Program in Biomedical Sciences Course Listing

PBMS Curriculum Director: Philip Copenhaver, 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 Summer 2026 and may change in subsequent terms.

Contents

BCMB 605A Protein Structure&Function JC 4
BCMB 606 JC: Cellular Structural Bio 4
BCMB 607A Department Seminar Series 4
BMSC 601 Rotations & Research 4
BMSC 603 Dissertation Research 4
BMSC 607 PBMS Seminar Series 5
BMSC 608 PBMS Journal Club Series 5
BMSC 610 Data, Rigor & Reproducibility 5
BMSC 610NN Nano Course 5
BMSC 611 Intro Scientific Writing 6
BMSC 612 Writing a Fellowship Proposal 6
BMSC 620 Introduction to Biostatistics 6
BMSC 621 Search/Information Management 6
BMSC 622 Scientific Posters 7
BMSC 630 Professional Practicum 7
BMSC 631 Professional Experience 7
BMSC 641 Translational Oncology I 8
BMSC 642 Translational Oncology II 8
BMSC 643 Translational Oncology III 8
BMSC 660 Short Scientific Talks 9
BMSC 661 Structure & Function of Bio Molecules 9
BMSC 662 Genetic Mechanisms and Bioregulation 9

BMSC 663 Molecular/Cellular Biology 10
BMSC 664 Methods/Model Systems 10
BMSC 665 Scientific Logic 10
BMSC 666 Chemical Biology Innovators 11
BMSC 667 Principles of Physiology 11
BMSC 668 Molecular Biophysics/Structural Bioinformatics 11
BMSC 669 Fundamentals of Immunology 12
CANB 606 Mechanisms/Cancer Journal Club 12
CANB 606A Tumor Microenvironment Journal Club 12
CANB 606C Basic and Translational Science Journal Club 13
CANB 607 Cancer Biology Seminar Series 13
CANB 616 Advanced Topics: Cancer Biology 13
CANB 695 Topics Qnt & Exp Cancer Bio 13
CELL 665 Develop, Differentiation, and Disease 14
MBIM 605B Virology Journal Club 14
MBIM 605C Immunology Journal Club 14
MBIM 605F Microbial Pathogenesis Journal Club 14
MBIM 607 Sem: MMI 15
MBIM 607 Seminar: VGTI 15
MBIM 608 Advanced Virology 15
MBIM 612 Advanced Immunology 15
MBIM 615 Dynamic Interface Between Pathogen and Host 16
MGEN 605E Molecular/Medical Genetics Journal Club 16
MGEN 607A Departmental Seminar Series 16
MGEN 611 Departmental Grand Rounds 17
MGEN 622 Advanced Topics Genome Sciences 17
MGEN 623 Genetic Basis/Human Disease 17
MGEN 624 Gene and Cell Therapy 18
MGEN 625 Applied Epigenetics 18
MGRD 628 Teach Practicum/Assistantship 18
MGRD 650 Practice and Ethics of Science 18
MGRD 651 Practice and Ethics of Science: Advanced 19
NEUS 624 Cellular Neurophysiology 19

NEUS 625 Cell/Molecular Neurobiology 19
NEUS 626 Neurobiology of Disease 20
NEUS 627 Systems Neuroscience 20
NEUS 637 Advanced Topics: Developmental Neuroscience 20
NEUS 644 Racial Equity Science Research & Beyond 21
PHPH 606 JC: Chemical Physiology 21
PHPH 606 JC: Drug Discovery Chemistry 21
PHPH 606 JC: Ocular Neuroscience 21
PHPH 607 Seminar 21
PHPH 617 Drug Discovery and Development 22
PHPH 618 Receptor Pharmacology 22
PHPH 621 The Visual System 22

BCMB 605A Protein Structure&Function JC

Credits: 1
Association: BMSB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Ujwal Shinde
David Farrens

Recommended 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 606 JC: Cellular Structural Bio

Credits: 1
Association: BMSB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Benjamin Barad

This is a Journal Club course

BCMB 607A Department Seminar Series

Credits: 1
Association: BMSB
Term(s) offered: FWS
Course Director(s): Rose Hill

This is a Department Seminar Series

BMSC 601 Rotations & Research

Credits: 1 to 16
Association: Core
Term(s) offered: Fall, Winter, Spring, & Summer
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: Fall, Winter, Spring, & Summer
Course Director(s): Varies

Dissertation research is supervised and graded by research mentors. Research topics vary and depend on the specific laboratory.

