EINSTEIN

Albert Einstein College of Medicine
OF YESHIVA UNIVERSITY

GRADUATE PROGRAMS IN THE BIOMEDICAL SCIENCES

COURSE CATALOG

Spring 2018

Spring 2018 Course Descriptions

Block III

7508 Advanced Methods in Epidemiology

COURSE DESCRIPTION: This course will introduce advanced methods in epidemiology with the primary goal of expanding knowledge of evolving methodological issues for epidemiological studies and causality inference. Topics include efficient study designs (e.g. nested case-controls, case-cohort, case-crossover) in epidemiological studies, causal diagrams and causal inference, propensity score and instrumental variable analysis to address confounding and bias. At the end of the course students will have a better understanding of various epidemiological methods used in clinical and epidemiological studies.

REQUIRED MATERIALS: Rothman KJ, Greenland S, Lash TL. Modern Epidemiology; 3rd Ed. 2008. Lippincott, Williams & Wilkins, Philadelphia, PA; ISBN-10:1451190050, ISBN-13: 9781451190052

PREREQUISITES: Clinical Research Intensive; Epidemiological Research Methods

STUDENT PREPARATION: No specific background preparation needed. All students are expected to have a working knowledge of basic computers and college mathematics.

SUITABLE FOR 1ST YEAR STUDENTS: No. This is an advanced course.

UNIQUE TRAINING OFFERED IN THIS COURSE: N/A

STUDENT ASSESSMENTS: Homework and final exam.

CREDIT HOURS: 2.0

7507 Design and Conduct of Clinical Research

COURSE DESCRIPTION: This seminar course aims to introduce students to clinical research with a focus on epidemiology and study design. The course uses an introductory clinical research text, along with a critical assessment of papers from the scientific (clinical and epidemiologic) literature, in order to learn about study designs: their strengths and weaknesses and how such studies are conducted. Topics to be covered include: basic epidemiology, measures of association, basic statistics, cohort studies, case control studies, clinical trials, causal inference, and research ethics.

REQUIRED MATERIALS: Designing Clinical Research, Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB., 4th Ed. Lippincott Williams & Wilkins; Philadelphia: 2013. ISBN-10: 1608318044 | ISBN-13: 978-1608318049

PREREQUISITES: None.

STUDENT PREPARATION: Interest in and some familiarity with clinical research preferred (Clinical Research 101 lecture series recommended)

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: Follows up on concepts introduced in the Clinical Research 101 lecture series, and provides a deeper dive into study design and interpretation.

STUDENT ASSESSMENTS: Final exam (multiple choice/short answer); preparation and participation in class.

CREDIT HOURS: 2.0

7402 Developmental Neuroscience

COURSE DESCRIPTION: This 13-week course will cover cellular and molecular principles underlying the construction of a functioning nervous system. The course will begin with overviews of neurogenesis, neural patterning and axon guidance, as well as an introduction to neuroembryology, grant proposal writing and relevant experimental techniques. Subsequent classes will focus on neural induction, patterning of the neuraxis, neural stem cell biology, growth factors/cytokines and relevant signaling mechanisms, neurogenesis, gliogenesis, epigenetics and the nervous system, forebrain development, neuronal cell death, axon guidance and dendrite branching mechanisms, synapse formation, developmental disorders and neural circuit formation. Throughout the course, insights gained from both vertebrate and invertebrate model systems will be discussed. Prior to each class, students will be provided with original research articles and reviews as background and preparatory reading. Each of these classes will involve the presentation of material from faculty members at Einstein and neighboring institutions (five guest class leaders) and require active student participation in the spirited discussion of current topics within each subfield. Eight Student Synopsis and Discussion sections, during which the course leaders facilitate student-centric discussion of original research reports in each subfield, will be distributed throughout this 13-week course. During the course, each student must prepare an original grant proposal on a topic of his or her choice within the field of Developmental Neuroscience and then prepare written critiques of their peers' proposals and present them orally at two student study sections. The 13-week duration is required to provide sufficient time for the students to develop an original grant proposal and have it subjected to two rounds of constructive peer review (see "unique training offered", below).

