



Program in Biomedical Sciences Course Listing

PBMS Curriculum Director: Alex Nechiporuk, Ph.D.

Before registering for classes, students must discuss their academic plan with their Academic Mentor. The following course list is available to help you with your educational plan. Please check with the Course Directors for more information.

This listing is current as of winter 2024 and may change in subsequent terms.

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BCMB 605A Protein Structure & Function **Credits: 1**

Association: BMSB

Term(s) offered: Fall, Winter, & Spring

Course Director(s): Ujwal Shinde
David Farrens

Recent publications focused on biochemical and biophysical analysis of receptor-mediated signal transduction, ion-transport, and ligand-stimulated membrane protein trafficking will be discussed. In addition, the journal club will offer an overview of modern experimental approaches to structure and function of membrane proteins, such as site-specific labeling, fluorescent spectroscopy, energy-transfer, EPR, and fluorescence photo bleaching recovery.

BCMB 607A Department Seminar Series **Credits: 1**

Association: BMSB

Term(s) offered: Fall, Winter, & Spring

Course Director(s): Phillip Yates
Ujwal Shinde

This is a Department Seminar Series

BEST 607 Neuroscience and Career Pathways **Credits:**

Association: Com Prof Dev

Term(s) offered: WS

Course Director(s): Varies

Contact the department for description.

BMSC 601 Rotations & Research **Credits: 1 to 16**

Association: Core

Term(s) offered: All

Course Director(s): Varies

This course covers rotation research (4-week long) and pre-qualifying exam research. Rotation research is supervised and graded by PBMS academic mentors, whereas pre-qualifying exam research is supervised and graded by research mentors. Research topics are varied and will depend on a specific laboratory.

BMSC 603 Dissertation Research **Credits: 1 to 16**

Association: Core

Term(s) offered: All

Course Director(s): Varies

Dissertation research is supervised and graded by research mentors. Research topics are varied and will depend on a specific laboratory.

BMSC 607 PBMS Seminar Series

Credits: 0.5

Association: Core
Term(s) offered: Winter
Course Director(s): Alex Nechiporuk

Cross-Departmental Seminar Series. This 0.5 credit course is required for all first-year PBMS students during winter term. This seminar series includes all hub specific/departmental seminars. Students should attend the seminars that are most relevant to their current lab rotation. Attendance is mandatory, students are required to attend a minimum of 5 seminars to maintain a passing grade. Student attendance will be monitored at each session by requiring each student to legibly print their name on the attendance roster.

BMSC 610 Data, Rigor & Reproducibility

Credits: 1

Association: Core, Com Prof Dev
Term(s) offered: Fall
Course Director(s): Varies

This course provides students with knowledge about the integral components of and practices that impact scientific rigor and reproducibility. Through class discussions, exercises, and reading students will learn to understand, identify, and apply methods and practices that contribute to rigor and reproducibility, as well recognize digital tools and OHSU resources for reproducible research. This class is organized in 8 modules: 1. Introduction and Lack of Transparency, 2. Blinding and Randomization, 3. Biological and Technical Replicates, 4. Sample Size, Outliers, and Exclusion Criteria, 5. Research Data Management, 6. Reproducibility Tools, 7. Publishing Data, 8. OHSU Resources for Reproducible Research.

BMSC 611 Introduction to Scientific Writing

Credits: 1

Association: Com Prof Dev
Term(s) offered: Spring
Course Director(s): Rachel Dresbeck
Zoe Speidel

Students will learn and practice the conventions of scientific writing through a variety of discussions, exercises and assignments. Students will learn how to effectively convey their message, as well as review the basics of literature searching and citation management, and examine editing and peer review processes.

BMSC 612 Writing a Fellowship Proposal

Credits: 1

Association: Com Prof Dev
Term(s) offered: Spring
Course Director(s): Alex Nechiporuk
Rachel Dresbeck

Contact Course Director for current description.

BMSC 620 Introduction to Biostatistics

Credits: 3

Association: Core
Term(s) offered: Winter
Course Director(s): Shangyuan Ye

This course will teach how to gain and communicate insights from biomedical data. Concepts learned will include data wrangling, exploratory data analysis and visualization, statistical inference with a simulation-based resampling focus, power analyses, and linear regression modelling. Students will learn how to implement the statistical programming language R throughout the research pipeline: importing, wrangling, visualizing, analyzing, interpreting, and communicating data. In addition, students will learn to create and maintain efficient workflows for reproducible research.

Modern teaching materials will be used to introduce and reinforce R skills in an interactive self-guided environment and through online resources.

