

# PATHOLOGY AND LABORATORY MEDICINE (PATH)

## PATH/PATH-BIO 210 – HIV: SEX, SOCIETY AND SCIENCE

3 credits.

HIV kills three million people per year, more than any other infectious disease. We will learn about the transmission, immunology, virology, vaccinology and societal impact of this virus. Six of the world's leading HIV scientists will give guest lectures.

**Requisites:** None

**Course Designation:** Breadth – Biological Sci. Counts toward the Natural Sci req

Level – Elementary

L&S Credit – Counts as Liberal Arts and Science credit in L&S

**Repeatable for Credit:** No

**Last Taught:** Fall 2023

## PATH 399 – INDEPENDENT STUDY

1-4 credits.

Directed study projects for freshmen and sophomores.

**Requisites:** Consent of instructor

**Course Designation:** Level – Elementary

L&S Credit – Counts as Liberal Arts and Science credit in L&S

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Spring 2024

## PATH 404 – PATHOPHYSIOLOGIC PRINCIPLES OF HUMAN DISEASES

3 credits.

Provides a basic understanding of the causes, pathophysiology, pathology and clinical manifestations of disease states from a medical perspective.

**Requisites:** ZOOLOGY/BIOLOGY 101, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY/BOTANY 151, ZOOLOGY 153, or BIOCORE 381

**Repeatable for Credit:** No

**Last Taught:** Spring 2024

## PATH/M&ENVTOX/PHM SCI/PHM COL-M/POP HLTH 626 – TOXICOLOGY II

3 credits.

Survey of the basic methods and fundamental biochemical mechanisms of toxicity. Toxicity in mammalian organ systems, techniques for evaluating toxicity, as well as mechanisms of species specificity, and environmental interactions (with toxicant examples) are presented.

**Requisites:** POP HLTH/M&ENVTOX/ONCOLOGY/PHM SCI/PHM COL-M 625

**Course Designation:** Breadth – Biological Sci. Counts toward the Natural Sci req

Level – Advanced

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Grad 50% – Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Spring 2024

## PATH 699 – INDEPENDENT STUDY

1-4 credits.

Directed study projects for juniors and seniors.

**Requisites:** Consent of instructor

**Course Designation:** Level – Advanced

L&S Credit – Counts as Liberal Arts and Science credit in L&S

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Spring 2024

## PATH 750 – CELLULAR AND MOLECULAR BIOLOGY/PATHOLOGY

2 credits.

Emphasizes current understanding of molecular and cellular mechanisms. Wherever possible, human diseases are used to illustrate the outcome at the organismal level of defects in these mechanisms. Focuses on different cell types and how cells function. We also discuss how cells talk to themselves and each other. Topics include mechanisms of cell survival and division. Provides an overview of a broad set of cell biology topics to demonstrate the breadth and diversity of cellular functions.

**Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% – Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Spring 2024

## PATH 751 – BIOLOGY OF AGING

2 credits.

Examines the molecular, cellular, physiological, and clinical aspects of aging beyond basic biology in a biomedical/clinical research setting. Aging and age-related diseases are examined via the combined expertise of basic scientists and clinicians covering a range of topics directly relevant to biology of aging research, including the clinical perspective, the research perspective, and the integration of the two.

**Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% – Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Fall 2022

## PATH 752 – CELLULAR AND MOLECULAR BIOLOGY/PATHOLOGY SEMINAR

1 credit.

The emphasis is on our current understanding of molecular and cellular mechanisms. Wherever possible, human diseases are used to illustrate the outcome at the organismal level of defects in these mechanisms. Discussions focus on immunology and cancer biology. Topics include mechanisms of cell survival, cell division, signal transduction, gene expression, vesicular transport, autophagy and cell death. Explore a broad set of cell biology topics, in greater detail such that they will have a better understanding of the breadth and diversity of cellular functions by the end of the semester. Learn how to critically evaluate the literature and the rigor of research.

