Master List for Spring 2015 Courses

BIOCHEMISTRY:
http://www.biochem.duke.edu

BIOCHEM 302 Introductory Biochemistry II - Introduction to Biochemistry II. This second semester of Biochemistry covers the synthesis, structure, and function of important biological molecules. Half of the course will cover carbon and nitrogen fixation and assimilation, and the synthesis of amino acids, nucleotides, DNA, RNA, and protein. The second half covers the structure, biosynthesis and function of important membrane lipids, membrane proteins and membrane-associated carbohydrates. *MWF 10:05 – 11:20 am; & recitations on M or Tu 4:40 – 5:30 pm; 147 Nanaline Duke Bldg; Been & Staff; 3 Units*

First Half Semester:

BIOCHEM 667 Biochemical Genetics I: DNA and Genome Stability - Chromatin and chromosome structure, replication, repair, genetic recombination, mutation and chromosome rearrangement. The major emphasis of this course will be on reading and discussing primary research papers in depth. The idea is to explore how new concepts have been developed in nucleic acids biology and biochemistry and what types of experiments have made advance possible. This will be done in two ways. First, each section of the course will consist of background lecture material presented as needed by the faculty member. Then there will be several sessions to discuss papers selected by the faculty as paradigm papers. The students will present these papers orally using figures from the papers and explanatory background as needed. Second, students will prepare an 8-10 page research paper at the end of one course and an oral talk of about 20 minutes at the end of the other. *Minicourse, 1st half-semester. TuTh 10:05 - 11:20 am; Kreuzer; 439 Nanaline Duke Bldg; 2 Units*

Second Half Semester:

BIOCHEM 668 (CELLBIO, IMMUNOL, UPGEN 268) Biochemical Genetics II: From RNA to Protein - Mechanisms of transcription, splicing, catalytic RNA, RNA editing, mRNA stability and translation. The major emphasis of this course will be on reading and discussing primary research papers in depth. The idea is to explore how new concepts have been developed in nucleic acids biology and biochemistry and what types of experiments have made advance possible. This will be done in two ways. First, each section of the course will consist of background lecture material presented as needed by the faculty member. Then there will be several sessions to discuss papers selected by the faculty as paradigm papers. The students will present these papers orally using figures from the papers and explanatory background as needed. Second, students will prepare an 8-10 page research paper at the end of one course and an oral talk of about 20 minutes at the end of the other. *Minicourse, 2nd half-semester. TuTh 10:05 - 11:20 am; Been; 439 Nanaline Duke Bldg; 2 Units*

BIOCHEM 695 Structural Methods: Macromolecular Structure Determination by NMR Spectroscopy and X-ray Crystallography - Theoretical and experimental principles of nuclear magnetic resonance (NMR) spectroscopy and macromolecular x-ray crystallography. Topics of NMR cover theory, data collection and interpretation of macromolecular NMR experiments, including 1D, 2D, and multidimensional NMR data collection and interpretation, chemical exchange, protein dynamics, residual dipolar couplings, and solution structure determination. Emphasis on crystal symmetry, space group determination, diffraction theory, and a practical understanding of macromolecular crystallization, x-ray intensity data collection, macromolecular structure determination, refinement, and analysis. Instructor consent required. Instructor: Schumacher Prerequisite: undergraduate physical chemistry and one year of calculus. *TuTh 1:25 – 3:25 pm; 252B Nanaline Duke Bldg.; Schumacher and Staff, 4 Units*

BIOCHEM 622 (SBB 622) Structure of Biological Macromolecules - How to get the most out of experimental and computational 3D structure: a) 3D Molecular Literacy: Computer and physical molecular models of proteins and nucleic acids; worksheets and hands-on exploration. b) Data bases and the data itself: gaining familiarity with the PDB (Protein Data Bank) in general, the EDS (Electron Density Server), and the peculiarities, caveats, and reliabilities of different categories of molecular data. c) Computational methods for studying and depicting macromolecules: Model building in structural biology, Molprobity and all-atom contact analysis, and methodologies for multiple conformations, ensembles, and mobility. d) Student Projects: interactive 3D illustration of some scientific point about macromolecules, using kinemages or other molecular graphics programs often with short non-interactive introduction. Reports given at end of semester, progress shown periodically. Once a week in-class presentations, discussion, and hands-on work with physical and computer molecular models. Homework includes worksheets and individual student projects. *Th 1:25 – 3:25 pm; 439 Nanaline Duke Bldg; Richardson; 3 Units*

BIOCHEM 746 - Biochemistry Seminar - required of all first-, second- and third-year biochemistry students. Credit / No Credit only. *W 4:40 - 5:40 pm; 439 Nanaline Duke Bldg.; Brennan & Staff; 1 Unit*