REQUIRED MATERIALS: Development of the Nervous System 3rd Edition. Sanes, Reh, and Harris. ISBN-13: 978-0123745392; ISBN-10: 012374539X. Available on Amazon ($13.00-$63.00)

PREREQUISITES: Undergraduate courses in Developmental Biology, Molecular Genetics and Neuroscience are recommended, but not required. There are no graduate course prerequisites.

STUDENT PREPARATION: A rudimentary understanding of the conceptual underpinnings of developmental biology, neuronal development/neuroanatomy and genetics, as well as the techniques utilized to characterize mRNA/protein expression patterns, and familiarity with in vitro and in vivo model systems used to study gene/protein function would be helpful, but is not required.

SUITABLE FOR 1ST YEAR STUDENTS: Yes

UNIQUE TRAINING OFFERED IN THIS COURSE: Writing and critiquing (written and oral) of original grant proposals. There is no overlap with existing courses.

UNIQUE TRAINING OFFERED IN THIS COURSE: ASSESSMENTS: Grant Proposal (final version graded by course directors): 50%; Critique of peers' grant proposals at the two Student Study Sections: 25%; Active Participation in all classes, especially the eight course director-facilitated Student Synopsis and Discussion sessions distributed throughout this 13-week course: 25%

CREDIT HOURS: 6.0

7002 Human Metabolism: Regulation and Disease

COURSE DESCRIPTION: The goal of *Human Metabolism: Regulation and Disease* is to provide students with an understanding of the principles of the interrelated pathways of human metabolism and the ability to apply those principles to discussion of the pathophysiology and the design of new therapies for human disease. The course combines lecture, self-study and weekly small group student-led discussions of contemporary literature relevant to the lecture topics.

REQUIRED MATERIALS: Students are requested to obtain a copy of the 6th edition of Thomas M. Devlin (ed) Textbook of Biochemistry With Clinical Correlations that is used by several of the lecturers. Used copies of this textbook are available online for less than $10.

PREREQUISITES: A passing grade in, or exemption from, course 7001, *Biochemistry*, is required.

STUDENT PREPARATION: The student should be conversant in the basic concepts of biochemistry that are presented in the Biochemistry course prerequisite. These include, but are not limited to a familiarity with the fundamental biochemical species of amino acids, lipids, oligosaccharides and nucleic acids, biochemical energetics, the fundamental energy-producing biochemical pathways, enzymatic catalysis and enzyme regulation.

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: The course is both an extension of Biochemistry taught during Block 1 as well as an opportunity for students to develop a more cohesive view of the nature and regulation of human metabolism. The course will cover key areas in metabolism and will highlight relationships to clinically relevant topics and the integration and regulation of carbohydrate, lipid, amino acid and nucleic acid metabolism.

CREDIT HOURS: 4.0

7013 Mechanisms of Disease

COURSE DESCRIPTION: This multidisciplinary course will investigate the pathobiology of human diseases and relevant animal models. Topics will include cellular pathology and the mechanisms of cell injury and repair. The course will emphasize the immunologic, molecular, genetic, and biochemical mechanisms that result in the gross and microscopic changes taking place within affected tissues. Types of injury to be explored in depth will include: biochemical/genetic (mechanisms of neurodegeneration and brain disorders, lysosomal storage diseases, expansion of trinucleotide repeats, chromosomal abnormalities), cancer, infectious, inflammatory, immunologic injury (Tuberculosis, Acquired Immunodeficiency Syndrome, Multiple Sclerosis, Malaria), and environmental (DNA damage). **Minimum 12 students.**

REQUIRED MATERIALS: Assigned Reading

PREREQUISITES: N/A

STUDENT PREPARATION: Background Knowledge of Immunology and Biochemistry is helpful.

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: This course will offer a broad perspective of pathologic mechanisms and aspects of disease. There is little overlap with existing courses.

STUDENT ASSESSMENTS: The course requirements will be assigned readings and open discussion, and 1-2 oral presentations of an assigned paper. Attendance is mandatory.

