# Health Sciences

This section presents the requirements for programs in:

- **Health Sciences with Concentration B.H.Sc. Honours**
- **Health Sciences B.H.Sc. General**
- **Journalism with Concentration in Health Sciences B.J. Honours**

## Program Requirements

Students in the B.H.Sc. Honours program choose to follow one of five concentrations. The selection must take place at admission.

### Health Sciences with Concentration B.H.Sc. Honours (20.0 credits)

**A. Credits Included in the Major CGPA (10.5 credits)**

1. **4.5 credits in:**
   - HLTH 1000 [0.5] Fundamentals of Health
   - HLTH 1002 [0.5] Health Science Communication
   - HLTH 2001 [0.5] Health Research Methods and Skills
   - HLTH 2002 [0.5] Molecular and Cellular Pathology
   - HLTH 2003 [0.5] Social Determinants of Health
   - HLTH 3101 [0.5] Global Health
   - HLTH 3201 [0.5] Epidemiology
   - HLTH 3302 [0.5] Immunity and Immune-Related Disorders
   - HLTH 3404 [0.5] Psychosocial and Biological Interactions in Health

2. **1.5 credits in:**
   - a) Project/Field Placement pathway
     - 0.5 credit from:
       - HLTH 3901 [0.5] Emerging Issues in Biomedical Science
       - HLTH 3902 [0.5] Emerging Issues in Global Health
       - HLTH 3903 [0.5] Emerging Issues in Environment and Health
       - HLTH 3904 [0.5] Emerging Issues in Health Throughout the Lifespan
       - HLTH 3905 [0.5] Emerging Issues in Disabilities and Chronic Illness
   - and
     - 1.0 credit from:
       - HLTH 4907 [1.0] Capstone Course – Group Research Project
       - HLTH 4909 [1.0] Capstone Course – Field Placement
       - HLTH 4910 [1.0] Honours Individual Research Thesis
   - OR
   - b) Essay pathway
     - 0.5 credit in HLTH elective at the 3000 level or above
     - 1.0 credit in:
       - HLTH 4906 [1.0] Capstone course – Research Essay
     - 3. **0.5 credit in HLTH at the 3000 level or above**

**B. Credits Not Included in the Major CGPA (9.5 credits)**

5. **2.5 credits in:**
   - BIOL 1103 [0.5] Foundations of Biology I
   - BIOL 1104 [0.5] Foundations of Biology II
   - CHEM 1001 [0.5] General Chemistry I
   - CHEM 1002 [0.5] General Chemistry II
   - MATH 1007 [0.5] Elementary Calculus I

6. **1.0 credit from:**
   - ECON 1000 [1.0] Introduction to Economics
   - PSYC 1001 [0.5] Introduction to Psychology I
   - PSYC 1002 [0.5] Introduction to Psychology II

7. **1.0 credit in:**
   - STAT 2507 [0.5] Introduction to Statistical Modeling I
   - STAT 2509 [0.5] Introduction to Statistical Modeling II

8. **1.0 credit in:**
   - BIOL 2104 [0.5] Introductory Genetics
   - BIOL 2200 [0.5] Cellular Biochemistry

9. **0.5 credit in approved 2000-level concentration electives**

10. **0.5 credit from:**
    - PHIL 1550 [0.5] Introduction to Ethics and Social Issues
    - PHIL 2408 [0.5] Bioethics

11. **3.0 credits in free electives.**

**NOTE:** The maximum allowed combined number of minors and concentrations for any student is two.

## Concentration in Biomedical Sciences (5.0 credits)

1. **0.5 credit from:**
   - CHEM 2203 [0.5] Organic Chemistry I
   - FOOD 2001 [0.5] Principles of Nutrition
   - NEUR 2201 [0.5] Cellular and Molecular Neuroscience
   - PSYC 2301 [0.5] Introduction to Health Psychology

2. **2.5 credits in:**
   - BIOL 3104 [0.5] Molecular Genetics
   - BIOL 3305 [0.5] Human and Comparative Physiology
   - or BIOL 3306 [0.5] Human Anatomy and Physiology

   - BIOL 3307 [0.5] Advanced Human Anatomy and Physiology
   - HLTH 2004 [0.5] Microbiology and Virology
   - HLTH 3303 [0.5] Molecular and Cellular Pathology II

3. **0.5 credit from:**
   - HLTH 4201 [0.5] Applied Health Statistics
   - HLTH 4202 [0.5] Health Program Evaluation Tools and Methods

