FOUNDATIONAL COURSES

Note: This track is broadly divided into the related sub-tracks of immunology, virology, and bacteriology. The foundational courses include two courses focused on each sub-track, denoted as 1=Immunology, 2=Virology, and 3=Bacteriology. Interested students can focus on one sub-track or mix and match from these sub-tracks depending on their specific area of research. Area directors or more senior MCB students can discuss these sub-tracks with interested first-year students.

Foundational Course 1A:
Course Number: IMMUN 532
Course Title: Intersection of innate and adaptive immunity in disease (“Advanced Immunology”)
Instructor(s): Michael Gerner, Elia Tait-Wojno
Location: SLU
Credits: 4
Quarter, Weeks, and Frequency course is offered: Winter quarter, every year
Attributes: Graded, lecture based, extensive discussion of primary literature.
Prerequisite: Undergraduate immunology course (e.g. IMMUN 441), or equivalent.
Sub Area (if applicable): Immunology
Synopsis: This is the primary graduate-level survey of immunology. Many lectures are given by guest lecturers from the Dept. of Immunology who are renowned experts in these topics. Lectures are complemented by discussion and critique of relevant primary literature.

Foundational Course 1B:
Course Number: IMMUN 537
Course Title: Immunological Methods
Instructor(s): Andrew Oberst, Mark Headley
Location (e.g., UW, FH, SLU): SLU
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Every Autumn quarter, weeks 6-10, T-Th 11-12:30
Attributes (e.g., graded, lecture-based): Graded, lecture based.
Prerequisite: Undergraduate Immunology course (e.g. IMMUN 441), or equivalent.
Synopsis: This course covers key methods required for immunological research.

Foundational Course 2A:
Course Number: MCB 532
Course Title: Human Pathogenic Viruses
Instructor(s): Michael Emerman
Location: FH
Credits: 3
Quarter, Weeks, and Frequency course is offered: Autumn, odd years. Will be offered in Autumn 2023
Attributes: Graded, lecture based, extensive discussion of primary literature.
Sub Area (if applicable): Microbiology

Please check the University of Washington Time Schedule for the most updated course information.
Synopsis: Replication, regulation, and pathogenesis of several groups of human viruses, including human immunodeficiency virus and papillomaviruses. Emphasis on the unique aspects of the viral-like cycles as they relate to effects on infected cells and organisms. Guest lecturers focus on viral immunology, measles, herpes simplex virus, and HHV-8

Foundational Course 2B:
Course Number: MICROM 540  
Course Title: Virology  
Instructor(s): Michael Lagunoff, Jason Smith, Jenny Hyde  
Location: SLU  
Credits: 3  
Quarter, Weeks, and Frequency course is offered: Autumn, even years  
Attributes: Graded, lecture based, extensive discussion of primary literature.  
Sub Area (if applicable): Microbiology  
Synopsis: The molecular biology, transmission, and pathogenesis of human viruses will be explored. In addition to general principles of virology, lectures and paper discussions will focus on specific human pathogens including HIV, herpesviruses, ebolaviruses, alphaviruses, and adenoviruses, among others.

Foundational Course 3A:
Course Number: CONJ 558  
Course Title: Prokaryotic Biology  
Instructor(s): Harwood, Leigh  
Location: UW  
Credits: 3  
Quarter, Weeks, and Frequency course is offered: Winter. Course not currently being offered  
Attributes: Graded, lecture based, extensive discussion of primary literature.  
Sub Area (if applicable): Microbiology  
Synopsis: Basic principles in prokaryotic cell structure, genomics, and metabolism. Introduction to prokaryotic physiology, bacterial pathogenesis, and microbial ecology.

Foundational Course 3B:
Course Number: MICROM 553  
Course Title: Molecular Interactions of Bacteria with their hosts  
Instructor(s): Woodward, Mougous  
Location: SLU  
Credits: 3  
Quarter, Weeks, and Frequency course is offered: Spring, odd years  
Attributes: Graded, lecture based, extensive discussion of primary literature.  
Sub Area (if applicable): Microbiology  
Synopsis: The processes bacteria employ to shape interactions with their hosts will be explored in molecular detail through selected examples in the literature.