**Requisites:** Concurrent enrollment in PATH 750

**Course Designation:** Grad 50% – Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Spring 2024

**PATH 755 – RESPONSIBLE CONDUCT IN RESEARCH: RESEARCH ETHICS, RIGOR, REPRODUCIBILITY AND TRANSPARENCY**

2 credits.

Meets the NIH Institutional Training Grant requirements covering all ten of targeted areas in biomedical research. Subject matter incorporates the following topics for instruction: 1) Conflict of interest - personal, professional, and financial; 2) Policies regarding human subjects, and rigor and reproducibility in clinical research; 3) Policies regarding live vertebrate animal subjects, rigor and reproducibility and transparency in pre-clinical research, and safe laboratory practices; 4) Mentor and mentee responsibilities and relationships; 5) Collaborative research including collaborations with industry; 6) Peer review; 7) Data acquisition and laboratory tools (management, sharing and ownership); 8) Research misconduct and policies for handling misconduct; 9) Responsible authorship and publication; 10) The scientist as a responsible member of society, contemporary ethical issues in biomedical research, and the environmental and societal impacts of scientific research.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2023**PATH 802 – HISTOPATHOLOGY FOR TRANSLATIONAL SCIENTISTS**

3 credits.

Introduces the pathogenesis of disease via integration of actual autopsy patient cases. Emphasis is placed on understanding the basic mechanisms of disease at the level of cell, organ, and body, as well as the morphologic expression patterns of selected common specific disease processes. Participate in autopsy gross organ conferences as well as microscopic review sessions. Concepts covered in lectures will be applied and reinforced in the interactive autopsy sessions. Observe at least one full autopsy, gaining a three-dimensional understanding of structure and disease.

**Requisites:** Declared in Cellular and Molecular Pathology graduate program**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2023**PATH 803 – PATHOGENESIS OF MAJOR HUMAN DISEASES**

3 credits.

This course will focus on disease pathogenesis and discussion of the leading disease research model. Throughout the course, we will combine expert clinicians, basic scientists, and literature review on specific major diseases.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2023**PATH 807 – IMMUNOPATHOLOGY: THE IMMUNE SYSTEM IN HEALTH AND DISEASE**

2 credits.

Gain fundamental knowledge of immunopathology and molecular immunology medicine, and have an in-depth research experience that combines pathobiological and translational immunology research.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 809 – MOLECULAR MECHANISMS OF DISEASE**

2 credits.

Focuses on molecular mechanisms of diseases. Course will focus on four modules: Neuroscience, cancer biology, growth factor/matrix biology, and immunology. Course will consist of a one hour lecture and a one hour group discussion.

**Requisites:** Declared in Cellular and Molecular Pathology graduate program**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 900 – SEMINAR**

0 credits.

Weekly Seminar for graduate students, professional students, medical professionals.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2024**PATH 901 – STUDENT SEMINAR / JOURNAL CLUB**

1 credit.

Review of current publications on relevant topics selected by department faculty and trainer.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2024**PATH 913 – TECHNIQUES IN VIROLOGY**

4 credits.

Culture-based methods for detecting and quantifying viruses. Describe concepts such as viral load, transmissibility, tissue tropism, host immune responses, and the effectiveness of various antiviral therapies. Perform multiple techniques for working with and quantifying viruses. Compare and contrast various methods of detecting and quantifying viruses.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024

**PATH 914 – CLINICAL MICROBIOLOGY: PHENOTYPIC IDENTIFICATION OF COMMON ORGANISMS**

2 credits.

Clinical microbiology lab practice, with a focus on identification of bacteria, fungi, and parasites. Learn techniques in specimen collection, staining, and plating. Gain an understanding of culture media, incubation, isolation, and microscopic and colony characteristics.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 915 – CLINICAL MICROBIOLOGY: OVERVIEW OF TECHNOLOGIES AND METHODOLOGIES**

2 credits.