BIOCHEM 760 (CELLBIO, MOLCAN, PHARM 760) Cellular Signaling – See CELLBIO **760**

CELL & MOLECULAR BIOLOGY:
http://cmb.duke.edu/home.html

CMB 733-01, 733-02, 733-03 (PHARM, NEUROBIO 733-01, 733-02, 733-03) Experimental Design and Biostatistics for Basic Biomedical Scientists - See PHARM 733-01, 733-02, 733-03

CMB 764 Cell and Molecular Biology Colloquium [Student Seminar] - Required of all CMB students. Presentations by upper-year students: one student talks about ongoing dissertation research and another introduces a research paper relevant to that week's seminar. Students attend the Thursday seminar (Cell Structure and Function) and can have lunch with the speaker. *11:55 am – 12:55 pm, 143 Jones Building; Kuehn; 2 Units*

CELL BIOLOGY:
http://note.cellbio.duke.edu/Graduate/Courses.html

CBI 503 Introduction to Physiology Modern organ physiology; cellular physiology, organ system physiology including cardiovascular, respiratory, renal, gastrointestinal, endocrine, reproductive, muscle and nervous. Prerequisite: elementary biology. *MWF 8:45–9:35 am, Jakoi, Bryan Research Building Room 103, 3 units. Enrollment: max 100*

CBI 720 Physiology and Medicine of Extreme Environments Advanced topics in the physiology and medicine of ambient pressure, immersion, gravity, temperature, and gas composition. Environments considered include: diving and hyperbaric medicine; hot/cold terrestrial and water operations; microgravity and high-g acceleration; high altitude: and space. Basic mechanisms and medical management of: decompression sickness; altitude sickness; hypothermia and hyperthermia; hypoxia; carbon monoxide poisoning; and oxygen toxicity. Practical applications: pressure vessel design and operation; life support equipment; cardiorespiratory physiology measurements at low and high pressure; simulated dive and flight (optional). Prerequisites: Human anatomy and physiology. For more information please contact Dr. Vann at 684-3305 or vann0001@mc.duke.edu. *MW 5:00-6:30; Vann, Freiberger, Pollock; CRII, Room 0585 Duke*

South, 3 units. Enrollment: max 12

CBI/MCB 730 Stem Cell Biology Lecture/discussion format designed for first-year graduate students to learn the fundamentals of stem cell biology and to gain familiarity with current research in the field. Prerequisites: undergraduate level cell biology, molecular biology and genetics. *TuTh 10:05–11:20 am; Poss, Hogan; 384 Nanaline, 3 units*

CBI/MCB/BIOCHEM/PHARM 760 Cellular Signaling Mechanisms of signaling at the cellular level, including ligand/receptor interactions and secondary messenger systems. Some lectures stress the clinical correlation of the basic course concepts. *MWF 8:45-9:35 am; Caron; 147 Nanaline, 3 units*

CBI 830 Developmental Biology Colloquium This course covers a broad range of problems in developmental biology based on prominent developmental biologists who are invited to speak at Duke University during that particular semester and participate in discussions with the class. *M 5:00-600 pm W 4:00–6:00 pm; Klingensmith/McClay, 3 units*

COMPUTATIONAL BIOLOGY & BIOINFORMATICS:
http://www.genome.duke.edu/CBB/

CBB 510S Computational Biology Seminar - A weekly series of seminars on topics in computational biology presented by invited speakers, Duke faculty and CBB doctoral and certificate graduate students. *M 11:30 am – 12:30 pm; 4233 French Science; Hartemink; 1 Unit*

CBB 511 Journal Club/Research in Progress - A weekly series of discussions led by students that focus on current topics in computational biology. Topics of discussion may come from recent or seminar publications in computational biology or from research interests currently being pursued by students. First and second year CBB doctoral and certificate students are strongly encouraged to attend as well as any student interested in learning more about the new field of computational biology. *F 10:30am – 11:30am; 4233 French Science; Schmidler, 1 Unit*

CBB 540 (STA 613) Statistical Methods for Computational Biology - Methods of statistical inference and stochastic modeling with application to functional genomics and computational molecular biology. Topics include: statistical theory underlying sequence analysis and database searching; Markov models; elements of Bayesian and likelihood inference;
multivariate high-dimensional regression models, applied linear regression analysis; discrete data models; multivariate data decomposition methods (PCA, clustering, multi-dimensional scaling); software tools for statistical computing. Prerequisites: multivariate calculus, linear algebra and Statistics 611. C-L: Statistics and Decision Sciences 613. *TuTh 3:05pm – 4:20 pm; Location TBD; Mukherjee; 3 Units*