ELECTIVE COURSES
Elective Course One:
Course Number: CONJ 539  
Course Title: Modern Approaches to Vaccines  
Instructor(s): Fuller  
Location: SLU
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Autumn/Spring quarter, every year
Attributes: Lecture based, extensive use of primary literature
Sub Area (if applicable):
Synopsis: Covers selected topics based on recent publications in viral and bacterial vaccine research. Emphasizes understanding the latest advanced and issues in vaccine discovery, mechanisms of action, and special topics in viral vaccines

Elective Course Two:
Course Number: CONJ 549
Course Title: Population Biology of Microorganisms
Instructor (s): Mittler
Location: UW
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Spring quarter, even years
Attributes: Lecture based, extensive use of primary literature
Sub Area (if applicable): Microbiology
Synopsis: Principles of ecology and evolution as they apply to microorganisms

Elective Course Three:
Course Number: CONJ 557
Course Title: Microbial Evolution
Instructor (s): TBD
Location: UW
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Autumn, Spring quarter, every year. Course not currently being offered
Prerequisite: MICROM 412 or general biology background
Attributes: Lecture based, extensive use of primary literature
Sub Area (if applicable): Microbiology
Synopsis: Selected topics in microbial evolution including evidence for early life on Earth, molecular mechanisms of bacterial and viral evolution, speciation, adaptive niche differentiation, bioinformatics tools to detect selection, and evolution of the virulence and pandemic spread.

Elective Course Four:
Course Number: GLOBAL HEALTH 566
Course Title: Biochemistry and Genetics of Pathogens and Their Hosts
Instructor (s): LeAnn Campbell
Location: UW
Credits: 3
Quarter, Weeks, and Frequency course is offered: Autumn quarter, every year
Attributes: Lecture based, extensive use of primary literature
Sub Area (if applicable):
Synopsis: Provides a strong foundation in biochemistry, molecular biology, and genetics for students interested in disease. Principles illustrated through examples focusing on pathogens, and infectious and non-infectious disease.
Note: offered jointly with PABIO 551A.

Elective Course Five:
Updated December 2022
Course Number: IMMUN 441
Course Title: Basic Immunology
Instructor(s): Jakob von Moltke
Location: UW
Credits: 4
Quarter, Weeks, and Frequency course is offered: Autumn quarter, every year
Attributes: Lecture based
Sub Area (if applicable): Immunology
Synopsis: This is an undergraduate class that presents a complete introduction to immunology. MCB students interested in this topic who have not taken a basic immunology course are encouraged to take or audit this course in preparation for more advanced immunology courses. Students must obtain approval from the MCB Co-Directors for this 400-level class to count toward their 18-graded credits.

Elective Course Six:
Course Number: IMMUN 538
Course Title: Immune-based diseases and treatments
Instructor(s): Ram Savan, Estelle Bettelli
Location: SLU
Credits: 2
Quarter, Weeks, and Frequency course is offered: Spring quarter, every year
Attributes: Lecture based, extensive use of primary literature
Sub Area (if applicable): Immunology
Synopsis: This course focuses on the role of the immune system in both causing and resolving disease. Topics include autoimmune disease, infection, and cancer immunology. Each class includes both a lecture component and a discussion of relevant primary literature.

Elective Course Seven:
Course Number: PABIO 552
Course Title: Cell Biology of Human Pathogens and Disease
Instructor(s): Hybiske, Grundner
Location: UW
Credits: 3
Quarter, Weeks, and Frequency course is offered: Winter quarter, every year
Attributes: Lecture based, extensive use of primary literature
Sub Area (if applicable): Immunology
Synopsis: Cell biology and immunology explored through diseases of public health importance. Examples of pathogen interaction with host cell biology and immune systems, unique aspects of the cell biology of pathogens, perturbations of these systems in non-infectious diseases, and design of therapeutics and vaccines to combat diseases of public health importance.

GENERAL METHODS/PROFESSIONAL DEVELOPMENT (GM/PD) COURSES
GM/PD Course One:
Course Number: BIOL 540B
Course Title: Uncommon Leaders: Women in Black, Indigenous, People of Color in Science
Instructor(s): Billie Swalla
Location: TBA
Credits: 2.0
Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-5
**Attributes**: Graded, Career development and methods  
**Sub Area (if applicable)**:  
**Synopsis**: This course is to learn about Women and Black, Indigenous, People of Color in Science and how they have extra challenges to overcome because of their identity. The way that some people think about their science is different and can lead to new discoveries and insights. It is important that you delve into the person that you choose to study and also what is exciting and transformational about their science. We will work on Wikipedia pages for these scientists and you will contact them and hopefully be able to interview them.