4. **1.0 credit from:**
   - HLTH 3401 [0.5] Diseases of Childhood
   - HLTH 3402 [0.5] Diseases of Aging
   - HLTH 3503 [0.5] Chronic Illness and Disability
   - HLTH 4102 [0.5] New Health Technologies
   - HLTH 4301 [0.5] Pandemics and Infectious Disease
   - HLTH 4302 [0.5] Inflammatory and Endocrine Factors in Diseases

**Total Credits:** 20.0
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**Total Credits:** 5.0

**Concentration in Disability and Chronic Illness (5.5 credits)**

1. **0.5 credit in:**
   - NEUR 2201 [0.5] Cellular and Molecular Neuroscience

2. **0.5 credit from:**
   - BIOL 2303 [0.5] Microbiology
   - CHEM 2203 [0.5] Organic Chemistry I
   - FOOD 2001 [0.5] Principles of Nutrition
   - NEUR 2202 [0.5] Neurodevelopment and Plasticity
   - PSYC 2301 [0.5] Introduction to Health Psychology

3. **2.5 credits in:**
   - BIOL 3305 [0.5] Human and Comparative Physiology
   - or BIOL 3306 [0.5] Human Anatomy and Physiology
   - BIOL 3307 [0.5] Advanced Human Anatomy and Physiology
   - HLTH 3503 [0.5] Chronic Illness and Disability
   - HLTH 4502 [0.5] Diseases and Disabilities Related to Sensory Processes and Movement
   - HLTH 4503 [0.5] Trauma-related Illness and Disability

4. **0.5 credit from:**
   - HLTH 4201 [0.5] Applied Health Statistics
   - HLTH 4202 [0.5] Health Program Evaluation Tools and Methods

5. **1.0 credit from:**
   - BIOL 3501 [0.5] Biomechanics
   - HLTH 3103 [0.5] Health Policy and Canada's Health Care System
   - HLTH 3104 [0.5] Regulatory Issues and Human Health
   - HLTH 3401 [0.5] Diseases of Childhood
   - HLTH 3402 [0.5] Diseases of Aging
   - HLTH 4302 [0.5] Inflammatory and Endocrine Factors in Diseases
   - NEUR 3501 [0.5] Neurodegeneration and Aging

6. **0.5 credit from:**
   - BIOC 3008 [0.5] Bioinformatics
   - BIOL 3104 [0.5] Molecular Genetics
   - BIOL 3202 [0.5] Principles of Developmental Biology
   - ECON 4460 [0.5] Health Economics
   - FOOD 3005 [0.5] Food Microbiology
   - FOOD 4103 [0.5] Food Safety Risk Assessment, Communication and Management I
   - FOOD 4201 [0.5] Advanced Nutrition and Metabolism
   - FOOD 4202 [0.5] Micronutrients and Health
   - GEOG 3206 [0.5] Health, Environment, and Society
   - NEUR 3304 [0.5] Hormones and Behaviour
   - NEUR 3401 [0.5] Environmental Toxins and Mental Health
   - NEUR 3502 [0.5] Neurodevelopmental Determinants of Mental Health
   - HLTH 2004 [0.5] Microbiology and Virology
   - HLTH 3102 [0.5] Indigenous Health in a Global World
   - HLTH 3303 [0.5] Molecular and Cellular Pathology II
   - HLTH 3403 [0.5] Gender and Health
   - HLTH 4101 [0.5] Global Health Governance
   - HLTH 4301 [0.5] Pandemics and Infectious Disease
   - HLTH 4303 [0.5] Fundamentals in Pharmacology and Toxicology
   - HLTH 4401 [0.5] Maternal and Perinatal Determinants of Health
   - HLTH 4601 [0.5] Environmental Pollution and Health
   - HLTH 4701 [0.5] Knowledge Translation
   - HLTH 4901 [0.5] Directed Studies in Health

**Total Credits:** 5.5

**Concentration in Environment and Health (6.0 credits)**

1. **1.0 credit in:**
   - CHEM 2800 [0.5] Foundations for Environmental Chemistry
   - BIOL 3305 [0.5] Human and Comparative Physiology
   - or BIOL 3306 [0.5] Human Anatomy and Physiology

2. **0.5 credit from:**
   - BIOL 2303 [0.5] Microbiology
   - FOOD 2001 [0.5] Principles of Nutrition
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**Total Credits: 6.0**

