 20, 2015 by Phelim Boyle (Wilfrid Laurier University) and Peter Klein (Simon Fraser University). The external reviewers made a number of suggestions, some of which resulted in small changes to the program as originally conceived as is reflected in the Dean's response to the review report. The final proposal received approval from the Rotman School of Management Faculty Council on April 22, 2015.

FINANCIAL IMPLICATIONS:

Any new/additional financial obligations resulting from this program will be met at the Faculty/Divisional level.

RECOMMENDATION:

Be It Resolved

THAT, subject to confirmation by the Executive Committee

THAT the proposed Master of Financial Risk Management, which will confer the new degree M.F.R.M., as described in the proposal from the Rotman School of Management dated April 2015 be approved effective September 1, 2016.

DOCUMENTATION PROVIDED:

- *Proposal for a new Master of Financial Risk Management, Rotman School of Management*



University of Toronto New Graduate Program Proposal

| | |
|--|---|
| Full Name of Proposed Program: | Master of Financial Risk Management |
| Degree Name and Short Form: | Master of Financial Risk Management, M.F.R.M. |
| Program Name: | Financial Risk Management |
| Professional Program | Yes |
| Unit (if applicable) offering the program: | Rotman School of Management |
| Faculty / Division: | Rotman School of Management |
| Dean's Office Contact: | Ken Corts, Vice Dean, Faculty and Research |
| Proponent: | |
| Anticipated date students will start program: | September 2016 |
| Version Date: | April 10, 2015 |

New Graduate Program Proposal

Master of Financial Risk Management

Rotman School of Management

Table of Contents

| | |
|---|----|
| Table of Contents..... | 2 |
| 1 Executive Summary..... | 4 |
| 2 Program Rationale | 5 |
| 3 Fields/Concentrations..... | 9 |
| 4 Need and Demand | 9 |
| 5 Enrolment | 12 |
| 6 Admission Requirements..... | 12 |
| 7 Program Requirements..... | 14 |
| 8 Program Description | 16 |
| 9 Degree Level Expectations, Program Learning Outcomes and Program Structure..... | 20 |
| 10 Assessment of Learning | 24 |
| 11 Consultation..... | 25 |
| 12 Resources:..... | 27 |
| 12.1 Faculty Complement..... | 27 |
| 12.2 Learning Resources..... | 29 |
| 12.3 Financial Support for Graduate Students | 29 |
| 12.4 Space/Infrastructure..... | 30 |
| 13 Quality and Other Indicators | 30 |
| 14 Governance Process..... | 31 |
| Appendix A: Courses | 32 |
| Appendix B: Graduate Calendar Copy | 34 |
| Appendix C: Faculty CVs..... | 37 |
| Appendix D: Library Statement..... | 38 |
| Appendix E: Student Support Services..... | 41 |
| Appendix F: Finance-related Programs..... | 43 |
| Appendix G: External Appraisal Report..... | 52 |

Appendix H: Dean of the Rotman School of Management, Administrative Response to External Appraisal Report.....61

Appendix I: Vice-Provost, Academic Programs' Response.....66

1 Executive Summary

The proposal is for a two session Master of Financial Risk Management (M.F.R.M.) degree program at the Rotman School of Management. The professional M.F.R.M. degree program will be offered over 8 months using a cohort-based model. The target audience is students with strong quantitative skills who have recently completed their undergraduate studies in business, commerce, economics, math, engineering or actuarial science, who have little or no work experience, and who wish to pursue a career in financial risk management.

Financial risk management is an emerging academic discipline, focusing on the way in which financial institutions manage risks and regulatory requirements. The study of financial risk management as a sub-discipline of finance includes several types of risk: market risk, credit risk, operational risk, business risk and liquidity risk. Since the credit crisis of 2007-09 the environment has become increasingly complex and, as a result, more research in this area is currently being carried out. The emergence of financial risk management as an academic discipline is illustrated by the increasing number of journals, many of which started in the last few years, that are devoted to these topics including the Journal of Credit Risk, the Journal of Operational Risk, the Journal of Risk Model Validation, the Journal of Risk Management in Financial Institutions and the Journal of Risk and Financial Management, among others.

Students in the M.F.R.M. will build on solid quantitative undergraduate degrees, gaining the educational foundation necessary to enable them to assess and analyze each of market risk, credit risk, operational risk, business risk and liquidity risk. They will gain knowledge of the structure of financial institutions and capital markets, and will learn about the way in which the regulatory environment has evolved for banks and other types of financial institutions. The M.F.R.M. will prepare its graduates to recognize potential risk problems, mitigate risk and identify solutions to risk challenges.

The M.F.R.M has been developed in response to current marketplace needs in Canada in the financial sector. The proposal addresses the growing demand for graduates with the skills to work in this domain given increased focus on better financial risk management following the 2007-09 global financial crisis. Canada is in an extensive period of regulatory change and economic uncertainty. Ongoing change in financial market regulation has resulted in the need for risk management professionals who have both quantitative skills and an understanding of the capital market environment in which decisions are made. In turn, these factors have been catalysts for a focus on building risk expertise in financial institutions and a stimulus for in-depth academic research in financial risk management.

Toronto is a major global financial centre, home to many multinational financial institutions.

According to the Conference Board of Canada, the financial services sector employed 229,380 people directly in Toronto and 191,210 indirect jobs across Canada.¹ The sector is a source of growth for Ontario, with financial services outpacing other sectors.

The current proposal builds on the recognized academic strength at Rotman in the area of financial risk management and regulation, and the strong links of the School to the financial sector. The proposed program will build on the latest research by Rotman's finance faculty, who consistently rank in the top ten globally according to the *Financial Times'* rankings of finance teaching. It will be the only graduate level program purely focused on financial risk management in the Toronto or Canadian markets.

It is anticipated that the program will appeal broadly to students who have completed their first entry-level degrees and wish to pursue a career in risk management in the financial sector. A survey of undergraduate Commerce students at the University of Toronto revealed that just over 2/3 of respondents would be interested in a Master of Financial Risk Management degree program.

Distinctive features of the proposed program include experiential learning opportunities through the state-of-the-art BMO Financial Group Finance Research and Trading Lab located at the Rotman School of Management, as well as leveraging resources of the renowned Global Risk Institute (GRI), a Toronto-based research institute that is a leading authority in developing applied and integrative research in financial risk.

2 Program Rationale

The Rotman School of Management is proposing to offer a graduate program leading to the professional degree of Master of Financial Risk Management. The objective of the program will be to permit students to acquire advanced analytical skills and judgement to enable better management of risk and opportunity in the finance sector.

Financial risk management is an emerging academic discipline. In recent years, it has become an important subfield of finance. The regulatory framework and the risks it assesses have evolved dramatically in the past several decades and exponentially more quickly in the past few years. Since the credit crisis of 2007-09, the regulatory environment has become increasingly complex and, as a result, more research in this area is currently being carried out. Evidence of this is seen in the increasing numbers of journals devoted to financial risk management: The

¹ Conference Board of Canada, "Ensuring the Future: Understanding the Importance of Toronto's Financial Services Sector, 2013, Executive Summary

Journal of Credit Risk, The Journal of Operational Risk, The Journal of Risk Model Validation, The Journal of Investment Strategies, The Journal of Financial Market Infrastructure, Journal of Risk Management in Financial Institutions, Journal of Risk and Financial Management, Journal of Financial Regulation and Compliance, Journal of Financial Regulation and Journal of Financial Intermediation, among others. In addition, there has been increasing focus on accreditation within the risk management field, with the development of several professional qualifications available to those who pass appropriate exams (e.g. Global Association of Risk Professionals, Professional Risk Managers' International Association and Chartered Enterprise Risk Analyst).

Financial risk management is concerned with the way in which financial institutions manage risks and regulatory requirements. The risks include market risk, credit risk, operational risk, and liquidity risk. Market risk involves the risk of losses arising from movements in market variables such as exchange rates, interest rates, commodity prices, and so on; credit risk involves the risk of losses arising from defaults by counterparties in financial transactions; operational risk is concerned with other categories of risk such as cyber risk, legal risk, compliance risk, external fraud, internal fraud and so on; liquidity risk is concerned with the risk that funds will not be available when needed. Credit risk and market risk have for many years been important areas of research for finance academics. In econometrics for example, models such as generalized autoregressive conditional heteroskedasticity (GARCH) have been developed for modeling volatilities and correlations. The impact of these models was acknowledged in 2003 when Rob Engle and Clive Granger won the Nobel Prize in Economics for their contributions to advancements in statistical methods for economic time series. Several business school researchers have developed models to describe default risk and the risk premium inherent in the relationship between the probability of default and credit spreads. Robert Merton and Myron Scholes who along with Fisher Black developed the first generation of derivatives and credit risk models in the early 1970s were awarded the Nobel Prize in Economics in 1997. As noted, in the last 15 years many journals focusing exclusively on different aspects of risk have been developed. Both academics and practitioners have contributed to these journals. In addition, international conferences dealing with the risk management field are becoming more common. There is now, therefore, a wealth of knowledge that can be communicated in a systematic way to students.

The M.F.R.M. will be the only masters-level program specializing in financial risk management in Ontario, and will address the ongoing changes in financial market regulation provincially, federally and globally that have resulted in the need for well-trained risk management professionals. Following the financial crisis of 2007-09 – arguably based on poor risk management - Canada fared relatively well on the global stage given its success at weathering much of the storm. Canada retains a reputation as ‘the darling’ of the global risk management world and Rotman faculty have deep expertise in the field. The M.F.R.M. will address rapidly

changing financial markets, providing graduates with the latest in-depth analysis and research insight into financial risk management. In all courses, students will be required to read the latest research in the topics being covered. In several of the courses, students will be required to present independent research and existing research papers in class and part of a student's grade will be based on the quality of that student's presentations.

The M.F.R.M. will be a new degree at the University of Toronto that will incorporate all aspects of the growing research in risk management described above. The program will deliver the depth of knowledge required to understand financial risk in today's context and the critical nature of the impact of regulatory and business changes on financial institutions. The degree nomenclature, Master of Financial Risk Management, is appropriate as it reflects the focus of a growing field of study very specific to risk management in the financial sector. Two other excellent pre-experience masters programs offered by University of Toronto that prepare students for quantitative jobs in finance are Master of Mathematical Finance (M.M.F.) and Master of Financial Economics (M.F.E.). Unlike the proposed M.F.R.M., the M.M.F. has mathematics as its underlying discipline and the M.F.E. has economics as its underlying discipline. The M.F.R.M. will have management as the underlying discipline and will focus entirely on risk management and regulation. The courses taught in the program will all have specialized financial risk management learning outcomes and build on the students' pre-existing knowledge of accounting, finance, investments and derivatives. Appendix F provides an overview of existing degree and other programs in finance and in risk management.

The program will be designed for graduate students who are fresh out of undergraduate degrees with little or no work experience and who are interested in pursuing a master's degree with a specialization in financial risk management. The expectation is that the majority of students will have recently completed an undergraduate degree in quantitative-based programs such as commerce, math, business, management, economics or actuarial science. In all cases, students should have already gained a strong analytical and quantitative background in their undergraduate program. The proposed program will provide them with advanced knowledge in the field of financial risk management, building on their undergraduate studies. The M.F.R.M. will be educating the next generation of risk managers, many of whom will be employed in the financial sector, mostly in the banks. Graduates will be able to assess and respond to changes in the financial risk environment, evaluate strategies to balance risk and develop effective solutions to risk challenges.

Distinctiveness

The M.F.R.M. is meant to have a strong experiential component to provide graduates with hands-on experience in applying judgment to risk challenges. Rotman's BMO Financial Group Finance Research and Trading Lab will offer that experiential learning to the M.F.R.M. program.

The state-of-the-art facility fosters the integration of theory and research with experiential practice. Research databases and real-time access to global financial resources will provide students with the ability to link classroom lessons to actual securities and markets. Interactive simulations will help students develop skills for making good financial decisions when faced with uncertainty about future outcomes. The Lab will be a critical and distinct component of the program design, providing a simulated environment in which to explore case studies and financial risk scenarios, allow students to make mistakes and help them learn how to assess risk.

M.F.R.M. will include a one-week industry session per term organized by Rotman faculty in which we will facilitate student interactions with practitioners working in different areas of risk management at institutions such as banks, insurance companies, pension funds, mutual funds and government regulatory bodies, as well as organize presentations on current risk topics given by senior risk managers. During the one-week sessions, students will learn about key research topics that are of interest to financial institutions. Students will get exposure to market risk, credit risk, operational risk and regulatory compliance functions, which will be critical learning for the courses that follow. Faculty will leverage resources available through the Global Risk Institute, including its research and financial industry membership links. The University of Toronto is a partner of the Global Risk Institute (GRI). Founded by representatives of Canada's private and public sectors, the Global Risk Institute enables financial institutions, policy-makers and regulators to better manage the balance between risk and opportunity. Its mandate is to develop applied research and education programs that build risk capacity and stimulate debate in risk management in the financial services sector around the world. Over the past year, GRI has concluded research agreements with numerous educational institutions and centres, including the Universities of Toronto, Waterloo, Calgary and McMaster and the International Centre for Pensions Management at the Rotman School of Management. GRI resources will help ensure that students will acquire the most up-to-date in-depth industry knowledge and research on risk in the financial services sector and learn to evaluate strategies to assess and balance risk.

Rotman finance faculty's expertise will support a vibrant program. The M.F.R.M. will take advantage of the depth of expertise at the Rotman School in the emerging academic discipline of financial risk management. In turn, the program will address the needs of students who wish to specialize in this growing field of interest. Furthermore, the M.F.R.M. speaks directly to the objective in the University of Toronto (U of T) Strategic Mandate Agreement (SMA) with the Ontario Government that defines Business/Management/Finance as an area of growth. Finally, the program takes advantage of the University of Toronto's proximity to the financial centre of Canada, and the School's close connections to the financial community.

3 Fields/Concentrations

None

4 Need and Demand

There is converging interest in, and demand for, the M.F.R.M. program. As outlined below, we found significant interest on the part of potential students in a master's degree program focused on financial risk management, and industry demand has increased for skills and experience in financial risk management following the financial crisis of 2007-09. The M.F.R.M. would be unique in the Toronto and Ontario markets in addressing this converging interest and demand.