BMSC 621 Search/Information Management

Credits: 1

Association: Core, Com Prof Dev
Term(s) offered: Spring
Course Director(s): Laura Zeigen
Tova Johnson

This course provides students with functional knowledge of information searching and information management in the sciences through a critical framework. Students will develop their abilities to identify the need for information, procure the information, evaluate the information, and subsequently revise their strategy for obtaining the information. Students will learn how to search database and non-database sources such as PubMed and other NCBI tools, Scopus, and grey literature to find information. They will also learn to use the information they find in an ethical and legal manner, engage in best practices for information management (e.g. using citation management software), and cultivate a mindset of lifelong learning related to information literacy. This course encourages students to be critically reflective in every stage of the information research cycle as they recognize that the information tools and systems they use in their everyday and academic lives are not neutral -- that existing power structures are reflected in the creation, organization, and access of information. Through class discussions, exercises, readings, and assignments, students will develop their own critical research praxis to become better researchers and information consumers.

BMSC 622 Scientific Posters

Credits: 1

Association: Core, Com Prof Dev
Term(s) offered: Fall
Course Director(s): Varies

This course provides students with the skills and knowledge to create posters for presentations at academic and scientific conferences. Through class discussions, exercises and readings, students will learn to understand, identify, and apply methods and practices that contribute to high-quality, well organized and visually stimulating posters. Students will also be introduced to opportunities and best practices for publishing and citing their conference contributions as well as digital tools and OHSU resources for effective poster design, production and sharing.

BMSC 630 Professional Practicum **Credits: 1**

Association: Core, Com Prof Dev

Term(s) offered: All

Course Director(s): Sud Anand, PBMS Program Director

Practicum or internship experience in biomedical organizations. Examples include PNNL, OHSU Tech Transfer, supervised guest lectures at other institutions. Application of principles and skills in biomedical sciences to real situations under the guidance of professionals in the field. Arrangements for suitable sites/experiences will be made in consultation with the student's research mentor and academic mentor.

BMSC 631 Professional Experience **Credits: 1**

Association: Core, Com Prof Dev

Term(s) offered: All

Course Director(s): Sud Anand, PBMS Program Director

Participation in an intensive advanced learning experience offered by biomedical societies, not for profit organizations, or institutes. Examples include Cold Spring Harbor Laboratories Workshops/Courses and the American Association of Immunologists Advanced Course. Arrangements for suitable experiences will be made in consultation with the student's research mentor and academic mentor.

BMSC 660 Short Scientific Talks **Credits: 1**

Association: Core

Term(s) offered: Summer

Course Director(s): Joshua Moreau

Contact Course Director for current description.

BMSC 661 Structure & Function Of Bio Molecules **Credits: 3**

Association: Core

Term(s) offered: Fall

Course Director(s): Farrens\Shinde

This course is designed to provide students with an in depth understanding of macromolecular structure/function including: 1) protein structure; 2) thermodynamic considerations of protein folding; 3) nucleic acid structure and topology; 4) the functions of proteins as enzymes and in macromolecular assembly, including quantitative analyses of ligand binding phenomena and enzyme kinetics; 5) structural and biochemical properties of lipids, membrane assembly and dynamics, and characteristics of membrane proteins; 6) the principles of bioenergetics and metabolism. Prerequisites: Undergraduate organic chemistry and biochemistry.

BMSC 662 Genetic Mechanisms and Bioregulation

Credits: 3

Association: Core
Term(s) offered: Fall
Course Director(s): Mushui Dai
Scott Landfear

This course is designed to provide students with a deeper understanding of genetic mechanisms, inheritance and gene regulation. The course is divided into four parts with one exam following each part (4 exams in total). Part I will focus on DNA replication, transcription, RNA processing, and translation; Part II will cover mutagenesis, recombination, DNA repair, genome architecture and human genetics; Part III will include lectures on chromatin structure, DNA methylation, epigenetics and non-coding RNAs; Part IV will cover the widely used genetic model organisms, such as bacteria, *Drosophila* and mouse, as well as genome editing and system biology. The material will primarily be presented by lectures with weekly lecture review and group discussion sessions. Prerequisites: Undergraduate genetics and biology or equivalent.

BMSC 663 Molecular/Cellular Biology

Credits: 3

Association: Core
Term(s) offered: Fall
Course Director(s): Julia Maxson
Megan Ruhland

The goal of this course is to provide students with a foundational understanding of cell biology that will accelerate their future scientific endeavors as well as introduce them to cutting edge areas of cell biological research. Topics to include: movement of molecules within cells by vesicular and cytoskeletal transport, protein modification and degradation, cellular organelles, cellular adhesion, cellular signaling and communication, and the regulation of cell division and death.

