

PATH, MICRO, & IMM

PMI 825 INTRODUCTION TO R PROGRAMMING FOR BIOMEDICINE 3 Credit Hours

An introduction to R programming language and data manipulation methods for graduate students in health and biomedical fields who currently need support from others for complicated data processing and analysis. Major topics include basic concepts of R, data manipulation and processing, statistical analysis, graphical presentation, basic simulation, genomic databases retrieval, and commonly used R packages. Computations will be illustrated using R.

Prerequisite: Instructor permission, BIOS806/CPH506 or an equivalent introductory statistics course, basic understanding of computer programming.

Instructor: Weiwei Zhang, Ph.D.

Typically Offered: SPRING

PMI 830 CLINICAL LABORATORY MANAGEMENT 3 Credit Hours

An introduction to the theory, practical application and evaluation of laboratory management principles in health care and laboratory information systems, research, educational methodology, quality control, ethics, laboratory operations, and laboratory accreditation standards. Opportunities for building critical thinking, problem-solving, teamwork, communication, professionalism, research, management, and leadership skills are provided.

Prerequisite: Enrolled in MS in PAMM Program focused on CLS training, and permission of instructor.

Typically Offered: FALL

PMI 857 INTRODUCTORY IMMUNOLOGY 2 Credit Hours

A study of the basic concepts and mechanisms of modern immunology with discussion of the applications of these principles to the study of diseases.

Instructor: Geoffrey M. Thiele, Ph.D.

Typically Offered: SPRING

PMI 870 BASIC PATHOLOGY FOR THE RESEARCHER 2 Credit Hours ELECTIVE

The emphasis of this course is to provide investigators with a foundation in basic pathologic principles and identification of changes that diseases cause in tissue at the gross and microscopic level. It provides a basic introduction to tissue histology and major classes of disease, organized around general pathologic processes. Students will apply the concepts covered in the course to their own research projects. The course also incorporates a lecture-laboratory format. Laboratory sessions involve microscopic examination of diseased tissues using virtual microscopy and gross examination of human organ specimens.

Prerequisite: Recommended preceding courses: Basic cell biology, immunology, bacterial pathogenesis, cancer biology

Instructor: Geoffrey Talmon, M.D., M.Ed.

Typically Offered: FALL

Capacity: 12

PMI 873 INTRO GENETIC SEQUENCE 2 Credit Hours

Fundamentals of using online search techniques for the analysis of genetic sequence databases. The course will be taught in UNMC computer clusters by lecture and by the completion of assignments using computer programs available on campus. Programming experience is not required.

Prerequisite: Introduction to Computational Molecular Biology, undergraduate course in biochemistry or molecular biology, or permission of instructor.

Typically Offered: SPRING

PMI 890 MOLECULAR BIOL VIRUSES 3 Credit Hours

The principles of molecular biology and their application to the study of virology will be presented. The contributions of virology to the understanding of general mechanisms of pathogenesis will be discussed. Typically Offered: FALL

PMI 896 NON-THESIS RESEARCH 1-9 Credit Hours

Student research that is clearly distinct from ongoing or planned thesis/dissertation work, or research/lab rotations performed prior to selecting a permanent advisor or supervisor.

Typically Offered: FALL/SP/SU

PMI 898 BACTERIAL GENETICS 3 Credit Hours

The principles of bacterial genetics including genome structure, DNA replication and recombination, transcription and translation, as well as quorum sensing and environmental sensing.

Instructor: Marat Sadykov, Ph.D., Co-director Amanda Brinkworth, Ph.D.

Typically Offered: SPRING

PMI 899 MASTERS THESIS 1-9 Credit Hours

Independent student research related to the masters thesis.

Typically Offered: FALL/SP/SU

PMI 910 BACTERIAL PATHOGENESIS 3 Credit Hours

This course is designed to introduce the graduate student to critical thinking about concepts and topics related to bacterial pathogenesis. Major topics to be covered include, but not limited to, mechanisms of pathogenesis, antimicrobial resistance, protein secretion, toxins and their modes of action, intracellular and extracellular bacterial pathogen lifestyles, introduction to cellular microbiology and host-pathogen interactions.

Prerequisite: IPBS 801, 802, 803 or IPBS 805, 860

Instructor: McKenzie Lehman, Ph.D.