**Concentration in Global Health (5.5 credits)**

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<td>PSYC 2301 [0.5]</td>
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### 3. **2.5 credits in:**

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### Concentration in Health Throughout the Lifespan (5.5 credits)

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### Total Credits: 5.5

### Health Sciences

### B.H.Sc. General (15.0 credits)

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<td>STAT 2507</td>
<td>Introduction to Statistical Modeling I</td>
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<td>STAT 2509</td>
<td>Introduction to Statistical Modeling II</td>
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<tr>
<td>BIOL 3305</td>
<td>Human and Comparative Physiology</td>
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<td>BIOL 3306</td>
<td>Human Anatomy and Physiology</td>
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<td>BIOL 3307</td>
<td>Advanced Human Anatomy and Physiology</td>
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<tr>
<td>HLTH 3303</td>
<td>Health Policy and Canada's Health Care System</td>
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<td>HLTH 3403</td>
<td>Gender and Health</td>
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<td>HLTH 3503</td>
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<td>HLTH 4102</td>
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<td>HLTH 4302</td>
<td>Inflammatory and Endocrine Factors in Diseases</td>
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<td>HLTH 4303</td>
<td>Fundamentals in Pharmacology and Toxicology</td>
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<td>NEUR 3501</td>
<td>Neurodegeneration and Aging</td>
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<td>NEUR 3502</td>
<td>Neurodevelopmental Determinants of Mental Health</td>
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<td>BIOC 3008</td>
<td>Bioinformatics</td>
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<td>BIOL 3104</td>
<td>Molecular Genetics</td>
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<td>BIOL 3202</td>
<td>Principles of Developmental Biology</td>
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<td>BIOL 3501</td>
<td>Biomechanics</td>
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<td>ECON 4460</td>
<td>Health Economics</td>
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<td>FOOD 3005</td>
<td>Food Microbiology</td>
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<td>FOOD 4103</td>
<td>Food Safety Risk Assessment, Communication and Management I</td>
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<tr>
<td>FOOD 4201</td>
<td>Advanced Nutrition and Metabolism</td>
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<td>FOOD 4202</td>
<td>Micronutrients and Health</td>
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<td>GEOG 3206</td>
<td>Health, Environment, and Society</td>
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<td>HLTH 3102</td>
<td>Indigenous Health in a Global World</td>
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<td>Environmental Pollution and Health</td>
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<td>HLTH 4901</td>
<td>Directed Studies in Health</td>
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<td>NEUR 3304</td>
<td>Hormones and Behaviour</td>
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<tr>
<td>NEUR 3401</td>
<td>Environmental Toxins and Mental Health</td>
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**Total Credits:** 5.5
HLTH 3404 [0.5]  Psychosocial and Biological Interactions in Health
HLTH 3503 [0.5]  Chronic Illness and Disability

B. Credits Not Included in the Major CGPA (8.0 credits)
6. 2.5 credits in:
   BIOL 1103 [0.5]  Foundations of Biology I
   BIOL 1104 [0.5]  Foundations of Biology II
   CHEM 1001 [0.5]  General Chemistry I
   CHEM 1002 [0.5]  General Chemistry II
   MATH 1007 [0.5]  Elementary Calculus I
7. 1.0 credit from:
   ECON 1000 [1.0]  Introduction to Economics
   PSYC 1001 [0.5]  Introduction to Psychology I
   PSYC 1002 [0.5]  Introduction to Psychology II
8. 0.5 credit from:
   PHIL 1550 [0.5]  Introduction to Ethics and Social Issues
   PHIL 2408 [0.5]  Bioethics

Journalism with Concentration in Health Sciences

B.J. Honours (20.0 credits)

