

# First Meeting of Courses

Fall Term 2019-2020

## **Classes start**

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Tuesday, September 3

### **Online check-in (registration)**

Opened August 1. Please visit the [Harvard University Knowledge Center](#) website for more information.

### **Deadlines & holidays**

Please visit the [GSAS Calendar](#) to view deadlines and holidays for the 2019-2020 academic year.

## **For more information**

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617-432-0605 or [dms\\_courses@hms.harvard.edu](mailto:dms_courses@hms.harvard.edu)

# First Meeting of Courses

## Fall Term 2019-2020

**BBS 230. Qualitative & Quantitative Analysis of the Biological Literature**

Jesse Gray, Roberto Chiarle

**BBS 301. Embedded Teaching Practicum (for Graduate Teaching Assistants)**

Jason Heustis, Madhvi Venkatesh

**BBS 330. Critical Thinking & Research Proposal Writing**

Rosalyn Adam, Matthew Harris

**BCMP 200. Principles of Molecular Biology**

Joseph Loparo, Karen Adelman, Alan Brown, Lee Churchman, Frank Slack, Ralph Scully  
Curriculum Fellow: Madhvi Venkatesh

**BCMP 218. Molecular Medicine**

Suneet Agarwal

**BCMP 230. Principles & Practice of Drug Development**

Stan Neil Finkelstein

**BMIF 201. Concepts in Genome Analysis**

Shamil Sunyaev, Cheng-Zhong Zhang, Michael Baym

**CELLBIO 235. History & Philosophy of Experimentation in Biology**

David Glass, Janet Browne, Ned Hall

**GENETIC 201. Principles of Genetics**

Fred Winston, Maxwell Heiman, Steven McCarroll, Matthew Pecot, Thomas Bernhardt, Jenna Galloway

**HBTM 201. Tumor Microenvironment & Immuno-Oncology: A Systems Biology Approach**

Rakesh Jain

Teaching Assistant: Ashwin Kumar

**HBTM 235. Principles of Human Disease: Physiology & Pathology**

Constance L. Cepko

**IMMUN 201. Advanced Topics in Immunology**

Thorsten Mempel, Shiv Pillai, Stephanie Dougan



**IMMUN 301. Immunology Seminar**

Shiv Pillai, Galit Alter

**MED-SCI 210. Intro to Matlab, Statistics & Dynamical Systems for Mathematical Biology in Pharma & Biotech**

Catherine Dubreuil

**MED-SCI 250AB. Human Functional Anatomy**

Lee Gehrke, Mohini Lutchman, Trudy Van Houten, Breda Zimkus, Sabine Hildebrandt  
Curriculum Fellow: Katelyn Burkhardt

**MICROBI 202. Mechanisms of Bacterial Pathogenesis & Host Immune Response**

Marcia Goldberg, Jonathan Kagan, Deepali Ravel, Michael Starnbach, Darren Higgins, Min Dong, Brian Russo  
Curriculum Fellow: Deepali Ravel

**MICROBI 205. Mechanisms of Microbial Pathogenesis**

Clyde S. Crumpacker, Harvey Simon

**NEUROBIO 215A. The Discipline of Neuroscience**

Lisa Goodrich, John Assad, Gary Yellen, Bruce Bean, Wade Regehr, Sandeep Robert Datta, Tom Schwarz, Michael Do, Josh Kaplan, David Corey, Bernardo Sabatini, Pascal Kaeser  
Curriculum Fellow: Taralyn Tan

**NEUROBIO 230. Visual Recognition: Computational & Biophysical Perspective**

Gabriel Kreiman

**SHBT 200. Acoustics of Speech & Hearing**

Satrajit Ghosh, Hideko Heidi Nakajima, John Rosowski

**SHBT 201. Biology of the Inner Ear**

Charles Liberman, Stéphane Maison

**VIROLOGY 200. Introduction to Virology**

Jonathan Abraham, Philip Kranzusch

**VIROLOGY 202. Proposal Writing**

James DeCaprio



## Biological & Biomedical Sciences

### **BBS 230. Qualitative & Quantitative Analysis of the Biological Literature**

Jesse Gray, Roberto Chiarle

4 units.

