

# MASTER OF SCIENCE HEALTH SYSTEMS

Health systems worldwide are undergoing a profound transformation. The Telfer Master of Science in Health Systems (MSc HS) cultivates researchers and industry leaders who will lead this transformation. We have developed a multi-talented, multidisciplinary core group of faculty who specialize in applying both qualitative and quantitative methods to health systems. Students in our program have come from varied disciplines including sociology, psychology, engineering, business and a number of health-related fields. They have studied such diverse topics as wait time management, human resource planning, inter-professional team development, capacity planning, information technology adoption and impacts, quality of care and patient perceptions of illness. What they have in common is a strong desire to apply their knowledge to help improve the quality and timeliness of care in health systems in Canada and around the world.

As the only health systems program embedded in a business school in Canada, we offer a unique opportunity to those who wish to make an impact on how health systems are managed. Our students have gone on to a number of PhD programs (including our own) as well as to careers in industry with various health organizations, consulting companies and research institutes. To find out more visit our website at <http://www.telfer.uottawa.ca/mschs/en/> (<http://www.telfer.uottawa.ca/mschs/en/>).

The MSc in Health Systems is acceptable as a basis for admission to the PhD in management.

The program builds on the expertise of professors and researchers in health systems research from the Telfer School of Management and from the Faculties of Health Sciences, Medicine, Social Sciences, Engineering and the Institute of Population Health.

The program is governed by the general regulations (<http://www.uottawa.ca/graduate-studies/students/general-regulations/>) in effect for graduate studies. It is offered in both English and French, primarily on a full-time basis.

## Admission Requirements

For the most accurate and up to date information on application deadlines, language tests and other admission requirements, please visit the specific requirements (<https://www.uottawa.ca/graduate-studies/programs-admission/apply/specific-requirements/>) webpage.

Applicants must hold a four-year bachelor's (honours) degree in management (B. Com.), health sciences, life sciences, medicine, nursing, computer science, economics, social sciences, engineering, mathematics or a related field with at least a 75% (B+) cumulative grade point average (CGPA) calculated in accordance with graduate studies guidelines.

The academic profile of applicants must contain a background in analysis including the equivalent of at least 6 units of analysis courses. Analysis courses include undergraduate level courses in quantitative and qualitative research methods, micro and macro economics, calculus, probability and statistics, linear algebra, and information technology. These courses represent excellent preparatory material for the core courses of the MSc in HS program. Students lacking background in the quantitative analysis material may be required to complete prerequisite course work as a condition of admission. The specific requirements of

the qualifying program will be determined by the admissions committee based on the academic and professional profile of the applicant.

Applicants to the program must have achieved at least a 50th percentile score on either the GMAT (General Management Admission Test) or GRE (Graduate Record Examinations), or TAGE-MAGE (Test d'Aptitude aux Études en Gestion), and submit at least two letters of recommendation and a statement of research interest of between 800-1000 words. The research statement is a letter of intent stating the applicant's motivation for studying in the MSc in HS program, their commitment to conducting research, their preferred areas of research interest as well as identifying a possible research supervisor.

Applicants who have successfully completed compulsory units or their equivalents prior to admission will be granted an exemption, that is, they will be permitted, on the advice of their supervisor, to replace those units with elective units in the program. To be eligible for exemption, the units must have been completed with a grade of 70% (B) or better no more than five years prior to admission to the MSc. The maximum number of units for which an exemption can be granted is six. The general regulations in effect for graduate studies, section B 2.7, apply for transfer of units.

Students are normally admitted to the program on a full-time basis and are required to enroll full-time for three terms.

## Language Requirements

Applicants must be able to understand, speak and write either English or French fluently and they must indicate in their application the language in which they intend to take their courses. Those whose mother tongue is neither English nor French are required, at the time of application, to provide evidence of proficiency in one of these languages. Applicants whose mother tongue is not English and who intend to study in English are required to provide one of the following as evidence of proficiency in English (the test scores cannot be more than two years old as of September 1 of the year of potential entry into the program):

- A score of at least 250 on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540.
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: [www.ielts.org](http://www.ielts.org) (<http://www.ielts.org>)
- A score of at least 14 on the CANTEST, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years of the last six years).

