

January
2014

Division of Medical Sciences
Ph.D. Programs at Harvard Medical School

January Courses 2014

Students register for January Courses on their Spring Semester Study Cards

Spring Semester Online Registration
January 22 – 27, 2014

See Website:

<http://www.registrar.fas.harvard.edu/registration-enrollment-degrees/online-registration-enrollment>

Spring Semester Study Card Days:

G3's and up: January 27th and 28th, 2014

G1's and up: January 27th and 28th, 2014

Final Day to turn in Study Cards in Cambridge:

Friday: January 31, 2014

Holiday: President's Day, Monday, February 17, 2014

For Information Call: 617-432-4134

***BCMP 301qc. Translational Pharmacology**

Catalog Number: 97487, Enrollment: Enrollment may be limited.

Donald M. Coen (Medical School) 7617 and David E. Golan (Medical School)

***Cell Biology 301qc. The Epidemiology and Molecular Pathology of Cancer**

Catalog Number: 24657

Massimo Loda

***Cell Biology 310qc. Current Topics in Cancer Biology Research – TO BE OFFERED IN SUMMER 2014**
(See Spring Term 2014 Quarter Course Document for details)

Catalog Number: 60742

Charles D. Stiles (Medical School) 4828

***Cell Biology 311qc. Experimental Approaches to Cell Biology**

Catalog Number: 86396

David Van Vactor (Medical School) 2089; Wade Harper (Medical School) 4957

***DRB 330qc. Experimental Approaches to Developmental Biology**

Catalog Number: 6590 Enrollment: Limited to 16.

Paola Arlotta 6703, and members of the Department

***DRB 331. Critical Analysis and Experimental Approaches in Developmental Biology (NEW COURSE)**

Catalog Number: 22543 Enrollment: Limited to 16

Paola Arlotta 6703, and members of the Department

***Genetics 390qc. Advanced Experimental Methods: Experimental Approaches in Genetic Analysis**

Catalog Number: 8039 Enrollment: Limited to 8.

Fred Winston (Medical School) 7877 and members of the Department

***Genetics 391qc. Advanced Experimental Design in Genetics**

Catalog Number: 70918 Enrollment: Limited to 8.

Fred Winston (Medical School) and members of the Department

***HB 223 / HBTM 301qc. Case Studies in Human Biology and Translational Medicine**

Catalog Number: 95905 Enrollment: Will be limited.

Caren Grossbard Solomon (Medical School) 6960 and Mary Elizabeth Hamel (Medical School)

***Microbiology 302qc. Introduction to Infectious Disease Research: Infectious Diseases Consortium Boot Camp**

Catalog Number: 96439

Eric J. Rubin (Medical School) 4084

***SHBT 203. Anatomy of Speech and Hearing**

Catalog Number: 17772 Enrollment: Limited to 12.

Barbara C. Fullerton (Medical School), James Tracey Heaton (Medical School), and James Bradley Kobler (Medical School)

***Virology 301qc. Advanced Topics in Virology - Viral Oncology**

Catalog Number: 33563

Karl Munger (Medical School)1586, James DeCaprio (Medical School)

**Division of Medical Sciences
Ph.D. Programs at Harvard Medical School
JANUARY 2014 COURSES**

Students register for January Courses on their Spring Semester Study Cards

***BCMP 301qc. Translational Pharmacology**

Catalog Number: 97487, Enrollment: Enrollment may be limited.

Donald M. Coen (Medical School) 7617 and David E. Golan (Medical School)

Quarter course (spring term). M. through F., 9:30 – 4 p.m.

This is an intensive course held during the first two full weeks of **January** (ten days) covering basic principles of pharmacology and how they are translated into the development of new drugs. Students participate actively in project groups composed of both graduate students and post-graduate M.D.'s to propose a strategy for drug development from target choice through clinical trials. There are two hours of lectures each of the first eight mornings; in the afternoons, there are case studies discussed by Harvard faculty and guest faculty from the pharmaceutical and biotechnology industries, or time to work on the group project. Evaluation is based on the project and class participation. Enrollment may be limited.

January Session 2014

Meeting dates: January 6-17, 2014

Time: 9:30am – 4pm, except January 17 (9:00am – 1pm)

Location: Rosen Lecture Hall in Modell Center

Course Heads: Don Coen don_coen@hms.harvard.edu and David Golan david_golan@hms.harvard.edu

Curriculum Fellow: Catherine Dubreuil, Catherine_dubreuil@hms.harvard.edu, 617-432-7882

Contact: Stuart Ferguson, stuart_ferguson@hms.harvard.edu

DRAFT Course Schedule:

		TOPIC & ROOM	FACULTY
Day 1 (Jan 6)	9:30-10:30 AM	UNMET CLINICAL NEEDS - Room TBD	<i>Ann Kwong (InnovaTID)</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	FINDING NEW DRUG TARGETS - Room TBD	<i>Donald Coen</i>
	12-1 PM	LUNCH	
	1-4 PM	CASE STUDY ON UNMET CLINICAL NEEDS - Room TBD	<i>Ann Kwong</i>
Day 2 (Jan 7)	9:30-10:30 AM	DRUG RECEPTOR INTERACTIONS/THEORY I - Room TBD	<i>David Golan</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	DRUG RECEPTOR INTERACTIONS/THEORY II - Room TBD	<i>David Golan</i>
	12-1 PM	LUNCH	
	1-4 PM	ASSIGN AND BEGIN WORK ON GROUP PROJECTS - Breakout rooms TBD	
Day 3 (Jan 8)	9:30-10:30 AM	MODERN APPROACHES TO DRUG DISCOVERY AND DESIGN I - Room TBD	<i>Nathanael Gray</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	MODERN APPROACHES TO DRUG DISCOVERY AND DESIGN II - Room TBD	<i>Nathanael Gray</i>
	12-1 PM	LUNCH	
	1-4 PM	CASE STUDY ON DRUG DISCOVERY AND DESIGN - Room TBD	<i>Ann Weber (Merck)</i>

Day 4 (Jan 9)	9:30-10:30 AM	PHARMOCOKINETICS AND RELATED TOPICS I - Room TBD	<i>David Golan</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	PHARMOCOKINETICS AND RELATED TOPICS II - Room TBD	<i>David Golan</i>
	12-1 PM	LUNCH	
	1-4 PM	CASE STUDY ON DRUG DELIVERY - Room TBD	<i>Robert Langer</i>
Day 5 (Jan 10)	9:30-10:30 AM	PHARMACO-GENETICS, -GENOMICS/DRUG RESISTANCE I - Room TBD	<i>Donald Coen</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	PHARMACO-GENETICS, -GENOMICS/DRUG RESISTANCE II - Room TBD	<i>Donald Coen</i>
	12-1 PM	LUNCH	
	1-2:30 PM	CASE STUDY ON DRUG MECHANISMS	<i>Donald Coen</i>
	2:30-4 PM	WORK ON GROUP PROJECTS - Breakout rooms TBD	