CBB 561L (BME 561L) Genome Science Technology Lab Hands-on experience on using and developing advanced technology platforms for genomics and proteomics research. Experiments may include nucleic acid amplification and quantification, lab-on-chip, biomolecular separation and detection, DNA sequencing, SNP genotyping, microarrays, and synthetic biology techniques. Laboratory exercises and designing projects are combined with lectures and literature reviews. Prior knowledge in molecular biology and biochemistry is required. Instructor consent required. *TuTh 3:05pm-4:20pm Lcation: TBA; Instructor: Satterwhite; 3 units*

CBB 612 (Genome 612 PUBPOL 634) Responsible Genomics - This course will introduce students to issues that arise in doing, interpreting, or applying genomics research. It includes (1) introduction to ethical reasoning and examination of selected issues calling for such analysis, including potential for conflicts among roles that an individual is expected to fulfill; (2) skills needed in any subsequent career path that involves doing or interpreting bioinformatics or genomics research, including research or professional school; doing presentations, writing a policy memo, and working in a group; (3) understanding why there are special procedures for research involving human participants, and how to respect privacy and confidentiality of genetic information; (4) historical and political background on sources of health research funding, and (5) issues involving public–private research interactions such as intellectual property and conflict of interest. *TuTh 3:05pm – 4:20pm; Location TBD; Chandrasekharan: 3 Units*

CBB 662 (COMPSCI 662) Computational Systems Biology - Provides a systematic introduction to algorithmic and computational issues present in the analysis of biological systems. Emphasizes probabilistic approaches and machine learning methods. Explores modeling basic biological processes (e.g., transcription, splicing, localization and transport, translation, replication, cell cycle, protein complexes, evolution) from a systems biology perspective. Lectures and discussions of primary literature. Prerequisites: basic knowledge of algorithm design (**COMPSCI 330**) or equivalent, probability and statistics (**STA 611)** or equivalent, molecular biology (**BIO 201L, 202L**) or equivalent, and computer programming. Alternatively, consent of instructor. *TuTh 10:05 pm – 11:20 pm; Location TBD; Hartemink; 3 Units*

CBB 622 Structure of Biological Macromolecules (Biochem 622) How to get the most out of experimental and computational 3D structure: a) 3D Molecular Literacy: Computer and physical molecular models of proteins and nucleic acids; worksheets and hands-on exploration. b) Data bases and the data itself: gaining familiarity with the PDB (Protein Data Bank) in general, the EDS (Electron Density Server), and the peculiarities, caveats, and reliabilities of different categories of molecular data. c) Computational methods for studying and depicting macromolecules: Model building in structural biology, Molprobity and all-atom contact analysis, and methodologies for multiple conformations, ensembles, and mobility. d) Student Projects: interactive 3D illustration of some scientific point about macromolecules, using kinemages or other molecular graphics programs often with short non-interactive introduction. Reports given at end of semester, progress shown periodically. Once a week in-class presentations, discussion, and hands-on work with physical and computer molecular models. Homework includes worksheets and individual student projects. *Th 1:25 – 3:25 pm; 439 Nanaline Duke Bldg; Richardson; 3 Units*

IMMUNOLOGY:
http://immunology.mc.duke.edu

IMMUNOL 736 Topics in Immunology - Focus on current immunology research, emphasizing emerging research areas and new directions in established areas. Students present recent papers in selected subjects. *Th 8:45 - 10:00 am; 001 MSRB I; Reinhardt & Hammer; 1 Unit*

IMMUNOL 791B Research in Immunology – This course is the second of two for first year students enrolled in the Immunology Graduate Program designed to introduce bench work in immunology and to expose students to a variety of techniques to increase their proficiency. One to two research rotations will be conducted in training faculty laboratories for periods of 10-12 weeks. Rotations should be approved by the DGS. The first course was IMMUNOL791A offered in the fall and is a prerequisite. Both courses must be taken in order for the four total credits and grades to post. *2 Units*

IMMUNOL 800 Comprehensive Immunology - an intensive course in the biology of the immune system and the structure and function of its major components. In sectioned lectures, we will have leading experts to discuss with you, in depth, the major challenges, major discoveries, as well as major conflictions in listed areas of immunology. Specifically, we will focus on the evolution of our understandings: what was the original question, how it was approached and what is still missing to complete the picture. These lectures were largely split into three sections: T cell biology, B cell biology, and immune regulation. There will be three individual take-home exams and your final grade will be compiled with results from all three exams. This is a required course for students specializing in immunology. Consent of instructor required for registration. Prerequisite: highly recommended, Immunol 544 or equivalent. Instructor: Li Prerequisite: IMMUNOL 544 or equivalent course. *MWF 10:20 – 11:10 am; 321 Jones Bldg; Li; 3 Units*

