2013 FALL COURSES  *Courses are appropriate for first year BBSP students.*

442 BIOCHEMICAL AND MOLECULAR TOXICOLOGY (ENVR 442, TOXC 442) (3). Prerequisites, one course in biochemistry/molecular biology or permission of instructor. Biochemical and molecular actions of toxicants and assessment of cellular and molecular mechanisms of adverse health effects. Three lecture hours per week. Fall. Rusyn (course director)

*601 ENZYME PROPERTIES, MECHANISMS AND REGULATION* (3). Prerequisite, CHEM 430, equivalent, or permission of instructor. Focuses on how the shapes of enzymes are designed to optimize the catalytic step and become allosterically modified to regulate activity, on the sources and evolution of transition state stabilization by enzymes, and on the design of artificial enzymes. Fall. Traut (course director), Wolfenden.

*631 ADVANCED MOLECULAR BIOLOGY I (BIOL 631, GNET 631, MCRO 631, PHCO 631) (3). Prerequisites, undergraduate courses in biochemistry and genetics. DNA structure, function and interactions in prokaryotic and eukaryotic systems, including chromosome structure, replication, recombination, repair and genome fluidity. Three lecture hours a week. Fall. A. Sancar (course director), Griffith, Ramsden.

*643 CELL STRUCTURE, FUNCTION AND GROWTH CONTROL I (CBIO 643, MCRO 643, PHCO 643) (3). Prerequisite, undergraduate cell biology/biochemistry or permission of instructor. Systematic coverage of major topics in cell biology including membrane structure, membrane trafficking, cytoskeleton, cell motility, and extracellular matrix. The class includes lectures as well as small group discussions of research papers. Alberts et al. is the required text. Fall. Cheney (course director) staff.

*649 MATHEMATICS AND MACROMOLECULES* (1.5) This course focuses on the application of mathematics to topics important in Biophysics, such as thermodynamics and electrostatics will be explained. The unit is designed to help students perform better in BIOC 650, 651 and 652. Fall. Berkowitz (course director).

*650 BASIC PRINCIPLES: FROM BASIC MODELS TO COLLECTIONS OF MACROMOLECULES* (1.5). Prerequisites, CHEM 430 and two semesters of physical chemistry or permission of the instructor. Basic molecular models and their use in developing statistical descriptions of macromolecular function. Course intended primarily for graduate students. Fall. Lentz (course director), Berkowitz.

*651 MACROMOLECULAR EQUILIBRIA: CONFORMATION CHANGE AND BINDING* (1.5). Prerequisites, CHEM 430 and two semesters of physical chemistry or permission of the instructor. Macromolecules as viewed with modern computational methods. Course intended primarily for graduate students. Fall. Lentz (course director), Berkowitz.

700 CURRENT TOPICS IN RNA STRUCTURE, FUNCTION, AND TECHNOLOGY (2). Critical reading and discussion of current literature related to the study of RNA structure, RNA-protein interactions, novel RNA functions, RNA as a therapeutic target/agent and RNA methods. Fall. Fried

*701 CRITICAL ANALYSIS & COMMUNICATION IN BIOCHEMISTRY* (2). Prerequisites, permission of course director. Critical analysis of current research in conjunction with biochemistry faculty and
departmental seminar series. Develop a range of communication skills including science podcasting, oral presentations, and roundtable deliberation coupled with in-depth analysis of seminar speaker research. Course provides an opportunity to become familiar with departmental research as well as state-of-the-art and standard laboratory techniques. Lunch with seminar speakers. Fall. Fried (course director).

*702 TEACHING IN BIOCHEMISTRY (2) Permission required of course director. Students should be 1st year BBSP students or 2nd year Biochemistry students who want to gain instruction and experience learning how to teach biochemistry. Students will gain experience leading small group session and may present a lecture to undergraduates. Fall. Toews.

*706 BIOCHEMISTRY OF HUMAN DISEASE [formerly 901] (3) Prerequisites. Students are expected to have had an undergraduate course in biochemistry or to have gained biochemical principles in a related biology or cell biology course. The objectives of this course are to provide students with a familiarity of contemporary biochemical principles and cutting edge approaches, and increase critical thinking and literature analysis, in the context of human disease. By the end of this course students should be familiar with biochemical causes of the diseases discussed, as well as current and future opportunities for biochemical-based treatments. Fall. Parise (course director), Staff.

715 SCIENTIFIC PRESENTATION (1). Senior graduate students present original research results as a formal seminar. Feedback on presentation effectiveness and style will be provided by faculty instructors and classmates. Summer – registered as Fall. Bergmeier and Neher (co-directors)

722A CELLULAR AND MOLECULAR NEUROBIOLOGY: POSTSYNAPTIC MECHANISMS-INTRACELLULAR SIGNALING (NBIO 723A, PHCO 723A, PHYI 723A) (2). Prerequisite, permission of course director. Explores biochemical signal transduction events following activation of neurotransmitter receptors including G-protein coupling, desensitization, signaling specificity, downstream effectors, calcium signaling and tryosine kinases. Course meets for five weeks with six lecture hours per week. Fall. Neurobiology faculty.

722B CELLULAR AND MOLECULAR NEUROBIOLOGY: PRESYNAPTIC MECHANISMS AND SYNAPTIC PLASTICITY (NBIO 723B, PHCO 723B, PHYI 723B) (2). Prerequisite, permission of course director. Explores the mechanisms regulating the release of neurotransmitters from nerve terminals, including quantal release, vesicle and terminal membrane proteins, neurotransmitter transporters and plasticity of synaptic transmission. Course meets for five weeks with six lecture hours per week. Fall. Manis (course director), Staff.

722C CELLULAR AND MOLECULAR NEUROBIOLOGY: Electrical Signaling (NBIO 722C, PHCO 722C, PHYI 722C) (2). Permission of the department. The genesis of electrical impulses in the nervous system is considered with an emphasis on membrane potentials, voltage-gated ion channels, and structural features of neurons that influence coding. Course meets for five weeks with six lecture hours per week. Fall. Staff.

725 SIGNAL TRANSDUCTION (PHCO 725) (3). Seminar/discussion course on molecular aspects of the receptors, G-proteins, effector proteins, kinases, and phosphatases that mediate hormone, neurotransmitter, growth factor, and sensory signaling. Fall. Dohlman and Harden (co-directors).

805 MOLECULAR MODELING (MEDC 805) (3). Prerequisites, MATH 231, 232, and CHEM 481. Introduction to computer-assisted molecular design, techniques and theory with an emphasis on the practical use of molecular mechanics and quantum mechanics programs. Fall. Tropsha.

993 MASTER'S THESIS

994 DOCTORAL DISSERTATION