		TOPIC & ROOM	FACULTY
Day 6 (Jan 13)	9:30-10:30 AM	PRECLINICAL ASSESSMENT I (ANIMAL MODELS) - Room TBD	<i>Nicholas Marsh (Adnexus)</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	PRECLINICAL ASSESSMENT II (BIOMARKERS) - Room TBD	<i>Vishal Vaidya</i>
	12-1 PM	LUNCH	
	1-4 PM	LECTURE & CASE STUDY ON TOXICOLOGY - Room TBD	<i>David Hutto (Eisai)</i>
Day 7 (Jan 14)	9:30-10:30 AM	CLINICAL ASSESSMENT I - Room TBD	<i>Mark Goldberg (Synageva)</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	CLINICAL ASSESSMENT II - Room TBD	<i>Mark Goldberg</i>
	12-1 PM	LUNCH	
	1-4 PM	CASE STUDY ON CLINICAL PHARMACOLOGY - Room TBD	<i>Lloyd Klickstein (Novartis)</i>
Day 8 (Jan 15)	9:30-10:30 AM	PHARMACO-EPIDEMIOLOGY, -ECONOMICS, -VIGILANCE I - Room TBD	<i>Jerry Avorn</i>
	10:30-10:50 AM	BREAK	
	10:50-11:50 AM	PHARMACO-EPIDEMIOLOGY, -ECONOMICS, -VIGILANCE II - Room TBD	<i>Jerry Avorn</i>
	12-1 PM	LUNCH	
	1-4 PM	CASE STUDY ON PHARMACO-EPIDEMIOLOGY, -ECONOMICS, -VIGILANCE - Room TBD	<i>Jerry Avorn</i>
Day 9 (Jan 16)	9:30 AM-4:00 PM	WORK ON GROUP PROJECTS - Breakout rooms TBD	
Day 10 (Jan 17)	9:00 AM-1:00 PM	STUDENT GROUP PRESENTATIONS (30 MINUTES PER GROUP) - Room TBD	<i>Faculty</i>

***Cell Biology 301qc. The Epidemiology and Molecular Pathology of Cancer**

Catalog Number: 24657

Massimo Loda

Quarter course (spring term). M. through F., 9:30–5.

This January course will provide students with an in-depth introduction to the epidemiology and molecular pathology of cancer. We will explore multiple types of cancer, including breast, colon, lung, prostate and brain, through a series of lectures and hands-on practice tutorials. These tutorials will include training in molecular pathology techniques, state of the art image analysis of human biomarkers, tissue processing, immunohistochemistry, and tumor histology. In addition, the epidemiology, genetics and relevant signal transduction pathways of cancer will be highlighted.

This course will meet for 9:30 am to 5:00 pm. In the mornings of each session, there will be a series of lectures discussing the epidemiology, pathology, and molecular pathology of a given cancer (breast, colorectal, lung, prostate, brain, and blood) followed by an afternoon hands-on tutorial where the students will learn pathology and molecular pathology techniques.

Schedule

Day 1 – Monday, January 13, 2013: Introduction to Cancer, Epidemiology and Pathology and Prostate Cancer

Day 2 – Tuesday, January 14, 2013: Lung Cancer

Day 3 – Wednesday, January 15, 2013: Molecular Genetics and Molecular Pathology

Day 4 – Thursday, January 16, 2013: Brain Cancer

Day 5 – Tuesday, January 21, 2013: Breast Cancer

Day 6 – Wednesday, January 22, 2013: Colorectal Cancer

Day 7 – Thursday, January 23, 2013: Heme Malignancies

Day 8 – Friday, January 24, 2013: Bladder Cancer, Liver Cancer, and Course wrap-up

January Session 2014

Meeting Dates: January 13 – January 24, 2014

Time: 9:30am – 5:00pm

First Meeting: January 13, 2013, 9:30am

Location: TMEC 446

Course Head: Massimo Loda, massimo_loda@dfci.harvard.edu

Curriculum Fellow & Course Contact: Megan Mittelstadt, megan_mittelstadt@hms.harvard.edu, 617-432-7468

*****If you plan to take a quarter course you must register for it on your study card*****

TO BE OFFERED IN SUMMER 2014 (See Spring Term 2014 Quarter Course Document for details):

***Cell Biology 310qc. Current Topics in Cancer Biology Research**

Catalog Number: 60742

Charles D. Stiles (Medical School) 4828

Quarter course (spring term). M., W., F., 2:30-4.

This course is designed for mid- to upper-year graduate students that are interested in Current Topics in Cancer Biology research. Leading and cutting edge technologies in Cancer Biology Research are explored in-depth using recent papers of high profile in a round-table discussion format. Topics include: Cancer Cell Signaling, Metastasis and EMT, Cancer Genomics, Cancer and microRNAs and Cancer Stem Cells.

Curriculum Fellow: Megan Mittelstadt, megan_mittelstadt@hms.harvard.edu, 617-432-7498

***Cell Biology 311qc. Experimental Approaches to Cell Biology**

Catalog Number: 86396

David Van Vactor (Medical School) 2089; Wade Harper (Medical School) 4957
Quarter Course (spring term) January Course

Provides a comprehensive overview on the most recent advances in cell biology, covering hands-on experimental sessions including, electron microscopy, live cell imaging, single molecule imaging, 3D cultures, quantitative proteomics, protein interaction mapping, and more.

Note: Open to first-year and second-year BBS students; permission of instructor required. Not repeatable for credit.

Meeting dates and times: Monday, January 6, 2014 from 4-8pm; Tuesday, January 7 to Wednesday, January 22, 2014 from 9-6 pm. If not indicated otherwise mornings will consist of a lecture and discussion followed by instruction to the laboratory component over lunch (9am-1pm). The afternoon will be spent in the respective faculty's laboratory conducting experiments (1-6pm).

SCHEDULE

Module 1: Imaging Cells and Cellular Dynamics

Day 1: Mon, January 6, 2014 (SGM-502, 4-6pm) – joined with DRB 330qc

Course Introduction (Davie Van Vactor/Wade Harper)

Lecture: Davie Van Vactor - A historical overview of breakthroughs in cell and developmental biology

Lecture: Jennifer Waters - Visualizing molecules and cells in real time

Day 2: Tues, January 7 – joined with DRB 330qc

Lecture: Jennifer Waters – Introduction into light microscopy (Goldenson 122)

Lab: Microscope tutorial (Nikon Imaging Center)

Day 3: Wed, January 8

Lecture: Tomas Kirchhausen – Cytoskeletal architecture and mechanics (C-216)

Lab: TBA

Module 2: Cycle of Cell Life and Death

Day 4: Thur, January 9

Lecture: Joan Brugge – Cell Signaling in 3-D (C1-513)

Lab: Studying morphogenesis and tumorigenesis in 3D culture models

Day 5: Fri, January 10

Lecture: Randy King – Cell cycle checkpoints and proliferative control (LHRRB-313)

Lab: Realtime imaging and analysis of cell cycle transitions, part I

Day 6: Mon, January 13

Lecture: David Pellman – Mechanics of cell division and its role in cancer (LHRRB-313)

