Chemistry 676: Neurochemistry

Instructor:	Dr. Kelly Drew
Office/office hrs:	Murie 223F, MWF 10-12:00
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Lecture:	TR, 9:45-11:15, Murie 130
Homework:	Assignments posted on course schedule are due at the **beginning of the next class** unless otherwise indicated. **Homework turned in after the deadline will not be accepted** unless arrangements are made before the homework is late. See schedule for when homework is due. Permission to hand-in HW via e-mail may be arranged in advance and will not be accepted without prior arrangements. Homework and reading assignments (other than from the text book) will be posted on blackboard
Home-work make-up:	Attend neuroscience seminars online at http://neuroseries.info.nih.gov/ or on campus. Check with the instructor to ask if the seminar will count as a neuroscience seminar). A write-up about a seminar will substitute for one HW assignment (peer-reviews of selected articles). Up to 3 HW assignments can be substituted by a seminar write-up.
Course Description:	This course is designed to teach graduate students critical thinking skills and experimental design in basic and applied aspects of inter-cellular signaling in the CNS. Lectures will be based on chapters from assigned text as well as current literature relevant to these topics. Critical thinking skills and experimental design will be taught through discussion of original research papers that relate to the lecture topic. Prerequisite: BIOL B417, CHEM F470 or equivalent instruction in basic cell and molecular biology and nervous system function.
Course Goals:	Students should learn to identify significant research questions related to inter-cellular communication and be able to develop working models to answer these questions. Students should learn to perform at the level of an independent investigator in critical analysis of peer-reviewed literature in neurochemistry and in written and oral communication of the strengths and weaknesses of hypothesis driven research in the area of neurochemistry.
Student Learning Outcomes	Written homework, group project and final project assignments will be used to assess • Familiarity with current literature related to functions and diseases associated with neurotransmitter/neuromodulator • Ability to critically evaluate published papers and to prepare written comments addressing limitations to experimental design, experimental approach and interpretation of results. • Ability to suggest means to improve a manuscript that are sufficient and appropriate to submit as comments to authors when invited to peer review a manuscript. • Ability to formulate a working model, at least one hypothesis to test this model and to devise an experiment to test that hypothesis. Exams and quizzes will be used to assess understanding of • Detailed mechanisms of inter-cellular communication in the CNS and the ability to design experiments to test hypotheses regarding these mechanisms and the physiological functions related to these processes. ➢ Synthesis ➢ Storage ➢ Regulated release ➢ Receptor subtypes and effectors ➢ Termination of effect

	➢ Basic neurochemical anatomy of transmitter systems ➢ Neuromodulation via astrocytes (Homework) Students will be guided by the instructor through critical evaluation of peer-reviewed papers to achieve the following objectives: • Apply knowledge of neurochemical transmission to interpretation of peer reviewed papers. • Apply knowledge of neurochemistry and experimental design to critically evaluate original research papers and literature reviews. • Develop critical thinking skills and oral and written communication styles to defend one's own interpretation of the data. • Know how to prepare comments for authors to be submitted in response to an invitation by a journal editor to review a manuscript. (Group project assignment) Students will gain practice with oral presentations of original research towards the following objectives: • Become familiar with original literature related to a topic of interest in neurochemistry • Develop effective techniques for oral presentation of original research • Develop effective techniques for optimizing positive group dynamics and productivity as a team player and as a group leader. Total points is calculated from the average of all presentations. Each group will give as many presentations as there are members in the group. Although we try for 3 people per group, sometimes 3 does not divide into class number evenly and we end up with 4/group. Sometimes a group member will drop the class before the end of the semester. Groups may give more presentations than members, but all groups must give at least as many presentations as group members.
Instructional Methods	Instructional methods will consist of about 40% traditional lecture on material from the text book and 60% discussion and interpretation of peer-reviewed literature.
Text:	Basic Neurochemistry: Molecular, Cellular and Medical Aspects by George J. Siegel (Editor), 8th edition.
Other Required Reading:	Original research and review articles as assigned
Exams and Grading:	Exams and quizzes will typically consist of a subset of review questions provided in class. There will be no make-up exams or quizzes except under **extreme** circumstances. If such circumstances arise notify Dr. Drew (474-7190) **before** the scheduled time of the exam. If a make-up exam is approved it must be completed within 1 week of the original exam. Any student suspected by the instructor of cheating on a quiz or exam may be assigned a course grade of F; course drop forms will not be signed in these cases. **The letter grades assigned will be based on the overall performance of the class** but will usually be in the range 90-100=A, 80-90=B, 70-79=C, 60-69=D, and below 60 is failing.
Drop a quiz option	Students may attend up to 3 online seminars at http://neuroseries.info.nih.gov/ and write a critical review of each presentation addressing areas for improvement in slide formatting/graphics, development of background and significance appropriate for the audience, communication of a hypothesis and overall rigor of experimental design, clarity of results, soundness of interpretation and discussion of caveats that limit interpretation or application of research findings. These 3 critical reviews may substitute for one quiz grade.

Final Project	For the final project each student will develop an original theoretical model to answer a question he/she finds to be significant and related to inter-cellular communication in the CNS. Based on the proposed model students will formulate a set of hypotheses and propose a set of experiments to test one of these hypotheses. The student will describe expected and alternative results and discuss interpretation of both expected and unexpected results. Learning will be assessed from the credibility of the model proposed, ability to assess the rigor of background literature related to the model, ability to identify weaknesses and strengths of prior work and ability to defend how the proposed model improves upon weaknesses and builds upon strengths of prior work. Learning will also be assessed from the student's ability to discuss and interpret expected and unexpected results.
Disabilities	Students with a physical or learning disability are required to identify themselves to the Disability Services office, located in the Center for Health and Counseling. The student must provide documentation of the disability. Disability Services will then notify the instructor of special arrangements for taking tests, working homework assignments, and completing other required assignments.

Assignments for Chemistry 675

2 Exams (50 pts ea.)	100 pts
3 Quizzes or 2 quizzes + optional (25 pts ea.)	75 pts
Presentations of original research papers	100 pts
Comprehensive final exam	100 pts
Homework (20 pts ea.) + 10peer review	~300 pts
Final Project (100 pts)	100 pts