

Health Sciences

This section presents the requirements for programs in:

- **M.Sc. Health Sciences**
- **M.Sc. Health: Science, Technology and Policy**
- **M.Sc. Health Sciences with Specialization in Data Science**
- **Graduate Diploma in Health: Science, Technology and Policy**
- **Ph.D. Health Sciences**

Program Requirements

M.Sc. Health Sciences (5.0 credits)

| Requirements: | | |
|---|---|-----|
| 1. 1.0 credit in: | | 1.0 |
| HLTH 5901 [0.5] | Advanced Topics in Interdisciplinary Health Sciences | |
| HLTH 5902 [0.5] | Seminars in Interdisciplinary Health Sciences for MSc | |
| 2. Completion of: | | 0.0 |
| HLTH 5905 [0.0] | Final Research Seminar Presentation for MSc | |
| 3. 4.0 credits in: | | 4.0 |
| HLTH 5909 [4.0] | MSc Thesis | |
| 4. Twice-yearly meetings with the thesis Graduate Advisory Committee, with students meeting a level of progress as determined by the Committee. | | |
| Total Credits | | 5.0 |

Note: the final research seminar presentation must be completed within one month of the thesis defence.

M.Sc. Health: Science, Technology and Policy (6.0 credits)

In consultation with the Graduate Advisor and potential project supervisor, students must carefully decide whether they wish to do a group or individual project. Whilst every effort will be made to accommodate this choice, there may not be a sufficient number of individual projects to go around, or some projects may be better suited for one type (group/individual) or the other. Students must be continually registered in the project (group/individual) for the duration of their degree program (5 terms). Students will not normally be able to change from the group to the individual project or vice-versa once a student has committed to one or the other.

| Requirements: | | |
|---------------------------|---|-----|
| 1. 3.0 credits in: | | 3.0 |
| HLTH 5100 [0.5] | Fundamentals of Research Methods | |
| HLTH 5150 [0.5] | Statistics for Health Sciences | |
| HLTH 5201 [0.5] | Fundamentals of Policy I: Policy Analysis | |
| HLTH 5300 [0.5] | Knowledge Translation | |
| HLTH 5350 [0.5] | New Health Technologies | |
| HLTH 5401 [0.5] | Interdisciplinary Problems in Health | |
| 2. 1.0 credit in: | | 1.0 |

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| HLTH 5504 [1.0] | Interdisciplinary Health Research Project - Group | |
| or HLTH 5505 [1. Interdisciplinary Health Research Project – Individual | | |
| 3. 2.0 credits from: | | 2.0 |
| a. HLTH selected topic elective courses focusing on areas of specific relevance to the health sector | | |
| HLTH 5151 [0.5] | Principles of Epidemiology | |
| HLTH 5202 [0.5] | Fundamentals of Policy II: The Health Sector | |
| HLTH 5600 [0.25] | Special Topics in Biostatistics and Epidemiology | |
| HLTH 5601 [0.25] | Special Topics in Health Policy and Administration | |
| HLTH 5602 [0.25] | Special Topics: Social and Behavioural | |
| HLTH 5603 [0.25] | Special Topics in Environmental Health | |
| HLTH 5604 [0.25] | Special Topics in the Science of Disease | |
| HLTH 5605 [0.25] | Special Topics: Engineering, Design and Computer Science | |
| HLTH 5701 [0.5] | Special Topics in Health Policy and Administration | |
| HLTH 5702 [0.5] | Special Topics: Social and Behavioural | |
| HLTH 5703 [0.5] | Special Topics in Environmental Health | |
| HLTH 5704 [0.5] | Special Topics in the Science of Disease | |
| HLTH 5705 [0.5] | Special Topics: Engineering, Design and Computer Science | |
| HLTH 5800 [0.5] | Directed Studies in Health: Science, Technology and Policy | |
| b. Courses offered by other graduate programs, selected with the guidance and permission of the supervisor of graduate studies and with the permission of the specific program and requiring the prior completion of prerequisites. Examples include: | | |
| PSYC 5209 [0.5] | Psychology of Health and Illness | |
| PHIL 5000 [0.5] | Special Topic in Philosophy | |
| SOCI 5209 [0.5] | Sociology of Science and Technology | |
| BIOM 5100 [0.5] | Biomedical Instrumentation | |
| COMS 5206 [0.5] | Communication, Culture, Regulation | |
| INAF 5705 [0.5] | Global Social Policy | |
| INAF 5706 [0.5] | Global Health Policy | |
| PADM 5221 [0.5] | Health Policy in Canada | |
| PADM 5222 [0.5] | Economics and Health Policy | |
| PADM 5229 [0.5] | The Health of Populations | |
| PADM 5817 [0.5] | Health Policy in Developing Countries | |
| SOWK 5302 [0.5] | Mental Health | |
| STAT 5600 [0.5] | Mathematical Statistics I | |
| STAT 5501 [0.5] | Mathematical Statistics II | |
| STAT 5602 [0.5] | Analysis of Categorical Data | |
| COMP 5308 [0.5] | Topics in Medical Computing | |
| PHYS 5204 [0.5] | Physics of Medical Imaging | |
| CHEM 5708 [0.5] | Principles of Toxicology | |