Lab: Realtime imaging and analysis of cell cycle transitions, part II

Module 3: The cytoskeleton and cell signaling

Day 7: Tues, January 14

Lecture: Sam Reck-Peterson – Molecular motors and protein trafficking (SGM-106A)

Lab: In vitro and in vivo analysis of molecular motors

Day 8: Wed, January 15

Lecture: John Flanagan – Development and regeneration of axonal connections (C-216)

Lab: Tracing axon trajectories and molecular patterns in the embryo

Day 9: Thu, January 16

Lecture: Introduction to electron Microscopy (C-216)

EM lab: Tissue and Cell Electron Microscopy Lab - Sample prep, sectioning, and visualization using EM (EM facility)

Lecture: Tom Walz - Electron microscopy from cells to structure (LHRRB-313)

Module 4: The dynamic proteome: modifications, interactions, and methods

Day 10: Fri, January 17

Steve Gygi & Wilhelm Haas – Fundamentals of mass spectrometry and multiplexing proteomics (LHRRB-313)

Lab: Analysis of protein interactions by mass spectrometry Part 1 (complex purification and sample preparation, possibly will require some time on Saturday AM)

Day 11: Mon, January 20

Wade Harper – Methods for analysis of protein complexes and interactions (LHRRB-313)

Lab: Analysis of protein interactions by mass spectrometry Part 2 (data analysis)

Module 5: Molecular Biology of the Cell; Regulating the Genome

Day 12: Tues, January 21

Lecture: Danesh Moazed – Genome regulation by non-coding RNAs (SGM-106A)

Lab: TBA

Day 13: Wed, January 22

Lecture: Davie Van Vactor – MicroRNA regulation of synapse development (C-216):

Lab: Developmental genetics and neurobiology with Drosophila

Lecture: Anders Naar – The biology and function of microRNAs

Concluding discussion & joined course party with DRB 330qc on Friday, January 24th, 2014.

January Session 2014

Meeting Dates: January 6 – January 22, 2014

Time: 9:00am – 6:00pm

First Meeting: January 6, 2014, 4:00 – 8:00pm

Location: See above schedule for varying locations.

Concluding Discussion & Party: January 24, 2014

Course Head: David VanVactor, davie_vanvactor@hms.harvard.edu

Co-Director: Wade Harper, wade_harper@hms.harvard.edu

Curriculum Fellow: Henrike Besche, henrike_besche@hms.harvard.edu, 617-432-7497

***DRB 330qc. Experimental Approaches to Developmental Biology**

Catalog Number: 6590, Enrollment: Limited to 16.

Paola Arlotta 6703, and members of the Department

Quarter course (spring term). M. through Sa., 12–6, January 6th-January 17th, 2014.

This laboratory course is designed to provide a survey of major topics and contemporary research in developmental and regenerative biology. Students will rotate in the laboratories of DRB faculty across the Harvard campuses and affiliated hospitals. Students engage with faculty and gain hands on experience in a variety of model systems, experimental techniques and research areas. Each day of the course will consist of a lecture followed by hands-on laboratory activities and interactive discussions.

Note: Open to first-year and second-year BBS students; Not repeatable for credit.

SYLLABUS

Quarter Course; January 6, 4:00-8:00pm; January 7-17, 12:00-6:00pm; January 24, 5:00-9:00pm

Course Description:

This laboratory course is designed to provide a survey of major topics and contemporary research in developmental and regenerative biology. Students will rotate in the laboratories of DRB faculty across the Harvard campuses and affiliated hospitals. Students engage with faculty and gain hands on experience in a variety of model systems, experimental techniques and research areas. Each day of the course will consist of a lecture followed by hands-on laboratory activities and interactive discussions.

This course runs concurrently with DRB 331, students can enroll in only one of the two. Students enrolled in DRB 330qc and DRB 331 will complete the same laboratory experience, read the background readings and participate in all discussions. DRB 330qc students will not be expected to complete any additional assignments. Students in the DRB program are required to complete either DRB 330qc or DRB 331. Space in the courses is limited; priority will be given to G1s and G2s interested in the program.

Course Director:

Paola Arlotta

Department of Stem Cell and Regenerative Biology

paola_arlotta@hms.harvard.edu

Phone: 617-496-9810

Curriculum Fellow:

Abha Ahuja

Developmental and Regenerative Biology Program

abha_ahuja@hms.harvard.edu

Phone: 414-467-8348

Evaluation:

All students will be graded on a pass/fail basis. All students are required to prepare background readings and participate actively in execution of experiments and discussions. The grade will be determined by your overall preparation and participation during the course.

Course Website:

Background readings, location and schedule information for each day will be posted on the course i-site. <http://isites.harvard.edu/icb/icb.do?keyword=k91949>

Course Schedule:

January 6th, 2014; 4:00pm - 8:00pm

- First Meeting and Course introduction, SGM 502, HMS Quad Longwood

January 7rd – January 17th, 2014, 12:00pm – 6:00pm

- We will be rotating between campuses. Detailed daily schedule and location will be posted on the website. Lunch will be provided for on all days in the course. Please be prepared to have breakfast and dinner on your own unless listed otherwise.

January 24th, 2014, 5:00 – 9:00pm

- End of course party. Queen’s head Pub in Cambridge. Dinner will be provided.

Location:

Maps and specific instructions will be provided on the course website to help you navigate across campuses. Please make sure you know where you are headed when you leave your house each morning!

Academic Integrity Policy:

On time attendance in all sessions is mandatory. We recommend that you do not pursue your own independent lab work during the course. Please arrive having completed the assigned readings. Participation is integral to your learning in this course and we encourage you to arrive prepared and ready to engage.

Academic Integrity Policy: Cheating on examinations, plagiarism and/or improper acknowledgment of sources in essays or research papers, and the use of a single essay or paper in more than one course, without the permission of the instructor, constitute unacceptable academic conduct. Student work may be checked by plagiarism detection software.

Disability Statement:

If you anticipate issues related to the format or requirements of this course, please meet with the course director to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with the Office of Disability Services and notify the course director of your eligibility for reasonable accommodations.

Topics Include (subject to change):

Davie Van Vactor: Formation of Neural Connections in *Drosophila*.

Jennifer Waters: Imaging theory and Practice

Trista North & Wolfram Goessling: Vessel Development in Zebrafish

Jay Rajagopal: Lung regeneration

Amy Wagers: Degeneration and Regeneration of skeletal muscle in mice

Chad Cowan & Lee Rubin: Stem Cells, Reprogramming, and Regenerative Medicine

Jeffrey Macklis: Neurogenesis in Mammalian Central Nervous System

Kiran Musunuru: Human genetic studies

Jessica Whited: Regeneration of vertebrate limbs (axolotl)

Arkhat Abzhanov: Craniofacial Development in vertebrates (chicks)

January Session 2014

Meeting Dates: January 6 – January 17, 2014

Time: 12:00 – 6:00pm

First Meeting: January 6, 2014, 4:00 – 8:00pm

First Meeting Location: SGM 502

Concluding Discussion & Party: January 24, 2014, 5:00 – 9:00pm

Course Head: Paola Arlotta, paola_arlotta@hms.harvard.edu

Curriculum Fellow: Abha Ahuja, abha_ahuja@hms.harvard.edu, 414-467-8348

***DRB 331. Critical Analysis and Experimental Approaches in Developmental Biology (NEW COURSE)**

Catalog Number: 22543, Enrollment: Limited to 16

Paola Arlotta 6703, and members of the Department

Half course (spring term). M. through Sa., 12–6, January 6th-January 17th, 2014.