Student Interest

A survey was conducted of U of T Commerce students in the second to fourth years of the program to assess the interest in an M.F.R.M. program. Results revealed that 68 % of respondents would be either 'Very Interested' or 'Somewhat Interested' in a full-time Master of Financial Risk Management (172 respondents). We expect the students to come largely from undergraduate business, commerce, economics, math, engineering or actuarial science, and U of T Commerce students represent, therefore, a core potential segment of the M.F.R.M. student pool.

From application inquiries regarding the Rotman Master of Finance and MBA degrees, it is evident that many potential students are keen to pursue graduate education immediately on completion of their undergraduate degrees. In addition, 32% of respondents in the Commerce survey indicated that they wished to pursue a graduate degree upon completion of their Bachelor degree.

Societal Need

Financial risk management is an area of global interest, as was starkly evident from the global financial crisis in 2007-09. We expect there will be interest from prospective international students in the M.F.R.M. and that, while a majority of the students will be from the Canadian market, a portion of the students will come from other countries. Through the Rotman Master of Finance program, we have concrete evidence of international demand for master's-level finance degree programs. Over the past five years, we have seen that the primary area of growth in interest is with international students with little to no work experience. International prospects make up 75% of our overall Master of Finance inquiries and 40% of our applications, even though the Master of Finance program is a working professional program and, as such, attended by Toronto residents only. In our experience with the Rotman Master of Finance

program, the Asian market (China and Taiwan in particular) is where the bulk of international demand for master's level finance programs is concentrated. India and Africa (Ghana in particular), along with the Middle East (e.g. Iran and Iraq) are other locations from which Rotman Master of Finance frequently receives inquiries and/or applications. As a result, these are the countries from which we expect much of the international interest in the M.F.R.M. to come.

There are no masters-level degree programs specializing exclusively in financial risk management in the Toronto or Ontario markets. Toronto, as an international hub for finance, is the natural centre for an M.F.R.M. program. According to the Conference Board of Canada, "Toronto is home to the headquarters of 4 of the world's 50 largest banks, 2 of the world's 15 largest life and health insurers, a top 10 global equity market, and 3 of the world's 40 largest pension funds."² Since 2002, financial services employment has risen by 24.9 percent, which is equivalent to an average annual growth of 2.2 percent, in comparison to 1.5 percent growth for all sectors.³

Market Demand

There is also substantial market demand for risk management professionals. The 2007-09 financial crisis underlined the need for better risk management and regulation in financial institutions. Research institutes such as the GRI clearly emphasize the need in the financial marketplace. Newer regulatory requirements in the financial sector that have arisen in response to the 2007-09 crisis require more specialized and deeper knowledge of financial risk management. As such, the market demand for expertise in financial risk management has grown. Deloitte's Executive Director for its Center for Regulatory Strategies states at the 2014 Annual Compliance Conference that, "There's a war for compliance and risk management talent...and the gap may not be filled anytime soon."⁴ Richard Nesbitt, former Chief Operating Officer of CIBC and now Adjunct Professor at Rotman, says that there has been an exponential increase in hiring across risk roles, from compliance to audit to anti-money laundering. In some financial risk areas, staff have been increased as much as 20 percent per year in recent years. According to Mr. Nesbitt, operational risk areas, such as cyber-risk, continue to grow in importance.⁵

² Conference Board of Canada, "Ensuring the Future: Understanding the Importance of Toronto's Financial Services Sector, 2013, p. iii

³ Conference Board of Canada, "Ensuring the Future: Understanding the Importance of Toronto's Financial Services Sector, 2013, p. 3-4

⁴ Wall Street Journal, Risk and Compliance Journal, "Demand for Compliance and Risk Skills Leaves a Talent Shortage", August 13, 2014

⁵ Interview with Richard Nesbitt, November 21, 2014

Executives at both CIBC and at Scotiabank have expressed support for the development of a program that focuses on providing students who have very solid quantitative skills with extensive knowledge content in financial risk management. They are looking for risk management professionals who have a balance of quantitative skills, solid judgment regarding assessing the various types of risk, and who can communicate effectively across the institutions. Both institutions indicated a keen willingness to hire these graduates.⁶

According to the Professional Risk Managers' International Association (PRMIA), which represents 7,000 risk management professional in Toronto and nearly 90,000 worldwide, a survey of members found that the risk industry continues to adapt, change and experience net growth:

“When asked about the trends within their company pertaining to hiring of staff to meet their needs, over 50% stated that their employers were adjusting job responsibilities with current staffing, 36% stated they were growing the number of risk professionals at their firms and 9% said the company was reducing risk staff.”⁷

Financial risk management requires excellent quantitative skills and superior knowledge of how financial institutions are organized and how capital markets work. The distinctive feature of M.F.R.M. is that it will have management as the underlying discipline and focuses entirely on risk management and regulation. It will be one of a small handful of programs throughout the world that does so.

Strategic Mandate Agreement

The M.F.R.M. is an example of the University of Toronto's ability to leverage our research strength and deliver world-class, research-informed professional master's programs, as was outlined in Priority #2 of the Institutional Vision, Proposed Mandate Statement and Priority Objectives document filed with the Ministry to develop the Strategic Mandate Agreement. The M.F.R.M. will also address the priority of job creation, innovation and economic development in Ontario, by identifying a growing specialized area of industry need in the financial sector, one of the province's largest sectors of employment.

This will be a distinct degree program for the University of Toronto, leveraging our renowned Rotman Finance faculty research strength, and a direct response to the needs of Bay Street and the province.

⁶ Interviews with Laura Dottori, Chief Risk Officer, CIBC, December 5, 2014 and Michael Durland, Group Head and CEO, Global Banking and Markets, Scotiabank, December 3, 2014

⁷ December 10, 2014 email of research findings from Capra Mihaela, Regional Director, Toronto Chapter, PRMIA to Professor Peter Christoffersen, Rotman School of Management

5 Enrolment

The M.F.R.M. falls within the Rotman School of Management's academic priorities and enrolment plans. This program will leverage the depth of expertise in financial risk management within the Finance faculty. We expect a steady state of 65 students by Year 3, with a mix of domestic and international students, the majority being Canadian residents. The M.F.R.M. ties in well with the priorities of the Rotman School, and graduate enrolment spaces for this program are part of the Faculty's current enrolment plan.

Table 1: Graduate Enrolment Projections

| Year of study | Academic year 16/17 | Academic year 17/18 | Academic year 18/19* | Academic year 19/20 | Academic year 20/21 | Academic year 21/22 | Academic year 22/23 |
|---------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|
| Year 1 | 40 | 50 | 65 | 65 | 65 | 65 | 65 |
| Total | 40 | 50 | 65 | 65 | 65 | 65 | 65 |

*Steady State

6 Admission Requirements

For students to be considered for acceptance into the M.F.R.M. program, they must meet the minimum admissions standards below.

Admissions Process

Applicants will complete a standardized application form, provide official transcripts, two reference letters and a resume, and will complete two essay questions.

Applicants are expected to be pre-experience and will be accepted immediately after completing their undergraduate education.

Applicants will be scored on each of the admission requirements and then ranked based on their overall score. The top ranked applicants will be invited for an interview (international applicants can be interviewed online through Skype or other means), which will facilitate screening for applicants with strong communication skills. The Admissions Committee will then make decisions based on the overall weighted score, including the interview score.

Admissions Requirements

Applicants must meet the following requirements:

1. **Appropriate 4-year undergraduate degree:** For entry into the School of Graduate Studies of the University of Toronto, a 4-year recognized undergraduate degree or equivalent is required. Business, Commerce, Economics, Mathematics, Engineering or Actuarial Science degrees will be preferred, but other 4-year undergraduate degrees will be considered if there is evidence of strong quantitative skills. This may be achieved with a minimum B average in Calculus, Linear Algebra, and Statistics or Econometrics.
2. **Grade Point Average:** Applicants must have achieved a minimum B average in the final year of their undergraduate or prior graduate education.
3. **English language proficiency:** Applicants must demonstrate the ability to communicate in English in one of the following ways:
 - An undergraduate or graduate degree from a university at which the language of instruction and examination was English
 - Satisfactory performance on a standardized English Language Test. Minimum TOEFL score of 100 is required. IELTS may be considered in special circumstances, and a minimum score of 7.0 will be required.
4. **Quantitative proficiency:** For some applicants, this will be satisfied by having obtained a minimum B average in Calculus, Linear Algebra, and Statistics or Econometrics during their undergraduate degree. In cases where evidence of quantitative ability is not obvious, applicants may be asked to supply a GMAT/GRE score or other supplementary evidence of quantitative ability.
5. **Prerequisite courses:** Applicants must have completed courses in:
 - Introductory/Corporate Finance
 - Financial Accounting
 - Investments
 - Futures and Options

This will normally be satisfied by having already taken a business degree that includes these courses. Applicants from disciplines other than business/management/commerce (such as economics, statistics, mathematics, engineering or actuarial science) who have not completed these courses may be granted admission conditional on completing these courses at a post-secondary institution recognized by U of T. The Program Director will provide counsel, on a case-by-case basis, regarding options and availabilities to complete these prerequisites should applicants require it.

The M.F.R.M. is designed as a 2-session program based on the specialized nature of the financial risk management sub-field and the prerequisite courses that applicants must have completed, the majority of whom will have a commerce/business undergraduate degree. The courses taught in the program all have specialized financial risk management learning outcomes

and build on students' pre-existing knowledge of accounting and finance in general, and of investments and derivatives in particular. As an example, the program will cover in detail how option portfolio risk can be hedged; however, it is assumed that the students are familiar with options and futures pay-off and pricing functions. As a another example, the program will assume that the student is familiar with the standard capital asset pricing model (CAPM) and will build on it to allow for uncertainty in investor views using the Black-Litterman asset allocation framework.

Taken together, the admission requirements will ensure students with strong undergraduate and quantitative backgrounds are admitted, which will help ensure their success in a professional master's degree designed to develop expertise in a specialized financial risk management field.

7 Program Requirements

For Proposed Calendar Copy, please see Appendix B.

The professional M.F.R.M. degree program will be offered over 8 months using a cohort-based model. Within this 2-session program, students must complete a structured sequence of 10 half courses (5.0 FCE with 2.5 FCE in each session) on a full-time basis. The time limit is 3 years full-time.

The program is structured as 2 sessions full-time (F/W), beginning in the fall. It consists of ten required half courses (total of 5.0 FCEs). The courses provide knowledge on the relevant range of concepts and applications relevant to a professional working in financial risk management.

Individuals who work in risk management need to have the skills necessary to quantify market risk, credit risk, operational risk and liquidity risk. Seven of the courses in the program address this. These courses are: Market Risk, which is new, Risk Modelling for Trading Strategies, Macroeconomics for Finance Professionals, Advanced Derivatives, Advanced Investments, which is new, and Operational Risk and Credit Risk, which are new. We anticipate that most of our graduates will work for financial institutions. Students will learn how financial institutions function and how they are regulated. Two of the courses (Financial institutions and Capital Markets, and Regulation of Financial Institutions, which is new) will focus on this. Finally, it is important for students to have some knowledge beyond banking to pension funds and insurance companies. The Risk Management in Insurance Companies and Pension Plans course, which is new, will deal with these issues.

Traditionally credit risk and market risk have been considered to be the most important risks

facing financial institutions. Operational risk is now recognized as equally important (if not more important). This risk includes legal risk, compliance risk, cyber risk, internal fraud and external fraud. An entire new course is devoted to operational risk. The regulations concerning capital that must be held by banks and insurance companies for operational risk will also be covered in the Operational Risk course. Although we have some expertise in operational risk area internally, we anticipate that it will be appropriate to invite practitioners from the business community to cover some current topics in operational risk management.

Sixty percent of the courses offered in the program will be new, adding to the distinctive nature of the M.F.R.M. and involving significant development commitment by Finance faculty. These new courses are noted in the list of courses below.

Fall Session 1

- Market Risk (RSM6301 FCE 0.5) (new)
- Financial Institutions and Capital Markets (RSM2304 FCE 0.5)
- Regulation of Financial Institutions (RSM6303 FCE 0.5) (new)
- Operational Risk (RSM6304 FCE 0.5) (new)
- Credit Risk (RSM6305 FCE 0.5) (new)

Winter Session 2

- Risk Modelling for Trading Strategies (RSM2303 FCE 0.5)
- Macroeconomics for Finance Professionals (RSM4113 FCE 0.5)
- Advanced Derivatives (RSM2307 FCE 0.5)
- Advanced Investments (RSM6308 FCE 0.5) (new)
- Risk Management in Insurance Companies and Pension Plans (RSM6309 FCE 0.5) (new)

Please see Appendix A for full course descriptions.

M.F.R.M. does not require a thesis, but there will be a research component to the program. In all courses, students will be required to read papers outlining the latest research in the topics being covered. In several of the courses, students will be required to present independent research in class and part of a student's grade will be based on the quality of that student's research and presentation.

In each of the Fall and Winter sessions, there will be a one-week standalone industry session that will not be assessed and that will offer all students exposure to practical aspects of market risk, credit risk, operational risk and regulatory compliance operations. These two one-week sessions will involve student interactions with practitioners working in different areas of risk management at various institutions, as well as presentations on current risk topics given by

senior risk managers. Preparatory work will be required and supervised by Rotman faculty.

8 Program Description

The M.F.R.M. will be full-time, 8 months in length and is aimed at those interested in risk management and regulation in the finance industry. The program will be cohort-based and consist of 10 half-courses (5.0 FCEs) over two sessions, beginning in the Fall. Given the prerequisite courses that applicants must have completed, and the relative homogeneity of the students, the program length is appropriate for a professional master's degree designed to develop expertise in a specialized field. As such, students will be expected to have already gained a strong analytical and quantitative background in their undergraduate program.