Candidates applying to study in French must submit one of the following to confirm their French proficiency:

- A score of at least 14 on the TESTCAN, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in a French language university.

- Proof of recent prolonged residence and exercise of a profession in a French-speaking country (normally at least four years of the last six years).

Considering the significant amount of health systems research that is published in English, all applicants need the ability to read and understand written English; proof of this ability may be required.

## Language of Instruction

All core courses and some of the electives are offered in both French and English. Some of the seminars in the Health Systems Research Seminar will be delivered in English and some in French so that the requirement may be completed fully in either language. There are sufficient elective courses in both languages for students to complete the elective requirements in either French or English. As per University of Ottawa policy, students can complete major assignments, examinations and their thesis in either English or French. This also applies to the oral presentations given by the students in the Health Systems Research Seminar. Opportunities exist for students to use French or English as a primary language of communication as they conduct their research.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

## Program Requirements

The MSc in Health Systems requires successful completion of 30 units consisting of 12 course units, a 6-unit Health Systems Research Internship and 12 units for the thesis.

### Compulsory Courses (7.5 units)

MHS 5301	Research Design Methodologies and the Conduct of Research	3 Units
MHS 6380	Systems Analysis, Modeling and Decision Support in Health	3 Units
MHS 6991	Health Systems Research Seminars <sup>1</sup>	
At least 1.5 optional course units in health administration (MHA) at the graduate level		1.5 Units

Note(s)

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Students are required to attend the regular seminars throughout their program of study; students are expected to present their proposal and preliminary research results normally in the Winter (term II) or Spring (term III) term.

### Electives (4.5 units)

Students in consultation with their thesis supervisor will select elective courses in areas related to their research topics. All courses offered in the MHA program are open to the MSc students. Enrollment to courses offered in the MBA, the MSc in Management and other graduate programs will normally require permission from the respective Program Directors.

The following list of electives, regrouped under possible themes of study, is not exhaustive, and is provided as a guideline for students and their advisors. Each year a list of elective courses approved and offered for students in the program will be posted on the program's website. Graduate courses other than those posted on the program website may be selected with the approval of the Thesis Supervisor and Program

Director. It is the students' responsibility to verify that they have the prerequisites for the elective courses they wish to take and to obtain the permission of the academic unit if required. Students are advised that enrollment in out of faculty courses may be limited at the discretion of the faculty offering the course. Unless otherwise indicated, all courses are worth 3 units.

### 1. Health Services and Policy

MHA 6203	Program Evaluation for Health Care Managers	1.5 Units
MHA 6250	Health Care Finance	1.5 Units
MHA 6351	Health Economics	3 Units
MHA 6360	Health Care in Canada in a Comparative Context	3 Units
NSG 6160	Policy, Political Action and Change in Health Care	3 Units

### 2. Public Health and Health Promotion

MHA 6301	Epidemiology and Population Health	3 Units
MBA 5320	Marketing	3 Units
EPI 5181	Population Health Risk Assessment I	3 Units
EPI 5210	Public Health Governance	3 Units
EPI 5271	Health Promotion	3 Units

### 3. Health Care Organizations

MHA 6361	Organizational Behavior and Change in Health Care	3 Units
MHA 6250	Health Care Finance	1.5 Units
MBA 5237	Change Management	1.5 Units
MBA 5330	Managing Talent Organizations	3 Units
MBA 6266	Principles of Negotiation	1.5 Units