BMSC 664 Methods/Model Systems

Credits: 2

Association: Core
Term(s) offered: Fall
Course Director(s): Martina Ralle

The goal of this course is to provide students with a fundamental knowledge of basic methods in biochemistry, cell, and molecular biology. The students will learn how these methods are uniquely deployed in prominent model organisms to address specific research questions. Lecture topics will be temporally correlated as closely as possible with BMSC663 to facilitate understanding of the primary literature. The course will discuss methods related to DN/RNA manipulation and analysis; protein expression, purification, and analysis; and in vitro techniques such as cell culture and sorting. The biology of six prominent model systems will be presented in alternate weeks. Students will further develop written and oral communication skills through assignments and class discussions.

BMSC 665 Scientific Logic **Credits: 3**

Association: Core
Term(s) offered: Fall
Course Director(s): Allison Fryer
 Jonathan Pruneda

The goal of this course is to provide students with the analytical, critical thinking, presentation, and communication skills to effectively select and present journal articles.

BMSC 666 Chemical Biology Innovators **Credits: 2**

Association: Core
Term(s) offered: Fall – Odd years
Course Director(s): Beth Habecker

The 2-credit (6 week; 4 h/week) course will provide a broad overview of the field of chemical biology. The focus will be on chemistry-mediated innovations that enable new biological discoveries. Topics will include: I. Lighting up Biology (GFP, small molecule probes); II. Analyzing enzyme classes (activity-based protein profiling); III. Metabolic engineering (bioorthogonal chemistry, unnatural amino acids); IV. Imparting new functions on proteins (directed evolution); V. Controlling enzymes (Photopharmacology, PROTAC) and VI. Chemical Genetics. Each lecture will highlight a leader in the field and her/his seminal papers. Grades will be based on: Course participation (25%); Paper reviews/commentaries (40%); Pre-proposal pitch (5%); Original research proposal (25%); presentation of proposal (5%).

BMSC 667 Principles of Physiology **Credits: 2**

Association: Core
Term(s) offered: Fall
Course Director(s): Jim McCormick

This course provides an introduction to mammalian physiology, with an emphasis on the roles and functions of major organs. During this course, the student is expected to gain a better understanding of the interplay and communication that coordinates cells into organ systems. Organ systems covered include the nervous system, endocrine, cardiovascular, and digestive systems. Lectures will emphasize maintenance of physiological homeostasis under normal conditions, and its dysregulation in diseases such as asthma, hypertension, and diabetes will be discussed.

BMSC 668 Molecular Biophysics and Structural Bioinformatics

Credits: 2

Association: Core, BMSC
Term(s) offered: Fall – Even years
Course Director(s): Dave Farrens
Ujwal Shinde

This course will cover the range of research using problem-based approaches. The goal is to expose the student to principles and concepts underlying physical and computational methods used in modern molecular and biological research. The course is specifically designed to be accessible to students lacking a strong background in computation methods, physical chemistry or calculus. Overall focus is placed on understanding general, key concepts, rather than the latest, most cutting-edge specific applications.

Topics include: Structural bioinformatics: theory of key bioinformatics tools and algorithms, their applications towards databases, data analysis and mining, alignments, 3-D structure prediction/visualization and genome analysis. Theory and application of genetic and proteomic approaches to analyze protein expression and modifications using high-throughput methods are also covered.

BMSC 669 Fundamentals of Immunology

Credits: 2

Association: Core, IDI
Term(s) offered: Fall
Course Director(s): Evan Lind
Ruth Napier

Students completing this course will understand the fundamentals of immunology. After this course students will be able to describe the underpinnings of innate and adaptive immunity. The course will introduce students to central concepts in immunology including immune responses to pathogens, allergies and hypersensitivity reactions, autoimmunity and anti-tumor responses.

CANB 606 Mechanisms/Cancer Journal Club

Credits: 1

Association: ICB, GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): David Qian

This course introduces students to the critical analysis of original research articles in Cancer Biology. Papers will be analyzed in terms of background, hypothesis, appropriate use of experimental methods, and objective interpretations of results. Covers a wide range of papers in biophysics, biochemistry, genetics, immunology, cell and biology, and pharmacology with an emphasis on seminal discoveries in cancer.

CANB 607 Cancer Biology Seminar Series

Credits: 1

Association: ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Ellen Langer
Kate Byrne

This is a weekly seminar series, with presentations by external and internal cancer biologists, that introduces students to new cutting-edge cancer research performed in preeminent labs around the country.