BMSC 607 PBMS Seminar Series

Credits: 0.5
Association: Core
Term(s) offered: Winter
Course Director(s): TBD

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 608 PBMS Journal Club Series

Credits: 0.5
Association: Core
Term(s) offered: Winter
Course Director(s): TBD

Cross-departmental journal club series that includes all hub-specific/departmental journal clubs. Students should attend the journal clubs that are most relevant to their current lab rotation.

BMSC 610 Data, Rigor & Reproducibility

Credits: 1
Association: Core, Com Prof Dev
Term(s) offered: Spring
Course Director(s): Breanna Carusso
Robin Champieux

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 as 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 610NN Nano Course

Credits: 0.5
Association: Varies
Term(s) offered: Varies
Course Director(s): Varies

Nano courses are short special-topics courses that capitalize on timely subject matter, visiting expertise, and/or highlight new developments in a field.

BMSC 611 Intro Scientific Writing

Credits: 1
Association: Core, Com Prof Dev
Term(s) offered: Spring
Course Director(s): 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: Core, Com Prof Dev
Term(s) offered: Spring
Course Director(s): Zoe Speidel

Students will learn and practice the conventions of scientific writing of an NRSA style proposal, with an emphasis on specific aims and research training plan components. The class will combine lectures, workshops and one-on-one instruction. There will be two lectures, one on Specific Aims and another one Research Training plan. The lectures will be followed by two-hour workshops where students will review and comment on one another's specific aims and research plans. The remaining time will be spent on one-on-one consultations with the course directors.

BMSC 620 Introduction to Biostatistics

Credits: 3
Association: Core
Term(s) offered: Winter
Course Director(s): Emile Latour

Introduces fundamental statistical methods used in the biomedical and health sciences, with emphasis on understanding, interpretation, and clear communication rather than mathematical derivation. Topics include descriptive statistics and graphical summaries; basic probability and sampling distributions; confidence intervals and hypothesis testing for one- and two-sample problems using parametric and nonparametric approaches; inference for proportions; two-way tables; one-way analysis of variance; correlation and simple linear regression; and effect size and power for study planning. Students use R for data management, visualization, and interpretation of statistical output, and learn to document their analyses so results are reproducible.

BMSC 621 Search/Information Management

Credits: 1
Association: Core, Com Prof Dev
Term(s) offered: Summer
Course Director(s): Tova Stroud
David Carson

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): Breanna Carusso

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 to 9
Association: Core, Com Prof Dev
Term(s) offered: Fall, Winter, Spring, & Summer
Course Director(s): Sud Anand

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 to 9
Association: Core, Com Prof Dev
Term(s) offered: Fall, Winter, Spring, & Summer
Course Director(s): Sud Anand

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, 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 641 Translational Oncology I

Credits: 2
Association: ICB
Term(s) offered: Fall 2027 - TBD
Course Director(s): Amy Moran

This course bridges basic science and clinical practice by immersing scientists in real-world clinical environments. In the first of 3 sections of this course, students engage directly with patient care providers to understand and identify unmet clinical needs. Through exposure to successful translational collaborations, clinical study design, and regulatory processes (e.g., IRB/IND), trainees develop a shared scientific–clinical language. The course emphasizes leveraging existing clinical data (i.e. Cancer Registry data, EPIC data pulls, etc.) and biorepositories to generate impactful, translational research questions, equipping students to move bold laboratory discoveries into meaningful clinical applications in collaboration with patient care providers.

BMSC 642 Translational Oncology II

Credits: 2
Association: ICB
Term(s) offered: Winter 2028 - TBD
Course Director(s): Amy Moran

This course bridges basic science and clinical practice by immersing scientists in real-world clinical environments. In the second of 3 sections of this course, in which students engage directly with patient care providers to understand, identify, and discuss how to address unmet clinical needs. Through exposure to successful translational collaborations, clinical study design, and regulatory processes (e.g., IRB/IND), trainees develop a shared scientific–clinical language and begin to consider translation of their science into the clinic. The course emphasizes leveraging existing clinical data (i.e. Cancer Registry data, EPIC data pulls, etc.) and biorepositories to generate impactful, translational research questions, equipping students to move bold laboratory discoveries into meaningful clinical applications in collaboration with patient care providers.

BMSC 643 Translational Oncology III

Credits: 3
Association: ICB
Term(s) offered: Spring 2028 - TBD
Course Director(s): Amy Moran

This course bridges basic science and clinical practice by immersing scientists in real-world clinical environments. In the third of 3 sections of this course, in which students engage directly with patient care providers to understand, identify, discuss and begin the process of addressing unmet clinical needs. Through exposure to successful translational collaborations, clinical study design, and regulatory processes (e.g., IRB/IND), trainees develop a shared scientific–clinical language. The course emphasizes leveraging existing clinical data (i.e. Cancer Registry data, EPIC data pulls, etc.) and biorepositories to generate impactful, translational research questions, equipping students to move bold laboratory discoveries into meaningful clinical applications in collaboration with patient care providers.