CREDIT HOURS: 3.0

7014 Molecular Approaches to Drug Action and Design

COURSE DESCRIPTION: As a society, where would we be without drugs? Antibiotics, chemotherapeutics and small molecules for the treatment of infections, cancer, diabetes, blood pressure, pain and a multitude of other conditions has allowed us to live longer, healthier and more productive lives. This course will involve in depth discussion of how some of our most impactful drugs were discovered or designed and their mechanisms of action. Modules will cover the principles of modern pharmacology (e.g. pharmacokinetics, pharmacodynamics, pharmacogenomics), methodologies of drug discovery/design and therapeutics for the treatment of cancer, metabolic diseases and infections. The course will also introduce the concept of aging as a drug target, with an overview of preclinical data and examples of how aging therapeutics are headed towards clinical use. Throughout, emphasis will be placed on the biology and chemistry of interactions between chemotherapeutic agents and their cellular targets, including specific enzymes, their cellular processes and the eventual development of resistance.

REQUIRED MATERIALS: N/A

PREREQUISITES: Undergraduate biochemistry or higher.

STUDENT PREPARATION: Thermodynamics, enzyme kinetics, protein structure and function, receptor ligand interactions.

SUITABLE FOR 1ST YEAR STUDENTS: Yes

UNIQUE TRAINING OFFERED IN THIS COURSE: I am not aware of any overlap between this course and other graduate courses at Einstein. Students will learn basic concepts central to pharmacology. In addition, a variety of cutting edge methods being employed to design new drugs by both academia and industry will be discussed. In addition, the course will survey a variety of major drugs and drug classes and their molecular mechanisms of action.

STUDENT ASSESSMENTS: There will be two take home exams (30% each) and team-based learning discussions (10%) and two group presentations (15% each).

CREDIT HOURS: 3.0

7013 Protein Folding: Disease to Design

COURSE DESCRIPTION: This course will focus on current research in understanding the relationship between the biophysical nature of proteins and how misfolding can lead to disease states, and will provide up-to-date insights in current approaches of protein engineering and its application to development of immunotherapeutics and vaccines.

REQUIRED MATERIALS: Computer; access to internet and Angel website (or equivalent). Student presentations are required.

PREREQUISITES: First 'Block' Graduate course in Biochemistry required; Fundamentals of Biophysics recommended.

STUDENT PREPARATION: Protein structure and composition; physical chemistry of protein structure; thermodynamics; some basic knowledge of metabolic pathways; enzyme mechanism.

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: The uniqueness of the course is that it takes a very broad and comprehensive view of the nature and fundamental role of proteins in life. There is slight overlap in some topics with Fundamentals of Biophysics, Computational Biology of Proteins, and probably others which cover some aspects of the course topics in depth but more narrowly.

STUDENT ASSESSMENTS: Throughout the term, students are asked to provide original presentations. A final consisting of thinking through and presenting a research program aimed at some specific disease.

CREDIT HOURS: 3.0

7010A Quantitative Skills for the Biomedical Researcher I

COURSE DESCRIPTION: This course will meet three times a week for combined lecture/lab sessions to intro-duce the basic concepts and methods of biostatistics. Concepts include: fundamentals of probability; foundations of statistical inference, confidence intervals, hypothesis tests, and sample size and power calculations. Students will also be introduced to the freely-available and powerful statistical software, R, for data exploration and analysis.

REQUIRED MATERIALS: No Textbook Required; Computer with R freeware installed.

RECOMMENDED MATERIALS: Principles of Biostatistics (Second edition) by Marcello Pagano and Kimberlee Gauvreau, ISBN-13: 978-0534229023, ISBN-10: 0534229026.

PREREQUISITES: N/A

STUDENT PREPARATION: No specific background preparation needed. All students are expected to have a working knowledge of basic computers and college mathematics.

SUITABLE FOR 1ST YEAR STUDENTS: Yes. Required for all 1st year PhD and MSTP students, and 1st year PREP scholars.

UNIQUE TRAINING OFFERED IN THIS COURSE: Students will learn the fundamental concepts of biostatistics and gain proficiency in the R programming language. No overlap with existing courses.

STUDENT ASSESSMENTS: One take-home exam (80%) and web-based homework (20%).

CREDIT HOURS: 1.0

7010B Quantitative Skills for the Biomedical Researcher II

COURSE DESCRIPTION: This course will meet three times a week for combined lecture/lab sessions to introduce the basic concepts and methods of regression analysis. Topics include linear regression, the analysis of two-way tables, One-way and Two-way ANOVA, permutation tests, logistic regression. Introduces and employs the freely-available statistical software, R, to explore and analyze data. This course is pre-requisite for Quantitative Skills for the Biomedical Researcher III.