CANB 616 Advanced Topics: Cancer Biology

Credits: 4

Association: ICB
Term(s) offered: Spring
Course Director(s): Zheng Xia
Jonathan Brody

Designed to give students entering cancer research a broad background in cancer biology. The course is divided into three main sections:

I) Basic Cancer Biology and Mechanisms. Topics include discovery of oncogenes and tumor suppressor genes and their functions; mechanisms of cancer initiation; role of the immune system in cancer; role of the microenvironment in cancer; metastasis; stem cells; cancer cachexia.

II) Technology in Cancer Research and Treatment. Topics include next generation sequencing in research and diagnosis; predictive gene signatures; radiation treatment; MRI; genetic manipulation of model systems; targeted therapeutics and clinical trials

III) Organ Specific Cancer Incidence, Characteristics, and Treatment. Lectures in this section will cover the pathogenesis and treatment of specific cancers such as breast, prostate, gastrointestinal, skin, and blood tumors.

The course will also have several special sections, including a series of basic pathology lectures and a project, grand rounds participation and presentation to the class, and physician shadowing to gain perspectives into current treatment options and shortcomings for patients with cancer.

CANB 617 Drug Discovery and Development

Credits: 2

Association: ICB
Term(s) offered: Spring
Course Director(s): Robert Duvoisin
Beth Habecker

This course will provide students with an introduction to key preclinical stages of the drug discovery process, from target identification and validation, through assay development, high throughput screening, hit identification, pharmacokinetics and finally selection of candidate molecules for clinical development.

CANB 622 Adv Topics Genome Sciences

Credits: 3

Association: ICB
Term(s) offered: Spring
Course Director(s): Haijiao Zhang
Shawn Chavez

This course is designed to provide in-depth coverage of topics in Genome Sciences such as the use of genetic systems to probe complex problems, genetic approaches to identify novel genotype-phenotype associations, molecular genetics, single-cell profiling, CRISPR/cas9 editing, and quantitative genetics. Focus areas may include gene regulatory mechanisms and genome regulation underlying development, regeneration, degeneration, stem cell fitness, cancer evolution, and cancer predisposition syndromes. Emphasis will be on recent insights and emerging technologies. Readings will be based on selected reviews and articles from the current literature. Interactive discussions will involve critical analyses of recent research papers.

CANB 606A Tumor Microenvironment Journal Club

Credits: 1

Association: ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Sud Anand
Megan Burger

The goal of the Tumor Micro-Environment Journal Club is to critically review manuscripts emerging in the field of tumor microenvironment. Students, postdocs, staff and faculty will present manuscripts that explore how changes in tissue structure and function potentiate malignant conversion and progression. This includes but is not limited to angiogenesis/lymphangiogenesis, matrix remodeling and fibroblast activation, tumor-associated inflammation and immunity, metastatic niche development and maintenance, tumor/stromal interactions. New features:

1. JC2.0 format in which single experiments from 3-5 papers are collected together to formulate hypotheses (optional)
2. Presenter polling audience about the paper under discussion (required)
3. Presenter including Altmetrics outputs during discussion of impact (required)

CANB 606C Basic and Translational Science Journal Club

Credits: 1

Association: ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Ellen Langer
Kate Byrne

This is a Journal Club course

CANB 613A Tissue Biology

Credits: 4

Association: ICB
Term(s) offered: Winter
Course Director(s): Bruce Schnapp

The first half of the course will be devoted to the teaching of basic histology. This will be accomplished in two parts: 1) through on-line video lectures, which the students will view independently outside of scheduled class time; and 2) through scheduled classes (labs) in which students observe digital slides, guided by written lab exercises. One or more faculty will be present during the lab classes. The faculty will provide an overview of the slides, address questions the students may have as they study the slides themselves, and address general questions about the on-line lecture material. These 1.5 hour "labs" are intended to be highly interactive. The second part of the course will be devoted to the critical reading and discussion of research papers. This part of the course will be thematic and change from year-to-year. The intent is for students to use the background information they acquired during the first half of the course to understand current literature that is at the cutting edge of tissue biology, particularly in the mouse system. Potential themes would be "tissue homeostasis and stem cells", "organogenesis", "physiology", or "novel approaches". The second part of the course-critical reading and discussion of papers-will be offered as a stand-alone "tissue biology" journal club.

CELL 606 Cell & Developmental Biology Journal Club

Credits: 1

Association: D3
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Alex Nechiporuk
This is a Journal Club course

CELL 607 Departmental Seminar

Credits: 1

Association: D3
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Ellen Langer
Kate Byrne

This is a weekly seminar series, with presentations by external and internal cancer biologists, that introduces students to new cutting-edge cancer research performed in preeminent labs around the country.

