FALL 2025 QC'S

HARVARD
DIVISION OF MEDICAL SCIENCES

Fall 2025
Quarter Courses (QC)

Referred to as "Half Term" in Academic Calendar

Fall Session 1 (Half-Term QC's): September 2 – October 20
Fall Session 2 (Half-Term QC's):October 21 – December 3

ENROLLMENT DEADLINES

Returning Student Crimson Carts Open	Mar 19
Returning Student (G2+) Reg. Opens	April 2
Returning Student (G2+) Reg. Closes	April 16
Incoming Student (G1) Reg. Opens	Aug. 12
Incoming Student (G1) Reg. Closes	Aug. 14
Check-In Opens (ALL students)	Aug. 18
ADD/Drop Period (ALL students)	Aug. 25 – Sept. 9
Full Term	Sept. 2 – Dec. 3
Fall 1 Opens	Sept. 2
Fall 1 drop date	TBD
Fall 1 Closes	Oct. 20
Fall 2 Opens	Oct. 21
Fall 2 drop date	TBD
Fall 2 Closes	Dec. 3

ACADEMIC CALENDAR

https://registrar.fas.harvard.edu/gsas-academic-calendar

REMINDERS

You **cannot register** for courses until all the holds have been lifted from your account. Information about registration holds and how to remove them can be found here: https://registrar.fas.harvard.edu/enrollment#holds.

Incoming Students: meet with your advisor or speak with your Program Admin regarding your course load so that advisors can lift the "Advising Hold" from your cart.

Check-In opens August 18
FAS Registrar Info: https://registrar.fas.harvard.edu/check-in
GSAS Info: https://gsas.harvard.edu/policy/check-and-registration-resident-students

Register for **16 credits is required** for full-time student status and health insurance eligibility **by the beginning of the term, Sept. 3.** Register by going to **https://my.harvard.edu/**

For questions, contact: **dms_courses@hms.harvard.edu**

Revised 8/1/25

BBS 330QC Critical Thinking and Research Proposal Writing
April Craft, Jessica Lehoczky

CELLBIO 302QC Advanced Experimental Design for Biologists
David Glass, Catherine Dubreuil

CELLBIO 306QC Teaching 100: The Theory & Science of Teaching
Taralyn Tan

CELLBIO 313QC Quantitative Imaging: Making measurements with fluorescence microscopy
Jennifer Waters

GENETIC 305QC CRISPR genome editing techniques and applications
Manda Arbab, Richard Sherwood

HBTM 302QC Imaging and Microscopy Methods in Biology & Medicine
Lev Perelman

IMMUN 307QC Cancer Immunology
Kai Wucherpfennig, Stephanie Dougan, Philip Kranzusch, Judith Agudo

IMMUN 319QC Mechanisms and therapeutics of inflammation and resolution
Timothy Hla

MED-SCI 300QC Responsible Conduct of Science (REQUIRED for G2 Students)
Rosalind Segal, Aimee Hollander

MED-SCI 302QC Responsible Conduct of Science Refresher (REQUIRED for G6 Students)
Rosalind Segal, Aimee Hollander

NEUROBIO 306QC Quantitative Methods for Biologists (AUGUST BOOTCAMP)
Michael Springer, Ella R. Batty

NEUROBIO 315QC Human Neuroanatomy & Neuropathology
Matthew Frosch, Jean Augustinack

NEUROBIO 324QC Evolution of Neuronal Circuitry: Structure, Function and Behavior
Wei-Chung Lee, Mohini Lutchman

NEUROBIO 328QC Neurobiology of Behavior
Dragana Rogulja, Michael Crickmore

SHBT 301QC Introduction to Speech & Hearing Laboratories
Gwen Geleoc

Biological & Biomedical Sciences

BBS 330QC Critical Thinking and Research Proposal Writing

April Craft, Jessica Lehoczky

2 units

Meeting Dates:
Session 1 (in-person lecture): Thursday Sept 4, 2:00PM-3:00PM
Session 2 (in-person lecture): Thursday October 9, 2:00PM-3:00PM
Session 3 (in-person lecture): Thursday October 23, 2:00PM – 3:00PM
Meeting Locations: NRB 350

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 small group sessions are determined by the faculty running the small group sessions. Three in person lectures will provide guidelines for preparing drafts and peer reviews. Two small group sessions vary as scheduled by faculty instructors.