This course will provide a survey of major topics and contemporary research in developmental and regenerative biology. Students will rotate in the laboratories of DRB faculty across the Harvard campuses and affiliated hospitals. Students engage with faculty and gain hands on experience in a variety of model systems, techniques and research areas. Each day of the course will consist of a lecture followed by hands-on laboratory activities and interactive discussions. Students will be required to complete the lab experience and the following assignments: lead two chalk-talk format paper presentations, and write one 5-6 page research proposal.

SYLLABUS

Half Course; January 6, 4:00-8:00pm; January 7-17, 12:00-6:00pm; January 24, 5:00-9:00pm

Course Description:

This course is designed to provide a survey of major topics and contemporary research in developmental and regenerative biology. Students will rotate in the laboratories of DRB faculty across the Harvard campuses and affiliated hospitals. Students engage with faculty and gain hands on experience in a variety of model systems, techniques and research areas. Each day of the course will consist of a lecture followed by hands-on laboratory activities and interactive discussions.

This course will run concurrently with DRB 330qc, students can enroll in only one of the two. Students enrolled in DRB 331 and DRB 330qc will complete the same laboratory experience, read the background readings and participate in all discussions. Students in DRB 331 will complete additional assignments, including leading chalk-talk paper presentations and writing a research proposal.

Students in the DRB program are required to complete either DRB 330qc or DRB 331. Space in the courses is limited; priority will be given to G1s and G2s interested in the program.

Course Director:

Paola Arlotta

Department of Stem Cell and Regenerative Biology

paola_arlotta@hms.harvard.edu

Phone: 617-496-9810

Curriculum Fellow:

Abha Ahuja

Developmental and Regenerative Biology Program

abha_ahuja@hms.harvard.edu

Phone: 414-467-8348

Evaluation:

All students will be graded on a pass/fail basis. All students are required to read the background readings and participate actively in the paper discussions and execution of experiments and data analysis. DRB 331 students will be required to complete the following assignments satisfactorily: lead two chalk-talk format paper presentations, and write one 5-6 page research proposal. Papers will be

assigned by mid-December and detailed instructions and grading criteria will be provided on the course website. Written proposals will be due one week after the end of Bootcamp.

Course Website: Background readings, location and schedule information for each day will be posted on the course i-site. Detailed instructions regarding format and grading criteria for presentations and research proposal will also be posted <http://isites.harvard.edu/icb/icb.do?keyword=k91949>

Course Schedule:

January 6th, 2014; 4:00pm - 8:00pm

- First Meeting and Course introduction, SGM 502, HMS Quad Longwood

January 7rd – January 17th, 2014, 12:00pm – 6:00pm

- We will be rotating between campuses. Detailed daily schedule and location will be posted on the website. Lunch will be provided for on all days in the course.

January 24th, 2014, 5:00 – 9:00pm

- End of course party. Queen's head Pub in Cambridge. Dinner will be provided.

Location:

We will be rotating between campuses during Boot Camp. Maps and specific instructions will be provided to help you navigate across campuses. Please make sure you know where you are headed when you leave your house each morning!

Course Policies:

On time attendance in all sessions is mandatory. We recommend that you do not pursue your own independent lab work during the course. Please complete the assigned readings for each session. Participation is integral to your learning in this course and we encourage you to arrive prepared and ready to engage.

Academic Integrity Policy: Cheating on examinations, plagiarism and/or improper acknowledgment of sources in essays or research papers, and the use of a single essay or paper in more than one course, without the permission of the instructor, constitute unacceptable academiconduct. Student work may be checked by plagiarism detection software.

Disability Statement:

If you anticipate issues related to the format or requirements of this course, please meet with the course director to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with the Office of Disability Services and notify the course director of your eligibility for reasonable accommodations.

Topics include (subject to change):

Davie Van Vactor: Formation of Neural Connections in Drosophila.

Jennifer Waters: Imaging theory and Practice

Trista North & Wolfram Goessling: Vessel Development in Zebrafish

Jay Rajagopal: Lung regeneration

Amy Wagers: Degeneration and Regeneration of skeletal muscle in mice

Chad Cowan & Lee Rubin: Stem Cells, Reprogramming, and Regenerative Medicine

Jeffrey Macklis: Neurogenesis in Mammalian Central Nervous System

Kiran Musunuru: Human genetic studies

Jessica Whited: Regeneration of vertebrate limbs (axolotl)

Arkhat Abzhanov: Craniofacial Development in vertebrates (chicks)

January Session 2014

Meeting Dates: January 6 – January 17, 2014

Time: 12:00 – 6:00pm

First Meeting: January 6, 2014, 4:00 – 8:00pm

First Meeting Location: SGM 502

Concluding Discussion & Party: January 24, 2014, 5:00 – 9:00pm

Course Head: Paola Arlotta, paola_arlotta@hms.harvard.edu

Curriculum Fellow: Abha Ahuja, abha_ahuja@hms.harvard.edu, 414-467-8348

***Genetics 390qc. Advanced Experimental Methods: Experimental Approaches in Genetic Analysis**

Catalog Number: 8039 Enrollment: Limited to 8.

*Fred Winston (Medical School) 7877 and members of the Department
Quarter course (spring term).*

A survey of major themes in genetics combined with exposure to various experimental techniques, technologies, and model systems. Combines lectures and hands-on laboratory activities emphasizing experimental methods, hypothesis generation and testing, and data analysis.

Note: Limited to 8 students. Priority will be given to first year graduate students. Students must first contact the faculty for enrollment approval prior to registration for the course. Meeting Dates/Times: Approximately 8:30 am-4:00 pm each day for 10 days from January 6th – January 19th, 2014.

Prerequisite: Students must also enroll in, or have taken, Genetics 201.

SYLLABUS

Dates: January 6th – January 19th, 2014

Course Director: Fred Winston (winston@genetics.med.harvard.edu)

Curriculum Fellow: Emily Gleason (Emily_Gleason@hms.harvard.edu), 617-432-7203

Prerequisites: Students must have taken Genetics 201.

The goal of this course is to provide a survey of major topics and themes in genetics and genetic analysis in conjunction with exposure to a variety of experimental techniques, technologies, and model systems. Building on fundamental principles learned in Genetics 201, students will gain knowledge and hands-on experience in using genetic approaches to address biologically relevant questions in a variety of experimental systems, such as *Drosophila*, yeast, zebrafish, and humans. The course will combine lectures and hands-on laboratory activities emphasizing experimental methods, hypothesis generation and testing, and data analysis.