In analyzing the key knowledge that students require to understand and subsequently enter the financial risk management field, these 10 half-courses were determined to be essential. Master of Finance programs are sometimes 3 sessions in order to cover both corporate finance and asset pricing. Risk management is a sub-field of asset pricing. The M.F.R.M. will be specific to the risk management sub-field only and will cover all major types of risk and their integration in two terms. The two session design is, therefore, appropriate for imparting the learning outcomes of the courses and program. At the end of the M.F.R.M., students will have learned the academic concepts and skills necessary to find careers in the continually changing financial risk environment.

Curriculum Principles

The M.F.R.M. aims to teach the students cutting-edge risk management tools and ideas in a two-session program. This is achieved by ensuring that the admitted students have strong quantitative skills and are versatile in the key areas of finance that underpin risk management. In particular we will require that the students have strong prior knowledge of corporate finance (including the Modigliani-Miller theorem and conditions under which it fails), investments (including the capital-asset pricing model and its empirical performance in equity and other markets), and derivatives (the Black-Scholes pricing model and the associated hedging formulas). We will also require that the students have studied financial accounting so that they are able to read a balance sheet and income statement for nonfinancial and financial corporations alike. In terms of quantitative skills, we will require a strong understanding of linear algebra and calculus, as well as familiarity with constrained optimization. Financial risk management can be viewed as decision making under uncertainty and we will therefore require a strong foundation in probability theory and a good familiarity with applied statistics including multivariate regression analysis and maximum likelihood estimation. As a result of the

requirements for solid foundation in quantitative skills and specific knowledge content, the degree has been designed as two sessions rather than the typical three.

The program's curriculum will build on the student's quantitative strengths and add to that the ability to judge and assess financial risk in every facet of an organization. Students will be exposed to cutting edge research in the field of financial risk management through course assignments, presentations and exams. In all courses, students will be required to read papers outlining the latest academic research in the topics being covered. In several of the courses, students will be required to present papers in class, and part of the student assessment will be based on the quality of the presentations.

The Master of Financial Risk Management program will be taught primarily by the faculty members in the Finance Area of the Rotman School. Courses will be held during the day, since it will be a full-time program targeted at pre-experience students. The mode of delivery will be mainly in-class lectures led by instructors with some online elements. The result will be a combination of traditional classroom lecture and discussion, along with built-in core elements of online learning in the form of lectures, presentation materials, group work and assignments, both synchronous and asynchronous.

The cohort model will offer students an opportunity to build strong relationships that will form a network for life. In addition, the cohort approach offers students a collaborative and supportive environment in which to learn and take risks as they learn and develop. Students who fall out of the cohort, either through failing a course or as a result of a leave of absence, may retake the course the following year with the next cohort. Since students will be full time, it will be difficult for them to access any equivalent courses that might be offered in the full-time MBA program. However, the administration will identify any possible equivalent offerings at the time that are Morning or Evening MBA core classes or MBA Electives offered outside the day-time hours to which the student might have access. As with many of our lock-step programs, in some cases the only option may be to take a leave of absence from the program and return with the following cohort.

Industry Connection

M.F.R.M. will include a one-week industry session per term organized by Rotman faculty in which we will facilitate student interactions with practitioners working in different areas of risk management at institutions such as banks, insurance companies, pension funds, mutual funds and government regulatory bodies, as well as organize presentations on current risk topics given by senior risk managers. During the one-week sessions, students will learn about key research topics that are of interest to financial institutions. Students will get exposure to

market risk, credit risk, operational risk and regulatory compliance functions, which will be critical learning for the courses that follow. Students will be required to do preparatory work, which will be supervised by Rotman faculty, and to report back on what they have learned. The preparation for the one-week sessions will draw on what students have learned to date regarding market risk, credit risk, operational risk and regulation. For these sessions, the Faculty will leverage resources from the Global Risk Institute, including its extensive membership within the financial industry as well as research by GRI and its associates, which will help ensure that students acquire the most up-to-date in-depth industry knowledge and financial risk management research.

In addition, we will ensure that course-work within the M.F.R.M. program provides opportunities to work on projects that are relevant to industry. We envisage students working in groups of 3-5 on projects such as:

- What will be the impact on market risk capital of a financial institution of the Fundamental Review of the Trading Book?
- What will be the impact of increases to the leverage ratio requirement for a bank?
- How can a bank hedge against a sharp decline in house prices?
- How can pension funds and insurance companies best hedge against a sharp increase in long-term interest rates?
- How do changes in asset correlations affect the risk of a hedge fund portfolio?

The projects would be chosen by faculty and integrated within the existing courses. Students would have access to cross-sector senior industry representatives for input and feedback. The projects would culminate in opportunities to present to faculty and industry. In effect, our approach has the projects integrated throughout the program, and these projects will be used to bridge material across different courses.

To ensure a global perspective in our program, we plan to bring industry leaders from around the world to our students as invited speakers and as members of our advisory board.

We also intend to offer non-credit opportunities for connection with industry through case competitions, experiential learning such as simulation-based exercises and networking events.

Online Elements

The various online elements will be similar to those we have incorporated in several of our existing degree programs (i.e. Full-Time MBA, Morning & Evening MBA, Executive MBA and Omnium Executive MBA) and will include some or all of the following:

- flipped classrooms, involving video-based lecture content combined with in-class interactive discussion and activities;
- asynchronous discussion groups, using electronic discussion boards;
- synchronous online discussions, which currently use Blackboard Collaborate or Adobe Connect platforms;
- electronic group rooms for group discussions through Adobe Connect; and
- MOOC-style video-based presentations and material using edX, the collaborative platform U of T supports as part of the edX consortium.

Experiential Learning BMO Financial Group Finance Research and Trading Lab

Experiential learning will be woven into the program, through the state-of-the-art BMO Financial Group Finance Research and Trading Lab, enabling students to interact with the global financial community and its resources in a real-time setting. In Risk Modelling for Trading Strategies (RSM2303), students will 'learn by doing' in this lab-based course. Through simulation cases and real-time data links to both a simulated market and to quotes from actual markets, students will practice developing effective strategies when faced with uncertainty and quantifiable risks. In addition, the Lab will undertake interactive training sessions which will allow students to make use of 65 dual flat panel stations equipped with Thomson-Reuters Eikon platform, S&P Capital IQ and real-time data feeds, three Bloomberg terminals, two media/data walls and an integrated sound system. Research databases and real-time access to global financial resources will allow students the ability to link classroom lessons to actual securities and markets. Interactive simulations will help students develop skills for making good financial decisions when faced with uncertainty about future outcomes. The Lab will provide a risk-free environment in which to explore case studies and financial risk scenarios and help them learn how to assess risk. These will be critical steps to developing the judgment necessary for future financial risk management roles.

Optional Seminar Series

While not required, students will be encouraged to attend the Capital Markets research seminars presented each Friday by visiting finance faculty from around the world. These seminars will gain the students exposure to the current issues investigated and latest methods developed by risk management researchers in academia.

Communications and Networking Opportunities

Feedback from industry senior executives across the financial sector given to current administration of the Master of Finance program indicates that communication excellence is a skill essential for their needs. It is important that risk management ideas and analyses can be explained to non-professionals in a way that is meaningful to them. Students will have the opportunity to enhance their communications skill-set through a presentation skills session at the outset and by giving presentations that will be woven through the program. There will be opportunities for students to participate in case competitions as well. In addition, students will have access to Rotman’s career services office which will offer extracurricular workshops on skills development and help students develop an individualized career plan during the program to facilitate their transition to an industry career in risk management.

Each semester will include sessions for students to network with and explore opportunities in particular organizations in the financial services industry as well as in government organizations dealing with risk management supervisory and regulatory issues.

Whereas the Province’s Quality Assurance Framework requires that students complete a minimum of 2/3 of courses at the graduate level, the University of Toronto requires graduate students to complete all of their course requirements from amongst graduate level courses. This proposed program complies with this requirement.

9 Degree Level Expectations, Program Learning Outcomes and Program Structure

Table: Master's DLEs

| MASTER’S DEGREE LEVEL EXPECTATIONS (based on the Ontario Council of Academic Vice Presidents (OCAV) DLEs) | MASTER’S PROGRAM LEARNING OBJECTIVES AND OUTCOMES | HOW THE PROGRAM DESIGN AND REQUIREMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES |
|--|--|---|
| EXPECTATIONS: <i>This Master of Financial Risk Management is awarded to students who have demonstrated:</i> | | |
| 1. Depth and Breadth of Knowledge A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of the | Depth and breadth of knowledge is defined in Master of Financial Risk Management as the ability to identify and analyze all types of financial risk. The focus will be on the risks faced by financial institutions such as banks, insurance | The program design and requirement elements that ensure these student outcomes for depth and breadth of knowledge are: Courses in the analysis of risk, the nature of financial institutions and |

| MASTER’S DEGREE LEVEL EXPECTATIONS (based on the Ontario Council of Academic Vice Presidents (OCAV) DLEs) | MASTER’S PROGRAM LEARNING OBJECTIVES AND OUTCOMES | HOW THE PROGRAM DESIGN AND REQUIREMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES |
|---|--|---|
| <p>academic discipline, field of study, or area of professional practice.</p> | <p>companies, and fund managers. The term “financial risk” will be defined broadly. It includes risks (such as market risk and credit risk) that can be quantified based on historical experience and risks (such as operational risk) where quantification is difficult but the process used for identifying and managing the risks is important.</p> <p>This depth and breadth of knowledge will be reflected in students who are able to:</p> <ol style="list-style-type: none"> 1. display an in-depth knowledge of all types of financial risk, including market risk, credit risk, operational risk and liquidity risk 2. understand how financial institutions function and how they are regulated 3. display in-depth knowledge of risk appetite, risk culture and the governance structure of organizations. | <p>their regulation.</p> <p>While all courses in the program will support the learning objectives related to depth and breadth of financial risk management, specific courses will include:</p> <p>Market Risk, which covers the risks arising from fluctuations in equity prices, currency rates, interest rates, and commodity prices.</p> <p>Advanced Investments, which will cover liquidity risk in depth.</p> <p>Credit Risk, which will cover models to forecast the probability of default as well as the pricing of default risk in corporate bonds and credit default swaps.</p> <p>Risk Modelling for Trading Strategies, which will cover model risk and market risk in depth.</p> <p>Regulation in Financial Institutions, which will cover business risk in depth.</p> <p>Operational Risk, which will cover estimation of losses from inadequate or failed internal processes, people and systems, or from external events (including legal risk and accounting fraud).</p> <p>Risk Management in Insurance Companies and Pension Plans, which will cover the types of products that are offered by life and property and casualty insurance companies and the risk they entail.</p> |
| <p>2. Research and Scholarship</p> <p>A conceptual understanding and methodological competence that i) Enables a working comprehension of how established techniques of research and inquiry are used to create and interpret knowledge in</p> | <p>Research and Scholarship is defined in Master of Financial Risk Management as the analysis of many different interrelated aspects of risk and the ability to critically evaluate the current state of the profession and literature. The</p> | <p>The program design and requirements that ensure these Student outcomes for research and scholarship include projects students complete within the courses.</p> <p>In addition to assigning textbook</p> |

| MASTER’S DEGREE LEVEL EXPECTATIONS (based on the Ontario Council of Academic Vice Presidents (OCAV) DLEs) | MASTER’S PROGRAM LEARNING OBJECTIVES AND OUTCOMES | HOW THE PROGRAM DESIGN AND REQUIREMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES |
|--|--|---|
| <p>the discipline; ii) Enables a critical evaluation of current research and advanced research and scholarship in the discipline or area of professional competence; and iii) Enables a treatment of complex issues and judgments based on established principles and techniques; and, on the basis of that competence, has shown at least one of the following: i) The development and support of a sustained argument in written form; or ii) Originality in the application of knowledge.</p> | <p>literature includes articles written both by academics and practitioners, as well as publications by regulatory bodies such as the Basel Committee on Banking Supervision and the Financial Stability Board.</p> <p>The research and scholarship is reflected in students who acquire an in-depth understanding of financial institutions and the risks they face. They are able to explain and evaluate the alternative theoretical constructs underlying risk management and regulation, and to carry out research themselves on topics in financial risk management.</p> | <p>readings, all courses will assign recently published academic papers. In class discussions, the students are expected to provide critical assessments of the risk management methodologies used in the article.</p> <p>In several of the courses, students will be required to present papers in class and part of a student’s grade will be based on the quality of that student’s presentations.</p> <p>During the one-week per semester industry sessions leveraging the Global Risk Institute resources, students will learn about key risk topics and research areas that are of interest to financial institutions, which will build on learning to date and be critical learning for courses that follow. Students will be required to do preparatory work, which will be supervised by Rotman faculty, and to report back on what they have learned.</p> |
| <p>3. Level of Application of Knowledge</p> <p>Competence in the research process by applying an existing body of knowledge in the critical analysis of a new question or of a specific problem or issue in a new setting.</p> | <p>Application of Knowledge is defined in Master of Financial Risk Management as the ability of students to understand and, where possible, quantify the risks being taken by an organization. They will then be able to recommend courses of action for managing, and possibly mitigating, the risks.</p> <p>The application of knowledge will be reflected in the students’ analysis of different types of risk in different situations that are presented to them. The risks considered will include market risk arising from trading, credit risk arising from lending and derivatives transactions, and operational risk.</p> | <p>The program design and requirements that ensure these student outcomes for level and application of knowledge are:</p> <p>Courses in advanced derivatives, fixed income and investments. Specifically,</p> <ul style="list-style-type: none"> Advanced Derivatives Advanced Investments Credit Risk Risk Modelling for Trading Strategies, in which students will use simulation cases and real-time data links through the BMO Financial Group Finance Research and Trading Lab Market Risk, in which the students |