### 4. Health Systems Analysis and Optimization

MHA 6271	Application of Information Technology in Health Care	1.5 Units
MHA 6370	Health Informatics	3 Units
MHA 6380	Quantitative Methods and Their Applications to Health Care Decision Making	3 Units
MBA 5280	Operations Supply Chain Management	1.5 Units
ADM 6275	Big Data Analytics	1.5 Units
SYS 5130	Systems Optimization and Management	3 Units
SYS 5140	Economic System Design	3 Units
EPI 5242	Biostatistics I	3 Units
EPI 6188	Systematic Review and Meta- Analysis	3 Units
MAT 5307	Topics in Operations Research	3 Units

### 5. Health Informatics and Technology

MHA 6271	Application of Information Technology in Health Care	1.5 Units
MHA 6370	Health Informatics	3 Units
EPI 5188	Health Technology Assessment	3 Units
CSI 5115	Database Analysis and Design	3 Units
CSI 5387	Data Mining and Concept Learning	3 Units

### 6. Quality of Care

MHA 6301	Epidemiology and Population Health	3 Units
MBA 6220	Sales Development Strategies for Products Services	1.5 Units

MHA 6361	Organizational Behavior and Change in Health Care	3 Units
MHA 6360	Health Care in Canada in a Comparative Context	3 Units

## 7. Clinical Decision Making and Support

MHA 6203	Program Evaluation for Health Care Managers	1.5 Units
MHA 6380	Quantitative Methods and Their Applications to Health Care Decision Making	3 Units
MBA 5280	Operations Supply Chain Management	1.5 Units
NSG 6133	Decision Making in Clinical Practice	3 Units
EPI 5181	Population Health Risk Assessment I	3 Units
EPI 6276	Biostatistics II	3 Units
PHR 6101	Risk Management in Government	3 Units

## Master's Thesis and Health Systems Research Internship (18 units)

The research deliverables of the program are comprised of the Master's thesis and the research internship for a total of 18 units:

THM 7999	Master's Thesis	
MHS 7991	Health Systems Research Internship	6 Units

Students enrolled for the MSc in HS must submit to their Thesis Committee, before the end of the second term of enrollment in the program, a clearly defined research proposal. The Thesis Committee will be formed prior to the thesis proposal submission. The Committee will include the thesis supervisor (and co-supervisor, if desired), a researcher from one of the collaborating institutions who may also act as co-supervisor, and another faculty member. Approval of the proposal by the Thesis Committee will normally be obtained by the end of the second term and no later than the end of the third. A student must enroll in the Masters thesis in the term immediately following the approval of the proposal. A student whose proposal is not approved on the first attempt may be permitted to submit a second proposal and present it in the Health Systems Research Seminars. Failure to obtain approval following the second submission will lead to an NS grade and to withdrawal from the program.

The master's thesis should reveal that the candidate is able to work independently in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. Insofar as possible, the thesis should be an original contribution. Theses will comprise theoretical and/or empirical research contributions applying a wide range of data collection methodologies, and modeling and analysis techniques based on appropriate software applications. Data collection methodologies will include the gathering of secondary data from published or archived sources, and/or primary data through interviews, surveys, and ethnographic studies. For example, topics for thesis research may address the issues of improving efficiencies of a health system and providing quality health services, the role of information and communication technologies in delivery of health services and the development of decision support tools.

The completed thesis will be evaluated by a Thesis Examining Board composed of at least two professors who are involved in the MSc in Health Systems. For information regarding the thesis, consult section G of the General Regulations in effect for graduate studies and the guide "Preparing a Thesis or a Research Paper," which are both accessible through the graduate studies website at [www.gradstud.uottawa.ca](http://www.gradstud.uottawa.ca).

Once the thesis proposal is accepted, students will be eligible to begin their Health Systems Research Internship with one of the collaborating organizations.

All MSc students will be required to undertake a one-term Research Internship that takes place in one of the collaborating Research Institutes. Students will work under the direction of their thesis supervisor and of a research mentor in the Institute. The Institute mentor is one of the members of the Thesis Committee. The Internship will allow the student to conduct thesis research and at the same time learn about and be involved in one or several of the cutting-edge research projects conducted in the Institute. It is expected that the student while doing the Health Systems Research Internship will participate in research seminars offered at the Institute as per the advice of the Internship supervisor as well as in the Health Systems Research Seminars. At the end of the term of the internship, students will be required to present a report to their Thesis Committee summarizing the research activities completed during the internship. The internship will be evaluated by the members of the Thesis Committee based on: (i) the Health Systems Research Seminars presentation and (ii) the written internship report to the Thesis Committee. The internship is graded on a (S) Satisfactory / (NS) Non-Satisfactory basis.