T/Th, 3:00pm - 6:00pm

BBS 230 is an integrated literature analysis course comprised of two related components: (1) intensive paper discussion on Thursdays and (2) workshops to assess individual student skills in critically evaluating the scientific literature on Tuesdays.

**Course Notes** This course is required for first year BBS and second year BIG students, and is open only to BBS and second year BIG students.

**Meeting Dates** Sept 5 - Dec 3

**Meeting Locations** TBA

**Course Head** Jesse Gray, [gray@genetics.med.harvard.edu](mailto:gray@genetics.med.harvard.edu)

### **BBS 301. Embedded Teaching Practicum (for Graduate Teaching Assistants)**

Jason Heustis, Madhvi Venkatesh

4 units. Instructor consent required.

MF, 12:45 - 2:30pm, T (select dates), 6:00pm - 8:00pm

The Embedded Teaching Practicum serves to enhance the teaching experience for TAs and the learning experience for enrollees in the core BBS courses. While TAs serve different functions and experience teaching from different perspectives in each of our core courses, they collectively serve a vital role in helping with the delivery of a contemporary, high-quality and accessible education to HMS graduate students. The embedded teaching practicum provides practice-based training in curriculum design, developing learning objectives, assessment development and DBER; facilitating a group discussion; professionalism in the classroom; and preparation for teaching throughout and beyond time in graduate school. Teaching assistants are provided training and experience in the development of an early-career teaching philosophy. Course for TAs working in BCMP 200.

**Course Notes** TAs should contact Jason Heustis, [ronald\\_heustis@hms.harvard.edu](mailto:ronald_heustis@hms.harvard.edu). Registration for this class is limited to students serving as Teaching Assistants for BBS core. Class meetings will be scheduled during daytime and evening hours, and will be communicated by the instructor. TAs are required to attend the lecture for the course in which they are a TA.

**Meeting Dates** Aug 27 - Dec 10

**First Meeting Location** Students will be contacted directly with room

**Course Head** Jason Heustis, [ronald\\_heustis@hms.harvard.edu](mailto:ronald_heustis@hms.harvard.edu)



## **BBS 330. Critical Thinking & Research Proposal Writing**

Rosalyn Adam, Matthew Harris

4 units.

A small group tutorial systematically guiding students in the writing of original, hypothesis-driven research proposals from initial topic selection through completion of a final draft.

**Course Notes** This course is open to second year BBS students. Others need permission of the instructors. Dates, times and locations for Sessions 3 and 4 will be determined by the faculty running the small group sessions. Students will be able to sign up for their specific group on a first-come, first-served basis until the group limit (5 students) is reached. The BBS office will coordinate this process. Group assignments will be posted on the course [website](#).

**Class Notes** Session 1 (lecture) will be held on Sept 10, 2:00pm - 4:00pm, in NRB350.

Session 2 (lecture) will be held on Oct 1, 2:00pm - 4:00pm, in NRB350.

**Recommended Prep** Check course website for downloadable material

**Course Website** <https://canvas.harvard.edu/courses/61871>

**Meeting Dates** Sept 10 - Dec 16

**First Meeting Location** NRB 350

**Course Heads** Rosalyn Adam, [rosalyn.adam@childrens.harvard.edu](mailto:rosalyn.adam@childrens.harvard.edu), Matthew Harris, [matthew.harris@childrens.harvard.edu](mailto:matthew.harris@childrens.harvard.edu)

## **Biological Chemistry & Molecular Pharmacology**

### **BCMP 200. Principles of Molecular Biology**

Joseph Loparo, Karen Adelman, Alan Brown, Lee Churchman, Frank Slack, Ralph Scully

4 units.

MWF, 10:45am - 12:15pm

Principles of Molecular Biology is a course organized around the Central Dogma of Biology with presentations covering fundamental aspects of DNA and RNA structure, their function and their interactions with proteins. The course opens with a discussion of the physical and chemical properties that drive the interactions of proteins with nucleic acids. This is used as a basis for understanding the material presented in the subsequent five modules, which cover DNA replication, DNA repair, gene regulation, transcription and translation. Throughout this course an emphasis will be placed on how the structure of small molecular machines (proteins) define their function in the processes and pathways that are introduced.