Learn the variety of techniques, methodologies, and instrumentation used in modern clinical microbiology laboratory practice. Gain an understanding of mass spectrometry, NAAT, PCR, sequencing, antigen/antibody detection, antimicrobial susceptibility testing, point-of-care testing, and biomarkers of infection.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 916 – CLINICAL MICROBIOLOGY: ANTIMICROBIAL RESISTANCE AND EMERGING PATHOGENS**

2 credits.

Understand the battle between humans and infectious diseases. Learn how microbes evade the immune system and develop resistance to antibiotics. Discuss emerging pathogens and multidrug resistant organisms and the techniques used to combat them.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 920 – GENERAL PATHOLOGY CLERKSHIP**

2-4 credits.

Understand the central role that diagnostic pathology and laboratory testing play in medical care in all specialties. Review your course work in anatomic and clinical Pathology and add to your fund of knowledge. Familiarize yourself with the workings of a busy diagnostic tissue laboratory. Participate in daily "clinical-pathologist" discussions concerning the effects of various pathological conditions as they relate to specific clinical problems. Understand the role of anatomic and clinical pathology as they contribute to the understanding of disease processes.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2024**PATH 921 – TRANSFUSION MEDICINE CUSTOMIZED**

2 credits.

Maximize preparedness for residency by correlating basic science concepts with practical decision-making in clinical transfusion medicine. Tested topics are customized based on the student's specialty interests. Topics include hemostasis, immunology of transfusions, transfusion reactions, red blood cell (RBC) antigens and antibodies, product modifications, lab tests, indications, therapeutic apheresis, blood donation, special patient populations and circumstances such as obstetrics or neonates, and massive transfusion in surgery and trauma.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 922 – LABORATORY MEDICINE CUSTOMIZED**

2 credits.

Learn the basic science principles of common laboratory tests. Apply this knowledge to assignments in which you make clinical judgments and answer common patient questions about lab test interpretations. Customize the curriculum based on your specialty interests.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 923 – SICKLE CELL DISEASE AND PUBLIC HEALTH**

2 credits.

Patients with sickle cell disease can present to any medical specialty with manifestations or complications of the disease. Using a disease-focused biopsychosocial approach, the goal is the identification and understanding of barriers to health and the potential opportunities for improvement. The topics surveyed include: 1) clinical review, 2) community voices, 3) diversity, equity, and inclusion, 4) practical communication skills, 5) actionable examples of quality improvement, 6) health care systems, 7) economics, 8) global health, 9) ethics, and 10) advocacy via intellectual persuasion.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 924 – IMMUNOHEMATOLOGY**

2 credits.

Utilize a case-based learning approach to interpret blood bank test results such as ABO typing data, antibody screens, antibody panels, and direct antiglobulin tests. Identify antibodies to red blood cell and platelet antigens. Demystify the inner workings of the blood bank clinical laboratory. Improve your ability to understand and communicate results from the blood bank.

**Requisites:** MED SC-M 810, 811, 812, and 813**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024

**PATH 926 – PATHOLOGY: CLINICAL MICROBIOLOGY-MARSHFIELD**

2-12 credits.

Clinical elective for fourth year medical students.

**Requisites:** Declared in Medicine program

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Spring 2024

**PATH 949 – GENETICS THROUGH THE LIFE CYCLE**

4 credits.

The genome impacts human health and disease from the moment of conception throughout growth, development, and aging. This course offers a comprehensive overview of clinical laboratory testing in the fields of medical genetics and public health. Topics include how genetic testing is integrated into patient care, including prenatal genetics, newborn screening, genetic testing in children and adults, and oncology genetics. Students will develop a strong foundational knowledge of basic genetics principles, identify indications for genetic testing, interpret population screening results and the implications for public health, assess the utility of diagnostic testing, and recognize the limitations of genetic testing and clinical laboratory medicine. It is anticipated that students will incorporate these concepts, knowledge, experiences, and evidence in their future clinical practice.

**Requisites:** Declared in Medicine program

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Spring 2023

**PATH 950 – INFECTIOUS DISEASE DETECTIVES**

2 credits.