## Duration of Program

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial enrollment in the program.

## Minimum Standards

The minimum passing grade in all courses taken as part of the program is 65% (C+). Students who has incurred failures in two courses or a practicum, or whose thesis proposal is rejected twice (NS grade in MHS 7991) is withdrawn from the program.

## Research

### Research at the University of Ottawa

Located in the heart of Canada's capital, a few steps away from Parliament Hill, the University of Ottawa ranks among Canada's top 10 research universities. Our research is founded on excellence, relevance and impact and is conducted in a spirit of equity, diversity and inclusion.

Our research community thrives in four strategic areas:

- Creating a sustainable environment
- Advancing just societies
- Shaping the digital world
- Enabling lifelong health and wellness

From advancing healthcare solutions to tackling global challenges like climate change, the University of Ottawa's researchers are at the forefront of innovation, making significant contributions to society and beyond.

### Research at the Telfer School of Management

For more information, consult the Professors by area of expertise (<http://www.telfer.uottawa.ca/en/directory/professors-by-area-of-expertise/>) page.

## Courses

### **MHS 5301 Research Design Methodologies and the Conduct of Research (3 units)**

Introduction to research and scientific inquiry in order to foster a better understanding of the research discovery process. The process of planning, designing, and conducting a research study focusing on the research process, detailed discussions of the research methods and techniques available for use at each stage in the process, and linking the choice of research methods and techniques to the nature of the problem and the objectives of the study. Exposure to various research methodologies including paradigms of social phenomena modeling, qualitative research, mathematical modeling methods, and experimental design approaches including randomized control trials (RCT) design principles.

**Course Component:** Lecture

### **MHS 5701 Recherche et méthodologies de recherche (3 crédits)**

Introduction à la recherche et aux travaux scientifiques afin de mieux comprendre la démarche propre aux travaux de recherche. Planification, conception et la réalisation d'une étude, l'accent étant mis sur le processus de recherche, examen détaillé des méthodes et techniques de recherche pouvant être utilisées à chaque stade de la recherche tout en liant le choix de ces méthodes et techniques à la nature du problème et aux objectifs de l'étude. Présentation de méthodologies de recherche variées comprenant les paradigmes des sciences sociales pour la modélisation de phénomènes sociaux, les méthodes de recherche qualitatives, les méthodes de modélisation mathématique et la conception d'expériences incluant les principes de conception d'essais contrôlés et randomisés (ECR).

**Volet :** Cours magistral

### **MHS 6380 Systems Analysis, Modeling and Decision Support in Health (3 units)**

Review of Checkland's soft-systems modeling methodology and of other systems approaches. Study of systems analysis in the broader context of modeling complex systems and of techniques for providing decisional support at macro and micro levels, including support of clinical decisions. Oral and written reports required.

**Course Component:** Lecture

### **MHS 6390 Research Topics in Health Systems (3 units)**

Seminar course focusing on current research issues and topics in health systems. Topics may change from year to year.

**Course Component:** Lecture

### **MHS 6780 Analyse de systèmes, modélisation et soutien décisionnels en santé (3 crédits)**

Ce cours traitera de la méthodologie de modélisation des systèmes souples de Checkland et d'autres approches systémiques. Il portera notamment sur l'analyse des systèmes dans le contexte élargi de la modélisation de systèmes complexes et sur le soutien décisionnel aux niveaux local et global, appliqué notamment aux décisions cliniques. Pour chacun des grands thèmes du cours (approche systémique, systèmes complexes et soutien décisionnel), les étudiants devront mener des recherches, rédiger des rapports et présenter leurs résultats en classe.