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|-----------------|--------------------------------|
| CHEM 5709 [0.5] | Chemical Toxicology |
| BIOL 5407 [0.5] | Biostatistics I |
| BIOL 5515 [0.5] | Bioinformatics |
| BIOL 5516 [0.5] | Applied Bioinformatics |
| BIOL 6406 [0.5] | Genetic Toxicology |
| NEUR 5201 [0.5] | Statistics for Neuroscience I |
| NEUR 5202 [0.5] | Statistics for Neuroscience II |
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| Total Credits | 6.0 |

M.Sc. Health Sciences with Specialization in Data Science (5.5 credits)

Requirements (5.5 credits)

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| 1. 1.0 credits in: | 1.0 |
| HLTH 5901 [0.5] | Advanced Topics in Interdisciplinary Health Sciences |
| HLTH 5902 [0.5] | Seminars in Interdisciplinary Health Sciences for MSc |
| 2. 0.5 credits in: | 0.5 |
| DATA 5000 [0.5] | Data Science Seminar |
| 3. Completion of: | |
| HLTH 5905 [0.0] | Final Research Seminar Presentation for MSc |
| 4. 4.0 credits in: | 4.0 |
| HLTH 5909 [4.0] | MSc Thesis |
| 5. Twice-yearly meetings with the thesis Graduate Advisory Committee, with students meeting a level of progress as determined by the Committee. | |
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| Total Credits | 5.5 |

Note: The final research seminar presentation must be completed within one month of the thesis defence.

Graduate Diploma in Health: Science, Technology and Policy (2.0 credits)

The Diplomas are designed to be completed in one year. However, as it is understood that most students in the Diploma programs will either be working or full-time students in another graduate program, students may take the program on either a part-time or full-time basis.

Type 2 Diploma

For graduate students currently enrolled in other Carleton graduate programs.

Requirements:

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| 1. 1.5 credits in: | 1.5 |
| HLTH 5100 [0.5] | Fundamentals of Research Methods |
| HLTH 5201 [0.5] | Fundamentals of Policy I: Policy Analysis |
| HLTH 5300 [0.5] | Knowledge Translation |
| 2. 0.5 credit in electives from: | 0.5 |
| a. HLTH selected topic elective courses focusing on areas of specific relevance to the health sector: | |
| HLTH 5600 [0.25] | Special Topics in Biostatistics and Epidemiology |
| HLTH 5601 [0.25] | Special Topics in Health Policy and Administration |
| HLTH 5602 [0.25] | Special Topics: Social and Behavioural |

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| HLTH 5603 [0.25] | Special Topics in Environmental Health |
| HLTH 5604 [0.25] | Special Topics in the Science of Disease |
| HLTH 5605 [0.25] | Special Topics: Engineering, Design and Computer Science |
| HLTH 5700 [0.5] | Special Topics in Biostatistics and Epidemiology |
| HLTH 5701 [0.5] | Special Topics in Health Policy and Administration |
| HLTH 5702 [0.5] | Special Topics: Social and Behavioural |
| HLTH 5703 [0.5] | Special Topics in Environmental Health |
| HLTH 5704 [0.5] | Special Topics in the Science of Disease |
| HLTH 5705 [0.5] | Special Topics: Engineering, Design and Computer Science |
| b. Courses offered by other graduate programs, selected with the guidance and permission of the supervisor of graduate studies and with the permission of the specific program and requiring the prior completion of prerequisites. | |
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| Total Credits | 2.0 |

Type 3 Diploma

For individuals currently employed, or with the goal of employment in the health sector, who are not currently registered in another Carleton graduate program.

