

PATHOLOGY AND MOLECULAR MEDICINE (PATH)

PATH 111 Data Science Through Visualization Units: 3.00

This blended course is designed to bring awareness and raise excitement in data science. Through different types of visualization students will learn key concepts of data science and big data investigation. The course will also explore examples of how data science is applied to solve problems in various disciplines.

Learning Hours: 120 (12 Lecture, 24 Group Learning, 36 Online Activity, 48 Private Study)

Requirements: Prerequisite None.

Offering Faculty: Faculty of Health Sciences

Course Learning Outcomes:

1. Perform, observe, and interpret visualization of data from variety of sources.
2. Apply skills acquired to critically evaluate and summarize data.
3. Describe appropriate data visualization for diverse types of challenges.
4. Collaborate and communicate an understanding of concepts and diverse perspectives in data science.

PATH 120 Understanding Human Disease in the 21st Century Units: 3.00

The course provides an introduction to human disease and our understanding of key conditions with major global health and societal impact, including cardiovascular, neurological and infectious diseases and cancer. The basic concepts of disease mechanisms and current management will be explored using specific diseases and clinical example cases. Also offered online.

LEARNING HOURS may vary 120(12L;36G;36O;36P)

Requirements: One-Way Exclusion PATH 310/3.0; CANC 440/3.0

Offering Faculty: Faculty of Health Sciences

Course Learning Outcomes:

1. Access the individual and population impacts of human disease by effectively researching major issues affecting changes in global health
2. Apply the skills acquired to critically evaluate scientific literature on human disease
3. Collaborate and communicate an understanding of the causes and implications of human disease including current and future management and treatments.
4. Explain how different populations are differentially impacted by the same disease
5. Identify and describe mechanisms underlying human disease and be able to recognize potential origins of human disease states



PATH 310 Introduction to Pathology and Molecular Medicine Units: 3.00

An introduction to pathology and molecular medicine. The course will be organized around a specific set of diseases, designed to illustrate basic concepts in the molecular biology, biochemistry, and pathology of human disease.

NOTE Also offered online. Consult the Bachelor of Health Sciences program office.

Requirements: Prerequisite Level 3 or above and (BCHM 102/3.0 or BCHM 218/3.0 or BCHM 270/3.0 or BIOL 205/3.0).

Course Equivalencies: PATH310, PATH410

Offering Faculty: Faculty of Health Sciences

Course Learning Outcomes:

1. Integrate underlying genetic and biochemical factors with resultant pathologic processes and disease states.
2. Compare and contrast the contributions of genetics and environmental factors to disease.
3. Apply course concepts to a hypothetical disease to identify its molecular basis and clinical features, and rationalize testing and treatment options.
4. Clearly and concisely articulate ideas in both oral and written formats, working individually as well as in team-based learning groups.

PATH 381 Clinical Biochemistry Units: 3.00

This upper-year health sciences course covers topics relating to the integrated role of clinical biochemists within a healthcare team. Students will critique analytical techniques in the context of various diseases. Through problem-based learning, students will also explore how to identify and troubleshoot issues in laboratory testing.

Learning Hours: 120 (12 Lecture, 12 Tutorial, 36 Online Activity, 60 Private Study)

Requirements: Prerequisite Level 3 or above and (BCHM 102/3.0 or BCHM 218/3.0 or BCHM 270/3.0) and 3.0 units from (BIOL 243/3.0; GPHY 247/3.0; HSCI 190/3.0; KNPE 251/3.0; NURS 323/3.0; POLS 285/3.0; PSYC 202/3.0; STAM 200/3.0; STAT 263/3.0).

Offering Faculty: Faculty of Health Sciences

Course Learning Outcomes:

1. Describe the role of clinical biochemistry in healthcare by linking clinical laboratory principles to patient care.
2. Critique how specific clinical laboratory test methodologies can be used to screen for, diagnose, and/or manage a given disease.
3. Scrutinize and assess the clinical application of novel biomarkers in the context of relevant, current literature.
4. Demonstrate verbal and written proficiency in clinical laboratory instrumentation and methods by navigating troubleshooting scenarios involving issues with a clinical biochemistry test.

PATH 411 Applied Data Science in Molecular Medicine Units: 3.00

The course introduces data science tools and methods to handle, process and extract knowledge and insights from large molecular medicine datasets. The focus will be on applying statistics, machine learning and related methods for the analysis of various research datasets and digital pathology.

Learning Hours: 120 (18L12pC, 84 Group Learning, 6 Online Activity, 36 Private Study)

Requirements: Prerequisite BIOL 243/3.0 or ECON 250/3.0 or GPHY 247/3.0 or HSCI 190/3.0 or NURS 323/3.0 or POLS 285/3.0 or PSYC 202/3.0 or SOCY 211/3.0 or STAT 263/3.0 or STAM 200/3.0.

