2025-2026 MCB Area of Interest Course Information

Cancer Biology

Please check the University of Washington Time Schedule for the most updated course information.

Area Directors

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FOUNDATIONAL COURSES

Foundational Course One:

Course Number: MCB 539
Course Title: Biological Basis of Neoplasia
Instructor (s): David MacPherson, Robert Eisenman
Location: FH
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10. *Will be offered in Spring 2026.*
Schedule for 2025-26: Tues, Thurs. 3:30-4:50 p.m.
Attributes: Lecture and literature review
Sub Area (if applicable):
Synopsis: Introduces the major themes in research in the biology of neoplastic change. Covers principle molecular mechanisms responsible for tumor initiation and progression, with a specific emphasis on intracellular signaling, DNA repair, cell cycle checkpoints, and loss of normal tissue homeostasis. The latest state of the art research in Cancer Biology will be presented by invited scientists, experts in their relevant field. The discussion meetings will concentrate on selected major papers in cancer biology and be presented and discussed by the students with help and guidance of the instructors.
Instructions: Contact graduateeducation@fredhutch.org for add code.

Foundational Course Two:

Course Number: PATH 518
Course Title: Emerging Topics in Cancer
Instructor (s): Eleanor Chen, Rosana Risques
Location: UW
Credits: 2.0

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10, odd years.
Will be offered in Winter 2027.
Schedule for 2025-26: N/A
Attributes: Lecture
Sub Area (if applicable):
Synopsis: Science and translational advances in cancer and therapeutics, related to recent major technological progress in cancer research. Explores how knowledge of cancer genetics as well as new molecular discoveries are translated to clinical management and treatment options.

ELECTIVE COURSES

Subtrack 1 – Cellular mechanisms of transformation

Elective Course 1A:

Course Number: CONJ 544
Course Title: Protein Structure, Modification and Regulation
Instructor (s): Barry Stoddard
Location: FH
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-5, every year.
Will be offered in Winter 2026.
Schedule for 2025-26: Tues, Thurs. 1:30-2:50 p.m.
Attributes: Lecture, literature review, methods
Sub Area (if applicable): Structure
Synopsis: Overview of general principles of protein structure, including forces that contribute to folding and stabilization, followed by an extended coverage of the means by which protein structure and function are modified and regulated. Examples from recent developments in protein folding, processing, and allosteric regulation.
Prerequisite: Introductory biochemistry and cell biology.
Instructions: Contact graduateeducation@fredhutch.org for add code.

Elective Course 1B:

Course Number: GENOME 565
Course Title: Advanced Human Genetics
Instructor (s): TBD
Location: UW
Credits: 4.0
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10.
Will be offered in Winter 2027.
Schedule for 2025-26: N/A

Attributes: Graded, Lecture, Literature review, Methods, Discussion
Sub Area (if applicable):
Synopsis The goal of the course is to provide students with knowledge and tools most useful for successful research in human genomics. Components of the course are: gene discovery and molecular function; genomic architecture; cancer genetics; and human diversity and evolution. The course meets winter quarter, with three lectures per week by the instructors and weekly section meetings. Multiple problem sets are based on real data.
Prerequisite: College-level genetics course (GENOME 361 or 371); for genetics courses taken elsewhere, please ask the instructors. The class typically includes about 60 students, including both undergraduate and graduate students.
Capacity Limit: 20

Elective Course 1C:

Highly recommended by MCB students
Course Number: MCB 522
Course Title: Developmental Basis of Human Disease
Instructor (s): Cecilia Moens
Location: FH
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10, even years. *Will be offered in Winter 2026.*
Schedule for 2025-26: Tues, Thurs. 3:30-4:50 p.m.
Attributes: Lecture and literature review
Sub Area (if applicable):
Synopsis: Uses recent discoveries in human genetics to guide student learning about animal development. Explores the normal developmental function of genes that have been identified as causal in human developmental disorders such as skeletal dysmorphologies, ciliopathies, autism, and cancer.
Instructions: Contact graduateeducation@fredhutch.org for add code.

Subtrack 2 – Computational biology techniques

Elective Course 2A:

Course Number: GENOME 552
Course Title: Technologies for Genome Analysis
Instructor (s): Lea M Starita
Location: UW
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10.
Will be offered in Autumn 2025.
Schedule for 2025-26: Tues, Thurs. 10:30-11:50 a.m.