REQUIRED MATERIALS: No textbook required; Computer with R freeware installed.

PREREQUISITES: Quantitative Skills for the Biomedical Researcher I or equivalent.

STUDENT PREPARATION: No specific background preparation needed.

SUITABLE FOR 1ST YEAR STUDENTS: Yes. Required for all 1st year PhD and MSTP students, and 1st year PREP scholars.

UNIQUE TRAINING OFFERED IN THIS COURSE: Students will learn the basic statistical tools for studying association between variables and gain proficiency in the R programming language. No overlap with existing courses.

STUDENT ASSESSMENTS: 40% homework, 60% Take home exam.

CREDIT HOURS: 1.0

7010C Quantitative Skills for the Biomedical Researcher III

COURSE DESCRIPTION: This course will cover the statistical principles that are pertinent to the study of big–omic data sets being collected in biology. Students will learn about current statistical approaches, issues related to experimental design and reproducible research, and important case studies that illuminate some of the challenges of analyzing big data. This course is the third module of the Quantitative Skills for the Biomedical Researcher series, and builds upon the material covered in the first two modules. As part of the assessment, students will gain practical experience by conducting a mini big data research project while working in small teams.

RECOMMENDED MATERIALS: Principles of Biostatistics (Second edition) by Marcello Pagano and Kimberlee Gauvreau, ISBN-13: 978-0534229023, ISBN-10: 0534229026; Laptop with R freeware installed.

PREREQUISITES: It is expected that students will have completed Quantitative Skills for the Biomedical Researcher I and II, or have acquired this material through other means (please consult the course leader if in doubt). Programming skills in R is mandatory.

STUDENT PREPARATION: All students are expected to have a working knowledge of basic computers and college mathematics.

SUITABLE FOR 1ST YEAR STUDENTS: Yes

UNIQUE TRAINING OFFERED IN THIS COURSE: Students will learn practical skills to conduct big data analysis and understand the challenges/limitations of this field. There is minor overlap with Computational Genomics and Epigenomics. This course is focuses more on statistical principles.

STUDENT ASSESSMENTS: Final project (100%).

CREDIT HOURS: 0.75

7010D Quantitative Skills for the Biomedical Researcher IV

COURSE DESCRIPTION: This 2-week course will cover the statistical principles that are pertinent to the study of population-based genetic data sets. Students will learn current statistical approaches for analyzing genome wide association studies (GWAS) and whole genome sequencing (WGS), issues related to experimental design and integrated analysis of GWAS and other large-scale data sets. This course is the fourth module of the Quantitative Skills for the Biomedical Researcher series, and builds upon the material covered in the first three modules. As part of the assessment, students will gain practical experience by conducting a mini big data research project while working in small teams.

RECOMMENDED MATERIALS: Laptop with R freeware installed. Principles of Biostatistics (Second edition) by Marcello Pagano and Kimberlee Gauvreau, ISBN-13: 978-0534229023, ISBN-10: 0534229026

PREREQUISITES: It is expected that students will have completed Quantitative Skills for the Biomedical Researcher I, II and III, or have acquired this material through other means (please consult the course leader if in doubt). Programming skills in R is mandatory.

STUDENT PREPARATION: All students are expected to have a working knowledge of basic computers and college mathematics.

SUITABLE FOR 1ST YEAR STUDENTS: Yes

UNIQUE TRAINING OFFERED IN THIS COURSE: Students will learn practical skills to conduct genetic analysis and understand the current analytic approaches of this field. No overlap with existing courses.

STUDENT ASSESSMENTS: Final project (100%).

CREDIT HOURS: 0.75

5012 Renal, Respiratory and Acid-Base Physiology

COURSE DESCRIPTION: This course will cover the basic principles of renal, respiratory and acid-base physiology from the whole animal to the cellular and molecular levels. It will focus on functional mechanisms and homeostatic regulatory processes that maintain the volume and composition of body fluids. Homeostatic mechanisms will be discussed in relationship to human pathophysiological conditions. The course is required for all first year MSTP students.