MEDICAL PHYSICS

http://medicalphysics.duke.edu

MEDPHY 510 Radiation Protection - Course discusses the principles of radiation protection dealing with major forms of ionizing and non-ionizing radiation, the physics and chemistry of radiation biology, biological effects of ionizing and non-ionizing radiations (lasers, etc.) at cellular and tissue levels, radiation protection quantities and units, medical HP issues in clinical environments, radiation safety regulations, and basic problem solving in radiation safety. *MW 8:30 am – 9:45 am; 1032 Hock Plaza; Yoshizumi; 3 Units*

MEDPHY 520 Radiation Therapy Physics - This introductory course has a clinical orientation, and reviews the rationale, basic science, methods, instrumentation techniques and applications of radiation therapy to the treatment of a wide range of human diseases. Major radiation modalities are covered including low and high energy photon therapy, electron and proton therapy, and low and high-dose rate brachytherapy. The clinical process of treatment, methods of calculating dose to patient, and the role of the medical physicist in radiation oncology clinic, are covered in detail. *TuTh 11:45 am – 1:00 pm; 1032 Hock Plaza; Oldham; 3 Units*

MEDPHY 541 Nuclear Medicine Physics - Topics include basics of nuclear medicine imaging, gas, scintillation, and solid state radiation detectors, counting statistics, gamma camera principles including modern digital designs, SPECT, coincidence imaging principles, PET instrumentation, radionuclide and x-ray CT transmission scanning techniques, nuclear medicine treatments, and surgical probes. *TuTh 8:30 – 9:45 am; 1032 Hock Plaza; Turkington; 3 Units*

MEDPHY 714 Clinical Dosimetry Measurements - This course covers advanced topics in clinical radiation dosimetry that is pertinent to both KV and MV energy range. Initially we will offer as 1 credit hour course in the spring of 2011, but plans to offer as 3-credit course in the future. Prerequisites: MP500, MP505. *W 11:45 am – 1:00 pm; Radiation Safety Dep; Yoshizumi; 1 Unit*

MEDPHY 715 Advanced Topics in Radiation Detection and Dosimetry - This series of lectures covers the topics in radiation detectors, measurements and signal processing. The basics of various types of radiation detectors used in nuclear, medical and health physics and their usage are discussed in detail. Prerequisites: MP500, MP505. *Tu 1:25 - 2:40 pm; 1032 Hock Plaza; Gunasingha; 1 Unit*

MEDPHY 718 Clinical Practicum and Shadowing (Medical Health Physics) - This practicum course provides hands-on experiences in various hospital health physics functions, in RAM lab oversight, in X-Ray room shielding and verification, and in license preparation experience under NRC/States oversight. The course includes shadowing a clinician, technologist, or physicist, while performing their routine clinical tasks. *Tu 3:05 – 6:15 pm; Radiation Safety Dep; Yoshizumi; 3 Units*

MEDPHY 723-01, 723-02, 723-03 Advanced Brachytherapy/Special Topics and Procedures - This course will cover advanced LDR and HDR brachytherapy, and other, selected special procedures and special topics. Prerequisite: MP 520. *MW 3:05 – 4:20 pm; Duke South; Yin, Wu, Chang, Craciunescu; 1 Unit each*

MEDPHY 726 Practicum on Monte Carlo Methods in Medical Physics - This course focuses on the fundamentals of Monte-Carlo simulations and provides hands-on experience with clinical Monte-Carlo codes used in medical dosimetry. The course will introduce software such as MCNP, EGS, FLUKA, GEANT and Penelope and companion data analysis software ROOT, PAW and CERNLIB. Students will study at least one major code and will perform two or more projects based on a clinically relevant task. Prerequisites: Calculus, modern physics, and programming. Knowledge of C, C++, or Fortran would be a plus. *Th 1:15 – 4:05 pm, 1032 Hock Plaza; Gunasingha, 1-3 Units*

MEDPHY 728 Clinical Practicum and Shadowing (Radiation Therapy) - The course gives hands on experience in practical aspects of medical physics as applied to radiation therapy. Special emphasis is given to the operation of various therapy units and dose measuring devices, techniques of measuring the characteristics of radiation beams, commissioning and quality assurance checks for radiation producing devices in the clinic. The course includes shadowing a clinician, technologist, or physicist, while performing their routine clinical tasks. *W 5:00 - 8:00 pm; Z. Wang, J. Wu et al; South Hospital; 3 Units*