Requirements:

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| 1. 0.5 credit in: | 0.5 |
| HLTH 5300 [0.5] | Knowledge Translation |
| 2. 1.5 credits in: | 1.5 |
| a. HLTH 5201 (recommended for students who do not have a strong policy background) | |
| b. HLTH selected topic elective courses focusing on areas of specific relevance to the health sector: | |
| HLTH 5600 [0.25] | Special Topics in Biostatistics and Epidemiology |
| HLTH 5601 [0.25] | Special Topics in Health Policy and Administration |
| HLTH 5602 [0.25] | Special Topics: Social and Behavioural |
| HLTH 5603 [0.25] | Special Topics in Environmental Health |
| HLTH 5604 [0.25] | Special Topics in the Science of Disease |
| HLTH 5605 [0.25] | Special Topics: Engineering, Design and Computer Science |
| HLTH 5700 [0.5] | Special Topics in Biostatistics and Epidemiology |
| HLTH 5701 [0.5] | Special Topics in Health Policy and Administration |
| HLTH 5702 [0.5] | Special Topics: Social and Behavioural |
| HLTH 5703 [0.5] | Special Topics in Environmental Health |
| HLTH 5704 [0.5] | Special Topics in the Science of Disease |

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|---|--|------|
| HLTH 5705 [0.5] | Special Topics: Engineering, Design and Computer Science | |
| Total Credits | | 2.0 |
| Ph.D. Health Sciences (10.0 credits) | | |
| Requirements: | | |
| 1. 1.5 credits in: | | 1.5 |
| HLTH 5901 [0.5] | Advanced Topics in Interdisciplinary Health Sciences | |
| HLTH 6902 [0.5] | Seminars in Interdisciplinary Health Sciences | |
| HLTH 6903 [0.5] | Grant Proposals and Ethics | |
| 2. Completion of: | | 0.0 |
| HLTH 6904 [0.0] | Mid-Program Defence | |
| HLTH 6905 [0.0] | Final Research Seminar Presentation | |
| 3. 8.5 credits in: | | 8.5 |
| HLTH 6909 [8.5] | PhD Thesis | |
| 4. Twice-yearly meetings with thesis Graduate Advisory Committee, with students reaching a level of satisfaction as determined by the Committee | | |
| Total Credits | | 10.0 |

Note: If the student fails to satisfy the requirements of HLTH 6904, he/she will be withdrawn from the program. The final research seminar presentation must be completed within one month of the thesis defence.

Regulations

See the General Regulations section of this Calendar.

All candidates are required to obtain a grade of B or higher in each course in the program.

M.Sc. Health: Science, Technology and Policy

Full-time candidates in the master's program are expected to complete their degree requirements within five terms (20 months) of first registration for full-time study.

Regulations

See the General Regulations section of this Calendar.

All candidates are required to obtain a grade of B or higher in each course in the program.

Regulations

See the General Regulations section of this Calendar.

All candidates are required to obtain a grade of B- or higher in each course in the program.

Admission

Applicants for the master's program will normally hold an Honours undergraduate degree or equivalent professional degree. Normally, an average of B+ or higher is required for admission. At least one university-level course in statistics is also required for admission. Applicants judged to be generally acceptable but deficient in some aspect of preparation may be asked to complete course-work in addition to the program requirements. In addition to transcripts and letters of reference, application packages will include a statement of interest explaining how the applicant's career goals are aligned with the program and a statement of expertise, including previous research

and/or work experience. The admissions committee will also consider the requirement for an appropriate balance of academic backgrounds to provide the disciplinary expertise required for the group projects, which are designed to represent a mixed-discipline workplace in the health sector.

Students whose first language is not English, or who have not completed a previous degree at an English speaking university, must demonstrate an adequate command of English. Please refer to section 3.6 of the general regulations in the Graduate Calendar.

Students may receive advanced standing with transfer of credit for up to 1.5 credits. Advanced standing will be considered only for core courses. It will be determined on an individual basis in consultation with the M.Sc Supervisor and the Faculty of Graduate and Postdoctoral Affairs and pursuant to Section 6.1 of the General Regulations section of this Calendar. In general, a grade of B+ or higher is necessary in the equivalent courses in order to receive advanced standing.

Note: students in the Diploma programs are not eligible to receive university funding.