**Course Note** Offered jointly with the Medical School as BP 723.0

**Recommended Prep** Intended primarily for graduate students familiar with basic molecular biology or with strong biology/chemistry background.

**Meeting Dates** Sept 4 - Dec 9

**First Meeting Location** Cannon Room, Building C 114

**Course Head** Joseph Loparo, [joseph\\_loparo@hms.harvard.edu](mailto:joseph_loparo@hms.harvard.edu)

**Curriculum Fellow** Madhvi Venkatesh, [madhvi\\_venkatesh@hms.harvard.edu](mailto:madhvi_venkatesh@hms.harvard.edu)



## **BCMP 218. Molecular Medicine**

Suneet Agarwal

4 units. Enrollment limited to 25.

T, 1:00pm - 3:00pm

A seminar on various human diseases and their underlying genetic or biochemical bases. Primary scientific papers discussed. Lectures by faculty and seminars conducted by students, faculty supervision.

**Course Notes** Faculty mentors will guide student-led discussions of the papers. Jointly offered with the Medical School as HT 140.

**Prerequisites** Molecular Biology and Biochemistry

**Meeting Dates** Sept 10 - Dec 3

**Meeting Locations** TMEC 128, MIT 66-168

**Course Head** Suneet Agarwal, [suneet.agarwal@childrens.harvard.edu](mailto:suneet.agarwal@childrens.harvard.edu)

## **BCMP 230. Principles & Practice of Drug Development**

Stan Neil Finkelstein

4 units.

W, 3:00pm - 6:00pm

Critical assessment of the major issues and stages of developing a pharmaceutical or biopharmaceutical. Drug discovery, preclinical development, clinical investigation, manufacturing and regulatory issues considered for small and large molecules. Economic considerations of the drug development process.

**Note** Classes are held at MIT.

**Meeting Dates** Sept 4 - Dec 11

**First Meeting Location** MIT 4-237

**Course Head** Stan Finkelstein, [finkelst@hcp.med.harvard.edu](mailto:finkelst@hcp.med.harvard.edu)



## **Biomedical Informatics**

### **BMIF 201. Concepts in Genome Analysis**

Shamil Sunyaev, Cheng-Zhong Zhang, Michael Baym

4 units.

MW, 2:30pm - 4:00pm

This course focuses on quantitative aspects of genetics and genomics, including computational and statistical methods of genomic analysis. We will introduce basic concepts and discuss recent progress in population and evolutionary genetics and cover principles of statistical genetics of Mendelian and complex traits. We will then introduce current genomic technologies and key algorithms in computational biology and bioinformatics. We will discuss applications of these algorithms to genome annotation and analysis of epigenomics, cancer genomics and metagenomics data. Proficiency in programming and basic knowledge of genetics and statistics will be assumed.

**First Meeting Date** Sept 4

**First Meeting Location** TMEC 340

**Course Head** Shamil Sunyaev, [ssunyaev@rics.bwh.harvard.edu](mailto:ssunyaev@rics.bwh.harvard.edu)

## **Cell Biology**

### **CELLBIO 235. History & Philosophy of Experimentation in Biology**

David Glass, Janet Browne, Ned Hall

4 units. Enrollment limited to 24.

T, 6:30pm - 8:30pm

How did developments in philosophy of science, technology, and statistics relate to practices in biology over time? We will trace the influence of particular philosophical arguments concerning science that have developed over the last 500 years, following the development of distinct types of “Scientific Method” in biology. The course will offer a foundation for exploring how today’s dominant scientific method relates to scientific research, medicine, and society’s popular understanding of science, and may help give perspective as to how modern practices of scientific method have come to be. Learning of alternate approaches to science and scientific epistemology might be of particular importance now, given current controversies relating to the reproducibility of many published findings.

**Meeting Dates** Sept 3 - Dec 3

**First Meeting Location** Barker Center 211

**Course Head** David Glass, [david\\_glass@hms.harvard.edu](mailto:david_glass@hms.harvard.edu)



## Genetics

### **GENETIC 201. Principles of Genetics**

Fred Winston, Maxwell Heiman, Steven McCarroll, Matthew Pecot, Thomas Bernhardt, Jenna Galloway

4 units.