CELL 615 Advanced Topics in Developmental Neuroscience

Credits: 3

Association: D3
Term(s) offered: Spring
Course Director(s): Philip Copenhaver

Advanced graduate course designed to provide an overview of the major aspects of nervous system formation, plus more in-depth presentations of specific topics in the field of neural development and differentiation. Emphasis will be on recent insights into the molecular and cellular mechanisms that underlie specific aspects of neural development, including patterning of the early nervous system, neurogenesis, neuronal migration and axonal outgrowth, synaptogenesis and plasticity, cell death, and neural stem cells in regeneration. Readings will be based on selected reviews and articles from the current literature. Interactive discussion sections will involve critical analyses of recent research papers.

CELL 616 Advanced Topics: Cancer Biology

Credits: 4

Association: D3
Term(s) offered: Spring
Course Director(s): Zheng Xia
Jonathan Brody

CANB616 is designed to give students entering cancer research a broad background in cancer biology. The course is divided into three main sections, as follows:

- I) Basic Cancer Biology and Mechanisms. Topics include discovery of oncogenes and tumor suppressor genes and their functions; mechanisms of cancer initiation; role of the immune system in cancer; role of the microenvironment in cancer; metastasis; stem cells; cancer cachexia.
- II) Technology in Cancer Research and Treatment. Topics include next generation sequencing in research and diagnosis; predictive gene signatures; radiation treatment; MRI; genetic manipulation of model systems; targeted therapeutics and clinical trials
- III) Organ Specific Cancer Incidence, Characteristics, and Treatment. Lectures in this section will cover the pathogenesis and treatment of specific cancers such as breast, prostate, gastrointestinal, skin, and blood tumors.

CELL 665 Development, Differentiation, and Disease

Credits: 3

Association: D3
Term(s) offered: Spring
Course Director(s): Sarah Andres
Amita Tiyaboonchai
Alina Maloyan

Orchestration of development requires precise timing, spatial coordination, and reciprocal signaling between cells to result in proper tissue generation and remodeling. Disruption of these normal cellular homeostatic mechanisms occurs in a number of diseases including cancer and in many cases has led to discoveries about the function of normal genes and interacting signaling pathways in development. In this class, mechanisms of growth and development of higher eukaryotes are covered, including important signaling events, pattern formation and cell movements resulting in the fully differentiated tissues and organisms. Consideration will be given to how stem cell population are positioned and maintained, as well as mechanisms that underlie the maintenance and function of individual tissues in the fully developed organism. Moreover, aberrations in these events are covered relative to their underlying contributions to the etiology and progression of specific disease and cancers.

CELL 607A Departmental Seminar Series

Credits: 1

Association: D3
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Ellen Langer
Kate Byrne

Departmental Seminar Series, after 1st year, all CDB students are required to enroll in and attend throughout their graduate training, which includes the Basic and Translational Sciences Seminar Series. Attendance is mandatory. Students who fail to maintain a passing grade in this course will be placed on immediate probation. Students in their second year of graduate training are required to participate in a pre-seminar journal club, during which students will discuss selected papers by outside speakers. This journal club will be organized by the course director. Students who have completed their Qualifying Examinations will be required to give a 30-minute presentation each year on their dissertation research. In general, students will give their first presentation in the spring term of their 3rd year, and will continue to give subsequent presentations annually throughout their graduate training. Students will receive oral and written critiques from participating faculty to help improve their presentation skills.

CELL 613A Tissue Biology

Credits: 4

Association: D3
Term(s) offered: Winter
Course Director(s): Bruce Schnapp

The first half of the course will be devoted to the teaching of basic histology. This will be accomplished in two parts: 1) through on-line video lectures, which the students will view independently outside of scheduled class time; and 2) through scheduled classes (labs) in which students observe digital slides, guided by written lab exercises. One or more faculty will be present during the lab classes. The faculty will provide an overview of the slides, address questions the students may have as they study the slides themselves, and address general questions about the on-line lecture material. These 1.5 hour "labs" are intended to be highly interactive. The second part of the course will be devoted to the critical reading and discussion of research papers. This part of the course will be thematic and change from year-to-year. The intent is for students to use the background information they acquired during the first half of the course to understand current literature that is at the cutting edge of tissue biology, particularly in the mouse system. Potential themes would be "tissue homeostasis and stem cells", "organogenesis", "physiology", or "novel approaches".

CONJ 640 Professional Development Fund

Credits: 1

Association: Com Prof Dev
Term(s) offered: Spring
Course Director(s): Monica Hinds

A focused selection of topics to give students a solid foundation to be successful as scientists and leaders. Topics will include: team dynamics, mentor relationships, negotiation, conflict management, basics of grant submission, presentations, writing, time management.