| MASTER'S DEGREE LEVEL EXPECTATIONS (based on the Ontario Council of Academic Vice Presidents (OCAV) DLEs) | MASTER'S PROGRAM LEARNING OBJECTIVES AND OUTCOMES | HOW THE PROGRAM DESIGN AND REQUIREMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES |
|---|---|--|
| | | <p>will be exposed to popular risk management software and asked to provide a critical appraisal of the assumptions, methodologies, and models underlying the risk engine.</p> <p>Risk Management in Insurance Companies and Pension Plans, in which students will be exposed to a broad range of risk management techniques related to insurance and pension plans and asked to critically assess the risks they entail.</p> |
| <p>4. Professional Capacity/Autonomy</p> <p>a. The qualities and transferable skills necessary for employment requiring i) The exercise of initiative and of personal responsibility and accountability; and ii) Decision-making in complex situations; b. The intellectual independence required for continuing professional development; c. The ethical behaviour consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research; and d. The ability to appreciate the broader implications of applying knowledge to particular contexts.</p> | <p>Professional Capacity/Autonomy is defined in Master of Financial Risk Management as the ability to translate the knowledge gained in the program to a professional setting, especially in terms of how different aspects of risk management are related to the overall objectives of the organization.</p> <p>This is reflected in students who are able to understand the big picture of how organizations function, their governance, and what their objectives are. Students will understand the different risk management functions within a financial institution and how they relate to the other activities of the financial institution.</p> <p>Students will be able to assess and respond to changes in the financial risk environment, evaluate strategies to balance risk, and develop effective solutions to risk challenges.</p> | <p>The program design and requirements that ensure these student outcomes for professional capacity/autonomy are:</p> <p>The Market Risk, Financial Institutions and Capital Markets and Risk Management in Insurance Companies and Pension Plans courses. In these courses, the students will learn how different risks can interact and create complex and highly non-normal distributions of outcomes for the institution. Students will also learn how institutions interact and how to assess the extent to which an institution is systemically risky, meaning that it has the ability when in distress to paralyze the entire financial system.</p> |
| <p>5. Level of Communications Skills</p> <p>The ability to communicate ideas, issues and conclusions clearly.</p> | <p>Communications skills are defined in Master of Financial Risk Management as the ability to successfully convey risk management results to people with</p> | <p>The program design and requirements that ensure these student outcomes for level of communication skills are:</p> <p>Presentations in class and written</p> |

| MASTER'S DEGREE LEVEL EXPECTATIONS (based on the Ontario Council of Academic Vice Presidents (OCAV) DLEs) | MASTER'S PROGRAM LEARNING OBJECTIVES AND OUTCOMES | HOW THE PROGRAM DESIGN AND REQUIREMENTS SUPPORT THE ATTAINMENT OF STUDENT LEARNING OUTCOMES |
|--|--|--|
| | <p>a wide range of backgrounds. It is important that risk management ideas and analyses can be explained to non-professionals in a way that is meaningful to them.</p> <p>Communication skills will be reflected in students who are able to communicate effectively the importance of risk management to individuals outside the risk management group.</p> | <p>assignments, both of which will help to develop a student's communications skills. In several of the courses, students will be required to present papers in class and part of a student's grade will be based on the quality of that student's presentations.</p> <p>There will be a presentation skills session at the outset, extracurricular opportunities for case competitions and workshops on skills development throughout the program, all of which will help students to prepare for major presentations and interviews.</p> |

10 Assessment of Learning

In this course-based program students will be assessed in a number of ways: mid-term exams, final exams, class participation, assignments, term papers and projects. Exams are appropriate where specific skills (e.g. how can market risk be quantified) are taught. Term papers and projects will be used to assess research materials where the student is required to demonstrate an understanding of the big picture and interrelationships between risks. Presentations will be graded and feedback on presentation performance will be offered. All assessment will be consistent with the University of Toronto's Grading Policy. Since the program is a professional program, a thesis will not be required.

Each course will contain a Rotman-specific student evaluation form to be completed by the students towards the end of each term. The course evaluation forms allow for course-specific questions designed by the course instructors. These questions can be used to assess the effectiveness of the course.

With regard to measuring success of the M.F.R.M., this will be done in a variety of ways. Surveys of students at the end of the first year and upon completion will be undertaken, and the results shared with appropriate administration and faculty. These will ensure student expectations are being met and identify needs and considerations moving forward. In addition,

we will monitor employment progress through alumni outreach in the form of surveys and informal discussions. We will also maintain contact, both formal and informal, with major industry employers to ask their input on the progress of graduates and changing skills and expertise in the financial risk management sector.

M.F.R.M. alumni will be invited to annual events where Rotman faculty will present their current research and where alumni will be able to network with current students and faculty members. Alumni will be solicited for information on how to improve the program, in part through an Alumni advisory group. These types of events and initiatives are already being organized for our Master of Finance alumni.

11 Consultation

We have consulted widely with colleagues at Rotman, with other U of T programs, with industry and with potential students.

The M.F.R.M. will complement the existing offerings of Rotman and the University of Toronto. Currently, the Rotman Master of Finance degree program offers experienced working professionals with a minimum of two years of finance-related experience a Master's level degree focused on depth and breadth in finance generally. We are seeing significant demand in the form of queries and applications to the Master of Finance program from international and domestic students looking for pre-experience, full-time master's-level finance offerings. The Academic Director of the Master of Finance program, Alexandra MacKay, is in full support of the M.F.R.M. proposal. The M.F.R.M. proposal was explained to the Master of Finance Alumni Advisory Group and no concerns were expressed.

Finance faculty at the Rotman School have been widely consulted and are supportive of the program. In fact, the faculty complement for the M.F.R.M. is overwhelmingly sourced from the Finance faculty. The Master's Programs Committee, the Executive Committee of the Rotman School and Faculty Council have supported the proposal in principle.

The M.F.R.M. program will be distinct from the Rotman full-time M.B.A. program since the M.B.A. students have an average of 4 years of work experience. While almost half of graduating full-time student employment per year is in the finance industry, a very small percentage of those are employed in risk management. Associate Dean, Rotman Full-time M.B.A., Mihnea Moldoveanu, estimates those as no more than 10 full time students per year in a cohort of 350. In addition, the M.F.R.M. students would not have the work experience required to compete for most of the positions being filled by full-time MBA graduating students.

Both U.T.M. and U.T.S.C. management faculties have been consulted and are supportive. It was clear from the discussions that there are no competing or overlapping programs in either case. Furthermore, U.T.S.C. has offered to market this program in its relevant undergraduate classes should the M.F.R.M. program be approved, and U.T.M. has said that the M.F.R.M. may be of interest to certain of its U.T.M. finance undergraduates.

Within the Faculty of Arts and Science, the University of Toronto's Master of Financial Economics (M.F.E.) and Master of Mathematical Finance (M.M.F.) programs have been consulted, are supportive and are interested in ways to collaborate. The M.M.F. program's emphasis is on finance through a mathematical framework. The M.F.E. program's emphasis is in economics, with an application to finance. The proposed M.F.R.M. program will have management, rather than economics or mathematics, as the underlying discipline. In addition, we have consulted with the Department of Statistics in the Faculty of Arts and Science with regard to the Master of Financial Insurance degree proposal. The Academic Director of the proposed M.F.I. and the Chair of the Department of Statistics are supportive of our proposed M.F.R.M. and are also interested in ways in which the programs can collaborate.

As detailed in Section 4, Need and Demand, a survey was undertaken of undergraduate students at U of T Commerce, who represent a core constituency as pre-experience business/quantitative undergraduates. 68 % of respondents would be either 'Very Interested' or 'Somewhat Interested' in a full-time Master of Financial Risk Management (172 respondents). In additions, 32% of respondents in the Commerce survey indicated that they wished to pursue a graduate degree upon completion of their Bachelor degree.

We have also consulted with financial industry executives to discuss demand. For example, Mike Durland, who is the Group Head and CEO, Global Banking and Markets at Scotiabank, indicated that there will be high demand in the market for graduates who have a broader understanding of risk areas. In his view, the opportunities in risk are fewer on the purely quantitative side going forward and greater for those with a broader perspective, one that marries art and science. Mr. Durland believes there will be excellent entry opportunities for graduates of an M.F.R.M. degree through training programs at all the major banks, for example, in capital market development and risk management areas.⁸

The CEO of the Global Risk Institute (GRI) and the co-head of the Professional Risk Managers' International Association (PRMIA) Toronto have both expressed support for the development of this new degree program and are interested in being involved. GRI is a leading authority in developing applied and integrative research in financial risk and enhance risk education for organizations around the world. The University of Toronto is a partner of the GRI and maintains

⁸ Interview with Mike Durland, Group Head and CEO, Global Banking and Markets, Scotiabank, Dec 3, 2014

close ties with GRI. The Professional Risk Managers' International Association (PRMIA) is a non-profit professional association representing more than 7,000 members in Toronto and nearly 90,000 worldwide for the promotion of sound risk management standards and practices globally.

12 Resources:

12.1 Faculty Complement

The Rotman School is distinctively, and perhaps uniquely, equipped to deliver a graduate degree in Financial Risk Management in view of the presence and prominence of faculty members with globally recognized expertise.

Numerous faculty members at Rotman will be directly engaged in teaching in the M.F.R.M. program, representing depth in expertise and in commitment by the School. Faculty research spans from derivatives securities, to financial econometrics, to financial risk management and financial institution governance. In addition, our Dean, Tiff Macklem, is an expert in financial market regulation. Furthermore, the addition of this program will take advantage of faculty who do not currently teach in the MBA program, and who carry out research in financial risk management.

Professors John Hull and Alan White developed some of the first and most-widely used derivative pricing models incorporating stochastic volatility and of dynamic interest rates. John Hull is a respected researcher in the field of quantitative finance (for example, his work with Alan White on the Hull-White model) and his research excellence is demonstrated through the wide used of his textbooks "Risk Management and Financial Institutions", "Options, Futures, and Other Derivatives" and "Fundamentals of Futures and Options Markets" in trading rooms and class rooms throughout the world.

Peter Christoffersen has published in leading finance and econometrics journals and is the author of "Elements of Financial Risk Management". Peter has won research awards from AIMA Canada and the Q-Group.

Other finance faculty also have deep risk management expertise. Redouane Elkamhi, Bing Han, Tom McCurdy, Chay Orthanalai, and Alan White also carry out research in this area. Alexander Dyck's research includes work on corporate governance issues. Rotman has a state-of-the-art Financial Research and Trading Lab of which Tom McCurdy is director. One of Rotman's newest finance professors, Tiff Macklem, Dean of the Rotman School, is the former Senior Deputy Governor of the Bank of Canada. Full CVs for each faculty member are included with this

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| proposal. |
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Table 3: Faculty Complement (please list alphabetically)

| Name | Home Department / Unit <i>(who holds primary budgetary appointment)</i> | University Rank | Graduate Faculty Membership Status <i>(e.g., Associate/ Full privileges)</i> | Commitment to other programs <i>(please list other programs in which the person routinely teaches / supervises)</i> | Nature of contribution to this program <i>Course Instructor (CI), Thesis Supervision (TS), Clinical or practice supervisor (C/PS).</i> |
|------------------------|--|------------------------|---|--|---|
| Tenured | | | | | |
| Peter Christoffersen | Management | Full | Full | PhD, MFin | Course instructor |
| Susan Christoffersen | Management | Associate | Full | PhD, MBA, Commerce | Course instructor |
| Alexander Dyck | Management | Full | Full | PhD, MBA | Course instructor |
| Bing Han | Management | Full | Full | PhD, Commerce | Course Instructor |
| John Hull | Management | Full | Full | PhD, MBA, MFin | Course Instructor |
| Tiff Macklem | Management | Full | Full | | Course Instructor |
| Tom McCurdy | Management | Full | Full | PhD, MBA, MFin, MMF, Commerce | Course instructor |
| Alan White | Management | Full | Full | PhD, MBA, MFin | Course instructor |
| Tenure-Stream | | | | | |
| Redouane Elkamhi | Management | Assistant | Associate | PhD, MBA | Course instructor |
| Liyan Yang | Management | Assistant | Associate | PhD, Commerce | Course instructor |
| Chayawat Ornthanalai | Management | Assistant | Associate | PhD, Commerce | Course instructor |
| Teaching Stream | | | | | |
| Alexandra MacKay | Management | Senior Lecturer | Associate | MFin, EMBA, Commerce | Course instructor |

| Name | Home Department / Unit <i>(who holds primary budgetary appointment)</i> | University Rank | Graduate Faculty Membership Status <i>(e.g., Associate/ Full privileges)</i> | Commitment to other programs <i>(please list other programs in which the person routinely teaches / supervises)</i> | Nature of contribution to this program <i>Course Instructor (CI), Thesis Supervision (TS), Clinical or practice supervisor (C/PS).</i> |
|---|---|-----------------|--|---|---|
| Others <i>(please specify – i.e., Adjunct, status only, clinical faculty, visiting or other as per U of T definitions)</i> | | | | | |
| Richard Nesbitt | Management | Adjunct | | MBA | Course instructor |

12.2 Learning Resources

Please see the following Appendices:

Appendix D: Library statement confirming the adequacy of library holdings and support for student learning

Appendix E: Standard statement concerning student support services

12.3 Financial Support for Graduate Students

As is the case with all professional Masters programs at the University of Toronto, there is no funding package.

The Rotman School of Management supports student accessibility to its programs through a Professional Loan Program currently offered by the Bank of Montreal (BMO) to assist Rotman students in financing their degree. BMO lends as much as the full tuition amount of the student’s degree program (depending on the individual student circumstance). International students currently require either a Standby Letter of Credit from their home bank or a Canadian co-signer to access the BMO financing. In addition, the Rotman School will pay the interest on the BMO loan for the duration of the degree program plus 2 months post-graduation. After that, students can make interest-only payments on the loan for 12 months, and are then required to start repayment of the loan principle.

Rotman also provides an interest subsidy on loans accessed through any other financial institution that students use to finance their tuition for their Rotman degree. The interest payment is not a loan – students do not pay back the interest subsidy to Rotman. As a result,

the student does not pay any interest on the loan for the duration of the program.

Domestic students may also be eligible for government assistance and for loans from other financial institutions.

12.4 Space/Infrastructure

The M.F.R.M. degree program will be offered in the Rotman School Building at 105 St. George Street. Classroom facilities, group study space and administrative support will be shared with the existing professional master-level degree programs at the School. No other space implications are anticipated.