MEDPHY 792 Clinical Practicum and Shadowing (Diagnostic Imaging) - Review and real-life exercises on principles of modern medical imaging systems with emphasis on the engineering and medical physics aspects of image acquisition, reconstruction and visualization, observations of imaging procedures in near clinical settings, and hands-on experience with the instruments. Modalities covered include ultrasound, CT, MRI, nuclear medicine and optical imaging. Medical Physics students will substitute X-ray imaging for the Nuclear imaging module. Prerequisite: BME 533/MP530 or equivalent. *M 8:30 – 9:45am, W 4:30 – 7:30 pm ; RAI Labs conf room; Samei; 3 Units*

MEDPHY 743 Basic Concepts of Internal Radiation Dosimetry - This course covers the physical and anatomical/physiological foundations of internal radiation dosimetry. Topics covered include definition of dose, absorbed fractions, residence times and methods to determine them, the and the MIRD methodology. Strategies to convert small animal radiopharmaceutical biodistribution data to humans will also be covered. Prerequisites: MP500, MP505. *W 11:45 am – 1:00 pm; 1032 Hock Plaza; Reiman; 1 Unit*

MEDPHY 744 PET and SPECT Image Reconstruction and Analysis. This course will cover the basics of image reconstruction for tomographic imaging in nuclear medicine. Filtered backprojection and iterative methods will be explored, including methods for correcting physical effects such as attenuation and scatter. Basic concepts of image quality and quantitative use of PET and SPECT image will introduced. Prerequisite: Medical Physics 541. *Tu 1:25 – 4:20; 1032 Hock Plaza; Tornai; 1 Unit.*

MEDPHY 746 Radiopharmaceutical Chemistry. The course will cover radiochemistry and production of various radiopharmaceuticals. The course will be conducted with lecture but may include some practical demonstrations. Prerequisite: Medical Physics 500 and 505. *MoTh 11:45 – 1:00 TBD; Vaidyanathan; 1 Unit*

MEDPHYP 751 Medical Physics Seminar (1 c.h.) Weekly seminar on various topics pertaining to medical physics. *Th 4:10 – 5:30 pm; Kapaida, Oldham, Segars; Learning Hall; 1 Unit*

MEDPHY 761.01, 761.02, 761.03 Biostatistics for Radiation Physics - The first part will introduce the basic principles of descriptive statistics, probability theory, estimation theory, correlation and regression, with applications in the biomedical field. This is a 4 week session. The second part covers inferential biostatistics. It will introduce statistical hypothesis testing and its application to group comparisons of biomedical data. This part will cover parametric and non-parametric statistical tests and the basics of ANOVA analysis. This is a 4-week session. The third part covers medical decision analysis. This section includes the study and application of decision analysis methods popular in medical decision making. This part will cover performance evaluation measures of medical diagnostic tests, strategies for combining diagnostic tests, receiver operating characteristics analysis and its variants, and cost-effectiveness analysis. This is a 5-week session. 1 course credit each session. Repeatable for 3 total credits. *MTh 1:25 – 2:40 pm; 1032 Hock Plaza; Kapadia & Mazurowski; 1 Unit per Section*

MEDPHY 770 Frontiers of Biomedical Sciences - A course covering the frontier topics of biomedical sciences that are currently not within the domain of medical physics, but medical physicists, nonetheless, need to have knowledge of. Topics include genomics, bioinformatics, proteomics, and others. *MW 10:05 – 11:20 am; 1032 Hock Plaza; Colsher; 3 Units*

MOLECULAR GENETICS & MICROBIOLOGY:
http://mgm.duke.edu/graduate/

MGM 522 (UPGEN 522) Critical Readings in Genetics and Genomics – Classical and molecular genetic approaches to understanding eukaryotic cell function using unicellular organisms such as yeasts. Experimental approaches as well as illustrative studies of secretion, cell cycle, signal transduction, and cytoskeleton. Discussion of current literature and student presentations. *TuThu, 4:40 – 6:10 pm, 408 CARL Bldg; Robertson; 3 units; (crosslisted with UPGEN 522)*

MGM 532 (UPGEN 532) Human Genetics – Topics include segregation, genetic linkage, population genetics, mulifactorial inheritance, biochemical genetics, cytogenetics, somatic cell genetics, neurogenetics, cancer genetics, clinical genetics, positional cloning, and complex diseases. Lectures plus weekly discussion of assigned papers from the research literature. Prerequisites: University Program in Genetics 278 or equivalent, and graduate status or consent of instructor. *TuThu, 10:05 – 11:30 am, 001MSRB1; Marchuk; 3 units; (crosslisted with UPGEN 532)*
*****Note: ACES has listed as 8:30 a.m.incorrectly***