Enrollment Note: Students will submit preferences for small group sessions. Students will receive preferencing instructions after enrollment closes.

Recommended Prep: Check course website for downloadable material

Course Heads: April Craft, april.craft@childrens.harvard.edu, Jessica Lehoczky, jlehoczky@bwh.harvard.edu
Other instructors: Caroline Burns, Geoff Burns, William Pu, Christina Jacobsen, Mimi Bandopadhayay, Hong Chen, Christian Dibble, Roby Bhattacharyya, Yu-Hua Tseng, John (Sean) Clohessy, Allegra Petti, Sean Stowell, Matthew Harris

Cell Biology

CELLBIO 302QC Advanced Experimental Design for Biologists

David Glass, Catherine Dubreuil

Fall 1
2 units. Enrollment limited to 20. Instructor consent required.

W, 5:30pm – 7:30pm
Meeting Dates: September 3 – October 8
Meeting Location: Longwood – instructor to provide location

This course will focus on both the theory and practice of experimental design. The emphasis is on project planning and vetting, individual experimental design, and trouble-shooting. Special focus will be placed on methods to avoid experimental bias, and potential sources of inappropriate interpretation. Also the importance of system validation is especially emphasized.

Course Note: Special consent required - preference given to Therapeutics Certificate Program students.

Course Head: David Glass, david_glass@hms.harvard.edu
Other Instructors: Catherine Dubreuil, catherine_dubreuil@hms.harvard.edu

CELLBIO 306QC: Teaching 100: The Theory & Science of Teaching

Taralyn Tan

2 units. Enrollment limited to 20 per section (total enrollment 40). Instructor consent required.

In-person section
W., 2:00pm - 4:00pm
Meeting Dates: September 17 – November 12 (final assignment due 11/19)
Meeting Location: Longwood campus - instructor to provide location

Remote section (only for Master's students)
W., 8:00am - 10:00am, ET

Meeting Dates: September 17 – November 12 (final assignment due 11/19)
Meeting Location: Zoom information provided by instructor

Course materials to be released beginning Sept. 3. The final class meeting is on 11/12 and the final assignment is due 11/19.

For many graduate students and medical educators, teaching will be part of their career, whether as mentoring, formal classroom teaching, or teaching in the hospital. In addition, the theory and research evidence accumulating in the disciplines of cognitive psychology, neuroscience, and from STEM classrooms, has turned the question of "How do we best teach science and medicine?" into its own scientific discipline. The Theory and Science of Teaching focuses on understanding why certain teaching methods are effective by examining the scientific research and theoretical frameworks that support these methods. We will read and discuss foundational educational and cognitive psychology texts and primary literature, and then develop course materials that allow us to put these ideas into practice.

Class Note: Class will meet for 2 hours of synchronous discussion and learning activities each week. The remote section will meet Wednesdays from 8:00-10:00 am over Zoom and is reserved for master's students. The in-person section will meet Wednesdays from 2:00-4:00 pm in Longwood and is intended for PhD students who must take their classes in-person. The content of the sections will be the same and both will share identical asynchronous learning components. This will include watching videos, reading a variety of materials, participating in discussion boards, creating sample materials, and writing learning reflections. The synchronous and asynchronous components combine to meet the course objectives and are equally important to students' learning.
Class begins September 3rd with the release of the first asynchronous module, which students will complete and discuss in short, individually scheduled small group meetings with the course instructor during the week of Sept. 8, in place of a synchronous class session that week. The first synchronous class meeting is September 17. The course concludes with the final synchronous class session on November 12 and the final capstone assignment due November 19.

Course Note: The course has been designed as a companion to GENETIC 302QC: Teaching 101, but neither course is a prerequisite of the other.
Required Prep: Make It Stick, by Brown, Roediger and McDaniel is required pre-reading and should be completed before the first day of class on September 17. A required asynchronous 'module 0' will be released on Canvas on September 3.