A. Credits Included in the Major CGPA (8.0 credits)
1. 1.0 credit in:
   JOUR 1001 [0.5]  Foundations of Journalism: Journalism in Context
   JOUR 1002 [0.5]  Foundations of Journalism: Journalism in Practice
2. 2.0 credits in:
   JOUR 2201 [1.0]  Fundamentals of Reporting
   JOUR 2202 [0.5]  Digital Journalism Toolkit
   JOUR 2501 [0.5]  Media Law
3. 2.5 credits in:
   JOUR 3207 [0.5]  Audio Journalism
   JOUR 3208 [0.5]  Video Journalism
   JOUR 3225 [0.5]  Reporting in Depth
   JOUR 3235 [0.5]  Digital Journalism
   JOUR 3300 [0.5]  Media Ethics in a Digital World
4. 0.5 credit in:
   JOUR 4001 [0.5]  Journalism Now - and Next
5. 0.5 credit from - Journalism Publications:
   JOUR 4003 [0.5]  The Digital Hub: Advanced Multimedia
   JOUR 4004 [0.5]  The Digital Hub: Advanced Audio
   JOUR 4005 [0.5]  The Digital Hub: Advanced Video
6. 0.5 credit from - Specialized Journalism:
   JOUR 4303 [0.5]  Specialized Journalism: Health and Science
   JOUR 4304 [0.5]  Specialized Journalism: Environment and Science
7. 1.0 credit from - Professional Skills and/or Investigating Journalism:
   Professional Skills
   JOUR 4400 [0.5]  Professional Skills: Special Topic
   JOUR 4401 [0.5]  Professional Skills: Data Storytelling
   Investigating Journalism
   JOUR 4402 [0.5]  Professional Skills: Longform Writing
   JOUR 4403 [0.5]  Professional Skills: Strategic Communication
   JOUR 4404 [0.5]  Professional Skills: Freelancing for Media Professionals

B. Credits Not Included in the Major CGPA (12.0 credits)
8. 1.0 credit in:
   BIOL 1103 [0.5]  Foundations of Biology I
   BIOL 1104 [0.5]  Foundations of Biology II
9. 2.0 credits in Health Science courses:
   HLTH 1001 [0.5]  Principles of Health
   HLTH 2001 [0.5]  Health Research Methods and Skills
   HLTH 2002 [0.5]  Molecular and Cellular Pathology
   HLTH 2003 [0.5]  Social Determinants of Health
10. 1.0 credit in a capstone course:
    NSCI 4901 [1.0]  Science Journalism Independent Project
11. 2.0 credit in electives in Health Sciences, including courses from Biology, Neuroscience and Psychology
12. 1.0 credit from:
    HIST 1300 [1.0]  The Making of Canada
    HIST 2301 [0.5]  Canadian Political History
    HIST 2304 [1.0]  Social and Cultural History of Canada
    HIST 2311 [0.5]  Environmental History of Canada
    INDG 1011 [0.5]  Introduction to Indigenous-Settler Encounters
13. 5.0 credits in free electives. Free elective credits may include JOUR courses in the 43XX, 44XX and 45XX series, 4003, 4004 and 4005.

Total Credits 20.0

Regulations
In addition to the program requirements described here, students must satisfy the University regulations (see the Academic Regulations of the University section of this Calendar).

Students should consult with the department when planning their program and selecting courses.
Admissions Information

Admission Requirements are for the 2018-2019 year only, and are based on the Ontario High School System. Holding the minimum admission requirements only establishes eligibility for consideration. The cut-off averages for admission may be considerably higher than the minimum. See also the General Admission and Procedures section of this Calendar. An overall average of at least 70% is normally required to be considered for admission. Some programs may also require specific course prerequisites and prerequisite averages and/or supplementary admission portfolios. Higher averages are required for admission to programs for which the demand for places by qualified applicants exceeds the number of places available. The overall average required for admission is determined each year on a program by program basis. Consult admissions.carleton.ca for further details.

Note: Courses listed as recommended are not mandatory for admission. Students who do not follow the recommendations will not be disadvantaged in the admission process.

Admission Requirements

B.Sc. (Honours)

First Year
The Ontario Secondary School Diploma (OSSD) or equivalent including a minimum of six 4U or M courses. The six 4U or M courses must include Advanced Functions and two of Biology, Chemistry, Earth and Space Sciences or Physics. (Calculus and Vectors is strongly recommended). A 4U course in English is recommended.

Advanced Standing
The program maintains a number of places for students who wish to transfer from Carleton or elsewhere. Normally, offers are made to students with an overall CGPA of 10.00 (A-) or higher following completion of at least 4 credits. Applications for admission with advanced standing will be evaluated individually by the department.

B.Sc. (General)

First Year
The B.H.Sc. does not accept students into first year of the general program. Entry to this program is via transfer.

Advanced Standing
Students may not transfer into the BHSc. program before completing 4 credits at Carleton. For entry to the General program after the completion of 4.0 credits, a student must be in good standing and have the recommendation of the Department. Applications for admission with advanced standing will be evaluated individually by the department.

Health Sciences (HLTH) Courses

HLTH 1000 [0.5 credit]
Fundamentals of Health
Introduction to what comprises a healthy body and mind, and what leads to illness and disease. Biomedical, psychosocial, and epidemiological approaches to current issues in the field of health. Policy and cultural/environmental contexts.
Precludes additional credit for HLTH 1001.
Lectures three hours a week and group one hour a week.