BMSC 660 Short Scientific Talks

Credits: 1
Association: Core
Term(s) offered: Summer
Course Director(s): Josh Moreau

This course covers presentation skills for scientific talks, including how to structure presentations, how to create effective slides and other visual aids, speaking skills, timing of talks and "commanding the room".

BMSC 661 Structure & Function of Bio Molecules

Credits: 3
Association: Core
Term(s) offered: Fall
Course Director(s): Dave Farrens
Ujwal 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.

BMSC 662 Genetic Mechanisms and Bioregulation

Credits: 3
Association: Core
Term(s) offered: Fall
Course Director(s): Hisham Mohammed
Don Conrad

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): Megan Ruhland
Ben Barad

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): Zhenying (Jane) Nie
Meghna Gupta

The goal of this course is to provide students with a fundamental knowledge of basic methods in biochemistry, cell, and molecular biology. Students will learn how these methods are uniquely deployed in prominent model organisms to address specific biological 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 DNA/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 along with a discussion of the ethical use of animals in biomedical research. Students will further develop oral communication skills by moderating class discussions.

BMSC 665 Scientific Logic

Credits: 3
Association: Core
Term(s) offered: Fall
Course Director(s): Jonathan Pruneda
Robin Champieux

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): Kimberly Beatty
James Frank

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): Jessica Hebert
Ryan Cornelius

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/Structural Bioinformatics

Credits: 2
Association: Core
Term(s) offered: Varies
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
Megan Burger

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 606A Tumor Microenvironment Journal Club

Credits: 1
Association: ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Sud Anand
Jevon Cutler

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): Haijiao Zhang
Teresa Zimmers

The Basic and Translational Science (BTS) Journal Club is held prior to each BTS series seminar and focuses on a recent publication from the upcoming speaker. The BTS series seminar features leading extramural scientists speaking on fundamental and translational research topics. The goal of the journal club is to familiarize students with the scientific contributions of the speaker and introduce them to the research topic that will be highlighted in the seminar. The format and expectations of the journal club will include all students reading the assigned publication as well as being prepared to explain the paper figures.

CANB 607 Cancer Biology Seminar Series

Credits: 1
Association: ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Gregory Baker
Ellen Langer

This weekly seminar series features Basic & Translational Sciences Seminar Series presentations by external and internal cancer biologists that introduce students to cutting-edge cancer research from preeminent labs across the country.

CANB 616 Advanced Topics: Cancer Biology

Credits: 4
Association: ICB
Term(s) offered: Spring
Course Director(s): Kate Byrne
Alexander Davies

This course is designed to give students entering cancer research a broad background from basic biology to translation and clinical practice. The course focuses on basic cancer biology and mechanisms, technology in cancer research and treatment, and organ-specific cancer incidence, characteristics, and treatment. Basic pathology and tumor boards will also be covered.

CANB 695 Topics Qnt & Exp Cancer Bio

Credits: 1
Association: ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Dan Zuckerman
Sud Anand

This course provides formal instruction and mentoring in both 'wet' and 'dry' techniques in cancer biology, as well as professional development. The course covers computational techniques, complementary wet-lab cancer biology approaches, and their integration using a mixture of didactic teaching, journal club sessions, trainee research presentations, and structured discussions. Specific topics will be geared toward current trainee needs.

CELL 665 Develop, Differentiation, and Disease

Credits: 3
Association: D3
Term(s) offered: Fall
Course Director(s): Sarah Andres
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.

MBIM 605B Virology Journal Club

Credits: 1
Association: IDI, ITSD
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Daniel N. Streblow
Rebecca Skalsky

Journal club

MBIM 605C Immunology Journal Club

Credits: 1
Association: IDI
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Lauren B. Rodda

Journal club

MBIM 605F Microbial Pathogenesis Journal Club

Credits: 1
Association: IDI
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Tim J. Nice

This is a Journal Club course

MBIM 607 Sem: MMI

Credits: 1
Association: IDI
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Tim Nice
Isabella Rauch

This is a Seminar course held on Marquam Hill

MBIM 607 Seminar: VGTI

Credits: 1
Association: IDI, ITSD
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Daniel Malouli
Dan Streblow

This is a Seminar course, held at the West Campus.