Course Head: Taralyn Tan, Taralyn_Tan@hms.harvard.edu

CELLBIO 313QC Quantitative Imaging: Making measurements with fluorescence microscopy

Jennifer Waters

Fall 1
2 units

W/F, 10:30am – 12:00pm
Meeting Dates: September 3 – October 18
Meeting Location: Longwood campus - instructor to provide location

This course provides an overview of quantitative fluorescence microscopy methods, with a focus on generating reliable and reproducible measurements from imaging data. Key topics include resolution, signal-to-noise ratio, sampling, and the use of fluorophores and fluorescent proteins in imaging applications for biomedical research. The curriculum covers digital detectors, imaging of live specimens, and advanced techniques such as confocal and quantitative phase microscopy. It also covers the fundamentals of bioimage analysis, including modern machine learning and deep learning approaches. Participants will also gain hands-on experience with image analysis using open-source software (ImageJ/FIJI) to perform critical measurements in biomedical research, including co-localization and dynamic fluorescence intensity changes, such as calcium signaling detected with GCaMP. By the end of the course, learners will acquire the theoretical foundation and practical skills necessary to conduct quantitative analyses in biological imaging.

Course Head: Jennifer Waters, jennifer_waters@hms.harvard.edu
Other Instructors: Federico Gasparoli, Eva de la Serna, Asemare Taddese

Genetics

GENETIC 305QC CRISPR genome editing techniques and applications

Manda Arbab, Richard Sherwood

Fall 2
2 units. Instructor consent is required.

M/W, 12:30PM – 2:00PM
Meeting Dates: October 21 – December 3
Meeting Location: Longwood campus - instructor to provide location

CRISPR genome editing has revolutionized the study of genetics and has shown promise to treat genetic disease at its roots. This course will provide an overview on how CRISPR-based genome editing tools work, how they are used to unravel the genetics of complex disease, and how they are being deployed to ameliorate genetic diseases. The course will combine lectures from experts on the development and use of CRISPR-based tools with seminars on the practical application of and ethical issues surrounding genome editing.

Course Notes: Strong background in genetics expected. Course expected to be offered annually. The structure of this course also includes a discussion component. Any additional details about this component will be provided by the course faculty.

Course Heads: Richard Sherwood, RSHERWOOD@BWH.HARVARD.EDU; Mandana Arbab, Mandana.Arbab@childrens.harvard.edu

Human Biology & Translational Medicine

HBTM 302QC Imaging and Microscopy Methods in Biology & Medicine

Lev Perelman

2 units. Enrollment limited to 15. Instructor consent required.

TH, 3:00pm - 5:00pm
Meeting Dates: September 11 – November 20
Meeting Location: Longwood campus - instructor to provide location

This quarter course will introduce students to modern imaging modalities used in biology and medicine, with emphasis on modalities most frequently employed in cellular and molecular biology. The course will offer an overview of the basic principles of light and electron microscopy and explain their resolution limits and sources of contrast. We will discuss modality-specific functionally relevant fluorescence molecular probes which can be used for live cell imaging. The course will provide a detailed review and theory of operation of modern advanced light microscopy techniques such as confocal, line-scanning, light sheet, STED, light scattering, multi-photon and superresolution microscopy. We will then discuss Raman and light scattering spectroscopy methods for monitoring induced pluripotent stem cell differentiation, genetic targeting in microscopy and CRISPR-based photoactivatable transcription systems and basic concepts of optogenetics. We will review specific optogenetic actuators and sensors, modern light delivery techniques and various applications from investigating brain functions to cardiac optogenetics. We will also offer an overview of medical imaging techniques, such as ultrasound, X-ray CT, MRI, PET/SPECT, and ultrasound imaging, along with emerging optical imaging and

spectroscopy methods. Lectures will be supplemented by visual demonstrations of the microscopy systems and hands-on laboratory work and discussions of the operation principles of those systems.