HLTH 1001 [0.5 credit]
Principles of Health
Health and illness will be considered from an interdisciplinary perspective, including biomedical, cultural, psychosocial and environmental.
Precludes additional credit for HLTH 1000.
Lecture three hours a week.

HLTH 1002 [0.5 credit]
Health Science Communication
Introduction to using library, database and/or bioinformatics resources to develop informed verbal, non-verbal and written communication within the context of healthcare, public health and health research. Concepts in ethical scholarship, proper use of sources and plagiarism will be introduced.
Lecture three hours a week.

HLTH 2001 [0.5 credit]
Health Research Methods and Skills
An introduction to quantitative and qualitative methods and designs in health sciences research. Basic research skills will also be provided, including regulatory aspects of conducting research, information literacy skills, evaluating published research and other sources of evidence in the digital age.
Prerequisite(s): HLTH 1000 or HLTH 1001.
Lecture three hours a week, lab/workshop two hours a week.

HLTH 2002 [0.5 credit]
Molecular and Cellular Pathology
Introduction to the causes, natural history, and pathophysiology of common human diseases of various organ systems. Diseases related to structural and functional changes at the molecular, cellular and organ level.
Prerequisite(s): HLTH 1000 and BIOL 1103.
Lecture three hours a week.

HLTH 2003 [0.5 credit]
Social Determinants of Health
Overview of the social determinants of health, ranging from early life experiences, poverty, social status, migration, and the physical environment. The relation between social determinants and environmental vulnerabilities, health behaviours, illness prevalence, treatment outcomes, and access to health care.
Prerequisite(s): HLTH 1000 or HLTH 1001.
Lecture three hours a week.
HLTH 2004 [0.5 credit]  
Microbiology and Virology  
Introduction to the pathogenic microorganisms, including fungal, bacterial, viral and prion. Biochemical, genetic, pathological and epidemiological aspects in the human context; their interaction with host defense systems and strategies for antibiotic and vaccine development. Precludes additional credit for HLTH 3301 (no longer offered). 
Prerequisite(s): HLTH 1000 and BIOL 1103 or permission of the department. 
Lecture three hours a week.

HLTH 3101 [0.5 credit]  
Global Health  
Overview of issues in global health with focus on developing countries. Key indicators and determinants of global health, implementation and evaluation of global programs, challenges of research and interventions in the developing world, and key players in addressing global health issues. 
Prerequisite(s): HLTH 2001 and HLTH 2003, or permission of the department. 
Lecture and seminar, three hours per week.

HLTH 3102 [0.5 credit]  
Indigenous Health in a Global World  
The health conditions of Indigenous peoples in different regions of the world; social and biological factors that contribute to greater risk and poor health; strategies of Indigenous peoples to restore health to their peoples. 
Prerequisite(s): HLTH 2001 and HLTH 2003, or permission of the department. 
Lecture and seminar three hours per week.

HLTH 3103 [0.5 credit]  
Health Policy and Canada's Health Care System  
The history of Canada’s health care system. The model of financing and intergovernmental responsibilities. Current and emerging policy debates facing our health care system, and the role of scientific evidence in decision-making and policy development. 
Prerequisite(s): HLTH 1000 or HLTH 1001, or permission of the department. 
Lecture and seminar three hours per week.

HLTH 3104 [0.5 credit]  
Regulatory Issues and Human Health  
The general principles of health regulatory policies in Canada. The role of scientific evidence in developing legislation and regulations at different levels, including probable levels of risk, standards of evidence, cost-benefit analysis, ethical considerations, psychosocial factors influencing risk management and compliance, and evolving technologies. 
Prerequisite(s): HLTH 1000 or HLTH 1001, or permission of the department. 
Lecture and seminar three hours a week.

HLTH 3201 [0.5 credit]  
Epidemiology  
Basic concepts of epidemiologic study designs and measures; inferences that are fundamental to the identification of causes and prevalence of diseases. Specialized issues within epidemiology including gene-environment interactions and the clustering of specific disease phenotypes. 
Prerequisite(s): STAT 2507 and HLTH 2001, or permission of the department. 
Lecture three hours a week, lab/workshop two hours a week.