Typically Offered: SPRING

PMI 915 BACTERIAL PHYSIOLOGY AND METABOLISM 3 Credit Hours ELECTIVE

Bacterial pathogens are remarkably recalcitrant to biological stresses and host immune effectors. The underlying reasons for this are primarily associated with bacterial metabolic plasticity and specific physiological adaptations to stress. PAMM950 will provide students a fundamental knowledge of bacterial metabolism and the different cellular adaptations in bacteria that enhance survival. The format of the course will mainly be lecture and discussion-based. PAMM950 is an immersive course where background reading and student participation in class discussions are critical for a successful outcome.

Instructor: Vinai Chittiezham Thomas, Ph.D.

Typically Offered: SPRING

PMI 921 CLINICAL APPLICATIONS OF MOLECULAR DIAGNOSTICS 2 Credit Hours

This graduate-level course emphasizes the clinical utility of modern molecular diagnostics. The course is designed as a human genetics course that prepares graduate students with the knowledge required to apply molecular techniques to modern medicine, including clinical testing and diagnosis.

Prerequisite: Admission to a biological sciences graduate program or permission of instructor.

Typically Offered: SPRING

PMI 922 REDOX BIOLOGY IN HUMAN DISEASE 2 Credit Hours

Biochemical sources and regulation of reactive oxygen species and reactive nitrogen species, and their role in diseases such as diabetes, hypertension, cancer, and neurodegeneration.

Prerequisite: Permission of course director

Instructor: Maher Abdalla, Ph.D.

Typically Offered: FALL

PMI 923 MOLECULAR DIAGNOSTIC LABORATORY TECHNIQUES 2 Credit Hours

This graduate-level course emphasizes the clinical utility of modern diagnostics. The course provides students with an opportunity to learn about and perform common molecular techniques, including, but not limited to, DNA extraction, electrophoresis, PCR, sequencing, and genomic microarrays. In addition, the course promotes the development of analytical and troubleshooting skills for the aforementioned techniques, as well as educating students about quality control and regulatory requirements in the clinical diagnostic laboratory setting.

Prerequisite: Admission to a biological sciences graduate program or permission of instructor.

Typically Offered: SPRING

PMI 940 MOLECULAR BASIS OF DISEASE 3 Credit Hours

This course covers current understanding of human diseases and modern approaches to investigate them. The lectures will highlight the abnormal molecular pathway (i.e. signal transduction) and cellular basis of the chronic conditions or in-born diseases. This course will highlight fundamental basis of functional genomics, use of genetically faithful murine models or patient derived xenografts to understand human diseases. We will also include special topics applicable to molecular diagnosis and treatment.

Prerequisite: IPBS 801, 802 and 803

Instructor: Javeed Iqbal, Ph.D.

Typically Offered: FALL

PMI 950 SPECIAL TOPICS 1-3 Credit Hours

Advanced study of current concepts and findings in selected areas of pathobiology, microbiology, and immunology. Includes a review of current literature, research and clinical problems.

Prerequisite: Permission of instructor.

PMI 955 ADVANCED IMMUNOLOGY 3 Credit Hours

Conceptual study of cellular and biomolecular immunology. Includes mechanisms of immune recognition, regulatory and effector functions, interleukins and clinical immunology, with discussion of current literature.

Prerequisite: PMI 857 or permission of instructor.

Instructor: Maher Abdalla, Ph.D., Rakesh Singh, Ph.D.

Typically Offered: FALL

PMI 970 SEMINAR 1 Credit Hour

Attendance at weekly seminars offered by the department/program, or other activities specific to the degree program (contact the program director for more information).

Typically Offered: FALL/SP/SU

PMI 992 ADV TOPICS IN IMMUNOLOGY, PATHOLOGY AND INFECTIOUS DISEASES 1 Credit Hour

Advanced study in one of several disciplines such as bacteriology, immunology, mycology, virology, cell biology, molecular biology, etc. This course will discuss literature directly published to the broad area of the Research Topic discussed during the semester. The broad topic will be decided by one of the invited Faculty with expertise in the area of research to be discussed during that semester. Student presenter will choose the paper and get it approved for presentation by the invited Faculty expert.

Typically Offered: FALL/SPR

PMI 999 DOCTORAL DISSERTATION 1-15 Credit Hours

Independent student research related to the PhD dissertation. This course may be utilized before or after successful completion of the comprehensive exam.

Typically Offered: FALL/SP/SU