Course Head: Lev Perelman, lperelman@fas.harvard.edu

Immunology

IMMUN 307QC Cancer Immunology

Kai Wucherpfennig, Stephanie Dougan, Philip Kranzusch, Judith Agudo

Fall 2
2 units. Enrollment limited to 20. Instructor consent required.

M, 4:00pm - 6:00pm
Meeting Dates: November 3 – December 15 (7 sessions)
Meeting Location: Longwood campus - instructor to provide location

There have been many exciting recent developments in the cancer immunology field, and multiple therapeutic approaches have shown efficacy against diverse types of cancer. This course will emphasize new mechanistic insights, specifically on the following topics: mechanisms of spontaneous protective anti-tumor immunity; key effector cell populations of anti-tumor immunity; innate immune pathways in tumor immunity; inflammation and tumor microenvironment; immunosuppressive mechanisms in tumor immunity; targeting of inhibitory receptors; cancer vaccines.

Course Note: Must be PhD student at Harvard or postdoctoral fellow

Course Head: Kai Wucherpfennig, kai_wucherpfennig@dfci.harvard.edu
Other Instructors: Dougan, Stephanie, Kranzusch, Philip, Agudo, Judith

IMMUN 319QC Mechanisms and therapeutics of inflammation and resolution

Timothy Hla

Fall 2
2 units

TH, 10:00am – 12:00pm
Meeting Dates: October 23 – December 18
Meeting Location: Longwood campus - instructor to provide location

Physiologic inflammation is followed by active resolution mechanisms to return the tissues to normal homeostasis. Uncontrolled inflammation and/or defective resolution mechanisms lead to many diseases, including asthma, fibrosis, cancer, autoimmunity, neurodegeneration and cardiovascular diseases. This course will cover multicellular interaction networks that involve immune, vascular and parenchymal cells, lipid mediators, signaling pathways and organ system-specific mechanisms. Discrete lipid mediator networks, namely, eicosanoids, SPMs, S1P, and LPA that are therapeutically employed to treat diseases will be highlighted. In addition, development of novel therapeutics to control inflammatory and resolution pathology will be discussed.

The course will have an hour of didactic lectures given by expert faculty. The second hour will feature a student-led discussion of a recent journal article in the area of the lecture. Students will also have an opportunity for synthesizing the lecture and/or the journal club in a social media format (i.e. Tweetorial, You Tube video, minipodcast) for the purpose of communication/ dissemination of scientific information.

Course note: This course includes a discussion component. Any additional details about this component will be provided by the course faculty.

Course Head: Timothy Hla, Timothy.Hla@childrens.harvard.edu
Other Instructors: Charles Serhan, cserhan@bwh.harvard.edu, Matt Spite, MSPITE@BWH.HARVARD.EDU

Medical Sciences

MED-SCI 300QC Responsible Conduct of Science (REQUIRED for G2 students)

Rosalind Segal, Aimee Hollander

2 units

September 15, 2025 - the week of November 10, 2025 (total of 9wks)
Faculty Section Meeting Dates and Locations: 6 in-person (on-campus) classes, 90-minutes, see canvas page for dates and locations. Enroll in section during enrollment.
Zoom Lecture Dates: 3 live zoom lectures, 90-minutes, see canvas page for dates

This course is a required course for all DMS students and all who receive support from NIH training grants. The goal of this course is to inform students about the appropriate conduct of

research and the many ethical and social problems that they may encounter during their research career in graduate school. The structure consists of highly interactive, in-person, small groups discussion sessions moderated by a faculty member, and live Zoom lectures. Issues discussed include (but are not limited to) experimental design and practices, equity in research, conflict of interest, research misconduct, interactions with members of the laboratory and the mentor, and the ethical role of the scientist in society.

To select your schedule for the 6 in-person classes, you must take action to enroll in the faculty member's section of your choice during the Registration period. Sections are first come, first serve. Once the section is filled, **it will be closed**. We recommend enrolling as soon as possible. You may need to adjust your schedule as needed in order to find a section that works. Please do not place yourself in the "place-holder" section. Anyone in the place-holder section will automatically be put into an open section. You will be emailed a document with all faculty scheduled sections and enrollment instructions.