REQUIRED MATERIALS: Readings from textbooks, journal and review articles will be provided.

PREREQUISITES: Membrane Physiology & Transport in Block 1 is a prerequisite to this course. Students should have a year of undergraduate chemistry and biology and preferably physics.

STUDENT PREPARATION: Students should be familiar with fundamental membrane and epithelial transport processes, membrane potentials, fluid mechanics and hemodynamics. Students should know about the G-protein coupled receptor second messenger signaling pathways regulating intracellular cAMP, cGMP, protein kinase C and IP3.

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: The course has no overlap with any other graduate division course. It will provide the students with an understanding of the kidney and lung function and how their function is homeostatical-ly regulated to maintain the volume, composition and acid-base balance of body fluids.

STUDENT ASSESSMENTS: Students will be assessed on in class paper presentations, class participation and a take home essay and short answer exam.

CREDIT HOURS: 2.0

8008 Special Topics in Molecular Genetics

COURSE DESCRIPTION: The aim of the course is to acquaint students with scientific literature and progress in selected focused areas of biological research. The topics to be treated will vary from year to year depending on the interests of the teaching faculty. Each year, several topics will be covered in short modules. Lectures may be presented, but a primary focus will be discussion of important background articles and current research papers. Through in-depth analysis of the literature on specific topics, the student is expected to gain a broadened knowledge, increasing appreciation of the process through which scientific understanding develops, and an improved ability to critically read and analyze the original research literature.

TOPICS FOR SPRING 2018 SEMESTER:

Host-microbe interactions **(Sridhar Mani)**. There are over a trillion different commensal microbes expressing 100-fold more genes than its mammalian host, yet the mechanisms governing how microbes form communities, co-exist, and "talk" to its mammalian counterparts remains largely unexplored. We will examine our current understanding of the molecular mechanisms that govern microbe-microbe, host-microbe; microbe-host relationships, as revealed in recent papers.

Modeling human disease with pluripotent stem cells **(Wei Liu)** Pluripotent stem cells emerge as powerful tools in modeling human development and inherited disease. Using neural and retinal tissues as models, the sessions will first introduce the principles of stem cell-based modeling, then review recent advances in the field, and lastly discuss current challenges and future perspectives.

Single-cell or bulk, what you need to know before designing your transcriptomic study. **(Masako Suzuki)** The goal is to learn to design effective functional transcriptomic studies. We will learn basics of designing transcription analyses including statistical considerations, and advantages/disadvantages of single-cell and bulk RNA-seq assays.

PREREQUISITES: Molecular Genetics or equivalent.

SUITABLE FOR 1ST YEAR STUDENTS: Appropriate for 1st year students with prerequisite background. Attendance and participation by more senior students, postdocs and faculty is welcomed.

UNIQUE TRAINING OFFERED IN THIS COURSE: N/A

STUDENT ASSESSMENTS: Students enrolled for credit will be evaluated according to their attendance and participation in discussion. Class size is limited.

CREDIT HOURS: 1.0

7029 Stem Cells, Development and Disease

COURSE DESCRIPTION: This course focuses on the fundamentals of developmental biology, stem cells and regenerative medicine. The pathways and processes central to embryogenesis are often reused during tissue regeneration. Moreover, many diseases have their origins in misregulation of developmental pathways. A fundamental knowledge of development can thus strengthen your understanding of regenerative biology, aging, and disease. In this course, we will focus on the major principles and appropriate experimental approaches utilized in researching questions in development and stem cell biology. Our goal is for students to be able to read literature and evaluate seminars critically, understand relevant experimental approaches, and develop logical thinking and good experimental design skills for studying development and stem cell biology.

RECOMMENDED MATERIALS: For background reading only: Gilbert, Developmental Biology (Tenth Edition, ISBN: 160535192X), Lanza and Atala, Essentials of Stem Cell Biology (Third Edition, ISBN: 0124095038), older editions of these books are also acceptable.

PREREQUISITES: N/A

STUDENT PREPARATION: Basic understanding of biological principles such as genetics, cell and molecular biology is needed. Important background material and recommended reading for each topic will be posted within the lesion folders on Angel at least one week prior to the lecture.