The Rotman School has a new building, completed in 2013, and state of the art facilities are available to offer this additional degree program. The BMO Financial Group Finance Research and Trading Lab enables students to interact with the global financial community and its resources in a real-time setting. Other existing resources required to operate the new M.F.R.M. degree program (e.g. administrative staff, IT resources, program services etc.) either currently exist or are planned to grow at Rotman to accommodate the needs of the M.F.R.M. degree.

13 Quality and Other Indicators

As discussed previously in Section 11.1, Faculty Complement, the Rotman School has a long-standing tradition of research and teaching excellence in financial risk management. Professors John Hull and Alan White developed some of the first and most-widely used derivative pricing models incorporating stochastic volatility and of dynamic interest rates. Hull and White's current work includes analysis of funding valuation adjustments to derivatives prices, the risk of central clearing parties, and executive compensation.

During the past 15 years Professor Tom McCurdy has led the development of a world-class lab at Rotman for financial decision making under uncertainty. The recently renamed BMO Financial Group Finance Research and Trading Lab focuses on the integration of theory and research with practice. Research databases and real-time access to global financial resources allow students to link classroom lessons to actual securities and markets. Quality instructional products of the Lab include the Rotman Interactive Trader and the Rotman Portfolio Manager platforms and the associated simulation cases. The BMO Lab will be used intensively in the new program including in classes taught by Tom McCurdy and other faculty members.

Through active recruitment, Rotman has been able further develop its faculty expertise in

financial risk management in recent years. Susan and Peter Christoffersen were hired in 2010, Redouane Elkamhi in 2011, Chay Ornthanalai in 2012, and Bing Han in 2013. They are all active in research and teaching in the various areas of risk management, including the risk of financial institutions (Susan Christoffersen), credit risk and bankruptcy (Redouane Elkamhi), derivatives and market risk (Peter Christoffersen and Chay Ornthanalai), and behavioural finance and investment risk (Bing Han). Peter Christoffersen’s textbook “Elements of Financial Risk Mangement” (now it its 2nd edition) will be used in the proposed program as well.

14 Governance Process

| | Levels of Approval Required |
|--|---|
| Consultation with Provost | |
| Decanal and Provostial Sign-Off | |
| | Faculty/Divisional Governance |
| Submission to Provost’s Office | |
| | AP&P |
| | Academic Board |
| | Executive Committee of Governing Council |
| <i>Program may begin advertising as long as any material includes the clear statement that “No offer of admissions will be made to the program pending final approval by the Quality Council and the Ministry of Colleges Training and University (where the latter is required).”</i> | |
| | Ontario Quality Council |
| | Submitted to MTCU (in case of new graduate degrees and programs, new diplomas) |

Appendix A: Courses

The M.F.R.M. program will start in the September of each year and continue until April the following year. The required courses will be as follows:

Fall Semester

Market Risk RSM6301*

This course deals with the way in which market risk--arising from fluctuations in security prices--is quantified and managed. It applies state-of-the-art risk measurement and risk management techniques, critically appraises commercially available risk management systems, explains the use of derivatives in risk management, and looks at ways speculative asset returns can be analyzed.

Financial Institutions and Capital Markets RSM2304

This course provides a discussion of the role of different financial institutions (commercial banks, investment banks, insurance companies, mutual funds, and central banks) in the economy. It considers their basic business practices, the regulatory environment, and the risk management challenges they face.

Regulation of Financial Institutions RSM6303*

This course traces the history of the regulation of banks and insurance companies. Students learn about the current regulatory environment and likely future developments. The course covers the lessons learned from the 2008 credit crisis and the way regulations have evolved since then.

Operational Risk RSM6304*

It is now recognized that operational risk is as important, if not more important than credit risk or market risk for a financial institution. This course will involve guest speakers who are non-finance faculty and employees of financial institutions. It will cover legal risk, compliance risk, cyber risk, internal fraud, external fraud, and so on.

Credit Risk RSM6305*

This course covers the fixed income securities market, default risk and securitization. It deals with the estimation of default probabilities (both from historical data and credit spreads) and explains the difference between physical and implied estimates. It explains the calculation of CVA, DVA and credit value at risk.

Winter Semester

Risk Modelling for Trading Strategies RSM2303

This lab-based course integrates theory and practice by using simulation cases and real-time data links to both a simulated market and to quotes from actual markets. This is a “learning-by-doing” course which gives students practice in deriving effective strategies when faced with uncertainty and quantifiable risks including market risk and model risk.

Macroeconomics for Finance Professionals RSM4113

This course provides an applied background into macroeconomic issues that are relevant to finance professionals. Towards that end, rather than presenting a detailed macroeconomic theory framework, the course examines a series of interrelated topics, with a particular focus on the monetary and international economic context of financial sector developments.

Advanced Derivatives RSM2307

This course considers the range of derivative products that exist in financial markets, how they are used, how they are valued, and how trading in the over-the-counter market is changing. Students are assumed to have taken an introductory options and futures markets course. This course provides a more in-depth coverage of key issues.

Advanced Investments RSM6308*

This course focuses on theories and techniques that underlie the construction and management of optimal investment portfolios, emphasizing the risk-return trade-offs that are appropriate for different types of investors. Students are assumed to have taken an introductory course in investments. This course deals with more advanced topics such as the Black-Litterman model.

Risk Management in Pension Funds and Insurance Companies RSM6309*

This course will discuss risks faced by insurance companies and pension plans on both sides of the balance sheet. The course will cover the types of products that are offered by life and property and casualty insurance companies and the risk they entail. In particular, it will discuss longevity risk, natural disaster risk, and the use of reinsurance and derivatives to hedge risks. It will include the specifics of defined benefit plans, and the asset management strategies that are appropriate.

*denotes new courses

Appendix B: Graduate Calendar Copy

Overview

The professional M.F.R.M. degree program will be offered over 8 months using a cohort-based model. Within this 2-session program, students must complete a structured sequence of 10 half courses (5.0 FCE with 2.5 in each session) on a full-time basis. The Master of Financial Risk Management (M.F.R.M.) is designed for pre-experience graduates.

Contact and Address

Web: general www.rotman.utoronto.ca

Telephone: 416.946.3377

Rotman School of Management
University of Toronto
105 St. George Street
Toronto, Ontario M5S 3E6
Canada

Degree Programs

Master of Financial Risk Management

Formal Admissions Requirements

Applicants must meet the following requirements:

- 1. Recognized 4-year undergraduate degree:** for entry into the School of Graduate Studies of the University of Toronto, a 4-year recognized undergraduate degree or equivalent is required. Business, Commerce, Economics, Mathematics, Engineering or Actuarial Science degrees will be preferred, but other 4-year undergraduate degrees will be considered if there is evidence of strong quantitative skills. This may be achieved with a minimum B average in Calculus, Linear Algebra, and Statistics or Econometrics.
- 2. Quantitative proficiency:** For some applicants, this will be satisfied by having obtained a minimum B average in Calculus, Linear Algebra, and Statistics or Econometrics during their undergraduate degree. In cases where evidence of quantitative ability is not obvious, applicants may be asked to supply a GMAT/GRE score or other supplementary evidence of quantitative ability.
- 3. Grade Point Average:** Applicants must have achieved a minimum B average in the final year of their undergraduate or prior graduate education.
- 4. English language proficiency:** Applicants must demonstrate the ability to communicate in English in one of the following ways:

- a. An undergraduate or graduate degree from a university at which the language of instruction and examination was English
- b. Satisfactory performance on a standardized English Language Test. Minimum TOEFL score of 100 is required. IELTS may be considered in special circumstances and a minimum score of 7.0 will be required.

5. Prerequisite courses: Applicants must have completed courses in:

- Introductory/Corporate Finance
- Financial Accounting
- Investments
- Futures and Options

Applicants who meet all the criteria will be assessed on the basis of their application essays (addressing writing ability, critical thinking and applying business knowledge), undergrad GPA and references (academic references are acceptable) by the admissions committee. Prospective students who have a combination of minimum requirements, plus acceptable scores on their essays and references, may be invited for an admission's interview. The admission decision will be based on both submitted materials, meaning the application form information, essays and references, and interview performance. The interview will assess, among other areas, communication skills, maturity and expectations.

Undergraduate GPA, evidence of quantitative skills/pre-courses satisfied, application essays, references and the interview performance will be scored in a similar manner to all of our existing degree programs and applicants assessed and chosen based on that analysis.

Program Requirements

Fall Session 1

- Market Risk (RSM6301 FCE 0.5) (new)
- Financial Institutions and Capital Markets (RSM6302 FCE 0.5)
- Regulation of Financial Institutions (RSM6303 FCE 0.5) (new)
- Operational Risk (RSM6304 FCE 0.5) (new)
- Credit Risk (RSM6305 FCE 0.5) (new)

Winter Session 2

- Risk Modelling for Trading Strategies (RSM6306 FCE 0.5)
- Macroeconomics for Finance Professionals (RSM6104 FCE 0.5)
- Advanced Derivatives (RSM6307 FCE 0.5)
- Advanced Investments (RSM6308 FCE 0.5) (new)
- Risk Management in Pension Funds and Insurance Companies (RSM6309 FCE 0.5) (new)

In each of the Fall and Winter sessions, there will be one-week standalone industry sessions that will not be assessed and that will offer all students exposure to practical aspects of market risk, credit risk, operational risk and regulatory compliance operations. These two one-week sessions will involve student interactions with practitioners working in different areas of risk management at various institutions, as well as presentations on current risk topics given by senior risk managers. Preparatory work will be required and supervised by Rotman faculty.

Appendix C: Faculty CVs

Full CVs submitted under separate cover for the following faculty:

| |
|--|
| Tenured |
| Peter Christoffersen |
| Susan Christoffersen |
| Alexander Dyck |
| Bing Han |
| John Hull |
| Tiff Macklem |
| Tom McCurdy |
| Alan White |
| Tenure-Stream |
| Redouane Elkamhi |
| Liyan Yang |
| Chayawat Ornthanalai |
| Teaching Stream |
| Alexandra MacKay |
| Others (please specify – i.e., Adjunct, status only, clinical faculty, visiting or other as per U of T definitions) |
| Richard Nesbitt |

Appendix D: Library Statement

University of Toronto Libraries Report for the Rotman School of Management Master of Financial Risk Management, 2015.

Context: The University of Toronto Library (UTL) system is the largest academic library in Canada and is currently ranked third among academic research libraries in North America, behind Harvard and Yale.⁹ The research and special collections, together with the campus and college libraries comprise almost 12 million print volumes, nearly 5.5 million microform volumes, more than 17,000 journal subscriptions, in addition to a rich collection of manuscripts, films, and cartographic materials. The system provides access to more than 1.5 million electronic books, journals, and primary source materials and increasingly supports access via personal handheld devices.¹⁰ There are numerous collection strengths in a wide range of disciplines reflecting the breadth of research and instructional programs at the University. The University of Toronto Library system has an annual acquisition budget of \$28 million. The strong collections, facilities and staff expertise attract unique donations of books and manuscripts from around the world, which in turn draw scholars for research and graduate work.

| Major North American Research Libraries ¹¹ | | | | | |
|---|---------------|---------------|---------------|----------------------------|----------------------------|
| | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-2013 |
| ARL RANK | UNIVERSITY | UNIVERSITY | UNIVERSITY | UNIVERSITY | UNIVERSITY |
| 1 | Harvard | Harvard | Harvard | Harvard | Harvard |
| 2 | Yale | Yale | Yale | Yale | Yale |
| 3 | Columbia | Toronto (3rd) | Toronto (3rd) | Toronto (3 rd) | Toronto (3 rd) |
| 4 | Toronto (4th) | Columbia | Michigan | Columbia | Columbia |
| 5 | Michigan | Michigan | Columbia | Michigan | Michigan |

| Top 5 Canadian Universities in the ARL Ranking of Major North American Research Libraries | | | | | |
|---|---------------------|---------------------|---------------------|-----------------|-----------------|
| | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-2013 |
| | RANK/ UNIVERSITY | RANK/ UNIVERSITY | RANK/ UNIVERSITY | RANK/UNIVERSITY | RANK/UNIVERSITY |
| | 4/Toronto | 3/Toronto | 3/Toronto | 3/Toronto | 3/Toronto |
| | 16/Alberta | 11/Alberta | 11/Alberta | 10/UBC | 18/Alberta |
| | 26/British Columbia | 24/British Columbia | 16/British Columbia | 15/Alberta | 24/UBC |
| | 34/Montreal | 31/Montreal | 32/Montreal | 18/McGill | 30/McGill |
| | 40/McGill | 37/McGill | 38/McGill | 32/Montreal | 35/Montreal |

Space and Access Services: The Library system provides a variety of individual and group study spaces for both undergraduates and graduates in the 10 central and 23 divisional libraries on the St. George,

⁹ Chronicle of Higher Education, "Library Investment Index at University Research Libraries, 2012 – 2013." In the Almanac of Higher Education, 2014.

¹⁰ Figures as of 2013 taken from UTL's [2012-2013](#) Annual Report.

http://oneresearch.library.utoronto.ca/sites/default/files/UTL%20Annual%20Report%202012-2013_FINAL_reduced%20size_0.pdf

¹¹ Association of Research Libraries Statistics, 2013

Mississauga, Scarborough and Downsview campuses. Study space and computer facilities are available twenty four hours, five days per week at one location, Robarts Library. Web-based services and electronic materials are accessible at all times from campus or remote locations, through the U of T based Scholars Portal and other leading edge digital services.

Instruction & Research Support: The Library plays an important role in the linking of teaching and research in the University. To this end, various information instruction classes are held to better acquaint students with various aspects of business and research resources. These services are aligned with the Association of College and Research Libraries (ACRL) Information Literacy Competency Standards for Higher Education.¹² In-class instruction for specific assignments, class-specific webpages and LibGuides, general information literacy classes, along with sessions on plagiarism and proper citing are some of the instruction and research support that that can be provided in the program.

Program Specific Instruction: Instruction for students in the Masters of Financial Risk Management Program will be provided by the faculty liaison librarian for Business and Commerce, Sean Forbes. Real time, point of need library support is available online by virtual chat, by phone and in person and provided by experienced librarians and highly trained graduate students. The library, through its [liaison librarians](#), customizes feeds of library resources which appear prominently in Portal/Blackboard course pages.