MBIM 607 Departmental Seminar

Credits: 1

Association: IDI
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Tim Nice
Isabella Rauch

This is a Seminar course

MBIM 608 Advanced Virology

Credits: 4

Association: IDI
Term(s) offered: Spring – Even Years
Course Director(s): Dan Streblow
Ashlee Moses

This course covers molecular biology and immunology of eukaryotic viruses. Particular emphasis is placed on structure, transcription and replication, entry, assembly and egress, latency, and oncogenesis.

MBIM 612 Advanced Immunology

Credits: 4

Association: IDI
Term(s) offered: Spring – Even Years
Course Director(s): Jeff Nolz

This course is intended for students who have had introduction to Immunology or equivalent. The intention is to cover, in some depth, important concepts and some current issues in basic molecular and cellular immunology. The course will be primarily literature based, supplemented as necessary with lectures, review articles and textbook material. Students are expected to read the assigned material and to discuss questions in the class. The course is taught by a small number of faculty, each of whom covers one area. Because the area covered are chosen to reflect the area of major active research in immunology, the actual topics may vary from year to year. Recent areas covered include: T cell activation and the immune synapse, NK receptors and related molecules and the expanding family of MHC class I like ligands; T and B cell development; T and B cell memory; toll-like receptors; T cell trafficking.

MBIM 615 Dynamic Interface Between Pathogen and Host

Credits: 4

Association: IDI
Term(s) offered: Spring – Odd Years
Course Director(s): Eric Barklis

This course will explore strategies by which microorganism avoid and subvert host defenses to cause disease. Emphasis is on the molecular basis of microbial pathogenesis. We will cover several mechanisms shared by bacteria, viruses and parasites. Topics in the first half of the course include intracellular and extracellular infection strategies, microbial exploitation of the host vacuolar trafficking system, bacterial virulence gene regulation, secretion of effector molecules and toxins. The second part of the course will delve into host innate immune defenses, microbial avoidance and manipulation of immune signaling pathways, features of latent and persistent infections, and how commensal organisms interact with the host immune system. Finally, we will look into the future of microbial pathogenesis and discuss the role of "omics" in understanding pathogens and the potential of mathematical modeling of infections.

MBIM 605B Virology Journal Club

Credits: 1

Association: IDI
Term(s) offered: Fall, Winter, Spring, & Su
Course Director(s): Daniel N. Streblow
Rebecca Skalsky

This is a Journal Club course

MBIM 605C Immunology Journal Club

Credits: 1

Association: IDI
Term(s) offered: Fall, Winter, Spring, & Summer
Course Director(s): Ruth Napier

This is a Journal Club course

MBIM 605F Microbial Pathogenesis Journal Club

Credits: 1

Association: IDI
Term(s) offered: Fall, Winter, Spring, & Summer
Course Director(s): Tim Nice
This is a Journal Club course

MGEN 611 Departmental Grand Rounds

Credits: 1

Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Jon Zonana
Contact Course Director for current description.

MGEN 622 Adv Topics Genome Sciences

Credits: 3

Association: GS
Term(s) offered: Spring
Course Director(s): Haijiao Zhang
Shawn Chavez

This course is designed to provide in-depth coverage of topics in Genome Sciences such as the use of genetic systems to probe complex problems, genetic approaches to identify novel genotype-phenotype associations, molecular genetics, single-cell profiling, CRISPR/cas9 editing, and quantitative genetics. Focus areas may include gene regulatory mechanisms and genome regulation underlying development, regeneration, degeneration, stem cell fitness, cancer evolution, and cancer predisposition syndromes. Emphasis will be on recent insights and emerging technologies. Readings will be based on selected reviews and articles from the current literature. Interactive discussions will involve critical analyses of recent research papers.

MGEN 623 Genetic Basis/Human Disease

Credits: 3

Association: GS, ICB
Term(s) offered: Spring
Course Director(s): Varies

A team of faculty experts discusses topics including chromosomal basis of disease, cancer genetics, disorders of energy metabolism, amino acid disorders, blood coagulation disorders, congenital heart defects, disorders of extracellular matrix, platelet disorders, endocrine disorders and stem cell/gene therapy. Format is reading, journal club, and conference style

MGEN 624 Gene and Cell Therapy

Credits: 2

Association: GS
Term(s) offered: Winter
Course Director(s): Renee Ryals

This course presents an overview of various gene delivery systems (viral and non-viral), cell-based therapeutic approaches and their clinical applications. This course will review the most clinically advanced gene- and cell-therapeutics, promising pre-clinical approaches, and common challenges associated with gene- and cell-therapies.