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: Students will learn and discuss concepts of modern and traditional developmental biology, with a strong focus on the biological relevance of stem cells. They will learn to appreciate their importance for the student of complex diseases. Active participation in group exercises and journal clubs is expected.

STUDENT ASSESSMENTS: Each student will be responsible for attending and participating in the lectures and exercises. Grade based on participation and quality of student contributions.

CREDIT HOURS: 2.0

7027 Systems Biology Seminar

COURSE DESCRIPTION: It has long been recognized that scientific breakthroughs and groundbreaking research in the coming century requires multidisciplinary approaches to many areas of research. By means of critical reading of classical and contemporary articles the course will cover a broad range of relevant techniques from mathematical, statistical and computational sciences, and their rela-tions to the specific scientific questions in each of the articles discussed. The course will cover 26 articles on biological questions that have been addressed both theoretically and experi-mentally. These articles will cover a broad range of biological topics from molecular biology, evolutionary biology, geonomics and neuroscience.

REQUIRED MATERIALS: N/A

PREREQUISITES: Quantitative background encouraged

STUDENT PREPARATION: Preferred pre-requisite (not required) Calculus, Linear Algebra, Differential Equations and Stochastic Processes.

SUITABLE FOR 1ST YEAR STUDENTS: Yes

UNIQUE TRAINING OFFERED IN THIS COURSE: The course will be exposed to the need and importance of abstract/theoretical and analytical approaches and their relevancy to experimental biomedical research.

STUDENT ASSESSMENTS: Student presentation throughout the course

NOTE: In order for this course to be given a (minimum of 6 students) must be registered.

CREDIT HOURS: 2.0

7015 Viruses

COURSE DESCRIPTION: The study of viruses helped lay the foundation of modern molecular biology, and continues to provide new insights into the biology of cells and organisms. Moreover, we live in an increasingly interconnected and crowded world in which “new” viruses can emerge and spread throughout the globe seemingly overnight, and are being discovered at an ever-accelerating pace through cutting-edge genome sequence-based technologies. At the same time, “old” viruses such as HIV-1 remain a global threat and viruses we thought we had defeated, such as measles, are resurgent. Therefore, a sophisticated and broad-based understanding of animal viruses is needed more than ever. In this course, we will study how viruses are put together, how they multiply in their hosts and cause disease, how we find new viruses and characterize them, and how we exploit them as tools for basic research and therapy.

'Viruses' will be kicked off with a lecture by a noted virologist. This will be followed by didactic lectures featuring Einstein’s own virology faculty complemented by invited outside speakers. All speakers are international experts in different areas of the study of viruses. The course is organized into 6 units and the lectures will cover virus structure, mechanisms of virus entry and replication, regulation of viral and host gene expression, virus assembly, virus egress, host responses to viral infections, and viral pathogenesis and evolution. ‘Viruses’ will demonstrate how these basic principles offer opportunities for diagnosis, prevention, and treatment of prevalent and emerging viral diseases, and for the development of new applications that utilize viruses as tools.

REQUIRED MATERIALS:

- A computer to access email and internet.
- Principles of Virology 4th Edition. by S.J. Flint, V. R. Racaniello, Rall, G. and A.M. Skalka (2015) ASM Press. ISBN # 978-1-55581-9330.

RECOMMENDED PREREQUISITES: Biochemistry, Gene Expression and Molecular Genetics courses are recommended, but not mandatory.

STUDENT PREPARATION: Information covered in the course requires a reasonable level of background in contemporary molecular biology, biochemistry and cell Biology.

SUITABLE FOR 1ST YEAR STUDENTS: Yes.

UNIQUE TRAINING OFFERED IN THIS COURSE: This course will impart students the ability to understand how viruses evolve, replicate and cause disease. They will be able to appreciate the basis for antiviral drug discovery and the molecular bases of vaccine design and development. All lectures are taught by faculty who are experts on the particular virus being discussed giving the students a unique

opportunity to learn directly from the practitioners. A special feature includes several expert virologists from outside Einstein will be teaching the course.

STUDENT ASSESSMENTS: There will be two exams: a mid-term and a final exam. In addition, classroom participation will carry 20% of the total marks.

CREDIT HOURS: 3.0