Collections: Many college and campus libraries collect materials in support of the Commerce Program; the largest collection of materials is centrally located in Robarts Library with a specialized collection of Management, Finance, and Business related materials located in Rotman School of Management's Business Information Centre and the BMO Financial Group Finance Research and Trading Lab. Collections are purchased in all formats to meet the variety of preferences and styles of our current students and faculty. The University of Toronto Library is committed to collecting both print and electronic materials in support of the Commerce Program at the University of Toronto.

Journals: The Library subscribes to 24 of the top 25 journals listed in Journal Citation Reports (JCR)¹³ in subject area 'Business;' all of the top 25 journals in the subject area 'Economics;' 24 of the top 25 in the subject area 'Business, Finance' and all of the top 25 journals in listed in the subject area 'Economics.' All journals are available electronically to faculty and students.

Monographs: The University of Toronto Library maintains comprehensive book approval plans with 53 book dealers and vendors worldwide. These plans ensure that the Library receives academic monographs from publishers all over the world in an efficient manner. In support of the Masters of Financial Risk Management Program, UTL specifically receives books through plans with YBP. Since 2010, these approval plans have provided UTL with an average of 1,933 monographs in call number ranges applicable to Management Sciences in general (HA, HB, HC, HD, HF, HG, QA 76+) each year. In addition to these plans, individual librarian selectors select unique and interesting scholarly material overlooked by standard approval plans. These selections include contributions to the collections of the Thomas Fisher Rare Book Library, special requests from faculty, and individual ebooks and ebook packages, including complete collections of ebooks from the following publishers: Taylor and Francis, Oxford

¹² Association of College & Research Libraries. *Information Literacy Standards*. ACRL, 2006.

¹³ 2012 Journal Citation Reports® (Thomson Reuters, 2013)

University Press, Cambridge University Press, major US University Presses and Canadian University Presses. In this way, the Library continues to acquire more than 120,000 book titles per year.

Preservation, Digitization, and Open Access: The University of Toronto Library supports open access to scholarly communication through its institutional research repository (known as T-Space), its open journal and open conference services, and subscriptions to open access publications. In addition to acquiring materials in support of the Commerce Program, the Library is also, in cooperation with the Internet Archive, digitizing its monograph holdings published before 1923. These books are available without charge to anyone with access to the Internet through the Scholar's Portal e-Book platform.

Key Databases: Investext, Compustat, Datastream, Bloomberg, Morningstar Direct, Factiva, Business Source Premier, ABI Inform, CPA Canada Standards and Guidance Collection, IBIS World, Mergent Online, Standard and Poor's NetAdvantage

Special Collection Highlight: To enhance its competitiveness and to further its reputation for academic excellence, the Rotman School of Management has developed the BMO Financial Group Finance Research and Trading Lab. This high-tech facility enables students, faculty and staff to interact with the global financial community and its resources in a real-time setting. For training sessions, the Lab has 65 dual flat panel stations equipped with [Thomson-Reuters Eikon](#) platform, [S&P Capital IQ](#), and real-time data feeds, three [Bloomberg](#) terminals, two media/data walls and an integrated sound system. In addition, the Lab has a growing stock of custom-designed applications software. For example, trading and risk management simulations are conducted using [Rotman Interactive Trader](#); and portfolio management training using [Rotman Portfolio Manager](#). Research databases include [NYSE's TAQ](#), TSE (CFRMC), [Compustat](#), [CRSP](#), and [Datastream](#).

Prepared by: Caitlin Tillman, AUL Collections & Materials Management with Dan D'Agostino, Social Sciences Selector with Sean Forbes Director, Business Information Centre. December 19, 2014.

Submitted by: Larry Alford, Chief Librarian, University of Toronto Libraries, Date

Appendix E: Student Support Services

Student service information for Quality Assurance Framework

[St. George Campus]

All University of Toronto undergraduate and graduate students have access to student services on all three campuses, Mississauga, St. George (downtown Toronto), and Scarborough, regardless of their 'home campus'. The services and co-curricular educational opportunities provide a complement to the formal curriculum by engaging and challenging students to reach their full potential as learners, leaders and citizens. At the University of Toronto (St. George Campus) these services are organized by Student Life Programs and Services, the academic division registrar offices, and the School of Graduate Studies, and support the success of our students from the time they are admitted through degree completion and beyond.

Students have access to comprehensive **physical and mental health care** on campus including a medical clinic, travel medicine services, immunization, contraception and sexual health education. Counselling and treatment options for psychological and emotional concerns include psychotherapy, group therapy and pharmacotherapy, as well as specialized assault counseling services.

Housing needs, including off-campus housing listings and resources for students living independently, are met through the Student Housing Service.

Coaching and education in the development of key **learning skills** – from time management to overcoming exam anxiety – is provided through the Academic Success Centre. The ASC also partners with faculty to integrate success strategies and support into the curriculum.

Students' career exploration and employment services are provided through a **Career Centre** offering resume and interview coaching, workshops, career resources, on and off-campus employment and volunteer listings, job shadowing, and career counseling.

Specialized services are provided for **international students** (orientation, advising, cross-cultural counselling), students with **disabilities** (academic accommodations, advising), students with **children or other family responsibilities** (advising, resources, subsidized child care), **aboriginal students** (academic support, financial counselling) and **lesbian, gay, bisexual and transgender** students (counselling, referrals, equity outreach and engagement).

Participation in **campus life** and **experiential learning** are facilitated through Hart House (clubs, committees, events), the Centre for Community Partnerships (service learning), the Multifaith Centre (interfaith dialogue, events), and the Office of Student Life (leadership development, orientation, recognition and support for student groups, activities.) **Sport and recreational facilities and programs** are provided to all students through both Hart House and the Faculty of Kinesiology and Physical Education.

The Rotman School of Management has available to students:

- Registrarial services and academic advising
- Student study and activity spaces
- Student life programs, including Orientation and Rotman speaker series events

School of Graduate Studies, Student Services [all campuses]

All graduate students at the University of Toronto have access to registrarial services and co-curricular programs at the School of Graduate Studies that assist students in meeting their academic goals.

Administrative staff at the School of Graduate Studies (SGS) provide **registrarial** services to graduate students including but not limited to recruitment, admission, orientation, registration, fees, program progress, awards/financial assistance and graduation.

The **Grad Room** is an accessible space on the St. George campus which provides University of Toronto graduate students with a lounge area and a multi-purpose space for academic, social and professional graduate student programming.

Grad Room is home to the **Graduate Professional Skills Program (GPS)**. GPS is a non-academic program presented by SGS consisting of a variety of offerings that provide doctoral stream students a range of opportunities for professional skills development. The program focuses on skills beyond those conventionally learned within a disciplinary program, skills that may be critical to success in the wide range of careers that graduates enter, both within and outside academe. GPS aims to help students communicate effectively, plan and manage their time, be entrepreneurial, understand and apply ethical practices, and work effectively in teams and as leaders.

The Office of **English Language and Writing Support (ELWS)** provides graduate students with advanced training in academic writing and speaking. By emphasizing professional development rather than remediation, ELWS helps students cultivate the ability to diagnose and address the weaknesses in their oral and written work. ELWS offers four types of instruction designed to target the needs of both native and non-native speakers of English: non-credit courses, single-session workshops, individual writing consultations, and website resources.

Appendix F: Finance-related Programs

The tables below outline the most relevant finance-related and risk management programs currently offered.

There are no graduate level programs purely focused on financial risk management in the Toronto or Ontario markets. There are several domestic and international Master of Finance degree programs with risk management streams, and a select few Master of Financial Risk Management programs. M.F.R.M. is a comprehensive curriculum of ten carefully designed courses that cover the breadth and depth of current issues and best practices in the domain of financial risk management, taught by global leading experts in the field. This distinguishes the M.F.R.M. from a stream of courses within another master's degree that leads to a major or specialization in risk management (e.g. Schulich in the GTA market and SFU in the BC market).

Other than the Schulich stream within its general Master of Finance program, there is an absence of graduate education in the GTA specifically focused on financial risk management. In the BC market, SFU offers a Master of Science in Finance, with an option to specialize in risk management. Internationally, NYU Stern, Rutgers and LBS, renowned institutions with finance expertise, each offer a master's level degree with a Risk Management focus targeted to finance. NYU Stern and LBS are offered in major financial centres of the world. NYU Stern is targeted to experienced working professionals, and the LBS program is a stream within its Master of Finance degree.

There are several other Finance masters-level degree programs in Ontario, including at the University of Toronto with our Master of Finance (Rotman), Master of Financial Economics (M.F.E.) (joint Department of Economics and Rotman) and Master of Mathematical Finance (M.M.F.) programs. The Rotman Master of Finance program is an experienced, working professionals' program rather than one targeted at the pre-experience students, and it has a broader finance focus. With regard to U of T's MFE and MMF, the Rotman Master of Financial Risk Management will not be focused on economics, engineering or mathematical finance. The M.F.R.M. will have management as the underlying discipline.

U of T's School of Continuing Studies offers a Certificate in Risk Management, as do others in the GTA market such as Queen's, Schulich and McMaster, but these are not degree programs and not necessarily focused on financial risk management.

There are the numerous general post-secondary and masters-level risk management offerings across Canada and abroad, as the second table below details. Stern, in the US, has a Master of Science in Risk Management focused on experienced professionals at the executive level. There is one program, at the Henley School of Business, which is specific to financial risk management.

Finance-related programs

| UNIVERSITY | LOCATION | PROGRAM | FT/PT | LENGTH | TUITION | MAIN ADMISSION REQUIREMENTS |
|---|-----------------|---------------------------------|--------------|---|--|--|
| ALBERTA (COURSES IN CALGARY AND CHINA) | Alberta | MFM – Financial Management | FT or PT | 12 months 24 months | \$31K | Bachelors, GPA 3.0; GMAT score of 550 |
| BROCK UNIVERSITY | Ontario | MSc in Finance | FT | 20 months | \$16K Domestic \$36K International | Bachelors B+ GMAT score of at least 550 |
| DALHOUSIE | Nova Scotia | MBA Financial Services | FT or PT | 3.5 years average (2 years full time. 7 years maximum) | \$37K | Undergrad GPA 3, B ; GMAT or 5 years of experience |
| HEC MONTREAL | Quebec | MSc in Administration - Finance | FT | 16 months | \$5K Quebec Resident \$11.5K for non-Quebec resident \$24.5K for international | Undergrad, GPA 3.0 / 4.3 |
| GOODMAN'S, CONCORDIA U | Quebec | MBA/CFA | PT | 3 years | \$54K | Undergrad B GMAT 550 or higher or CFA 1 |
| LAURIER | Ontario | MFin | FT | Co-op: 20 months (two paid four-month work terms) Non-co-op: 12 months | \$25.5K Domestic Co-op \$23.5K Domestic non-co-op \$39K International Co-op \$38K International non-co-op | Minimum B+ average over the last two years of full-time study. The GMAT is required, with a minimum score of 650 |
| MCGILL | Quebec | MBA – Concentration in Finance | FT | 20 months | \$80K | average GMAT score of 650 and an overall GPA of 3.3, |
| MCGILL | Quebec | Diploma in Applied Finance | PT | 5 required courses and 5 complementary courses | \$4K Quebec Resident \$8K Non-Quebec Resident \$18K International | minimum CGPA of 3.0 out of 4.0 or 3.2 out of 4.0; GMAT optional |

| | | | | | | |
|---------------------------------------|------------------|-----------------------------------|----------|--|--|--|
| MCGILL | Quebec | Certificate in Financial Planning | PT | 5 required courses, each classes is 13 weeks | \$2K Quebec Resident \$4K Non-Quebec Resident \$9K International | minimum CGPA of 3.0 out of 4.0 or 3.2 out of 4.0; GMAT optional |
| MCMASTER | Ontario | MFin | FT | 12 months Or 16 month program with summer internship | \$12.6K per term Same for international | Undergrad GPA B+ One term of university level calculus, algebra, and statistics GMAT 600 minimum |
| MIT: SLOAN | International | MFin | FT | One year | \$114,240 | Average: - GPA 3.7 - GMAT - 700 |
| QUEEN'S | Ontario | MFin | PT | 10 months | \$40K Domestic \$61K Internat'l | Undergrad degree from a recognized university GMAT or CFA 1 |
| QUEEN'S (AND CHINA'S RENMIN U) | Ontario | MFin - Beijing | PT | 12 months, on weekends | \$45K (\$248,000 CNY) | Admissions handled by Renmin U: Undergrad degree, GMAT or CFA 1 |
| QUEEN'S | Ontario | Masters Management Analytics | PT | 10 months | \$40K Domestic \$61K Internat'l | Recognized undergrad with good Math and Stats performance |
| SAUDER (UBC) | British Columbia | MSc in Finance | FT | 2 years | \$44K Domestic \$55K International | Four year Bachelor's degree with an overall B+ , GMAT or GRE |
| SOBEY (ST. MARY'S) | Nova Scotia | MFin | FT | 12 months | \$53K Domestic \$54K International | B average undergrad in engineering, physics, computer science, economics, or other mathematical discipline; GMAT |
| RUTGERS | New Jersey | Master Quantitative Finance | FT PT | 3 semesters 3 years | FT \$37K US Domestic (PT \$12.4K per semester) \$64K US International (PT \$21K per | GRE/GMAT, calculus, stats, algebra |

| | | | | | | |
|----------------|---------|---|----|--|---|--|
| | | | | | semester) | |
| UOFT | Ontario | MF | PT | 20 months | \$86K domestic 102K international | B average Min 2 years finance work experience CFA, CA or GMAT |
| UOFT | Ontario | MFE | FT | 16 months, including 4 month internship | \$40K Domestic \$58K Internat'l | B+ average undergrad Economics, Calculus, Stats |
| UOFT | Ontario | MMF | FT | 12 months, including 4 month internship | \$43K | Mid-B average undergrad Exceptional math skills. At least one stats course. |
| WESTERN | Ontario | MFE | FT | 16 months | \$28K Domestic \$41K International | GPA B+ |
| WINDSOR | Ontario | Master of Management – International Accounting and Finance | FT | 16 months | \$30K | Undergrad – 70% GPA |