MWF, 9:00am - 10:20am

An in-depth survey of genetics, beginning with basic principles and extending to modern approaches and special topics. We will draw on examples from various systems, including bacteria, yeast, *Drosophila*, *C. elegans*, zebrafish, mouse, and human.

**Course Notes** Intended for first-year graduate students. Offered jointly with the Medical School as GN 701.0.

**Meeting Dates** Sept 4 - Dec 12

**First Meeting Location** Cannon Room, Building C

**Course Heads** Fred Winston, [winston@genetics.med.harvard.edu](mailto:winston@genetics.med.harvard.edu), Max Heiman, [heiman@genetics.med.harvard.edu](mailto:heiman@genetics.med.harvard.edu)

## Human Biology & Translational Medicine

### **HBTM 201. Tumor Microenvironment & Immunology: A Systems Biology Approach**

Rakesh Jain, Teaching Assistant: Ashwin Kumar

4 units.

M, 5:00pm - 7:00pm

Provides theoretical background to analyze and synthesize the most up-to-date findings from both laboratory and clinical investigations into solid tumor pathophysiology. Covers different topics centered on the critical role that the tumor microenvironment plays in the growth, invasion, metastasis and treatment of solid tumors. Develops a systems-level, quantitative understanding of angiogenesis, extracellular matrix, metastatic process, delivery of drugs and immune cells, and response to conventional and novel therapies, including immunotherapies. Discussions provide critical comments on the challenges and the future opportunities in research on cancer and in establishment of novel therapeutic approaches and biomarkers to guide treatment.

**Course Notes** Given in alternate years. Offered jointly with the Medical School as PA 712.0. Classes held at MIT.

**Meeting Dates** Sept 9 - Dec 9

**First Meeting Location** MIT E25-117

**Course Head** Rakesh Jain, [jain@steele.mgh.harvard.edu](mailto:jain@steele.mgh.harvard.edu)





## **HBTM 235. Principles of Human Disease: Physiology & Pathology**

Constance L. Cepko

4 units.

MWF, 9:00am - 10:30am (lectures)

MW, 9:00am - 10:30am (tutorials on select dates)

This course covers the normal physiology and pathophysiology of selected organs, through lectures, readings, tutorials based on clinical cases, and patient presentations. Human biology is emphasized, with some examples also drawn from model organisms. Recent therapeutic approaches, including RNAi, gene therapy, and genome editing will be covered

**Course Note** Course enrollment is open to graduate students from any program as well as undergraduates.

**Prerequisites** Knowledge of introductory biochemistry, molecular biology, and cell biology required (MCB52 and MCB54 or equivalent and one year of organic chemistry for undergraduates).

**Meeting Dates** Sept 4 - Dec 11

**First Meeting Location** NRB 350

**Course Head** Connie Cepko, cepko@genetics.med.harvard.edu

## **Immunology**

### **IMMUN 201. Advanced Topics in Immunology**

Thorsten Mempel, Shiv Pillai, Stephanie Dougan

4 units. Enrollment limited to 50.

T/Th, 1:30pm - 4:00pm

Comprehensive core course in basic immunology, providing an intensive and in-depth examination of the cells and molecules of the immune system. Special attention is given to the experimental approaches that led to the discovery of the general principles of immunology.

**Course Notes** Intended for students who have had prior exposure to immunology on the undergraduate level. In the absence of such exposure, students must obtain the permission of the Course Director. Offered jointly with the Medical School as IM 702.0.

**Prerequisites** A background in genetics and biochemistry is strongly recommended.

**Meeting Dates** Sept 3 - Dec 5

**First Meeting Location** Modell 100A

**Course Heads** Thorsten Mempel, tmempel@mgh.harvard.edu, Stephanie Dougan, stephanie\_dougan@dfci.harvard.edu



## **IMMUN 301. Immunology Seminar**

Shiv Pillai, Galit Alter

4 units. Enrollment limited to 20.

W, 12:00pm - 1:00pm (lunch), 2:30pm - 4:00pm (discussion)

Gives students exposure to research topics in immunology. Students prepare for the weekly seminar through readings, discussions, and preparing brief write-ups. These discussions are facilitated by members of the Committee on Immunology.