Please visit the Fall 2025 RCoS canvas site HERE, or paste the URL into your browser: https://canvas.harvard.edu/courses/152869 for a list of faculty sections outlining dates, times and locations for each section and Zoom lecture registration links. You will need this information in order to enroll yourself into a section that works best for your schedule.

Course Notes: This class is graded SAT/UNSAT. This course is required for all current G2 students during the Fall semester. Please contact Bethany_Krevat@hms.harvard.edu, for inquiries. **Restricted to HILS graduate students within programs on the Longwood campus.**

Course Head: Rosalind Segal, Rosalind_Segal@dfci.harvard.edu
Co-Course Head: Aimee Hollander, Aimee_Hollander@hms.harvard.edu
Course Administrator: Bethany Krevat, Bethany_Krevat@hms.harvard.edu

MED-SCI 302QC Responsible Conduct of Science Refresher (REQUIRED for G6 students)

Rosalind Segal, Aimee Hollander

2 units

September 15, 2025 - the week of November 10, 2025 (total of 9wks)
Faculty Section Meeting Dates and Locations: 6 in-person (on-campus) classes, 90-minutes, see canvas page for dates and locations. Enroll in section during enrollment.
Zoom Lecture Dates: 3 live zoom lectures, 90-minutes, see canvas page for dates

This course is a required course for all DMS students and all who receive support from NIH

training grants. The goal of this course is to inform students about the appropriate conduct of research and the many ethical and social problems that they may encounter during their research career in graduate school. The structure consists of highly interactive, in-person, small groups discussion sessions moderated by a faculty member, and live Zoom lectures. Issues discussed include (but are not limited to) experimental design and practices, equity in research, conflict of interest, research misconduct, interactions with members of the laboratory and the mentor, and the ethical role of the scientist in society.

To select your schedule for the 6 in-person classes, you must take action to enroll in the faculty member's section of your choice during the Registration period. Sections are first come, first serve. Once the section is filled, **it will be closed**. We recommend enrolling as soon as possible. You may need to adjust your schedule as needed in order to find a section that works. Please do not place yourself in the "place-holder" section. Anyone in the place-holder section will automatically be put into an open section. You will be emailed a document with all faculty scheduled sections and enrollment instructions.

Please visit the Fall 2025 RCoS canvas site HERE, or paste the URL into your browser: https://canvas.harvard.edu/courses/152869 for a list of faculty sections outlining dates, times and locations for each section and Zoom lecture registration links. You will need this information in order to enroll yourself into a section that works best for your schedule.

Notes: This class is graded SAT/UNSAT. This course is required for all current G6 students during the Fall semester. Please contact Bethany_Krevat@hms.harvard.edu, for inquiries. **Restricted to HILS graduate students within programs on the Longwood campus.**

Course Head: Rosalind Segal, Rosalind_Segal@dfci.harvard.edu
Co-Course Head: Aimee Hollander, Aimee_Hollander@hms.harvard.edu
Course Administrator: Bethany Krevat, Bethany_Krevat@hms.harvard.edu

Neurobiology

NEUROBIO 306QC Quantitative Methods for Biologists (August bootcamp)

Rick Born, Michael Springer, Ella R. Batty

Fall 1
2 units. Enrollment limited to 80. Instructor consent required.

M/W/F, 10:00am-4:00pm (one-hour break from 2pm-3pm) EST
T/Th, 2:00pm-4:00pm (drop-in/homework) EST
Meeting Dates: August 11 – August 22 **(SEE ENROLLMENT INSTRUCTIONS BELOW)**
Meeting Locations:
M/W/F: Cambridge campus - TBD
T/TH: Longwood - instructor to provide location

The goal of this camp is to introduce you to programming in the PYTHON environment and to show you the power this provides for analyzing data and for gaining intuition about the behavior of complex systems through the use of numerical simulations. Some of you, upon encountering in the previous sentence words like "programming" and "numerical simulations," will feel the cold hand of fear grip your stomach, because you have never done any programming and, in fact, have tried to avoid math as much as possible. If so, YOU ARE PRECISELY THE PERSON WE HAD IN MIND as we were planning the course. We are aiming to help you break through this barrier of darkness and fear into the radiant sunshine of quantitative enlightenment. The true beauty of PYTHON, as we will personally demonstrate, is that it allows people who are not mathematically adept (e.g. some of the instructors of this course) to use powerful numerical methods and visualization tools to gain an understanding of concepts that are very difficult to grasp analytically.