**GM/PD Course Two**:  
**Course Number**: CENV 500  
**Course Title**: Communicating Science to the Public Effectively  
**Instructor(s)**: Nicole Gregorio  
**Location**: UW  
**Credits**: 3.0  
**Quarter, Weeks, and Frequency course is offered**: Winter, will be offered in Winter 2023  
**Attributes**: Career development and methods  
**Sub Area (if applicable)**:  
**Synopsis**: Whether you’re looking to give an unforgettable job talk, change a policymaker’s mind, or finally get your family to understand your research, the Engage course is a great professional development opportunity and learning experience. This is a discussion-based course for graduate students in the sciences that focuses on effective techniques for communicating science, with an emphasis on sharing your science with non-specialists. At the end of the quarter, each student will present a 20 minute public talk on their graduate research to be delivered during the 2023 Engage: The Science Speaker Series at Town Hall Seattle. In this course, students will:  
- Develop and practice analogies to distill their research  
- Perfect their elevator pitches  
- Practice storytelling, audience consideration, and cultural competency  
- Play improv games to leverage improvisation as a public speaking tool  
- Engage in weekly readings and discussions  
- Hear from guest speakers on science communication  

**Note**: Space is limited in this course and it often fills quickly, with an extensive waitlist. An application process and expectation agreement must be completed by the student to be considered for the course. Please reach out to the instructor for more information.

**GM/PD Course Three**:  
**Course Number**: MCB 512  
**Course Title**: Scientific Speaking Seminar  
**Instructor(s)**: Jihong Bai  
**Location**: FH  
**Credits**: 1.5  
**Quarter, Weeks, and Frequency course is offered**: Winter, weeks 1-5, will be offered in 2023  
**Attributes**: Career development and methods  
**Sub Area (if applicable)**:  
**Synopsis**: A crucial part of a scientific career is the ability to effectively deliver a research seminar. This course will focus on all aspects of giving a seminar and teach students how to introduce the research topic, how to make clear and effective slides, and how to explain methods and data in a clear manner. Students will prepare their own research seminar.
throughout the course. Each week they will practice a part of it and receive feedback from other students and the instructors. By the end of the course, students will have an entire seminar about their thesis project prepared. The course will also give examples of good and bad seminars and help students learn how to communicate with non-scientists about their research.

**GM/PD Course Four:**
- **Course Number:** MCB 543
- **Course Title:** Logic Constructs and Methodologies of Biological Research
- **Instructor(s):** Sandra Bajjalieh
- **Location:** UW
- **Credits:** 3.0
- **Quarter, Weeks, and Frequency course is offered:** Spring, weeks 1-10, *will be offered in 2023*
- **Attributes:** Career development and methods

**Synopsis:** This course surveys the logic and methods of scientific practice from historical, practical, and sociological points of view. Topics covered include how the philosophy of science influences experimental approaches, how the demarcation between science and pseudoscience has evolved, how common cognitive biases lead to errors in judgement and interpretation, and how sociological factors impact scientific progress. After completing the course, students should understand and interface differently with science they encounter, papers they read, and their own projects.

**GM/PD Course Five:**
- **Course Number:** MCB 560
- **Course Title:** MCB Biotechnology Externship
- **Instructor(s):** Celeste Berg
- **Location:** TBA
- **Credits:** 2.0
- **Quarter, Weeks, and Frequency course is offered:** Summer, weeks 1-10
- **Attributes:** Career development and methods

**Synopsis:** This externship program provides MCB students with the opportunity to gain firsthand research experience in biotechnology companies in the Puget Sound area. Applications are available in the early spring and reviewed by the Externship Program Director. Applications are submitted to participating companies to find a suitable match. This externship is only available during the summer between Year 1 and Year 2 to students who have completed 3 rotations and identified a dissertation laboratory. Students are supported by MCB for the summer quarter.

**GM/PD Course Six:**
- **Course Number:** UCONJ 510
- **Course Title:** Introductory Laboratory Based Biostatistics
- **Instructor(s):** Lloyd Mancl
- **Location:** UW
- **Credits:** 2.0
- **Quarter, Weeks, and Frequency course is offered:** Summer
- **Attributes:** Lecture-based with assignments

**Synopsis:** Introduces methods of data description and statistical inference for experiments. Covers principles of design and analysis of experiments; descriptive statistics; comparison of group means and proportions; linear regression; and correlation. Emphasizes examples from
laboratory-based biomedical sciences, and provides demonstrations using standard statistical programs.