**Course Note** Required for, and limited to, first-year Immunology graduate students. All others will be evaluated for enrollment on a case by case basis.

**First Meeting Date** Sept 4

**First Meeting Location** Modell 100A

**Course Heads** Shiv Pillai, pillai@helix.mgh.harvard.edu, Galit Alter, galter@partners.org

## **Medical Sciences**

### **MED-SCI 210. Intro to Matlab, Statistics & Dynamical Systems for Mathematical Biology in Pharma & Biotech**

Catherine Dubreuil

4 units. Enrollment limited to 24.

This course provides an introduction to the use of mathematical modeling, continuous differential equations, statistics and analysis and programming in Matlab with a focus on mathematical biology applications in pharmaceutical and biotechnology industries. Biological topics will include dynamic systems math modeling and statistical analysis applied to the drug discovery and development pipeline. Computational tools, model simulations, and statistical analyses will be executed in MATLAB. MATLAB code will be covered in class.

**Meeting Dates** TBA

**First Meeting Location** TBA

**Course Head** Catherine Dubreuil, catherine\_dubreuil@hms.harvard.edu



## **MED-SCI 250AB. Human Functional Anatomy**

Lee Gehrke, Mohini Lutchman, Trudy Van Houten, Breda Zimkus, Sabine Hildebrandt

4 units. Enrollment limited to 48.

MWF, 1:30pm - 6:00pm

Lectures, detailed laboratory dissections, and prosections provide a thorough exploration of the gross structure and function of the human body. Fundamental principles of embryology and bioengineering promote analytical approaches to understanding the body's design.

**Course Notes** Open to qualified graduate students with permission of the course director. The course has a minimum enrollment of 30. This course requires rental of a locker for a fee. Offered jointly with the Medical School as HT010.

**Meeting Dates** Sept 4 - Dec 13

**First Meeting Location** Armenise Amphitheater

**Course Head** Lee Gehrke, lee\_gehrke@hms.harvard.edu

## **Microbiology & Immunobiology**

### **MICROBI 202. Mechanisms of Bacterial Pathogenesis & Host Immune Response**

Marcia Goldberg, Jonathan Kagan, Deepali Ravel, Michael Starnbach, Darren Higgins, Min Dong, Brian Russo

4 units. Enrollment limited to 15.

T/ Th, 10:00am - 12:00pm

This course focuses on molecular mechanisms of bacterial pathogenesis and the host response to infection. The class consists of lectures and group discussions emphasizing themes of pathogenesis, methods, results, and interpretations of classic and contemporary literature. Subjects including bacterial secretion systems, mechanisms of entry into host cells, biofilm formation, and motility are viewed primarily from the pathogen's perspective, whereas topics including inflammasome activation, TLR signaling, and adaptive immune responses provide a host-centric view. Additional sessions are spent examining current methods of antibiotic discovery and vaccine development. The course also introduces students to the wide diversity of pathogenic bacteria. Organisms discussed include pathogenic *E. coli*, *Shigella* species, *Vibrio cholerae*, *Listeria monocytogenes*, *Chlamydia trachomatis*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*, as well as a discussion of the challenges presented by currently unculturable species.

**Course Notes** Designed to complement Microbiology 201; however, students who have not taken Microbiology 201 previously are welcome. Designed for graduate students in their first year or beyond, however undergraduates with specific interest in the field may audit.

**Meeting Dates** Sept 3 - Dec 3

**First Meeting Location** NRB 1031

**Course Head** Marcia Goldberg, marcia.goldberg@mgh.harvard.edu

**Curriculum Fellow** Deepali Ravel, deepali\_ravel@hms.harvard.edu



## **MICROBI 205. Mechanisms of Microbial Pathogenesis**

Clyde S. Crumpacker, Harvey Simon

4 units. Enrollment limited to 40.

T/Th, 8:30am - 12:30pm

The mechanisms of bacterial, mycoplasmal, fungal, and viral pathogenesis are covered. Topics are selected for intrinsic interest and cover the spectrum of pathophysiological mechanisms of the infectious process. Emphasis on pathogenesis at the molecular level.