Admission

The normal requirement for admission into the Ph.D. program is an M.Sc. degree in a relevant field. Students who are in the Health Sciences M.Sc. program may be admitted to the Ph.D. program if they show outstanding academic performance and demonstrate significant promise for advanced research, upon recommendation of the student's Graduate Advisory Committee and approval by the Graduate Advisor.

Admission

Applicants must have a bachelor's degree (or equivalent). Normally, an average of B+ or higher is required for admission. A university level course in statistics is also required for admission.

Students whose first language is not English, or who have not completed a previous degree at an English speaking university, must demonstrate an adequate command of English. Please refer to section 3.6 of the general regulations in the Graduate Calendar.

Note: students in the Diploma programs are not eligible to receive university funding through the program.

Health Sciences (HLTH) Courses

HLTH 5100 [0.5 credit]

Fundamentals of Research Methods

Experimental design, statistical analysis and interpretation of results in health science research, principles and methods of epidemiology, fundamentals of research ethics.

Includes: Experiential Learning Activity
Prerequisite(s): university-level statistics.

HLTH 5101 [0.0 credit]**Statistical Software and its Application to Health Sciences Primer**

Introduction to statistical softwares used to analyze health research data. Data management topics include data entry, manipulation, and elementary statistical analyses using SAS, SPSS, Stata and R. Other topics include privacy/maintaining security of health datasets. For students without strong backgrounds in biostatistics/data handling.

Includes: Experiential Learning Activity

HLTH 5150 [0.5 credit]**Statistics for Health Sciences**

Statistical methods commonly used in analyses of health data. This applied course covers topics related to descriptive and graphical methods, tests of hypotheses in both paired and independent samples, linear regression, survival analysis, and logistic regression.

Includes: Experiential Learning Activity

Lecture three hours a week, lab/workshop three hours a week.

HLTH 5151 [0.5 credit]**Principles of Epidemiology**

Introduction to epidemiologic concepts and methods. Different types of epidemiological study designs. Fundamental concepts of: definitions and measures of disease frequency and effects, causality, bias, sample size, confounding and interaction.

Includes: Experiential Learning Activity

HLTH 5201 [0.5 credit]**Fundamentals of Policy I: Policy Analysis**

Policy analysis and policy processes with an emphasis on the stages of the policy process, as well as the influences of institutions, ideas and interests.

HLTH 5202 [0.5 credit]**Fundamentals of Policy II: The Health Sector**

Canadian health policies and programs with emphasis on the economics, politics and public administration of the healthcare sector.

HLTH 5300 [0.5 credit]**Knowledge Translation**

The application of knowledge translation in the formulation of policy and the development of skills required to maximize the impact of scientific findings through real world programs and policies and communication skills for diverse audiences.

Precludes additional credit for NEUR 5801.

Prerequisite(s): HLTH 5100, HLTH 5200.

Also offered at the undergraduate level, with different requirements, as HLTH 4701, for which additional credit is precluded.

HLTH 5350 [0.5 credit]**New Health Technologies**

Overview of new and emerging health technologies, including medical and assistive devices, diagnostics and screening, genetics, reproduction, tissue regeneration, imaging, and health informatics. Health technology assessment methods and issues. Regulatory, ethical and social implications; considerations in the developing world.

Includes: Experiential Learning Activity

Also offered at the undergraduate level, with different requirements, as HLTH 4102, for which additional credit is precluded.

HLTH 5401 [0.5 credit]**Interdisciplinary Problems in Health**

Development of an understanding of the scope and interdisciplinary nature of issues that impact the health of Canadians is the focus of this course.

HLTH 5501 [2.0 credits]**Collaborative Group Research Project**

Student teams, supervised by a cross-disciplinary team of faculty, will collaborate on a project that addresses a real-world health concern.

Includes: Experiential Learning Activity

Prerequisite(s): HLTH 5400.

HLTH 5504 [1.0 credit]**Interdisciplinary Health Research Project - Group**

Student teams will collaborate on a research project that addresses a real-world health concern, supervised by a cross-disciplinary team of faculty. Students must be continually registered in this course throughout their degree program (five terms.).

Includes: Experiential Learning Activity

Precludes additional credit for HLTH 5502 (no longer offered), HLTH 5503(no longer offered), HLTH 5505.

HLTH 5505 [1.0 credit]**Interdisciplinary Health Research Project – Individual**

An independent research project that addresses a real-world health concern, supervised by a faculty member and advised by a cross-disciplinary team of experts. Students must be continually registered in this course throughout their degree program (five terms).