Risk Management programs

| UNIVERSITY | LOCATION | PROGRAM | FT/PT | LENGTH | TUITION | MAIN ADMISSION REQUIREMENTS |
|---|------------------|--|-------|-----------------------|---------------------------|---|
| UNIVERSITY OF ALBERTA | Alberta | Certificate in Risk Management – CRM Designation | PT | 3 courses | \$2000 | |
| UNIVERSITY OF CALGARY | Alberta | Certificate in Professional Management specializing in Risk Management | PT | 2-3 years (300 hours) | | You must be a minimum of 18 years of age to be admitted to the program. Successful completion of a Grade 12 diploma and relevant work experience are recommended. |
| BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY | British Columbia | General Insurance and Risk management Diploma | FT | 2 years | | Three credits of post-secondary English, Humanities, or Social Science and one post-secondary math credit |
| CARLETON | Ontario | Professional Certificate in Risk Management | PT | 1.5 years | \$2.7K | For managers, executives, board members, supervisors, project officers |
| COLUMBIA UNIVERSITY | International | Enterprise Risk Management certification | | "Coming Soon" | | |
| FRANKFURT SCHOOL OF FINANCE AND MGT | International | MSc in Risk Management and Regulation | PT | 2 years | 29,500Euros (\$41,300Cdn) | 2 yrs work experience, Undergrad |
| HEC PARIS | International | Risk Management Open Program | | 2.5 Days | 3,580 Euros | The program is designed for: Senior Managers, especially those currently serving as, or preparing for a new role as, Global Business Unit Head, |

| | | | | | | |
|--|------------------|---|--------------------|--|---------------------------------------|--|
| | | | | | | Regional Business Unit Head, Worldwide Sector Head or Country President with overall responsibility. |
| LAURIER | Ontario | Certificate in Risk Management | PT | 1 year | \$1.5 K | Must hold a CEGEP diploma or equivalent |
| LBS (3 CAMPUSES + ONLINE) (3 START DATES = MAR, JUN, SEP) | International | MA in Finance and Investment (Risk Mgmt specialisation) | FT or PT or online | FT = 15 months (12 months of courses + online dissertation) PT = 24 months Online = 15-36 months (blended) | £8.4K (UK/EU & international) | UK undergrad or equivalent English test No work experience |
| LBS (LONDON) (2 START DATES = FEB, OCT) | International | MS Finance and Investments (Risk Mgmt specialization) | FT or PT | FT = 12 months PT = 24 months | £10.5K (UK/EU & international) | Undergrad from US-equivalent inst TOEFL Professional resume |
| MCMASTER | Ontario | Certificate in Risk Mgmt (CRM prep) | PT | 3 courses: Risk Assessment, Risk Finance, Risk Mgmt | \$700 per course | Open enrollment |
| PENN STATE | International | Financial Risk Management Certificate | PT | Continuing ed or concurrent with degree | | |
| QUEEN'S (SUPPORT FROM GRI & OSFI) | Ontario | Diploma in Risk Policy and Regulation | FT | 4 months | \$9.6K domestic \$19.2K internat'l | B+ MA in Econ or MFE required |
| SFU | British Columbia | MSc in Finance (Candidates choose one of two streams: investment mgmt. or risk mgmt.) | FT | 16 months (possible pre-program of 4 courses) | \$27.8K | Undergrad B GMAT – min 600 No work experience required |
| STANFORD | International | Strategic Decision and Risk | PT | 1-2 years | \$10K | 3 years' work experience Bachelor's degree |

| | | Management Certificate | | | | or equivalent |
|---|-----------------------------------|--|----------|-------------------------------------|--|--|
| STERN (NYU) (MODULES ARE IN NYC, AMSTERDAM, NYC, ABU DHABI, NYC) | International | MSc in Risk Mgmt for Executives | PT | 1 year Start in May | US\$67.5K includes tuition, course materials, some meals | Strong GPA Minimum five years of full time professional experience |
| SWINBURNE UNIVERSITY OF TECHNOLOGY | International | Graduate Certificate in Risk Management | FT | 6 months | | A Bachelor qualification (AQF 7 or 8), in one of the following allied fields: Engineering, Technology, Aviation, Mining, Project Management, Emergency Management, Health and Safety, Environment Sciences |
| RUTGERS | International | Master's in Statistics - Financial Statistics and Risk Management (FSRM); GARP/FRM partnership | FT PT | 3 semesters +internship; 2 years | \$18,720 US | Quantitative Undergrad; Pre-req Calculus, Linear algebra, Advanced Stats, Computer programming; GMAT/GRE |
| UCLA | International | Risk, Security, and Resiliency Management Certificate | PT | | \$6000 | Intended for managers, supervisors, directors, insurance industry professionals |
| UNIVERSITY OF PENNSYLVANIA (WHARTON) | International | Advanced Risk Management Program | PT | | \$28K | Executives with several years of risk management experience in banking and related fields |
| UNIVERSITY OF READING (HENLEY SCHOOL OF BUSINESS) | International (GARP, PRMIA, ICMA) | MSc in Financial Risk Mgt | FT | 9 months | £22,250 (\$39,500Cdn) | Undergrad, equiv min upper second class B, Satisfactory numeracy |

| | | | | | | |
|---|---------------|---|------------------------|---|--|--|
| UOFT (M ENG) | Ontario | MEng Certificate in Financial Engineering | FT, PT, or Extended PT | | Overall MEng tuition | MEng requirements, and 4 core + 3 electives, or 1 elective + MEng project; must have Calculus, Linear algebra |
| UOFT (ROTMAN EXEC PROGRAMS) (GRI SANCTION) | Ontario | Board Risk Oversight and Insight Program: Finding Opportunity in Risk | PT | | | |
| UOFT (SCHOOL OF CONTINUING STUDIES) | Ontario | Certificate in Risk Mgmt | PT | Complete 3 courses: Foundations in Risk, Risk Control, Risk Financing Max time = 3 yrs | \$2235 | |
| UNIVERSITY OF WASHINGTON | International | Certificate in Information Security and Risk Management | PT | 9 months | \$6525 USD | Professionals, managers, administrators |
| YALE SCHOOL OF MANAGEMENT | International | Certificate in Risk and Investment Management | Seminar Series | 8 out of 12 days of seminars and submit an assignment for each seminar attended | Standard rate: USD 4,000/EUR 3,000 • CFA Institute member rate: USD 3,000/EUR 2,250 | The seminar series are intended for senior officers, investment specialists and administrators working for buy- and sell-side institutions, and for consultants and key account representatives advising high net worth individuals and institutional investors. |
| YORK UNIVERSITY - SCHULICH | Ontario | MFin - 3 streams: Financial Risk Mgmt, Regulatory Affairs for Financial | FT | 12 months | \$49K Domestic \$61K Internat'l | B+ average undergrad Strong Economics, Stats, Calculus GMAT |

| | | | | | | |
|-----------------------------------|---------|-------------------------------|-------|--------------------------|-------|--------------------------------|
| | | Institutions, Capital Markets | | | | |
| YORK UNIVERSITY - SCHULICH | Ontario | Certificate in Risk Mgmt | in PT | 3 Intensive Week modules | \$11K | Designed for Senior Management |

Appendix G: External Appraisal Report

New Program Proposal Appraisal Report

Master of Financial Risk Management

Rotman School of Management

Prepared by:

Phelim Boyle

Peter Klein

March 30, 2015

Purpose of Report

We were requested to conduct an external review of the proposed Master in Financial Risk Management at the Rotman School of Management of the University of Toronto. In this connection we studied the Program Proposal and visited the Rotman School of Management on March 19 and 20. During the visit we met with the Dean, the Vice Dean of Academic Affairs as well as the faculty who will be involved in the new program. Details of our schedule are given in the Appendix. We first provide an executive summary of our main comments and concerns. Then we follow the template provided that covers specific aspects of the program.

Executive Summary

Overall this is an impressive proposal. We first outline the advantages of the proposed program and then we discuss some of our concerns.

In our view the proposed program has several strengths. First is the outstanding quality of the Rotman finance faculty. Several of the senior faculty involved in the program have international reputations in derivatives, market risk, credit risk, investments and risk management. Equally impressive are the junior faculty we met with. They are publishing in the top journals and are enthusiastic teachers. Second, the Rotman School is very well resourced with state of the art class rooms and strong support in terms of its administrative structure. Third, the Rotman Trading Lab provides a unique teaching and learning opportunity for the students in this program. It is truly an innovative facility. Fourth, the proposed program director Alexandra Mackay is a dedicated, experienced leader who has a proven record of success as director of the Master of Finance program. Fifth, the Rotman School has an ideal location given its proximity to the head offices of many of Canada's major financial institutions. Finally the Rotman School has acquired an international reputation as a leader in management education and finance research during the last two decades.

We also have some concerns that were raised during our visit. The duration of the proposed program is two academic terms or eight months. Based on our experience this is too short a period to accomplish the program's objectives. The proposal recognizes the importance of strong quantitative and analytical skills and states that the majority of student will have completed a degree in an undergraduate degree in quantitative-based programs such as

commerce, math, business, management, economics or actuarial science. Our experience is that the mathematical level in the typical commerce, business and management programs is well below what would be required in state of the art risk management program. We agree that University of Toronto commerce students who have taken rigorous course in mathematics, statistics and econometrics would have these skills. However there are valuable diversification benefits by including students from a range of universities.

While we recognize that the listed courses do not convey the extent or degree of integration we felt that this should be more specifically addressed in the proposal. It should be made clear how the various courses will be integrated and the program description should demonstrate a more cohesive and coherent framework. We felt there should be a capstone course at the end of the program. We also pointed out the value of having a meaningful project.

The proposal has a strong emphasis on the Canadian banks and this is a natural target market. However the faculty we met with are aware of the opportunities with other institutions such as pension plans, insurance companies and hedge funds. Since many of the graduates of this program will not have had prior work experience career coaching and placement will play a key role in the success of the program.

We next address the specific points in the terms of reference.

1 Objectives

- Consistency of the program with the institution's mission and unit's academic plans
- Clarity and appropriateness of the program's requirements and associated learning outcomes in addressing the academic division's graduate Degree Level Expectations
- Appropriateness of the degree or diploma nomenclature

These objectives are met by the proposed program.

2 Admission requirements

- Appropriateness of the program's admission requirements for the learning outcomes established for completion of the program
- Appropriateness of any alternative requirements for admission into the program such as minimum grade point average or additional languages or portfolios, along with how the program recognizes prior work or learning experience

The criteria as outlined on page 6 of the report are generally appropriate. The target input students (page 12) are appropriate but could be extended to include computer science students

and perhaps hard sciences such as physics. We are concerned that most commerce students will lack the necessary quantitative background to handle the program. Of course there are exceptions especially at the University of Toronto where some commerce students take rigorous courses in mathematics and economics and econometrics. Commerce students at the University of Toronto contemplating this program should take the fourth year econometrics course. We recommend a very conscious effort be made to advertise this program to students at other universities. The document has an emphasis on targeting pre-experience students but there is a case for including students with work experience as well as they could add so much to the class discussions. It may be necessary to start the program with a smaller number of students to ensure a high quality first year and establish the program's reputation

3 Structure

- Appropriateness of the program's structure and regulations to meet specified program learning outcomes and Degree Level Expectations
- Rationale for program length in order to ensure that the program requirements can be reasonably completed within the proposed time period

As noted earlier we have strong reservations about the length of the program. On page 15 the proposal states “[t]he *M.F.R.M.* aims to teach the students cutting edge risk management tools and ideas in a two semester program.” To us this seems very ambitious. Other similar programs take three or even four terms including a three month internship. A capstone course and/or a project could extend the program into another term. A project provides opportunities for synthesis and integration of knowledge and can be supervised by a faculty member. In our experience it can be used to showcase abilities to prospective employers. It can provide valuable experience in group work.

The current proposal for the one week industry session requires some reconsideration. They may have little value to either the student or the employer. The faculty agreed with our suggestion that that a trek might be a viable alternative. This idea has worked well in the Simon Fraser program. We strongly endorse the advantages of the cohort approach in building up team spirit and identification with the program. There may be synergies with the Rotman Masters of Finance in terms of mentoring and career advancement.

4 Program Content

- Ways in which the curriculum address the current state of the discipline or area of study
- Identification of any identified unique curriculum or program innovations or creative components and their appropriateness
- For research-focused graduate programs: Clarity of the nature and suitability of the major research requirements for degree completion
- Evidence that each graduate student in the program is required to take all of the course requirements from among graduate level courses

The courses listed in the program should be more properly integrated and better described. In some cases it was not apparent where a particular course fitted in the overall program objectives and in other cases it was not clear what the course content would be. As noted in the program proposal, the Trading Lab provides an excellent method of integrating concepts and ideas in an applied setting. Perhaps more courses should involve this connection. From our discussions with faculty it appears that programming opportunities will be limited to excel which is an important if low tech language in this area. The program proposal emphasizes that there will be ample opportunities for communications but we would like to see this more specifically embedded in the course descriptions. One strength of the graduates of this program should be their ability to communicate technical ideas with clarity and precision within the organization. We note with approval that the program is not tied directly to industry groups such as PRMIA or GARP. We would like to see more evidence of how risk management concepts and ideas will be integrated through cases, projects and similar exercises. This would give the students a more holistic perspective.

5 Mode of Delivery

- Appropriateness of the proposed mode(s) of delivery (distance learning, compressed part-time, online, mixed-mode or non-standard forms of delivery, flex-time options) to meet the intended program learning outcomes and Degree Level Expectations

We note that the Rotman School of Management is investing in improving on line learning. This should be a real strength for the new program. A strong technical student can acquire useful finance, accounting and economics background knowledge through this medium before he or she starts the program. It is much harder for a commerce student to require the appropriate quantitative skills.