HLTH 3302 [0.5 credit]  
Immunity and Immune-Related Disorders  
Basic processes relevant to the immune system; the relationship between immune activity and functioning as related to the development of particular pathologies, such as virally-related illness, autoimmune disorders, inflammatory illnesses, and interactions with social and economic factors that promote immune-related disturbances. 
Prerequisite(s): HLTH 2002 and BIOL 2200 or permission of the department. 
Lecture three hours a week, laboratory four hours a week. Labs require regular participation outside of the scheduled lab time.

HLTH 3303 [0.5 credit]  
Molecular and Cellular Pathology II  
Advanced concepts in cell signaling and function, cell injury and death, tissue structure and wound healing and repair. This course will integrate genetic, biochemical and physiological mechanisms that contribute to health and disease. 
Prerequisite(s): HLTH 2002. 
Lecture three hours a week, lab four hours a week.

HLTH 3401 [0.5 credit]  
Diseases of Childhood  
Epidemiological, psychological and physiological basis for disease in childhood and adolescence. Topics will be discussed from a global and Canadian perspective and include the medicalization of these diseases. 
Prerequisite(s): HLTH 2002 and HLTH 2003 or permission of the department. 
Lecture three hours a week.

HLTH 3402 [0.5 credit]  
Diseases of Aging  
Aging is accompanied by increased illness related to cardiovascular, immune and neurodegenerative processes. This course assesses the fundamental mechanisms that determine these pathological conditions. Molecular mechanisms and psychosocial determinants; intervention and therapeutic strategies. 
Prerequisite(s): HLTH 2002 and HLTH 2003 or permission of department. 
Lecture three hours a week.
HLTH 3403 [0.5 credit]
Gender and Health
The role of gender on psychosocial and biological mechanisms that alter the course of disease and treatment; health issues unique to women (e.g., reproductive and maternal health); the role of gender across cultures.
Prerequisite(s): HLTH 2002 and HLTH 2003, or permission of the department.
Lecture and seminar three hours a week.

HLTH 3404 [0.5 credit]
Psychosocial and Biological Interactions in Health
The psychosocial and biological mechanisms that interact to influence health outcomes. Cultural, political, socioeconomic, and psychological factors that can impact the biological mechanisms underlying both mental and physical health; epigenetic and genetic alterations; implications for psychosocial interventions.
Precludes additional credit for HLTH 4402 (no longer offered).
Prerequisite(s): HLTH 2002 and HLTH 2003 or permission of the department.
Lecture and seminar three hours a week.

HLTH 3503 [0.5 credit]
Chronic Illness and Disability
An interdisciplinary view of disabilities related to injury or disease processes including risk factors, the trajectory of such conditions, the burden of health attributable to them, and their global distribution. Strategies for early prevention and health promotion.
Prerequisite(s): HLTH 2002 and HLTH 2003 or permission of the department.
Lecture three hours a week.

HLTH 3901 [0.5 credit]
Emerging Issues in Biomedical Science
These courses enable students to develop an understanding of the current state of research and practice in the BHSc concentrations. They provide the opportunity to bring together knowledge from other courses and for skills development, including teamwork, communication and critical thinking.
Prerequisite(s): third-year standing and above in the specific stream of the BHSc program appropriate to the course, a major CGPA of at least 8.0 and permission of the Department of Health Sciences.
Seminars three hours a week.

HLTH 3902 [0.5 credit]
Emerging Issues in Global Health
These courses enable students to develop an understanding of the current state of research and practice in each of the B.H.Sc concentrations. They provide the opportunity to bring together knowledge from other courses and for skills development, including teamwork, communication and critical thinking.
Prerequisite(s): third-year standing and above in the specific stream of the B.H.Sc. program appropriate to the course, a major CGPA of at least 8.0 and permission of the Department of Health Sciences.
Seminars three hours a week.

HLTH 3903 [0.5 credit]
Emerging Issues in Environment and Health
These courses enable students to develop an understanding of the current state of research and practice in each of the BHSc concentrations. They provide the opportunity to bring together knowledge from other courses and for skills development, including teamwork, communication and critical thinking.
Prerequisite(s): third-year standing and above in the specific stream of the B.H.Sc. program appropriate to the course, a major CGPA of at least 8.0 and permission of the Department of Health Sciences.
Seminars three hours a week.