Students will be graded on a pass/fail basis. In order to earn a passing grade and receive credit for this course, students must attend and arrive prepared for every course session. Students must also complete daily evaluations of course activities and a final overall course evaluation. Student will have the option of receiving a second quarter credit for a total of one half credit by enrolling in and successfully completing Genetics 391qc Advanced Experimental Design in Genetics which will run concurrently with Genetics 390qc.

January Session 2014

Meeting Dates: January 6 – January 19, 2014 (with the exception of January 10, 12, 17 and 18)

Time: Approximately 8:30am – 4:00pm

First Meeting: January 6, 2014

First Meeting Location: Dana Farber Smith Building

Course Head: Fred Winston, winston@genetics.med.harvard.edu

Curriculum Fellow: Emily Gleason, Emily_Gleason@hms.harvard.edu, 617-432-7203

***Genetics 391qc. Advanced Experimental Design in Genetics**

Catalog Number: 70918. Enrollment: Limited to 8.

*Fred Winston (Medical School) and members of the Department
Quarter course (spring term).*

To be run concurrently with Genetics 390qc. Students will have the opportunity to design experimental approaches that aim to answer specific questions in the field of genetics. Combined with the hands-on laboratory experience of Genetics 390qc, students will use their knowledge of experimental methods and data analysis with a variety of model organisms and techniques. Over the two-week course period, students will be asked to reflect daily on their experiences and design two unique experiments that will broaden their experience in the areas of hypothesis testing and data interpretation. Note: Must be taken concurrently with Genetics 390qc. Priority will be given to first year graduate students. Students must first contact the faculty for enrollment approval prior to registration for the course. Meeting Dates/Times: Approximately 8:30am – 4:00pm each day for 10 days from January 6 – January 19, 2014.

SYLLABUS

Dates: January 6 – January 19, 2014

Course Director: Fred Winston (winston@genetics.med.harvard.edu)

Curriculum Fellow: Emily Gleason (Emily_Gleason@hms.harvard.edu)

Teaching Assistant: Jacob Layer (jlayer@fas.harvard.edu)

Prerequisites: Students must have taken Genetics 201 and be enrolled in Genetics 390qc.

The goal of this course is for students to gain experience designing experiments in the field of genetics, using a variety of model organisms and techniques. As it is run concurrently with Genetics 390qc, students will be able to apply the knowledge gained during the “boot camp” course to important questions in the field of genetics.

In order to earn credit for this course, students must complete two classes of written assignments. First, after each daily session, each student must write a 1-2 paragraph reflection on the day’s activities. These reflections are intended to encourage students to synthesize what they learned that day and begin to identify topics that interest them and that they may wish to pursue further with the second assignment for this course or other ways during their graduate career. Suggested topics for the reflections are listed below. The reflections must be e-mailed to the Curriculum Fellow and the Teaching Assistant prior to the start of the next daily session. The Curriculum Fellow and the Teaching Fellow will grade the reflections on a satisfactory/unsatisfactory basis. Students must receive a satisfactory grade on at least nine of the ten reflections in order to receive a passing grade.

The reflections should briefly summarize the day’s activities and address at least one of the following questions:

- What unique features of this lab’s model organism make it a good system for the research questions discussed today?
- Briefly describe a technique you used in this lab that interests you. What questions does this technique help you to address? What are some of the limitations of this technique? How has this technique been developed for use in this lab’s model organism? How might you adapt this for use in a different model organism that you have interacted with during this course?

- How do the suggested readings relate to the experiments you completed in this lab?
- What further questions do you have about the results of your experiments or any other material that was covered during this session?
- Compare and contrast the research being conducted in this lab with another lab that you have visited during this course. How are the labs similar in terms of the types of questions they are trying to answer and how they approach these questions? How might the findings in one lab inform the research in the other lab?

Second, each day of the Genetics 390qc course, the faculty member in charge of the lab they are in will provide you with one unanswered research question in their field, which should be able to be answered by designing experiments using the model organisms and techniques learned in the lab that day. Each student must choose two of these research questions (ideally one per week) and submit a **3 page paper for each**, proposing an experiment to answer this question. Students may contact the faculty member in charge of the lab for advice or to validate a suggested method, but the ideas for answering the research question must be original to the student.

Each paper must meet the following criteria:

- The paper should be about 3 pages in length, but no more than 4 pages (double-spaced, 12-pt. font).
- Students must state the question they wish to answer and including any relevant background and preliminary data.
- Between one and three experimental aims must be outlined.
- Students must detail ALL aspects of their proposed experiment, including their choice of model organisms, any genetic crosses they will perform, and the exact techniques they will utilize to answer this question.
- Because this is a techniques-centered course, students must explain in detail exactly how they will perform each technique (reagents used, samples analyzed, etc.), their method of data analysis, as well as propose a timeline for these experiments. For this portion of the paper, a project flowchart may be used with the appropriate information included.
- Students must detail the experimental (positive and negative) and systems controls they will employ. They must also explain what results they would expect to see from these controls, as well as the meaning of any alternative results.
- Students must state the possible results they might obtain, and explain how each set of results would inform them about the answer to their research question.

Both papers will be due to the Curriculum Fellow one week after the end of the course by 5pm (Sunday, January 26th 2014). The Curriculum Fellow will send each assignment to the respective faculty member for critique. The faculty member will evaluate the proposal and assign it a score between zero and 100, based on its feasibility, completeness, rationale, and how well the students have met the criteria above. They will also include written comments in order to provide more thorough feedback to each student. Any score above a 75 will be considered satisfactory. Students must receive a satisfactory score on both assignments in order to receive credit for the course.

January Session 2014

Meeting Dates: January 6 – January 19, 2014 (with the exception of January 10, 12, 17 and 18)

Time: Approximately 8:30am – 4:00pm

First Meeting: January 6, 2014

First Meeting Location: Dana Farber Smith Building

Course Head: Fred Winston, winston@genetics.med.harvard.edu
Curriculum Fellow: Emily Gleason, Emily_Gleason@hms.harvard.edu, 617-432-7203

***HB 223 / HBTM 301qc. Case Studies in Human Biology and Translational Medicine**

Catalog Number: 95905 Enrollment: Will be limited.

*Caren Grossbard Solomon (Medical School) 6960 and Mary Elizabeth Hamel (Medical School)
Quarter course (spring term). M. – Th., 9-11, & F., 9-10.*

Two-week course that is required of and restricted to first-year LHB students. Each week of the course focuses on a different "case study" in translational medicine.

Note: January term course. Restricted to Leder students only.

SYLLABUS

Course number: HB 233 / HBTM 301qc

Course Directors: Caren Solomon, MD, MPH, and Mary Beth Hamel, MD, MPH

Meeting days/times: M-T-W-Th- 9-11 AM, Friday 9-10: 30 AM

From Monday January 6 through Friday January 17, 2014.