MGEN 625 Epigenetics & Reprogramming

Credits: 3

Association: GS
Term(s) offered: Spring
Course Director(s): Andrew Adey
Lucia Carbone

The Course in Epigenetics and Reprogramming occurs twice a week. By the end of the course students will understand the differences between genetic and epigenetic impact on gene expression and have a clear understanding of the range of epigenetic mechanisms existing in mammals. Moreover they will learn about phenotypic consequences of normal and abnormal epigenetic regulation on disease and development. Finally, an overview of the effects of environmental factors will be provided. This is the only course at OHSU entirely dedicated to epigenetics and reprogramming, filling an essential need and covering some fundamental topics: 1. Waddington epigenetic landscape and cell fate (Dr. Andrew Adey), 2. 3D-genome organization (Dr. Lucia Carbone), 3. Non-coding RNAs regulation of gene expression (Dr. Rebecca Skalsky), 4. Epigenetic mechanisms: DNA methylation & histone modifications (Dr. Mitch Turker and Dr. Caren Weinhouse), 5. Epigenetic Reprogramming and Genomic Imprinting (Dr. Shawn Chavez), 6. Epigenetics of disease (Dr. Hisham Mohammed), 7. Environmental insults on epigenetics (Dr. Caren Weinhouse), 8. X-inactivation and monoallelic expression (Dr. Matt Thayer), 9. Cell fate determination (Dr. Andrew Adey), 10. Oxygen-dependent Regulation of Gene Expression and Epigenetic Mechanisms (Dr. Adam Krieg)

The course adopts a new format geared to guarantee extensive student participation and training on critically reviewing the literature, while learning new concepts. Lectures are not based on slide presentations and are highly focused on discussions involving both students and lecturers. In this course there are two types of lectures each week: lecture 1) the main topic (e.g. epigenetic landscape, Noncoding RNA) is introduced and 3-5 key papers with a series of discussion points are provided to students; lecture 2) discussions of the papers based on the points provided during lecture 1 expecting ample student participation. Each student leads one of the discussion points and has to answer questions arising from the conversation, demonstrating that he/she has critically read the papers.

MGEN 605E Molecular/Medical Genetics JC

Credits: 1

Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Amanda McCullough
Josh Saldivar

Contact Course Director for current description.

MGEN 605F Mechanisms/Cancer Jrnl Club

Credits: 1

Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): David Qian

This course introduces students to the critical analysis of original research articles in Cancer Biology. Papers will be analyzed in terms of background, hypothesis, appropriate use of experimental methods, and objective interpretations of results. Covers a wide range of papers in biophysics, biochemistry, genetics, immunology, cell and biology, and pharmacology with an emphasis on seminal discoveries in cancer.

MGEN 607A Departmental Seminar Series

Credits: 1

Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Melanie Gillingham

Genome Sciences integrates basic science and clinical faculty across OHSU who work in disciplines of genetics and genomics, epigenetics, rare disease genetics, genome technologies and computational biology, stem cell and developmental biology, cancer genetics, and gene therapy. The interdisciplinary nature of this seminar series is based on the combined basic science and clinical composition of the Department of Molecular & Medical Genetics that will cultivate interactions between the basic sciences and the clinical researchers and practitioners. The goals of the Genome Sciences Seminar Series are to facilitate interactions among faculty and trainees and to provide an opportunity to expand breadth and depth of knowledge in a variety of Genetic research areas that both complement and expand attendees areas of research focus.

This is a weekly seminar series, with presentations by external and internal genetics researchers that introduces students to new cutting edge genome research performed in preeminent labs around the country.

MGRD 628 Teach Practicum/Assistantship

Credits: 1

Association: Com Prof Dev
Term(s) offered:
Course Director(s): Varies

The course will consist of a teaching methods workshop, followed by a Teaching Assistantship for one of the Fall CONJ courses. TAs will lead the review sessions. Weekly meetings with the CONJ course directors will inform the process. A culminating workshop with the course director and other TAs to discuss challenges and successes encountered during the course and strategies for improvement.

MGRD 650 Practice and Ethics of Science

Credits: 1

Association: Core
Term(s) offered: Fall
Course Director(s): Varies

The goal of this course is to discuss topics pertaining to the proper conduct of scientific research. The boundary between appropriate and inappropriate conduct is often grey and deceptive. What constitutes dishonesty? How do investigators remain unbiased in their data gathering, analysis, and presentation? How is authorship determined? What ethical concerns or legal issues might you encounter if you become engaged in translational research? Other topics covered by the course are how to respond to inappropriate scientific conduct by an advisor or lab mate, how to manage stress and time, and how to build a supporting network. Following four lectures, the class will break up into small groups, each assigned to a separate room. Each group will be assigned a faculty ?leader? who will facilitate an open discussion related to the topic of the course.