Course Notes: The camp is primarily designed for those of you with no prior programming experience. If you fit this description, you should definitely plan to take the course. It is critical to be familiar with a scientific programming language with which to improve your quantitative literacy throughout graduate school.

Enrollment: enrollment for this course may be **required in two places**. During enrollment:

1) All participants must enroll here
2) If you wish to receive credit for this course on your fall term study card, you must also enroll via my.harvard

If you have any questions about enrollment, email Jennie_Epp@hms.harvard.edu

Course Instructors: Rick Born, richard_born@hms.harvard.edu, Michael Springer, Michael_Springer@hms.harvard.edu, Ella R. Batty, Eleanor_Batty@hms.harvard.edu

NEUROBIO 315QC Human Neuroanatomy & Neuropathology

Matthew Frosch, Jean Augustinack

Fall 1
2 units. Enrollment limited to 20. Instructor consent required.

M, 8:00am – 12:30pm
W, 8:00am – 10:30am
F, 8:00am – 9:15am
Meeting Dates: September 22 – November 3
Meeting Location: Longwood - instructor to provide location

This course will cover human neuroanatomy in depth, with an emphasis on the functional implications of structure and medical implications of lesions. Teaching occurs through lectures, small group sessions, brain dissection and homework assignments.

Course Notes: Restricted to Graduate Students only. This course is offered as part of HT130. Students may not co-register for both courses.

Course Heads: Matthew Frosch, mfrosch@mgh.harvard.edu, Jean Augustinack, jaugustinack@mgh.harvard.edu

NEUROBIO 324QC Evolution of Neuronal Circuitry: Structure, Function and Behavior

Wei-Chung Lee, Mohini Lutchman

Fall 1 QC
2 units. Instructor consent required.

M/W, 10:00am – 11:30am
Meeting Dates: September 3 – October 15 (no class 10/13)
Meeting Location: Longwood - instructor to provide location

Neuroscientists employ diverse model systems and experimental approaches to study nervous system structure, function, and behavior. Modern experimental methods and online resources will be used to study neural circuit structure and function across species using a combination of lectures, hands-on lab activities, and paper discussions. This quarter course will introduce students to principles of nervous system organization and provide a conceptual understanding

of the structural and functional relationships between components of the nervous system from an evolutionary perspective.

Course Heads: Wei-Chung Lee, Wei-Chung_Lee@hms.harvard.edu, Mohini Lutchman, mohini_lutchman@hms.harvard.edu

NEUROBIO 328QC Neurobiology of Behavior

Dragana Rogulja, Michael Crickmore

Fall 2
2 units. Instructor consent required.

M/F, 10:00am – 12:00pm
Meeting Dates: October 20 – November 24
Meeting Location: Longwood campus - instructor to provide location

Students will search the classical and recent history of neuroscience for mechanistic explanations of behavior, while attempting to identify the most successful approaches through lectures, readings, discussion, and debate. Topics include innate and learned behaviors, circadian rhythms, hippocampal place fiels, neurohormonal regulation, and brain-body interactions.

Course Notes: Course offered every other year

Course Heads: Dragana Rogulja, dragana_rogulja@hms.harvard.edu; Michael Circkmore, michael_crickmore@hms.harvard.edu

Speech & Hearing Bioscience Technology

SHBT 301QC Introduction to Speech & Hearing Laboratories

Gwen Geleoc

2 units

Meeting Dates: Contact instructor
Meeting Location: Contact instructor

Short research presentations by faculty in the Speech and Hearing Bioscience and Technology to help students select a laboratory for research rotations. Some meetings include an on-site

laboratory visit.

Course Head: Gwen Geleoc, Gwenaelle.Geleoc@childrens.harvard.edu