In much of the world, infection remains the leading cause of disease and death. While medicine has made great strides in the diagnosis and treatment of infection, new and deadly pathogens continue to emerge, and antibiotic resistance continues to grow. No matter what a physician's specialty, understanding principals of infectious disease manifestations, diagnosis and treatment are key.

**Requisites:** Declared in the Medical program with 4th year standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Fall 2023

**PATH 960 – PATHOLOGY FOR SURGEONS**

2 credits.

The surgeon-pathologist relationship is an integral aspect of the surgical care process. The intraoperative and postoperative findings of the pathologist confirm that the appropriate course of action was taken, and this information determines what the surgeon will tell the patient and his or her family about the disease entity, prognosis, and recommended next steps. In this basic science selective, future surgeons will have the opportunity to refresh their understanding of essential anatomy and histology, and deepen their knowledge of disease pathophysiology. They will also engage in multiple practical learning activities such as cutting a frozen section, working up a transfusion reaction, staining and interpreting an FNA cytology slide, assisting in prosecting (grossing) surgical pathology and autopsy specimens and following up on the diagnosis/molecular testing/tumor board discussion to enhance their understanding of the pathologist's critical role in managing surgical patients.

**Requisites:** MED SC-M 810, 811, 812, and 813

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Spring 2024

**PATH 962 – THE MOLECULAR BASIS OF HEMATOLOGIC MALIGNANCIES**

2 credits.

Understanding molecular mechanisms of hematologic disease, and developing a foundation in the principles of relevant molecular assays, is critical to providing appropriate patient care. Topics include bases of neoplastic disorders of the hematopoietic and lymphoid systems, how underlying molecular abnormalities contribute to the pathophysiology of these diseases, and the evolving spectrum of molecular and cytogenetic/FISH testing and other ancillary testing (such as flow cytometry), which are often utilized in the work-up of hematopoietic and lymphoid malignancies. Learn about strengths and weaknesses of these technologies, and how pathologists integrate results of molecular testing with the traditional histologic exam to produce accurate diagnoses and drive clinical decision making. Develop an understanding of how knowing the underlying molecular pathology of a hematopoietic or lymphoid malignancy can inform prognosis and guide therapy.

**Requisites:** MED SC-M 810, 811, 812, and 813

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Spring 2024

**PATH 963 – WOMEN'S GLOBAL HEALTH: A FOCUS ON WOMEN'S CANCERS AND PUBLIC HEALTH INTERVENTIONS**

2 credits.

Unique opportunity for fourth year medical students to develop an intervention project focused on women's health and cancer prevention, diagnosis, treatment, or awareness globally and locally. Explore how women's health is influenced by both biological and sociocultural factors. Observe components of diagnosis of women's related cancers. Analyze molecular components of cancers used for diagnosis and treatment. Deconstruct the unique diseases that affect women throughout the life cycle and social factors that influence them.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2023**PATH 970 – GENOMICS, PROTEOMICS, AND METABOLOMICS: A DEEP DIVE INTO OMICS DATA ANALYSIS**

2 credits.

Advances in medicine are increasingly being driven by "big data" analyses, including proteomics, genomics, and metabolomics. Basic knowledge of how to analyze these datasets can allow one to generate and test hypotheses that have the potential to transform a field. In this course, students will conduct individual data mining expeditions using a collection of large proteomics and metabolomics data sets. Formulate hypotheses about the interrelationships of molecules and their potential relationship to health, disease, and biological phenotypes. Basic background instruction on "omics" methodologies, heritability studies, and analytical methods will be provided. Provides the basic knowledge to carry out future 'omics analyses; using scientific inquiry to potentially transform the practice of medicine.

**Requisites:** MED SC-M 810, 811, 812 and 813; or Declared in Cellular and Molecular Pathology Graduate Program**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2024**PATH 990 – RESEARCH**

1-8 credits.

For Grad and medical students desiring advanced pathology; work done under the direction of a senior staff member.

**Requisites:** Declared in Medicine program or Cellular and Molecular Pathology graduate program**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2024