Course venue: Countway Library, 6th Floor NEJM Conference Room

Contact: 1. Curriculum Fellow: Joya Mukerji (joya_mukerji@hms.harvard.edu, 617-432-7860), or

2. Course Directors: Caren Solomon (csolomon@nejm.org) and Mary Beth Hamel (mhamel@nejm.org)

Overview:

HBTM 301qc is a two-week course that focuses on translational medicine and common methods used in clinical research. In each week, we review a different "case study" in translational medicine. These case studies are selected to represent examples in which fundamental discoveries in human disease biology led to the development of new therapeutic approaches. In the process of reviewing these case studies and critical reading of selected papers, the Leder Human Biology students will also learn some of the basics of clinical trial design and the principles of clinical epidemiology.

Week 1

Monday, Tuesday Fabry Disease (Mark Goldberg)

Dr. Goldberg will describe the research establishing the molecular defect causing Fabry Disease (α -galactosidase A deficiency), and the development and clinical testing of effective treatment of the disease with alpha-galactosidase beta.

Background Readings:

Bishop DF, Calhoun DH, Bernstein HS, Hantzopoulos P, Quinn M, Desnick RJ. Human alpha-galactosidase A: nucleotide sequence of a cDNA clone encoding the mature enzyme. *J Inher Metab Dis.* 1997 Sep;20(5):643-57.

Garman SC, Garboczi DN. The molecular defect leading to Fabry disease: structure of human alpha-galactosidase. *J Mol Biol.* 2004 Mar 19;337(2):319-35.

Ioannou YA, Zeidner KM, Gordon RE, Desnick RJ. Fabry disease: preclinical studies demonstrate the effectiveness of alpha-galactosidase A replacement in enzyme-deficient mice. *Am J Hum Genet.* 2001 Jan;68(1):14-25.

Eng CM, Banikazemi M, Gordon RE, Goldman M, Phelps R, Kim L, Gass A, Winston J, Dikman S, Fallon JT, Brodie S, Stacy CB, Mehta D, Parsons R, Norton K, O'Callaghan M, Desnick RJ. A phase 1/2 clinical trial of enzyme replacement in Fabry disease: pharmacokinetic, substrate clearance, and safety studies. *Am J Hum Genet.* 2001 Mar;68(3):711-22.

Eng CM, Guffon N, Wilcox WR, Germain DP, Lee P, Waldek S, Caplan L, Linthorst GE, Desnick RJ, for the International Collaborative Fabry Disease Study Group. Safety and Efficacy of Recombinant Human Alpha-Galactosidase A Replacement Therapy in Fabry's Disease. *N Engl J Med.* 2001;345: 9-16.

Germain DP, Waldek S, Banikazemi M, Bushinsky DA, Charrow J, Desnick RJ, Lee P, Loew T, Vedder AC, Abichandani R, Wilcox WR, Guffon N. Sustained, long-term renal stabilization after 54 months of agalsidase beta therapy in patients with Fabry disease. *J Am Soc Nephrol.* 2007 May;18(5):1547-57.

Wednesday: Case Control Studies (Solomon)

Dr. Solomon will introduce the most common study designs used in clinical research. The session will focus on case control studies. Confounding will be defined and discussed. Students will learn how to compute and interpret odds ratios. The group will critically review 2 published case control studies and students will be asked to identify potential sources of bias and confounding variables.

Required Readings:

[Ries M](#), [Bettis KE](#), [Choyke P](#) et al. [Kidney Int.](#) Parapelvic kidney cysts: a distinguishing feature with high prevalence in Fabry disease. *Kidney Int* 2004 Sep;66(3):978-82.

Talbot TR, Hartert TV, Mitchel E, Halasa NB, Arbogast PG, Poehling KA, Schaffner W, Craig AS, Griffin MR. Asthma as a risk factor for invasive pneumococcal disease. *N Engl J Med.* 2005 May 19;352(20):2082-90.

Thursday: Randomized Controlled Trials #1 (Hamel)

Dr. Hamel will provide an overview of the design and conduct of a randomized trial. She will provide guidance about how to assess the quality of randomized trials and how to interpret trial results. Dr. Hamel will review statistical issues relevant to randomized control trials, including power, sample size, p values, and confidence intervals. The group will critically review 2 randomized trials.

Required Readings:

Banikazemi M, Bultas J, Waldek S, Wilcox WR, Whitley CB, McDonald M, Finkel R, Packman S, Bichet DG, Warnock DG, Desnick RJ; Fabry Disease Clinical Trial Study Group. Agalsidase-beta therapy for advanced Fabry disease: a randomized trial. *Ann Intern Med.* 2007 Jan 16;146(2):77-86.

Fox RJ, Miller DH, Phillips JT, et al Placebo-Controlled Phase 3 Study of Oral BG-12 or Glatiramer in Multiple Sclerosis. *N Engl J Med* 2012; 367:1087-1097.

Friday: (Goldberg, Solomon, Hamel)

The group will have a discussion over breakfast of the material covered in the first part of the week, and students will have the opportunity to ask questions.

Week 2

Monday, Tuesday: Leukotriene Inhibition Therapy for Asthma (Jeff Drazen)

Dr. Drazen will review how basic discoveries in the enzymology of leukotrienes led to the development of new therapeutic agents used to treat asthma.

Background Readings:

Drazen JM, Austen KF. Effects of Intravenous Administration of Slow-Reacting Substance of Anaphylaxis, Histamine, Bradykinin, and Prostaglandin F₂α on Pulmonary Mechanics in the Guinea Pig. *J Clin Invest.* 1974, 53; 1679 – 1685.

Lewis RA, Austen KF, Drazen JM, Clark DA, Marfat A, Corey EJ. Slow reacting substance of anaphylaxis: Identification of leukotrienes C-1 and D from human and rat sources. *Proc Nat Acad Sci USA.* 1980; 77: 3710-3714.

Griffin M, Weiss JW, Leitch AG, McFadden ER Jr, Corey EJ, Austen KF, Drazen JM. Effects of Leukotriene D on the airways in asthma. *N Engl J Med.* 1983; 308: 436-439.

Israel E, Dermarkarian R, Rosenberg M, Sperling R, Taylor G, Rubin P, Drazen JM. The effects of a 5-lipoxygenase inhibitor on asthma induced by cold, dry air. *N Engl J Med.* 1990; 323: 1740-4.

Israel E, Cohn J, Dube L, Drazen JM, Zileuton Clinical Trial Group. The effect of treatment with zileuton, a 5-lipoxygenase inhibitor, in patients with asthma. *J Am Med Assoc.* 1996; 275: 931-936.

Drazen JM, Yandava C, Dube LM, Szczerback N, Hippensteel R, Boodhoo TI, Pillari A, Israel E, Schork NJ, Silverman ES, Katz D, Drajesk J. Pharmacogenetic association between *ALOX5* promoter genotype and the response to the anti-asthma treatment. *Nat Genet* 1999; 22: 168-170.