**Course Notes** Offered jointly with the Medical School as HT 040.

**Prerequisites** A background course in molecular biology is strongly encouraged.

**Meeting Dates** Sept 3 - Dec 12

**First Meeting Location** TMEC 250

**Course Head** Clyde S. Crumpacker, ccrumpac@bidmc.harvard.edu

## **Neurobiology**

### **NEUROBIO 215A. The Discipline of Neuroscience**

Lisa Goodrich, John Assad

4 units.

T/Th, 9:00am - 12:00pm

This course will endow students with the broad conceptual fluency in the discipline of neuroscience required to relate genes to circuit function, metabolism to neurological disease, and cell biology to neural computations. Through a combination of lectures and in-class activities, students will learn to design, quantitatively analyze, and interpret experiments that address a variety of questions spanning molecular to systems neuroscience. During the first semester, students will think critically about the fundamental units of the nervous system within the context of cellular function, electrical conduction, and chemical signaling. The second half of the course builds upon this foundation to focus on broadly defined “networks of neural function”; as related to coordinated neural activity, the concerted execution of genetic programs, and anatomically defined structural networks. The course culminates with students writing a grant proposal in the style of the NIH NRSA. Part one of a two-part series. The curriculum for this course builds throughout the academic year. Students are strongly encouraged to enroll in both the fall and spring course within the same academic year.

**Course Notes** Please note that Program in Neuroscience (PiN) students must take both semesters to fulfill the requirement. Non-PiN students may enroll in just the fall semester with instructor approval.

**Meeting Dates** Sept 3 - Dec 12

**First Meeting Location** WAB 236

**Course Head** Lisa Goodrich, lisa\_goodrich@hms.harvard.edu, John Assad, john\_assad@hms.harvard.edu

**Curriculum Fellow** Taralyn Tan, taralyn\_tan@hms.harvard.edu



## **NEUROBIO 230. Visual Recognition: Computational & Biophysical Perspective**

**Gabriel Kreiman**

4 units. Enrollment limited to 50.

M, 3:00pm - 5:00pm

How does cerebral cortex store information, compute and learn? How can we build prosthetic devices to fix or augment brain function? How can we build biologically inspired artificial intelligence? This course will examine these questions in the context of visual cognition. Topics: architecture of visual cortex, neurophysiology, visual consciousness, computational neuroscience, models of pattern recognition and computer vision, artificial intelligence, brain-machine interfaces.

**Course Notes** Jointly offered with Faculty of Arts & Sciences as NEURO 130. NEUROBIO 230 cannot be taken if NEURO 130 has been taken. NEUROBIO 230 cannot be taken concurrently with NEURO 130.

**Course Website** Neurobiology 230, Visual Recognition, brain-machine interfaces and artificial intelligence [http://klab.tch.harvard.edu/academia/classes/hms\\_neuro300\\_vision.html](http://klab.tch.harvard.edu/academia/classes/hms_neuro300_vision.html)

**Prerequisites** Life Sciences 1a (or Life & Physical Sciences A) and Life Sciences 1b (or equivalent)

**Recommended Prep** Math (Maa/Mab, Math 1A, 1B, Math 19 a/or equivalent). Physical Sciences 1. MCB 80.

**Meeting Dates** Sept 9 - Dec 2

**First Meeting Location** Biolabs 2062, HU, Cambridge

**Course Head** Gabriel Kreiman, [gabriel.kreiman@childrens.harvard.edu](mailto:gabriel.kreiman@childrens.harvard.edu), (617) 919-2530



# Speech & Hearing Bioscience and Technology

## SHBT 200. Acoustics, Production & Perception of Speech

Satrajit Ghosh, Hideko Heidi Nakajima, Sunil Puria

4 units.