MGM 552 Virology - Molecular biology of mammalian viruses, with emphasis on mechanisms of replication, virus-host interactions, viral pathogenicity, and the relationship of virus infection to neoplasia. *MWF 3:20 – 4:10 pm; 408 CARL Bldg; Cullen; 3 Units*

MGM 582 Microbial Pathogenesis - Modern molecular genetic approaches to understanding the pathogenic bacteria and fungi. Underlying mechanisms of pathogenesis and host- parasite relationships that contribute to the infectious disease process. *MWF 1:30 – 2:30 pm; 001 MSRB1; Tobin; 3 Units*

MGM 790s Topics in Molecular Genetics & Microbiology - This is a student seminar with two upper classmen students presenting each seminar. Refreshments are provided by first year students. *F 4:15 - 5:30 pm; 001 MSRB1; Luftig; 1 Unit*

MOLECULAR CANCER BIOLOGY:
http://pharmacology.mc.duke.edu/grad/mcb.html

MOLCAN 730 (CELLBIO) Stem Cell Course - See CELLBIO 730

MOLCAN 760 (BIOCHEM, CELLBIO, PHARM 760) Cellular Signaling – See CELLBIO 760

MOLCAN 780 (PHARM 780) Graduate Student Seminar – See PHARM 780

MOLCAN 819 Cancer as a Disease - This course looks at cancer from the point of view of the patient, the doctor and the scientist. Faculty from around the medical center will discuss diagnosis, detection and prediction of cancer, the molecular basis of the disease, and new approaches to therapy. The object is to give students a deeper appreciation for the clinical aspects of cancer and how molecular biology can contribute to improved understanding and treatment of the disease. This course is mandatory for all MCB students, and would be suitable for second year students with a solid background in molecular biology. Permission is required to participate, class limit is 15. *M 1:25 – 2:40 pm; C335 LSRC; Mathey-Prevot; 2 Units*

NEUROBIOLOGY:
http://neurobiology.mc.duke.edu/graduate/curriculum.html

NEUROBIO 702 Basic Neurobiology – Medical neuroscience, clinical neuroanatomy, and biological psychiatry for first-year medical students. Also available to graduate students, who will be integrated into small-group teams of medical students. Instructional approach: team-based learning methods, with frequent readiness assessments, application exercises, neuroanatomy laboratories, patient-interviews, and clinical problem-solving sessions. Permission of instructor required. *January 2-28, 2013, MTuWThF 8:45 am – 5:00 pm; TSCHE Learning Hall, Labs; White; 4 Units*

NEUROBIO 720A-E Concepts in Neuroscience II: Principles of Organization of Neuronal Systems - The principles of organization of neurons into functional circuits will be examined through a series of 5 distinct modules, listed below. All five modules required for first-year neurobiology students. Prerequisites: NBI 719. Consent of instructor required. *MWF 8:45 am – 11:15am; 301 Bryan Research Bldg; Groh; 5 Units – one credit each (course will begin February)*

NEUROBIO 720A – Neuroanatomy

Overview of anatomical structures, organization and connectivity of the brain Bill Hall and Len White Feb 3-14

NEUROBIO 720B Learning and Memory

The neural basis of learning and memory, with emphasis on bird song and decision making in drosophila Rebecca Yang and Rich Mooney Feb 17-28

NEUROBIO720C – Sensory/motor integration

How sensory and motor structures of the brain communicate with each other to support movements guided by sensory stimuli Steve Lisberger and Marc Sommer March 3-7 and March 17-21

NEUROBIO 720D – Circuit development and function

This module concerns how neural circuits develop and implications for function Fan Wang, Lindsey Glickfeld, Vikas Bhandawat March 24-April 4

NEUROBIO 720E – Sensory Perception and Cognition

This module concerns the neural basis of sensory processing and its connection to cognition Jennifer Groh, Kevin Franks, Dale Purves April 7-16

NEUROBIO 733-01, 733-02, 733-03 (CMB, PHARM 733-01, 733-02, 733-03) Experimental Design and Biostatistics for Basic Biomedical Scientists - See PHARM 733-01, -02, -03