Attributes:
Sub Area (if applicable):
Synopsis: Discussion of current and newly-emerging technologies in genome analysis with regard to applications in biology and medicine and to potential advantages and limitations.
Prerequisite: Contact course instructor and state your interest (prior genetics coursework required).
Capacity Limit: 18 - required for the GS first-year students. Remaining slots will be available on a first-come, first-served basis.

Elective Course 2B:

Course Number: GENOME 555
Course Title: Protein Technology
Instructor (s): TBD
Location: UW
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 1-5.
Will be offered in Autumn 2025.
Schedule for 2025-26: Tues, Thurs. 9:00-10:20 a.m.
Attributes:
Sub Area (if applicable):
Synopsis: Focuses on current and emerging technologies and approaches in protein analysis, and considers applications of these technologies in biology, biotechnology, and medicine.

Elective Course 2C:

Course Number: GENOME 560
Course Title: Introduction to Statistical Genomics
Instructor (s): TBD
Location: UW
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10, every year. *Will be offered in Spring 2026.*
Schedule for 2025-26: TBD
Attributes: Graded, lecture
Sub Area (if applicable):
Synopsis: An introduction to fundamental concepts necessary for the analysis of genetic and genomic data including, basic elements of probability theory, parameter estimation, and hypothesis testing.

Elective Course 2D:

Highly recommended by MCB students
Course Number: MCB 536
Course Title: Tools for Computational Biology
Instructor (s): Arvind "Rasi" Subramaniam
Location: FH
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 1-10, every year. *Will be offered in Autumn 2025.*
Schedule for 2025-26: Tues, Thurs. 3:30-4:50 p.m.
Attributes: Graded, lecture, hands-on computational work
Sub Area (if applicable): Computational
Synopsis: Introduction to established best practices in computational biology. Learn to organize unstructured data into standard formats, transform data for statistical analyses, and visualize the transformed data. Learn workflows for reproducible research such as version control, project organization, and code documentation. Gain basic experience with Linux command line tools and the Python and R programming languages. Classes will involve hands-on learning through coding exercises, collaborative problem solving, and extensive use of online learning resources.
Instructions: Contact graduateeducation@fredhutch.org for add code.

Elective Course 2E:

Course Number: PATH 558
Course Title: Integrative Omics
Instructor (s): N/A
Location: N/A
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Spring. ***Not currently offered.***
Schedule for 2025-26: N/A
Attributes:
Sub Area (if applicable):
Synopsis: Explores how to integrate genomic, transcriptomic, and proteomic approaches with state-of-the-art genetic engineering strategies to uncover a systems-level understanding of pathway interactions that regulate disease pathogenesis and complex phenotypes.

Subtrack 3 – Cancer Immunology

Elective Course 3A:

Course Number: IMMUN 532

Course Title: Intersection of Innate and Adaptive Immunity in Disease
Instructor (s): Elia Tait Wojno
Location: SLU
Credits: 4.0
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10. *Will be offered in Winter 2026*
Schedule for 2025-26: Mon, Wed, Fri. 1:00-2:20 p.m.
Attributes:
Sub Area (if applicable):
Synopsis: Examines the molecular and cellular basis of immune function. Topics include: hematopoiesis, innate immunity, antigen receptor structure, lymphocyte development, antigen presentation, effector T-cell functions, and immune-mediated diseases.
Prerequisite: Coursework in molecular genetics; intro to Immunology course; graduate standing in immunology; other graduate students with permission of instructor.

Elective Course 3B:

Highly recommended by MCB students
Course Number: IMMUN 537
Course Title: Immunological Methods
Instructor (s): Andrew Oberst
Location (e.g., UW, FH, SLU): SLU
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10. *Will be offered in Autumn 2025.*
Schedule for 2025-26: Tues, Thurs. 11:00 a.m. – 12:20 p.m.
Attributes (e.g., graded, lecture-based): Lecture and literature review
Sub Area (if applicable):
Synopsis: Introduces whole animal, cellular, biochemical, and molecular techniques used in immunological research. Discusses strengths and limitations of each technique and emphasizes caveats in interpreting the resulting data.