T/ Th, 2:00pm - 3:30pm (lectures); W, 2:00pm - 3:00pm (recitations)

Speech and hearing are fundamental to our ability to communicate, yet in the US alone millions of people suffer from some form of speech or hearing impairment. As engineers and scientists, it is important to understand the underlying principles of speech and hearing. The goals of this course are to introduce students to the acoustics, anatomy, physiology, and mechanics related to speech and hearing and to build a foundational understanding of one of the most complex, interdisciplinary, and fascinating areas of bioengineering. Particular attention will be paid to how humans generate and perceive speech. Topics include acoustic theory of speech production, basic digital speech processing, control mechanisms of speech production and basic elements of speech and voice perception. These fundamental topics will be explored through applications and challenges involving acoustics, speech recognition, and speech disorders, which are especially relevant given the ubiquity of recording and playback devices such as smartphones and home assistants. On the hearing side, topics include acoustics and mechanics of the outer ear, middle ear, and cochlea, how pathologies affect their function, and methods for clinical diagnosis. Surgical treatments and medical devices such as hearing aids, bone conduction devices, and implants will also be covered.

**Course Note** This course is taught as course in consort with HST.714J at the Massachusetts Institute of Technology. Classes will be held at MIT.

**Course Website** <https://goo.gl/rhNqY4>

**Prerequisites** Mathematical methods in science (Applied Mathematics 21a or Mathematics 21a) or equivalent. Calculus and introductory physics. Rigid body mechanics (Physics 11A), or Electrical circuits (Engineering Science 154) or permission of the instructor.

**First Meeting Date** Sept 3

**First Meeting Location** MIT Building 46-5056, 43 Vassar St, Cambridge

**Course Heads** Satrajit Ghosh, [satra@mit.edu](mailto:satra@mit.edu), Hideko Nakajima, [heidi\\_nakajima@meei.harvard.edu](mailto:heidi_nakajima@meei.harvard.edu)



## **SGBT 201. Biology of the Inner Ear**

Charles Liberman, Stéphane Maison

4 units. Enrollment limited to 12.

M, 1:00pm - 2:30pm, T/ Th, 9:00am - 10:15am

Normal biology, biophysics, physiology and morphology of the inner ear, its sensory innervation and efferent control systems, and the mechanisms underlying sensorineural hearing loss and balance disorders. Material is presented through lectures, laboratory exercises and discussions of the primary literature.

**Course Notes** Lecture notes will be available online.

**Prerequisite** Introductory neurobiology recommended.

**First Meeting Date** Sept 3

**First Meeting Location** Massachusetts Eye and Ear Infirmary, 4th floor library, Room 432

**Course Head** Charles Liberman, [charles\\_liberman@meei.harvard.edu](mailto:charles_liberman@meei.harvard.edu)

## **Virology**

### **VIROLOGY 200. Introduction to Virology**

Jonathan Abraham, Philip Kranzusch

4 units. Enrollment limited to 20.

MW, 1:30pm - 3:45pm

Introduction to virology. The lecture component reviews the basic principles of virology and introduces the major groups of human viruses. Weekly discussion groups critically analyze selected papers from the literature.

**Course Notes** There will be mid-term and final projects consisting of proposals based on laboratory rotations. Offered jointly with the Medical School as MG 705.0.

**Course Website** <http://www.courses.fas.harvard.edu/6075>

**Prerequisites** Current Virology PhD student, or upon special consent

**Meeting Dates** Sept 4 - Dec 4

**First Meeting Location** TMEC 342

**Course Heads** Jonathan Abraham, [abraham@crystal.harvard.edu](mailto:abraham@crystal.harvard.edu), Philip Kranzusch, [philip\\_kranzusch@dfci.harvard.edu](mailto:philip_kranzusch@dfci.harvard.edu)



## **VIROLOGY 202. Proposal Writing**

Jim DeCaprio, Sylvie Le Gall, Daniel Lingwood, Alex Balazs

4 units. Enrollment limited to 12.

W, 1:45pm - 4:00pm (first class meets Sept 4, 4:00pm - 6:00pm)

Students will write, present, and evaluate research proposals in the areas of virus replication, viral pathogenesis and treatment and prevention of viral infections.

**Course Note** Offered jointly with the Medical School as MG 724.0.

**Prerequisites** General background in biochemistry and virology.

**Meeting Dates** Sept 4 - Oct 30

**First Meeting Location** TMEC 333

**Course Head** Jim DeCaprio, james\_decaprio@dfci.harvard.edu

**Teaching Assistant** Michael Walsh, michael\_walsh@g.harvard.edu