NEUROBIO 762 Neurobiology of Disease - This course is a month-long (January) series of 3 weekly two-hour sessions, each centered on a given disease of the nervous system. One or two students working with a designated faculty member are responsible for an introduction (20-25 minutes) followed by a discussion of key primary papers on the subject. Two or three articles provided in advance provide a framework for discussion. Diseases to be covered currently include: ALS, Alzheimer's, CNS neoplasms, Epilepsy, multiple sclerosis, Parkinson's disease, retinitis pigmentosa, and stroke. The idea is to describe the key features of the disease, current insight into etiology and pathogenetic mechanisms of the disease, models available and the evidence (if any) establishing the validity of the models, therapies available and envisioned. The topic "Neuroengineering: Approach to Restorative Neurology" will also be addressed. Students are expected to have a background in fundamentals of neuroscience and cell and molecular biology. Permission of instructor required to register. *MWF 2-4pm; 1/2/13 – 1/30/13; 301 Bryan Research Building; McNamara; 2 units*

NEUROBIO 755 (PHARM 755) Neurotoxicology – See PHARM 755

PATHOLOGY:

http://pathology.mc.duke.edu

PATHOL 750 General Pathology - Lectures deal with broad concepts of disease and underlying molecular mechanisms. Laboratory sessions familiarize the student with how to identify common disease processes in histologic sections. PTH 225 (histology) or an equivalent course is a prerequisite. *MWF 3:05 – 4:15 pm; M409 Davison; Hale; 4 Units*

PATHOL 785 Molecular Aspects of Disease - This course is based upon the study of the background, investigative method and recent advances in understanding the molecular basis of selected diseases, with an in-depth focus on a small number of diseases where defects are known at genetic or molecular levels. *TuTh 8:30 – 10:25 am; 151 MSRB I; Bachelder and He; 3 Units*

PATHOL 786. Translational Aspects of Pathobiology. Translational Research in Pathobiology is an integrated multidisciplinary course designed to provide students with the necessary tools to understand the principle components of the research processes involving patients or materials obtained from a human source. This course reflects the Department of Pathology's unique I ntegration of traditional pathology research with experimental therapeutics in an environment that seeks to bridge the basic sciences and clinical medicine. Instructor: *Weds 1:00-2:30 pm; MSRB 451; Devi. 3 units.*

PATHOL 855S Graduate Seminar in Pathology - Discussions outlining the scope of modern pathology. This will include reports of original research by graduate students, members of staff and visitors. *Th 4:00 – 5:00 pm; Markee Lecture Hal (M224 Davison Bldg); Multiple Staff; 1 Unit*

PHARMACOLOGY:
http://pharmacology.mc.duke.edu/grad/pharmacology.html

PHARM 534 Interdisciplinary Approach to Pharmacology - Several model systems (cancer, immunological, cardiovascular, reproductive, neurological and infective diseases) will be used to explore the molecular, biochemical, and physiologic basis of drug action**.** *MWF 3:20 - 4:10 pm; Rathmell, Wang & Whorton; C144 LSRC; 4 Units*

PHARM 733-01, 733-02, 733-03 (CMB, NEUROBIO 733-01,733-02, 733-03) Experimental Design and Biostatistics for Basic Biomedical Scientists - The use and importance of statistical methods in laboratory science, with an emphasis on the 'nuts and bolts" of experimental design, hypothesis testing, and statistical inference. Central tendency and dispersion, Gaussian and Non-Gaussian distribution, parametric and non-parametric tests, uni- and multivariate, ANOVA and regression procedures are covered. Students will present their own data and literature examples in addition to lectures. Consent of Instructor required. ***Section 01:*** *Tu 8:30 – 10:15 am; C144 LSRC; Slotkin; 2 Units.* ***Section 02:*** *W 8:30 – 10:15 am; C144 LSRC; Slotkin; 2 Units.* ***Section 03:*** *Th 8:30 – 10:15 am; C144 LSRC; Slotkin; 2 Units*

PHARM 755 (NEUROBIO 755) Neurotoxicology - Adverse effects of drugs and toxicants on the central and peripheral nervous system; target sites and pathophysiological aspects of neurotoxicity; factors affecting neurotoxicity, screening and assessment of neurotoxicity in humans; experimental methodology for detection and screening of chemicals for neurotoxicity. W *1:25 -3:15pm; C144 LSRC; Abou-Donia; 3 Units*

PHARM 760 (BIOCHEM, CELLBIO, MOLCAN 760) Cellular Signaling – See CELLBIO 760

PHARM 780 (MOLCAN 780) Graduate Student Seminar - A presentation and discussion course in which program faculty and graduate students review recent progress in contemporary areas of Pharmacology and Cancer Biology. Provides an important avenue for evaluation and feedback for graduate student research and communication skills and is required for all students pursuing their Ph.D. degree in Pharmacology and Molecular Cancer Biology. *Th 4:15 - 5:30 pm; C144 LSRC; Thiele, Wood; 2 Units*