Wednesday: Cohort Studies (Solomon)

This session will focus on cohort studies and contrast this design with that of case control studies. Students will learn how to compute and interpret relative risks. The group will discuss 2 cohort studies, with attention to the strengths and weaknesses of this design.

Required Readings:

Ball TM, Castro-Rodriguez JA, Griffith KA, Holberg CJ, Martinez FD, Wright AL. Siblings, day-care attendance, and the risk of asthma and wheezing during childhood. *N Engl J Med.* 2000; 343: 538-43.

Sears MR, Greene JM, Willan AR, Wiecek EM, Taylor DR, Flannery EM, Cowan JO, Herbison GP, Silva PA, Poulton R. A longitudinal, population-based, cohort study of childhood asthma followed to adulthood. *N Engl J Med*. 2003 Oct 9;349(15):1414-22.

Thursday: Randomized Controlled Trials #2 (Hamel)

Dr. Hamel will review superiority, non-inferiority, and equivalency trial designs and Phase I, II and III trials. The group will critically review 2 randomized trials assessing the effects of a leukotriene inhibitor and strategies for reducing treatment in patients with persistent asthma.

Required Readings:

Israel E, Cohn J, Dube L, Drazen JM, Zileuton Clinical Trial Group. The effect of treatment with zileuton, a 5-lipoxygenase inhibitor, in patients with asthma. *J Am Med Assoc*. 1996; 275: 931-936.

American Lung Association Asthma Clinical Research Centers, Peters SP, Anthonisen N, Castro M, Holbrook JT, Irvin CG, Smith LJ, Wise RA. Randomized comparison of strategies for reducing treatment in mild persistent asthma. *N Engl J Med*. 2007 May 17;356(20):2027-39. Erratum in: *N Engl J Med*. 2007 Aug 16;357(7):728.

Friday (Drazen, Hamel, Solomon)

The group will have a discussion over breakfast of the material covered during the week, and students will have the opportunity to ask questions.

January Session 2014

Meeting Dates: January 6 – January 17, 2014

Time: M.-Th., 9:00 – 11:00am; Fri. 9:00 – 10:30am

First Meeting: Monday, January 6, 2014

Final Meeting: Friday, January 17, 2014

Location: Countway Library, 6th Floor NEJM Conference Room

Course Head: Caren Solomon (csolomon@nejm.org) and Mary Beth Hamel (mhamel@nejm.org)

Curriculum Fellow: Joya Mukerji, joya_mukerji@hms.harvard.edu, 617-432-7860

***Microbiology 302qc. Introduction to Infectious Disease Research: Infectious Diseases Consortium Boot Camp**

Catalog Number: 96439

Eric J. Rubin (Medical School) 4084

Quarter course (spring term). M. through F., 9-5.

This intensive January course provides an introduction to the breadth of infectious disease research carried out at Harvard. Students will learn techniques for studying infectious diseases, more about different types of infectious diseases, and meet faculty, students, and postdocs in infectious diseases labs at Harvard.

Curriculum Fellow: Zofia Gajdos, zofia_gajdos@hms.harvard.edu, 617-432-1871

DRAFT BOOTCAMP SCHEDULE 2014

January 13 – 17, 2014

Day 1: Infectious diseases and how to study them – Monday, January 13, 2014

9:00am-10:30am: *Eric Rubin* – A Brief Introduction to Infectious Diseases

10:30am-12:00pm: *Roger Shapiro* – Studying Disease Outbreaks

12:00pm-1:00pm: Lunch + icebreaker Pandemic board game – get to know your classmates

[pre-class optional assignment: play Pandemic online at

<http://www.crazymonkeygames.com/Pandemic-2.html> or Plague Inc on your smartphone or tablet

<http://www.ndemiccreations.com/en/>]

1:00pm-2:30pm: *Ed Ryan* – Infectious Diseases from an International Perspective

2:30pm-5:00pm: *Alex McAdam* – Discussion and lab tour of the clinical microbiology labs at Children's Hospital

Day 2: Computational methods and disease modeling – Tuesday, January 14, 2014

9:00am-10:30am: TBD – Computational Methods for Microbial Community Analysis – emailed 9/3

10:30am-12:30pm: Computational exercises

12:30pm-1:30pm: Lunch + informal discussion

1:30pm-3:00pm: *Ted Cohen* – Modeling in Infectious Diseases – emailed 9/3

3:00pm-5:00pm: Modeling exercise/activity

Day 3: Microscopy in infectious diseases – Wednesday, January 15, 2014

9:00am-12:30pm: *Maria Ericsson* – Introduction to Electron Microscopy

12:30pm-1:30pm: Lunch

1:30pm-5pm: TBD – Microscopy, part 2

Day 4: Infection and immunity; microbial sequencing – Thursday, January 16, 2014

9:00am-10:30am: *Tiffany Horng* – Host-pathogen interactions part I

10:30am-12:00pm: *Michael Starnbach* – Host-pathogen interactions part II

12:00pm-1:00pm: Lunch

1:00pm-5:00pm: Broad Institute Genomic Sequencing Center for Infectious Diseases Tour

(<http://www.broadinstitute.org/scientific-community/science/projects/gscid/genomic-sequencing-center-infectious-diseases>) and lecture by Bruce Birren

Day 5: Focus on parasites and viruses – Friday, January 17, 2014

9:00am-10:30am: *TBD* – malaria and other parasites

10:30am-12:00pm: *Rebeca Plank* – clinical HIV

12:00pm-2:00pm: concluding course luncheon

2:00pm-5:00pm: *TBD*

Contact Information

Course Coordinator: Zofia Gajdos
Office Phone: 617-432-1871
Email: zofia_gajdos@hms.harvard.edu

Course Director: Eric Rubin
Office Phone: 617-432-3335
Email: erubin@hsph.harvard.edu

Teaching Assistants: TBD

Student List: TBD

January Session 2014

Meeting Dates: January 13 – 17, 2014

Time: 9:00am – 5:00pm

First Meeting: Monday, January 13, 2014

Final Meeting: Friday, January 17, 2014

Location: TMEC 334

***SHBT 203. Anatomy of Speech and Hearing**

Catalog Number: 17772 Enrollment: Limited to 12.

Barbara C. Fullerton (Medical School), James Tracey Heaton (Medical School), and James Bradley Kobler (Medical School)

Half course (spring term). Lecture: M.-F., 9:30- 10:30 am, Lab: M.- F., 10:30-1:30 pm.

This course covers anatomy of the head and neck, with cadaver dissection, stressing structures important in speech and hearing. Lecture topics also include basic neuroanatomy, imaging, surgery, and cancer of head and neck.

Note: This an intensive January Course. Offered jointly with MIT as HST 718. Classes to be held at the Harvard Medical School campus (HMS)

Prerequisite: Introductory biology or equivalent and permission of the course director.