HLTH 3904 [0.5 credit]
Emerging Issues in Health Throughout the Lifespan
These courses enable students to develop an understanding of the current state of research and practice in each of the BHSc concentrations. They provide the opportunity to bring together knowledge from other courses and for skills development, including teamwork, communication and critical thinking.
Prerequisite(s): third-year standing and above in the specific stream of the B.H.Sc. program appropriate to the course, a major CGPA of at least 8.0 and permission of the Department of Health Sciences.
Seminars three hours a week.

HLTH 3905 [0.5 credit]
Emerging Issues in Disabilities and Chronic Illness
These courses enable students to develop an understanding of the current state of research and practice in each of the B.H.Sc. concentrations. They provide the opportunity to bring together knowledge from other courses and for skills development, including teamwork, communication and critical thinking.
Prerequisite(s): third-year standing and above in the specific stream of the B.H.Sc. program appropriate to the course, a major CGPA of at least 8.0 and permission of the Department of Health Sciences.
Seminars three hours a week.
HLTH 4101 [0.5 credit]
Global Health Governance
Contemporary issues and debates in global health governance and effects on health monitoring and outcomes at individual and population levels. Historical patterns of global health, its regulatory framework, principal coordinating mechanisms and emerging challenges, and implications of globalization and international trade policies.
Prerequisite(s): HLTH 3101, or permission of the department.
Lecture and seminar three hours per week.

HLTH 4102 [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.
Prerequisite(s): HLTH 1000 or HLTH 1001 and third-year standing or higher, or permission of the department. Also offered at the graduate level, with different requirements, as HLTH 5350, for which additional credit is precluded.
Lecture and seminar three hours a week.

HLTH 4201 [0.5 credit]
Applied Health Statistics
Statistics concepts and procedures used in the analysis of health data; techniques commonly used to analyze data collected from different types of epidemiological and experimental study designs; how to interpret and present statistical findings.
Prerequisite(s): HLTH 3201 and STAT 2507 or permission of the department.
Lecture three hours a week, lab/workshop two hours a week.

HLTH 4202 [0.5 credit]
Health Program Evaluation Tools and Methods
Introduction to concepts, principles and processes of evaluating health care programs and interventions. Methodological tools including needs assessment, project management skills, use of health information management databases. Issues in communication with stakeholders, including change management and decision making.
Prerequisite(s): HLTH 2001 and STAT 2507 or permission of the department.
Lecture and seminar three hours a week.

HLTH 4301 [0.5 credit]
Pandemics and Infectious Disease
Factors that influence disease processes, including viruses, bacteria, protozoa, fungi and infectious agents, how these agents come to have the effects that they do in a given individual, how they spread within and how to limit their spread.
Prerequisite(s): HLTH 2004 or BIOL 2303 or permission of the department.
Lecture three hours a week.

HLTH 4302 [0.5 credit]
Inflammatory and Endocrine Factors in Diseases
Inflammatory and hormonal processes and their relevance to disease states. Immune-related disorders, heart disease and stroke, metabolic syndrome, diabetes, psychiatric conditions, and neurodegenerative disorders. The contribution of psychosocial and genetic factors to diseases.
Prerequisite(s): HLTH 3302 or BIOL 4200 or BIOC 4200 or permission of the department.
Lecture three hours a week.

HLTH 4303 [0.5 credit]
Fundamentals in Pharmacology and Toxicology
Introduction to pharmacological principles, xenobiotics and their interactions within living systems. Topics include biological mechanisms of action of xenobiotics on macromolecules, cells and their effects on various organ systems. Social, legal and governmental policies will be discussed.
Prerequisite(s): HLTH 3303 or permission of the department.
Lecture and seminar three hours a week.

HLTH 4401 [0.5 credit]
Maternal and Perinatal Determinants of Health
The influence of prenatal events on illnesses. Stressful events, viruses, and toxins encountered during pregnancy; interactions between pre- and postnatal events; economic and psychosocial influences related to maternal care.
Prerequisite(s): HLTH 2002 and HLTH 2003, and at least third-year standing in the B.H.Sc. program or permission of the department.
Lecture three hours a week.

HLTH 4501 [0.5 credit]
Diseases and Disabilities Related to Sensory Processes and Movement
Neurobiological processes related to sensation, proprioception, reflex and voluntary movement, disorders of the nervous system and sensory systems. Conditions associated with pathology related to genetic and developmental factors, accident, and aging.
Precludes additional credit for HLTH 3501 (no longer offered).
Prerequisite(s): HLTH 3503 and (BIOL 2005 or BIOL 3305 or BIOL 3306) or permission of the department.
Lecture three hours a week, workshop two hours a week.