PHARM 814 Case Studies Toxicology - Students are assigned topics relative to their chosen research discipline in toxicology and are asked to develop case studies to present at a roundtable workshop. Emphasis on review and analysis of toxicological problems from a holistic

(multidisciplinary) viewpoint. Offered on demand. *T 1:25-3:15pm; C144 LSRC; Abou-Donia; 1 Unit*

PHARM 815 (ENVIRON 815) Focused Topics in Toxicology - A contemporary advanced toxicology research area will be covered with readings from the current primary literature. An integrative review of the topic will be prepared as a collaborative effort. Prerequisites: Consent of instructor required. Pharmacology 533, Pharmacology 847. *M 11:45 am - 1:00 pm; A312 LSRC; Levin; 1 Unit; Slotkin; 2 Units.*

STRUCTURAL BIOLOGY AND BIOPHYSICS:
http://sbb.duke.edu/index.php

SBB 546S Structural Bio and Biophysics Seminar - Weekly seminars are presented by program students beyond their first year, faculty members or guest speakers. (Required of all SBB Students) *M 4:15 – 5:15 pm; 437 Nanaline Duke Building; Oas; 1 Unit*

SBB 682T Advanced Physical Biochemistry - Transient kinetics, computational methods, multidimensional NMR, x-ray crystallography, thermodynamics of association. Prerequisite: Structural Biology and Biophysics or consent of instructor. *Oas; Tutorial – contact Course Director for time & location; 3 Units*

UNIVERSITY PROGRAM IN GENETICS:
http://upg.duke.edu/home.html

UPGEN 522 (MGM 522) Critical Readings in Genetics and Genomics – Classical and molecular genetic approaches to understanding eukaryotic cell function using unicellular organisms such as yeasts. Experimental approaches as well as illustrative studies of secretion, cell cycle, signaltransduction, and cytoskeleton. Discussion of current literature and student presentations. *TuThu, 4:25 – 5:40 pm, 408 CARL Bldg; Robertson; 3 units; (cross-listed with* MGM 522*)*

UPGEN 532 (MGM 532) Human Genetics – Topics include segregation, genetic linkage, population genetics, mulifactorial inheritance, biochemical genetics, cytogenetics, somatic cell genetics, neurogenetics, cancer genetics, clinical genetics, positional cloning, and complex diseases. Lectures plus weekly discussion of assigned papers from the research literature. Prerequisites; University Program in Genetics 278 or equivalent, and graduate status or consent of instructor. *TuThu 10:00 – 11:30 am, MSRBI Room 001 Marchuk; 3 units; (cross-listed with* MGM 532*)*
*****Note: ACES has listed as 8:30 a.m.incorrectly***

UPGEN 668 (BIOCHEM 668) Biochemical Genetics II - Mechanisms of transcription, splicing, catalytic RNA, RNA editing, mRNA stability and translation. *TuTh 10:05 – 11:20 am; Nanaline Duke 439; Been, Michael D; 3 Units*

UPGEN 701 Advanced Topics in Genetics and Genomics - This course is only open to first year UPGG graduate students. It is a weekly discussion of current literature in genetics (Fall semester) and genomics (Spring semester). The course has two objectives. The first is to ground each of the members of the UPGG first year class, regardless of areas of interest, in the two areas of focus of the program – namely genetics and genomics. The second objective is to facilitate interactions among the diverse student body by bringing the class together once a week for discussion. *W 4:00 – 6:00 pm; GSRB I Room 2029; Haase, Steve, Ashley-Koch, Allison 2 Units*

Master List for Spring 2015 Courses

UPGEN 716 Genetics Student Research - This is a student seminar with two advanced students presenting each seminar. Refreshments are provided by first year students. *F 4:00 – 5:00 pm; 001 MSRB I; MacAlpine and Marchuk; 1 Unit*

UPGEN 750 Genetics Colloquium - Sponsored by the UPGG Program Seminar Series. *T 12:30 – 1:30 pm; Room 147 Nanaline Duke Bldg; Ashley-Koch; 1 Unit*

UPGEN 787 (BIO 787) Evolutionary Genetics - An introduction to the principles of evolutionary genetics, with discussion of the current literature and hands-on exercises. Genetic variation, neutral theory, natural selection, human population genetics, phylogenetic reconstruction, evolutionary genomics and evolutionary bioinformatics. This course is paired with BIO 111. Note from instructor: This course is split with undergrads and focuses on undergrads in class. As a result, the course will require more work that other graduate courses. If graduate students are looking for a lighter introduction to evolutionary genetics, they should consider taking Dr. Mitchell-Olds Solutions module. *TuTh3:05 – 4:20 p.m.; Bio Sciences 113 Mitchell-Olds, Tom; 3 Units*