**Volet :** Cours magistral

### **MHS 6790 Sujets de recherche en systèmes de santé (3 crédits)**

Ce cours donné sous forme de séminaire porte sur des questions et des sujets de recherche d'actualité dans le domaine des systèmes de santé. Les sujets traités dans ce cours peuvent changer d'année en année.

**Volet :** Cours magistral

### **MHS 6991 Séminaires sur la recherche en systèmes de santé / Health Systems Research Seminars**

Série de séminaires de recherche de deux types : ceux donnés par des conférenciers invités et ceux animés par des étudiants qui présenteront leurs projets de thèse. Les étudiants doivent assister à au moins six des séminaires donnés par des conférenciers invités pendant toute la durée du programme d'études. Les projets de thèse et résultats préliminaires des recherches des étudiants sont présentés lors de la session d'hiver (session II) ou celle du printemps (session III). Noté S (satisfaisant) ou NS (non satisfaisant). / Research seminar series with some seminars given by invited speakers and others consisting of student presentations of their thesis proposals. Students are expected to attend at least six of the invited speakers' seminars over the duration of their program. Students are expected to present their proposal and preliminary research results in the winter (session II) or spring (session III). Graded S (Satisfactory) or NS (Not Satisfactory).

**Volet / Course Component:** Recherche / Research

### **MHS 6998 Lectures dirigées / Directed Reading (3 crédits / 3 units)**

**Volet / Course Component:** Recherche / Research

Permission of the Department is required.

### **MHS 6999 Lectures dirigées / Directed Reading (3 crédits / 3 units)**

**Volet / Course Component:** Recherche / Research

Permission of the Department is required.

### **MHS 7991 Internat de recherche en systèmes de santé / Health Systems Research Internship (6 crédits / 6 units)**

Tous les candidats à la M.Sc. devront effectuer un internat de recherche d'une durée d'une session qui aura lieu à l'un des instituts partenaires de l'Université. Ils travailleront sous la supervision directe de leur directeur de thèse et d'un mentor membre de l'institut. Le mentor fait partie de leur comité de thèse. Pendant son internat, l'étudiant effectuera sa recherche de thèse tout en prenant part à l'un ou plusieurs des projets de recherche d'avant-garde de l'institut. On s'attend à ce qu'il participe, sur la recommandation de son mentor, à des séminaires de recherche offerts par l'institut ainsi qu'au Séminaire sur la recherche en systèmes de santé (MHS 6991). À la fin de l'internat, l'étudiant devra présenter à son comité de thèse un rapport sommaire sur ses activités de recherche. Les membres du comité de thèse évalueront l'internat selon les critères suivants : (i) la présentation que l'étudiant aura faite lors du Séminaire sur la recherche en systèmes de santé; (ii) le rapport d'internat écrit que l'étudiant aura présenté à son comité de thèse. L'internat sera noté S (satisfaisant) ou NS (non satisfaisant). / All MSc students will be required to undertake a one-session Research Internship that takes place in one of the collaborating Research Institutes. Students will work under the direction of their thesis supervisor and of a research mentor in the Institute. The Institute is one of the members of the Thesis Committee. The Internship will allow the student to conduct thesis research and at the same time learn about and be involved in one or several of the cutting-edge research projects conducted in the Institute. It is expected that the student, while doing the Health Systems Research Internship (MHS 6991), will participate in research seminars offered at the Institute as per the advice of the Internship supervisor as well as in the Health Systems Research Seminars. At the end of the session of the Internship, students will be required to present a report to their Thesis Committee summarizing the research activities completed during the Internship. The Internship will be evaluated by the members of the Thesis Committee based on: (i) the Health Systems Research Seminars presentation and (ii) the written Internship report to the Thesis Committee. The Internship is graded on a S (Satisfactory) / NS (Not satisfactory) basis.

**Volet / Course Component:** Stage / Work Term

Permission of the Department is required.