Offering Faculty: Faculty of Health Sciences

Course Learning Outcomes:

1. Perform basic programming and scripting (Mini Assignments 1 and 2, Group Assignments 1-3)
2. Design experiment with data analysis in mind (Mini Assignment 2, Group Assignments 1-3)
3. Perform data analysis that includes sequence alignment, data preprocessing, unsupervised and supervised learning and statistics (Mini Assignments 1 - 3, Group Assignments 1 - 3)
4. Work in a team to complete assignments, report and present results (Group Assignments 1 - 3)
5. Assess and critique analytical methodology found in scientific publications (Paper critiques)

PATH 425 Current Topics in Human Genetics Units: 3.00

An advanced level course introducing current topics in human genetics. The course will focus on the significance and implications of genetic variation and its role in disease, development and normal human diversity. In particular, the course will explore the future directions and implications of human genetic research in the post genomic era.

Participation in seminars and group discussions is required. Enrollment is limited.

RECOMMENDATION BCHM 218/3.0 or permission of the course coordinator.

Requirements: Prerequisite Minimum 4th year (Level 4) standing, registration in a LISC/BHSc Major or SSP, a GPA of 2.5, and a minimum grade of B in one of (BIOL 205; PATH 310). Exclusion BIOL 441.

Offering Faculty: Faculty of Health Sciences

PATH 430 The Molecular Basis of Disease Units: 3.00

An in-depth perspective of the pathogenesis of human disease. An integration of the genetic, biochemical, physiologic, anatomic, and general etiologic factors which play a role in the progression of several specific diseases from inception to death or recovery. The course will comprise short introductory presentations by teaching faculty followed by the presentation and discussion of relevant scientific papers by students. Given jointly with PATH 826/3.0.

Requirements: Prerequisite Minimum 4th year (Level 4) standing, registration in a LISC/BHSc Major or SSP, a GPA of 2.5, and PATH 310.

Offering Faculty: Faculty of Health Sciences

PATH 499 Research Project in Pathology Units: 12.00

A research project involving the study of human disease processes. The project will be supervised by a Faculty member in the Department and will provide opportunities for experimental design, data analysis and both written and oral presentation of results. Students must contact a potential faculty supervisor in the Spring preceding registration in fourth year.

NOTE Acceptance by a supervisor required prior to registration.

NOTE Students whose research requires the care and/or handling of animals must also complete the Introductory Animal Care Course and if required the appropriate Animal Use workshops through the Office of the University Veterinarian.

Learning Hours: 480 (288 Laboratory, 24 Group Learning, 24 Individual Instruction, 144 Private Study)

Requirements: Prerequisite Level 4 and registration in a LISC Specialization Plan and a cumulative GPA of 2.50 or higher. Exclusion Maximum 12.0 units from: ANAT 499/12.0; ANAT 599/6.0; BCHM 421/6.0; BCHM 422/6.0; BCHM 594/3.0; BCHM 595/6.0; BCHM 596/12.0; CANC 499/12.0; DISC 591/3.0; DISC 592/3.0; DISC 593/3.0; DISC 594/3.0; DISC 598/6.0; DISC 599/6.0; EPID 499/12.0; EPID 595/6.0; HSCI 591/3.0; HSCI 592/3.0; HSCI 593/3.0; HSCI 594/3.0; HSCI 595/3.0; HSCI 598/6.0; HSCI 599/6.0; LISC 499/12.0*; LISC 594/3.0; LISC 595/6.0; LISC 596/12.0; LISC 598/9.0; MICR 499/12.0; NSCI 499/12.0; PATH 499/12.0; PATH 595/6.0; PHAR 499/12.0; PHGY 499/12.0; REPD 499/12.0.

Offering Faculty: Faculty of Health Sciences

**PATH 595 Independent Study Units: 6.00**

Exceptionally qualified students entering their fourth-year may take an independent study provided it has been approved by the Program Office(s) principally involved. The Program Office may approve an independent study without permitting it to be counted toward a concentration in that Program Office. It is, consequently, the responsibility of a student taking an independent study to ensure that the concentration requirements for their degree will be met. NOTE Requests for an independent study must be received one month before the start of the first term in which the student intends to undertake the independent study.

Requirements: Prerequisite Permission of the Program Office(s) principally involved. Exclusion Maximum 12.0 units from: ANAT 499/12.0; ANAT 599/6.0; BCHM 421/6.0; BCHM 422/6.0; BCHM 594/3.0; BCHM 595/6.0; BCHM 596/12.0; CANC 499/12.0; DISC 591/3.0; DISC 592/3.0; DISC 593/3.0; DISC 594/3.0; DISC 598/6.0; DISC 599/6.0; EPID 499/12.0; EPID 595/6.0; HSCI 591/3.0; HSCI 592/3.0; HSCI 593/3.0; HSCI 594/3.0; HSCI 595/3.0; HSCI 598/6.0; HSCI 599/6.0; LISC 499/12.0*; LISC 594/3.0; LISC 595/6.0; LISC 596/12.0; LISC 598/9.0; MICR 499/12.0; NSCI 499/12.0; PATH 499/12.0; PATH 595/6.0; PHAR 499/12.0; PHGY 499/12.0; REPD 499/12.0.

Offering Faculty: Faculty of Health Sciences