MBIM 608 Advanced Virology

Credits: 4
Association: IDI, ITSD
Term(s) offered: Spring
Course Director(s): Dan Streblow
Rebecca Skalsky

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
Course Director(s): Tim Nice
Nathan Pennock

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
Course Director(s): Eric Barklis
Fikadu Tafesse

This course will explore strategies by which microorganisms 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 included 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.

MGEN 605E Molecular/Medical Genetics Journal Club

Credits: 1
Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Alaa Koleilat

This journal club explores current and emerging topics in genetics and genomics through critical review of the scientific literature. Sessions focus on evaluating study design, methodology, interpretation of genetic data, and the clinical and translational implications of recent research.

MGEN 607A Departmental Seminar Series

Credits: 1
Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Neal Bennett

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.

MGEN 611 Departmental Grand Rounds

Credits: 1
Association: GS
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Amy Yang

The Department of Molecular and Medical Genetics (MMG) Grand Rounds series is an interactive lecture series predominantly comprised of clinical MMG faculty; however, there is a strong basic science research presence, both in the audience and in the speakers, particularly involving translational research.

Topics range from clinical and laboratory case vignettes to more in-depth discussions of common and rare medical genetics entities. Participation is unrestricted and experts from other departments within OHSU, in addition to other regional and national experts, often attend and lecture.

MGEN 622 Advanced Topics Genome Sciences

Credits: 3
Association: GS
Term(s) offered: Spring
Course Director(s): Haijiao Zhang
Deena Walker

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
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 Applied Epigenetics

Credits: 3
Association: GS
Term(s) offered: Spring
Course Director(s): Andrew Adey
This course covers epigenetic mechanisms existing in mammals, cutting-edge techniques and methods used to interrogate the epigenome. Students will learn about computational methods available for epigenetic analyses, data interpretation and display, and how to leverage publicly available epigenetic datasets for their own research.

MGRD 628 Teach Practicum/Assistantship

Credits: 1 to 6
Association: Varies
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Sud Anand
Teaching Assistantship for the basic science courses. Contact Sud Anand for additional information and registration.

MGRD 650 Practice and Ethics of Science

Credits: 1
Association: Core
Term(s) offered: Fall
Course Director(s): Isabella Rauch
Bruce Schnapp
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.

MGRD 651 Practice and Ethics of Science: Advanced

Credits: 1
Association: Core
Term(s) offered: Fall
Course Director(s): Isabella Rauch
Bruce Schnapp

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.

Advanced students will additionally serve as facilitators for small-group discussion sections.

NEUS 624 Cellular Neurophysiology

Credits: 4
Association: CBCP
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 cells communicate with each other.

This course is the first in a sequence of three courses presented sequentially in the first term.

NEUS 625 Cell/Molecular Neurobiology

Credits: 4
Association: CBCP
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: CBCP
Term(s) offered: Spring every other year
Course Director(s): Varies

This course has the following general goals:

- To provide a foundation in the underlying mechanisms of neurological 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 interest 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: CBCP
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 637 Advanced Topics: Developmental Neuroscience

Credits: 3
Association: CBCP, D3
Term(s) offered: Varies
Course Director(s): Kevin Wright
Kelly Monk

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 pattering 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.

NEUS 644 Racial Equity Science Research & Beyond

Credits: 3
Association: CBCP
Term(s) offered: Varies
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 JC: Chemical Physiology

Credits: 1
Association: CBCP
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Bingbing Li
Beth Habecker

This is a Journal Club course

PHPH 606 JC: Drug Discovery Chemistry

Credits: 1
Association: CBCP, ICB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Sanjay Malhotra

This is a Journal Club course. Must have course director approval for registration.

PHPH 606 JC: Ocular Neuroscience

Credits: 1
Association: CBCP
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Catherine W. Morgans

This is a Journal Club course

PHPH 607 Seminar

Credits: 1
Association: CBCP, BMSB
Term(s) offered: Fall, Winter, & Spring
Course Director(s): Rose Hill

This is a Seminar course

PHPH 617 Drug Discovery and Development

Credits: 2
Association: CBCP
Term(s) offered: Spring
Course Director(s): Sanjay Malhotra
Shivaani Kummar

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: CBCP
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: CBCP
Term(s) offered: Winter - Even years
Course Director(s): Kate Keller
Yan Li

The goal of this course is to provide students with an understanding of the visual system that includes basic science and clinical perspectives. Students will be introduced to the latest research, including molecular biology, gene therapy approaches, imaging modalities, application of AI methods, as well as clinical treatments for various ocular diseases.

This course is offered biennially.