HLTH 4502 [0.5 credit]
Trauma-related Illness and Disability
Neurobiological and psychological factors associated with trauma and effects on behavioural functioning. Consequences of traumatic brain injury, burns, amputations, chronic severe illnesses; chronic strain encountered in workplace. Consideration of treatment and rehabilitation strategies.
Precludes additional credit for HLTH 3502 (no longer offered).
Prerequisite(s): HLTH 3503 and (BIOL 2005 or BIOL 3305 or BIOL 3306) or permission of the department.
Lecture three hours a week.
HLTH 4601 [0.5 credit]  
**Environmental Pollution and Health**  
Introduction to environmental and occupational health; detection, assessment, management and mitigation of chemical, physical and biological hazards.  
Prerequisite(s): HLTH 3104 or permission of the department.  
Lecture and seminar three hours a week.

HLTH 4701 [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.  
Prerequisite(s): fourth-year standing and permission of the Department of Health Science and permission of the instructor.  
Also offered at the graduate level, with different requirements, as HLTH 5300, for which additional credit is precluded.  
Seminar three hours a week.

HLTH 4901 [0.5 credit]  
**Directed Studies in Health**  
Independent study, open to third- and fourth-year students to explore a particular health related topic, in consultation with a Faculty supervisor. May include directed reading, written assignments, tutorials, laboratory or field work.  
Prerequisite(s): third- or fourth-year standing in the B.H.Sc. program, in addition to permission of the Faculty supervisor and the Department of Health Sciences.

HLTH 4906 [1.0 credit]  
**Capstone course – Research Essay**  
Independent critical review and research proposal on a health-related topic, using library, database and or bioinformatics resources, under the supervision of the course instructor. Seminar topics include identification and critical review of resources, development of scientific writing skills, and formulation of health science-related research.  
Precludes additional credit for HLTH 4907, HLTH 4908 (no longer offered), HLTH 4909, HLTH 4910.  
Prerequisite(s): fourth-year standing in the B.H.Sc. Honours and permission of the Department of Health Sciences.  
Lecture/seminar three hours a week.

HLTH 4907 [1.0 credit]  
**Capstone Course – Group Research Project**  
A collaborative project on a health related topic. Students, working together as a team, will complete a research project and develop communication and research skills under the supervision of the faculty supervisor. Evaluation will be based on a written report and oral presentation.  
Precludes additional credit for HLTH 4906, HLTH 4908 (no longer offered), HLTH 4909, HLTH 4910.  
Prerequisite(s): fourth-year standing in the B.H.Sc. Honours program, one of HLTH 3901, HLTH 3902, HLTH 3903, HLTH 3904 or HLTH 3905, a major CGPA of at least 9.0, and permission of the Faculty supervisor and the Department of Health Sciences.  
Seminars three hours a week as scheduled by the course instructor; other hours as arranged with the Faculty Adviser.

HLTH 4909 [1.0 credit]  
**Capstone Course – Field Placement**  
Field placement providing practical experience in a health related field. Placements may be in institutional or community settings, governmental or non-governmental organizations. Sites may vary each year. Evaluation based on a written report and an oral presentation.  
Precludes additional credit for HLTH 4906, HLTH 4907, HLTH 4908 (no longer offered), HLTH 4910.  
Prerequisite(s): fourth-year standing in B.H.Sc. Honours, one of HLTH 3901, HLTH 3902, HLTH 3903, HLTH 3904 or HLTH 3905, a major CGPA of at least 9.0 and permission of the Department of Health Sciences.  
Schedules may vary depending on the field placement site, but students are required to spend a minimum of eight hours per week on-site and attend required seminars as arranged by the course instructor.

HLTH 4910 [1.0 credit]  
**Honours Individual Research Thesis**  
An independent health related research project under the direct supervision of a faculty member. Evaluation will be based on a written thesis and oral poster presentation (oral or poster).  
Precludes additional credit for HLTH 4906, HLTH 4907, HLTH 4908, HLTH 4909.  
Prerequisite(s): fourth-year standing in B.Sc. Honours Health Sciences, one of HLTH 3901, HLTH 3902, HLTH 3903, HLTH 3904 or HLTH 3905, a major CGPA of at least 10.0, and permission of the Faculty advisor and the Department of Health Sciences. Permission will depend, in part, on capacity, such that meeting the minimum requirements does not guarantee enrollment in this research thesis course.

**Summer session**: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current
session and to determine the term of offering, consult the class schedule at central.carleton.ca