Includes: Experiential Learning Activity

Precludes additional credit for HLTH 5502(no longer offered), HLTH 5503(longer offered), HLTH 5504.

Prerequisite(s): permission of the Faculty supervisor and the Department of Health Sciences.

HLTH 5600 [0.25 credit]**Special Topics in Biostatistics and Epidemiology**

Selected topics in biostatistics and epidemiology, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

Includes: Experiential Learning Activity

HLTH 5601 [0.25 credit]**Special Topics in Health Policy and Administration**

Selected topics in health policy and administration, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5602 [0.25 credit]**Special Topics: Social and Behavioural**

Selected topics in the social and behavioural sciences, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5603 [0.25 credit]**Special Topics in Environmental Health**

Selected topics in environmental health, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5604 [0.25 credit]**Special Topics in the Science of Disease**

Selected topics in the science of disease, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5605 [0.25 credit]**Special Topics: Engineering, Design and Computer Science**

Selected topics in applications of engineering, design or computer science in health, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5700 [0.5 credit]**Special Topics in Biostatistics and Epidemiology**

Selected topics in biostatistics and epidemiology, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

Includes: Experiential Learning Activity

HLTH 5701 [0.5 credit]**Special Topics in Health Policy and Administration**

Selected topics in health policy and administration, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5702 [0.5 credit]**Special Topics: Social and Behavioural**

Selected topics in the social and behavioural sciences, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5703 [0.5 credit]**Special Topics in Environmental Health**

Selected topics in environmental health, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5704 [0.5 credit]**Special Topics in the Science of Disease**

Selected topics in the science of disease, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5705 [0.5 credit]**Special Topics: Engineering, Design and Computer Science**

Selected topics in applications of engineering, design or computer science in health, focusing on areas of specific relevance to the health sector, not available in regular program offerings. These courses are designed to provide depth of expertise and/or specific skills relevant to the workplace.

HLTH 5800 [0.5 credit]**Directed Studies in Health: Science, Technology and Policy**

One-to-one instruction in selected aspects of specialized Health: Science and Technology subjects not covered by other graduate courses. Students may not take this course from their project supervisor(s), and are limited to one directed studies course per program.

Prerequisite(s): permission of the director of Health: Science, Technology and Policy.

HLTH 5901 [0.5 credit]**Advanced Topics in Interdisciplinary Health Sciences**

Discussion of current health problems and exploration of innovative interdisciplinary solutions. Development of skills required to perform critical analyses of health research to evaluate the quality, interpret the findings, and assess the impact of health sciences literature across disciplines.

HLTH 5902 [0.5 credit]**Seminars in Interdisciplinary Health Sciences for MSc**

Development of scientific communication skills through attendance at interdisciplinary seminars and by the student presenting a seminar on their own thesis research. Topics have specific or broad relevance to health sciences. Graded SAT/UNS.

HLTH 5905 [0.0 credit]**Final Research Seminar Presentation for MSc**

Final seminar of MSc thesis research. Seminar presentation should occur within one month of the final oral thesis defence.

Includes: Experiential Learning Activity

HLTH 5909 [4.0 credits]**MSc Thesis**

Includes: Experiential Learning Activity

HLTH 6902 [0.5 credit]**Seminars in Interdisciplinary Health Sciences**

Development of scientific communication skills through attendance at interdisciplinary seminars and by the student presenting a seminar on their own thesis research.

Topics have specific or broad relevance to health sciences. Graded SAT/UNS.

HLTH 6903 [0.5 credit]**Grant Proposals and Ethics**

Advanced course in writing successful grant proposals in Tri-Council (CIHR, NSERC, SSHRC) formats. Ethics associated with conducting health sciences research, including the preparation of ethics proposals for human and animal studies in health sciences research.

Includes: Experiential Learning Activity

HLTH 6904 [0.0 credit]**Mid-Program Defence**

Departmental seminar and Graduate Advisory Committee meeting on PhD research including results to date and future research aims and directions, and on field-specific knowledge.

Includes: Experiential Learning Activity

HLTH 6905 [0.0 credit]**Final Research Seminar Presentation**

Final seminar of PhD thesis research. Seminar presentation should occur within one month of the final oral thesis defence.

Includes: Experiential Learning Activity

HLTH 6909 [8.5 credits]**PhD Thesis**

Includes: Experiential Learning Activity