NEUS 624 Cellular Neurophysiology

Credits: 4

Association: CP
Term(s) offered: Fall
Course Director(s): Varies

This course presents the fundamental principles of how nerve cells work. Starting with ion channels themselves, it integrates them into the functioning of individual neurons. The way in which voltage-dependent ion channels act in concert to generate action potentials and synaptic potentials is discussed in the framework of basic physical laws. The mechanisms of transmitter release and the postsynaptic actions of transmitter are studied. The overall aim is to provide students with a quantitative understanding of how individual nerve cells communicate with each other. This course is the first in a sequence of three courses presented sequentially in the first term.

NEUS 625 Cellular and Molecular Neurobiology

Credits: 4

Association: CP
Term(s) offered: Fall
Course Director(s): Varies

This is a survey course designed to introduce the cell and molecular mechanisms underlying the development, structure and function of the nervous system. The course is divided into three general topic areas: Development, Cell Biology and Signaling in the Nervous System.

NEUS 626 Neurobiology of Disease

Credits: 3

Association:	CP
Term(s) offered:	Spring every other year
Course Director(s):	Varies

The course has the following general goals:

- To provide a foundation in the underlying mechanisms of neurological and psychiatric disease. The course takes a theme-oriented approach to probe fundamental molecular, cellular and organismal mechanisms, rather than a disease-specific approach. The intent is to engage students who are interested in basic aspects of brain function.
- To provide a toolbox of topical methods and issues relevant to the neurobiology of disease.
- To provide a sampling of neurological and psychiatric disorders that serve as training examples for the themes addressed in goal one.
- To provide hands-on exposure to clinical situations through live patient presentations, multimedia presentations, and visits to clinics, hospital wards, and other clinical settings. Clinical Demonstrations stress hands-on interactive experience so that graduate students experience first-hand the impact of neurological and psychiatric disease on brain function, and on the social fabric of the patient's life, their families and their community.

NEUS 627 Systems Neuroscience

Credits: 4

Association:	CP
Term(s) offered:	Fall
Course Director(s):	Varies

This course is an introduction to the functional anatomy, electrophysiology, and pharmacology of the central and peripheral nervous systems. Emphasis is placed on the functional organization and processing of information in the major input and output systems of the brain, including the somatosensory, motor, visual, auditory and autonomic and hormonal regulatory systems, and on the higher integrative functions of the nervous system, including learning, emotion, motor control, and sleep. The course will consist of lectures and readings in primary literature.

NEUS 644 Racial Equity in Scientific Research & Beyond

Credits: 3

Association:	Com Prof Dev
Term(s) offered:	
Course Director(s):	Varies

This course provides foundational knowledge and skills required to address racial inequities. Students will develop a systems perspective on the historical basis, structure, and impact of systemic racism outside and within the scientific enterprise. Students will tackle three common barriers to equity: learning, discussing, and addressing racial inequities. This course is meant to empower students by developing the knowledge and skill set to become active agents of change within their own environments, both within and outside of their program or institution.

PHPH 606 PHPH Journal Club

Credits: 1

Association: CP
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Bingbing Li
This is a Journal Club course

PHPH 606 PH2 Chemistry Journal Club

Credits: 1

Association: CP
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Michael S. Cohen
This is a Journal Club course

PHPH 607 Seminar

Credits: 1

Association: CP
Term(s) offered:
Course Director(s): Robert Duvoisin
This is a Seminar course

PHPH 617 Drug Discovery and Development

Credits: 2

Association: CP
Term(s) offered: Winter
Course Director(s): Robert Duvoisin
This course will provide students with an introduction to key preclinical stages of the drug discovery process, from target identification and validation, through assay development, high throughput screening, hit identification, pharmacokinetics and finally selection of candidate molecules for clinical development.

PHPH 618 Receptor Pharmacology

Credits: 2

Association: CP
Term(s) offered: Fall – Even years
Course Director(s): Braden Lobingier
This course will provide students with an introduction to the molecular mechanisms of drug action and the principles of drug-receptor interactions.

PHPH 621 The Visual System

Credits: 2

Association: CP
Term(s) offered: Winter
Course Director(s): Kate Keller
Yan Li

The goals of this course are:

To understand the basic cellular and physiological mechanisms underlying visual perception.

To critically review fundamental as well as recent published papers on important topics in vision research.

To examine the current understanding and treatment of several blindness diseases.

The materials will be divided into two courses to be offered in alternate years: One course will focus on the Cellular and Developmental Biology of the Visual System, and the other on the Neuroanatomy and neurophysiology of the Visual System.