SYLLABUS

Course Instructors: Barbara Fullerton (Barbara_fullerton@meei.harvard.edu), Course director; James Kobler, James Heaton

Guest lecturers: Joe Perkell, John Rosowski

SHBT 203, Anatomy for Speech and Hearing, is a required course for the graduate students in the SHBT speech and hearing program. It is a course based on anatomical dissection of the head and neck in human cadavers at Harvard Medical School with an emphasis on structures that are important in speech and hearing. Lectures also cover basic brain anatomy and neuroscience, and including some information on head and neck imaging, surgery, and head and neck cancer. The course is taught during the month of January, with 3 and a half hours of lecture and lab daily.

Texts:

Anatomy & Physiology for Speech, Language, and Hearing, by Seikel, King, and Drumright, 4th Ed.

Grant's Anatomy or Anatomy by Clemente, any older edition is fine.

Course Structure: Supervised cadaveric dissections, lectures and lab exercises

Lecture List:

DATE	LECTURE - 9:30 am	LAB - 10:30 am-1:00 pm	LOCATION
Thurs., 1/2	Introd-Heaton/Fullerton	Thorax (lab 1)	HMS, 443MEC
Fri., 1/3	Anatomy of respiration- Heaton	Thorax, II (lab 1, cntd.)	HMS, 443MEC
Mon., 1/6	Anatomy of neck-Fullerton	Neck I (lab 2)	HMS, 443MEC
Tues., 1/7	Anatomy of neck-Fullerton	Neck II (lab 2, cntd.)	HMS, 443MEC
Wed., 1/8	Cranial cavity-Heaton	Cranial cavity (lab 3)	HMS, 443 MEC
Thurs., 1/9	Anatomy of face- Fullerton	Face (lab 4)	HMS, 443MEC
Fri., 1/10	Brain I- Fullerton	Brain lab- human brain examination	MEEI: 4th fl. Conf

Mon., 1/11	Brain II- Fullerton	Brain lab- human brain examination	MEEI: 4th fl. Conf
Tues., 1/14	Anatomy of jaw- Fullerton	Infratemporal fossa (lab 5)	HMS, 443MEC
Wed., 1/15	Temporal bone - Rosowski	Lect 9:30-11-30; temp bone demo	MEEI: 4th fl. Conf
Thurs., 1/16	Cranial nerves I/eye-Fullerton	Infratemp fossa (lab 5 cntd)	HMS, 443MEC
Fri., 1/17	Cranial nerves II- Fullerton	Orbit (lab 6); CT, MRI scans	HMS, 443MEC
Mon., 1/20	HOLIDAY- MLK DAY		
Tues., 1/21	Larynx & phonation- Kobler	Fresh cow larynx	HMS, 443MEC
Wed., 1/22	Oral cavity,pharynx- Heaton	Oral cavity, pharynx, larynx (lab 7); student model demonstrations	HMS, 443MEC
Thurs., 1/23	Neural control of speech-Heaton	Pharynx, larynx, (lab 7, contd)	HMS, 443MEC
Fri., 1/24	Functional anatomy of vocal tract- Perkell	Lecture 9:30-11-30; no lab	HMS, 443 MEC
Wed., 1/29	EXAM (9:30 am- 12:00pm) TENTATIVE DATE		

January Session 2014

First Meeting Date: Thursday, January 2, 2014

Final Meeting Date: Friday, January 24, 2014

Examination Date: Wednesday, January 29, 2014 (TENTATIVE)

Course Head: Barbara Fullerton (Barbara_fullerton@meei.harvard.edu)

Location: TMEC 443 (with the exceptions of labs)

***Virology 301qc. Advanced Topics in Virology - Viral Oncology**

Catalog Number: 33563

*Karl Munger (Medical School)1586, James DeCaprio (Medical School)
Quarter course (spring term). Tu., Th., 4:30–6:00.*

Introduction to viral oncology and critical evaluation of key papers in viral oncology. Requirements include presentations, written critiques and class participation.

Note: Offered in the month of January; class size limited to 10 students

January Session 2014

Meeting Dates: January 7, 9, 14, 16, 21, 23, 2014

Time: 4:30 – 6:00pm

First Meeting: Tuesday, January 7, 2014

Last Meeting: Thursday, January 23, 2014

Location: TMEC 340

Course Head: Karl Munger kmunger@rics.bwh.harvard.edu and
James A. DeCaprio james_decaprio@dfci.harvard.edu

OTHER COURSES OF INTEREST

Systems Biology 301qc. Studying Evolution through Models and Experiments

Catalog Number: 31854

Roy Kishony (Medical School) 5501

Quarter course (spring term). M. through F., 10–12.

Intensive January course covering theoretical foundations in population genetics, genetic drift versus selection, identifying selection in genomes, advances in laboratory evolution experiments, with applications to key questions in systems biology and evolution.

Note: January 13, 2014 - January 24, 2014 in Warren Alpert, RM 563

To register for this course, please contact the Systems Biology Department at

SysBio.Courses@hms.harvard.edu.

"Nothing in biology makes sense except in the light of evolution" (Dobzhansky, 1973). The combination of new systems biology modeling approaches and modern high-throughput technological advances in genotyping and phenotyping, now allow us to apply fundamental concepts in evolution to diverse important frontiers ranging from gene expression optimality to drug resistance and human genetic diversity. The course will cover basic theoretical foundations in population genetics, will explain the processes of genetic drift versus selection and identify their signatures in the human genome, and will cover modern advances in laboratory evolution experiments. It will then apply these concepts and tools to answer key questions in systems biology and evolution: What determines the maximal rate of adaptation? How do bacteria evolve resistance to antibiotics and can we reverse this process? How gene expression is evolving and to what extent is it optimal? And what are epistatic interactions and how can epistasis networks reveal gene function?

Outline:

- (i) Population Genetics: Selection versus Drift, Neutral Theory, Fixation probabilities, Maximal rate of adaptation
- (ii) Genomic signatures of selection and drift
- (iii) Selection of non-genetic variability
- (iv) Evolution of cooperation
- (v) Laboratory evolution experiments
- (vi) Optimal metabolic networks: Flux Balance Analysis
- (vii) Optimality of gene expression levels
- (viii) Evolution of drug resistance :Resistance mechanisms, Drug interactions, Mutant selection window
- (ix) Genetic networks: Genetic interactions, Network growth, Network motifs
- (x) Molecular Evolution
- (xi) Evolution of Microbes in the Clinic

Systems Biology 305qc. Practical Synthetic Biology

Catalog Number: 22318

Jeff Way and Avi Robinson-Mosher

Quarter course (spring term). M. through F., 4–6.

Synthetic biology is a new discipline that seeks to enable the predictable engineering of biological systems. According to one conception of synthetic biology, proteins and genetic regulatory elements are modular and can be combined in a predictable manner. In practice however, assembled genetic devices do not function as expected. The purpose of the course is to go beyond the textbook, first-pass description of molecular mechanisms and focus on details that are specifically relevant to engineering biological systems.

Note: January 13, 2014 - January 24, 2014 in Warren Alpert, RM 563.

To register for this course, please contact the Systems Biology Department at SysBio.Courses@hms.harvard.edu.