

2026-2027 MCB Area of Interest Course Information

Gene Expression, Cell Cycle & Chromosome 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 517

Course Title: Molecular Mechanisms of the Central Dogma

Instructor (s): Yasuhiro Arimura, Christopher Lapointe

Location (e.g., UW, FH, SLU): FH

Credits: 1.5

Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10, every year. *Will be offered in Autumn 2026.*

Schedule for 2026-2027: Tues, Thurs. 1:30-2:50 p.m.

Attributes (e.g., graded, lecture-based): Lecture

Sub Area (if applicable):

Synopsis: A five-week graduate survey course that covers a broad range of chromatin and translation regulation. This course will also cover the latest biology techniques, such as next-generation sequencing, cryo-electron microscopy, and single-molecule analysis, that are used for investigating the mechanisms of gene expression.

Instructions: Contact graduateeducation@fredhutch.org for add code.

ELECTIVE COURSES

Elective Course One:

Course Number: CONJ 532 (offered jointly with PHCOL 502)

Course Title: Signal Transduction from The Cell Membrane to The Nucleus

Instructor (s): Shao-En Ong

Location: UW

Credits: 2.0

Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10, every year. *Will be offered in Autumn 2026.*

Schedule for 2026-2027: Mon, Tues, Wed, Fri. 9:30-10:20 a.m.

Attributes: Lecture

Sub Area (if applicable):

Synopsis: Intracellular signaling pathways leading from cell membrane receptors to nucleus. Pathways activated by seven transmembrane receptors and G-proteins, insulin/PI3 kinase, MAPKs, and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction.

Elective Course Two:

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 2027.

Schedule for 2026-2027: Tues, Thurs. 3:20-4:50 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 Three:

Course Number: GENOME 565

Course Title: Advanced Human Genetics

Instructor (s): Evan Eichler, Mary-Claire King

Location: UW

Credits: 4.0

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10.
Will be offered in Winter 2027.

Schedule for 2026-2027: TBD

Attributes: 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 Four:

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. *Expected to be offered Winter 2028.*

Schedule for 2026-2027: N/A

Attributes: Lecture, literature review, discussion

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.

Elective Course Five:

Course Number: MCB 539

Course Title: Biological Basis of Neoplasia

Instructor (s): Robert Eisenman, David MacPherson

Location: FH

Credits: 3.0

Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10, even years. *Will be offered in Spring 2028.*

Schedule for 2026-2027: N/A

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.