6 Assessment of Teaching and Learning

- Appropriateness of the proposed methods for the assessment of student achievement of the intended program learning outcomes and Degree Level Expectations
- Completeness of plans for documenting and demonstrating the level of performance of students, consistent with the academic division's statement of its Degree Level Expectations

The proposal is well beyond satisfactory in this respect.

7 Resources

- Adequacy of the administrative unit's planned utilization of existing human, physical and financial resources, and any institutional commitment to supplement those resources to support the program
- Participation of a sufficient number and quality of faculty who are competent to teach and/or supervise in the program
- Adequacy of resources to sustain the quality of scholarship and research activities of graduate students, including library support, information technology support, and laboratory access
- Faculty have recent the research or professional/clinical expertise needed to sustain the program, promote innovation and foster an appropriate intellectual climate
- Where appropriate to the program, financial assistance for students will be sufficient to ensure adequate quality and numbers of students
- Supervisory load distribution and the qualifications and appointment status of supervisors

In general the resources are excellent: well above the level of other Canadian universities. The faculty have a broad range of relevant experience especially in the banking area. We caution against launching this program unless adequate resources are devoted to career counselling and placement. The school will need to be sensitive to the needs of both the students in this program and students in other finance and MBA programs. There may be synergies with MFin program but they are very different in some respects.

8 Quality and Other Indicators

- Quality of the faculty (e.g., qualifications, research, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed program)
- Program structure and faculty research that will ensure the intellectual quality of the student experience

The quality of the finance faculty is the greatest strength of the program. The faculty directly involved in the program have relevant experience, are strong teachers and have outstanding research records.

Appendix

Rotman Master of Financial Risk Management - External Appraisers Schedule

External Appraisers:

Professor Phelim Boyle
 Professor of Finance
 School of Business & Economics
 Wilfred Laurier University
pboyle@wlu.ca

Professor Peter Klein
 Professor of Finance
 Beedie School of Business
 Simon Fraser University
pklein@sfu.ca

| March 19th | Rotman Attendees | Content |
|----------------------------------|---|--|
| 8:00-9:00 am | Tiff Macklem, Dean Peter Pauly, Vice-Dean, Academic | Rotman Overview |
| 9:00-9:15- Walk to Rotman School | | |
| 9:30-10:30 am | John Hull & Alex MacKay | Overview of MFRM |
| 10:30-11:30 | Leanne Pollard, Registrar & Elizabeth Duffy-Maclean | Student Support, Financial Aid, & Recruitment |
| 11:30-12:00 | Break | |
| 12:00-1:00 | Jan Mahrt-Smith | Online Initiatives & Full Time MBA |
| 1:00-2:30 | Working Lunch w/ Alex MacKay & Elizabeth Duffy-Maclean & Students: Jeremy Chiu (3rd year Commerce); Paige Franzoi (3rd year Commerce); Richard Gill (First Year Full Time MBA & MFIN Class of 2012); Jia Ong (2nd Year Full Time MBA); & Mile Pajovic (3rd Year Commerce) | |
| 2:30-3:00 | Break | |
| 3:00-3:30 | John Hull & Alex MacKay | Tour including classrooms, Lab, & library |
| 3:30-4:00 | Holly Inglis | Library Resources |
| 4:00-4:30 | Tom McCurdy/Marco Salerno | Lab Resources and Experiential Courses |
| 6:30-8:30 pm | Dinner w/ Finance faculty: John Hull, Chay Ornthanalai, Redouane Elkamhi, & Don Brean | MFRM Courses and Finance Faculty Research |

March 20th**Rotman Attendees****Content**

| | | |
|-------------|--|-------------|
| 9:00-9:30 | Craig Doidge, Finance Area Coordinator | |
| 9:30-10:00 | Susan Christoffersen | |
| 10:00-10:30 | Peter Christoffersen | |
| 10:30-11:30 | Peter Christoffersen, John Hull, & Alex MacKay | Wrap-Up Mtg |
| 11:30-1:00 | Working Lunch | |
| 1:00-2:00 | Dean Tiff Macklem & Vice-Dean Peter Pauly | Wrap-Up Mtg |

Appendix H: Dean of the Rotman School of Management, Administrative Response to External Appraisal Report



Tiff Macklem, Dean

April 9, 2015

Sioban Nelson
Vice-Provost, Academic Programs
Office of the Vice-President & Provost
University of Toronto
27 King's College Circle
Toronto, Ontario M5S 1A1

Dear Vice-Provost Nelson:

Re: External Appraiser Report, Master of Financial Risk Management proposal, Rotman School of Management

I am writing in response to the report by external appraisers Professors Phelim Boyle and Peter Klein, concerning our proposed Master of Financial Risk Management (MFRM) degree program. We are deeply appreciative of Professors Boyle and Klein for their valuable time and input, spending two days with us and offering thoughtful views on our proposal. We are thankful for their expressed support for the proposed program. As experts in the field of risk management, their endorsement reinforces our commitment to this proposal, as well as the value to students, the university and the financial sector.

Designing a successful two-session MFRM Master's Program

The report raises the question of the length of the MFRM program and whether the program should be three sessions in length (12 months) rather than the currently proposed 2-session program (8 months). There are several reasons why we believe we can deliver an excellent program in two sessions with strong market demand by both employers and students. The key to delivering a two-session program will be ensuring that we have an intake of MFRM students with solid quantitative knowledge and academic background to effectively complete the program in this amount of time. We agree this is critical to the success of our program, and our intent has been, and will be, to ensure the students chosen for the program have a similar strong base of quantitative knowledge on which to build. The program is designed specifically with this in mind.

As outlined in our proposal, students will be required to have gained a strong analytical and quantitative background in their undergraduate program. We agree with the external appraisers that we will need to look beyond Commerce/Business undergraduates. Our proposal states that "Business, Commerce, Economics, Mathematics, Engineering or Actuarial Science degrees will be preferred, but other 4-year undergraduate degrees will be considered if there is evidence of strong quantitative skills." Physics and Computer Science undergraduate degrees will certainly be included. As stated in our proposal, we will require quantitative proficiency, which will be satisfied through a minimum B average having been obtained in Calculus, Linear

Algebra and Statistics or Econometrics during a prospective student's undergraduate degree. Our expectation is that the entry requirements will in practice far exceed this minimum requirement given it will be a selective program. Solid quantitative skills will be a fundamental criterion in our recruitment of students into the program.

We intend to recruit quantitatively strong students from Ontario, Canada and the rest of the world. However, we are not aiming to develop graduates in quantitative skills. That is the focus of other existing programs, such as the University of Toronto MMF program, with which we do not wish to compete. Our focus is to teach the students how to apply the quantitative tools they bring with them to a risk management setting. Given students already have the necessary mathematical background coming into the program, we believe that 2 sessions is sufficient to teach the fundamental tools in managing credit, market, liquidity, and operational risk as they apply to a variety of financial institutions.

As noted in the proposal, we will also be requiring non-business applicants to take 4 prerequisite courses in Introductory/Corporate Finance, Financial Accounting, Investments and Futures and Options. This will ensure all students have a common understanding of financial concepts before entering the program. We will offer counseling and direction to those who require one or more of these prerequisites regarding where these courses can be taken prior to starting the program. Our view is that it is quite realistic to assume students can be brought up to speed on the basics of finance and accounting in the summer prior to entering and that these courses are standard and can be taken online. In contrast, it is not possible to teach students solid quantitative skills over a short period of time so we will look for more extensive quantitative training in an undergraduate degree. With these high standards in the selection of students, our professors can immediately move to the core material in the first semester of the program without having to spend this time teaching the basic tools.

Ensuring meaningful connection to industry

We acknowledge that the underlying concept of connecting students with prospective employers is essential for these pre-experience students. Providing connections and exposure to the financial sector will be critical for students to gain an understanding of how academic research and theory applies in the financial risk management industry and to position them well for employment.

We do not see a great need for students to travel during the program to create these connections when we are so close to many institutions that are considered global leaders in risk management. One of the benefits of being located in the heart of Toronto is the close proximity to the head offices and risk functions of banks, insurance companies, and pension plans. All these institutions are considered at the forefront of risk management practices so much can be learned from connecting with the local institutions, reducing the need for students to travel elsewhere. To ensure a global perspective in our program, we plan to bring industry leaders from around the world to our students as invited speakers and as members of our advisory board. These experts will not only enrich our teaching but will help us establish placement contacts outside of Canada.

In the model we envisage, we intend to offer non-credit opportunities for connection with industry through projects, case competitions, experiential learning such as simulation-based exercises and networking events.

We will also ensure the course work provides opportunities to work on projects that are relevant to industry. We are proposing that students work in groups of 3-5 on an integrative project during the program. These cumulative projects will bring together concepts taught in the courses covered. Industry-relevant examples of topics might include:

- What will be the impact on market risk capital of a financial institution of the Fundamental Review of the Trading Book?
- What will be the impact of changes to the leverage ratio requirement for a bank?
- How can a bank hedge against a sharp decline in house prices?
- How can pension funds and insurance companies best hedge against a sharp change in long-term interest rates?
- How do changes in asset correlations affect the risk of a hedge fund portfolio?

Students would have access to cross-sector senior industry representatives for input and feedback on their projects. The projects would culminate in opportunities to present to faculty and industry. In effect, our approach has the projects integrated throughout the program, rather than extending into another session as a capstone.

A solid and cohesive financial risk management curriculum

With regard to the curriculum, the report notes that courses need to be integrated and that there is a need for a cohesive framework. As outlined above, we will already have projects integrated into the program, and these projects will be used to bridge material across different courses. We have also very thoughtfully built a curriculum that addresses all areas of financial risk management. As the report states, one of the major strengths of the proposal is the quality of the Rotman finance faculty:

“Several of the senior faculty involved in the program have international reputations in derivatives, market risk, credit risk, investments and risk management. Equally impressive are the junior faculty we met with. They are publishing in the top journals and are enthusiastic teachers” (MFRM Appraisal Report, page 1).

We are honoured to have the calibre of our faculty recognized by the appraisers. Our finance faculty have worked very closely together on the design of the proposal, and we are confident that the course design by the finance faculty reflects a solid and cohesive framework for the MFRM degree program. The fact that our faculty are leading scholars in risk management and working so closely together means they can easily relate their class material to topics taught in other sections of the program as well as to relevant real world situations.

The appraisers note that the program focus will need to extend beyond banks to pension funds and insurance companies. We agree. Discussion with industry experts since the program proposal was written suggests that a course devoted to risk management specifically related to pension funds and insurance companies would be more relevant to teach these students than enterprise risk management. In response to this, we have devised a solution which we think will

be able to provide students with learning in both topics. With regards to enterprise risk management, we want students to have a broad picture of the how a risk management function fits into a large organization and this perspective can be taught as part of the existing courses rather than separating the material as a stand-alone course. Enterprise risk management is also a topic that industry guest speakers would be well-suited to discuss in workshops that are planned to run outside the classroom so students would have additional exposure from industry experts.

In place of the proposed course on Enterprise Risk Management & Governance with Risk Management, we intend to offer a course in Pension Funds and Insurance Companies. The course on pension and insurance companies will discuss risks faced by insurance companies and pension plans on both sides of the balance sheet. The course will cover the types of products that are offered by life and property and casualty insurance companies and the risk they entail. In particular, it will discuss longevity risk, natural disaster risk, and the use of reinsurance and derivatives to hedge risks. It will include the specifics of defined benefit plans, and the asset management strategies that are appropriate.

Enhancing communication skills development

The report points out the importance of skills development in the area of communications, strengthening the ability of students "...to communicate technical ideas with clarity and precision". We agree. Our intention is to:

- use interviews in the application process to screen initially for students with strong communication skills
- include a presentation skills session at the outset;
- weave the requirement for presentations directly into the curriculum, requiring presentation of papers or other deliverables within the framework of the course work;
- develop and encourage extracurricular case competitions; and
- offer extracurricular workshops on skills development to help students prepare for these major presentations, as well as for interviews.

My colleagues and I are sincerely appreciative of the significant time and the substantive input of Professors Boyle and Klein. Our MFRM proposed program will benefit from the constructive discussions we were able to have, culminating in the report and drawing on their experience and expertise.

Yours truly,



Tiff Macklem

Dean, Rotman School of Management

Appendix I: Vice-Provost, Academic Programs' Response



April 27, 2015

Tiff Macklem
Dean
Joseph S. Rotman School of Management
University of Toronto

Re: Appraisal Report, Proposed new Master of Financial Risk Management

Dear Tiff,

I am very pleased to receive the appraisal of the proposed Master of Financial Risk Management. Your administrative response to the appraisal nicely summarizes the report and highlights the specific suggestions made by the reviewers for consideration. The reviewers suggested making a number of changes including extending the proposed program and introducing a capstone project. In your response you agree with the reviewers that student success will rest on the strong quantitative background of applicants from a broad range of disciplines, and are confident that the admission requirements support student completion within the proposed time. You also noted that, in addition to non-credit opportunities to connect with industry, the curriculum will include an integrative group project, which will require interactions with and presentations to cross-sector industry representatives. The program's approach will be to weave this industry-relevant project throughout the curriculum rather than establishing a discrete course at the end of the program. I am delighted to note that in response to a suggestion by the reviewers, you are creating a course in Pension Funds and Insurance Companies.

The reviewers praised the outstanding quality of the faculty, stating it was the program's greatest strength, along with the state of the art learning and teaching facilities that will enhance the proposed program. I will be very pleased to recommend this new professional master's program to governance for approval, following approval at the Divisional level.

Sincerely,

Sioban Nelson
Vice-Provost, Academic Programs

cc.

Jackie Monahan, Assistant to the Dean, Rotman School of Management
Professor Susan Christoffersen, Vice Dean Undergraduate and Pre-Experience Programs

Jennifer Francisco, Coordinator, Academic Change, Office of the Vice-Provost, Academic Programs

Daniella Mallinick, Acting Director, Academic Programs, Planning and Quality Assurance, Office of the Vice-Provost, Academic Programs

Locke Rowe, Dean, Graduate Studies and Vice-Provost, Graduate Research and Education, SGS

Elizabeth Smyth, Decanal Advisor on Graduate Policies, SGS