**Cellular and Molecular Neurobiology (NBIO 722-723)**

**Prerequisites**: Must be in good standing as a graduate student at UNC.

**Course Description:**

The purpose of this course in Cellular and Molecular Neurobiology is to explore the experimental and theoretical basis for our cur­rent concepts of nervous system function. The course runs as a series of three Blocks in the fall semester and three Blocks in the spring semester. This is NOT a survey course in neurobiology. The goals of the course are not so much to inform as to fos­ter an under­standing of how we accumu­late our knowledge and hypotheses; not to provide a com­plete text­book picture of the func­tion­ing ner­vous sys­tem as we know it in now, but to pro­vide the intellectual tools and skills to evaluate current and future hypotheses; not so much to pro­vide an­swers to ques­tions as to attempt to de­fine the unanswered questions. IT IS ALMOST ALWAYS expected that all students commit to taking both semesters (**Fall 722 and Spring 723**).

**Target Audience: (Limit on Enrollment and Priority for Registration):**

In order to create a climate for active discussion and exploration of ideas, each Block is limited to 24 students. All students are required to obtain permission from the Course Director or Student Services Manager to enroll. Because of BBSP, we do not know how many applicants we will have typically in the Fall. Priority is given to (1) students entering the Neurobiology Curriculum, as they are required to take the entire course, and to (2) students from departments affiliated with the course and who intend to register for BOTH SEMESTERS of the course. Students should acquaint themselves with the course description and schedule and, if they are willing to take on the responsibilities of the course, email the student services manager (SSM) for permission to enroll; The SSM will contact the Course Director. The email should state for how many Blocks the student intends to register and why he or she wants to take the course.

**Time, place, and course administration:**

All sessions will take place in Neuroscience Research Building (NRB) Rm 3118, from 10:10 AM to 12:05pm, Mon. Wed. Fri, usually with a short break roughly at 11:00.

**Course Director:**

Jay Brenman, Ph.D. - brenman@med.unc.edu

**Course Administrative Assistant/Student Services Manager:**

Sue Modlin - smodlin@email.unc.edu

**Absence from class:**

Please email the appropriate "Block Head" if you will be absent from class. It is particularly important to do this if you will unavoidably miss your group’s presentation.

**Grades: (Course organization and style):**

The course material for the year is organized into six three-to-six-week Blocks: three Blocks in the fall semester and three Blocks in the spring semester. The student receives a separate grade for each semester. Typically there are 3 tests per semester (one for each block). Students intending to join the Neurobiology Curriculum are required to take all six Blocks. The block tests count for the vast majority of the final grade for the student.

Often, the first hour of each session is an interactive presentation of fundamental material by a faculty member. The second hour may be a continuation of the first presentation, may be a different topic, or may be a presentation and discussion of an origi­nal paper led by the students. Faculty “lectures,” while presenting major concepts, are in general interactive rather than didactic. **Student participation during "lectures" and discussion sessions is essential in order that this course be effective. Participation during a Block can "bump up" or "bump down" a borderline grade (see next page).** Active discussion participation by students can affect the final grade.

*Students: It is crucial in undertaking this course that you view yourself as a begin­ning professional developing the skills of the profession – the ability to design and judge the quality of experiments, to talk about your experiments and hypotheses with colleagues, to express ideas in writing, and to master material well enough to be confident in discussing it – and not as an undergraduate cramming in information with the expectation of being tested in a rote manner.*

**Course Resources: (Assigned background reading):**

Assignments will be posted under Course Documents/resources at the course site on Sakai. Studens are responsible for pro-actively looking in all Sakai materials for any assignments/quizess etc.

Assigned background reading are typically articles that will be assigned me each instructor**. *While we do not require a specific text,* *it is strongly suggested that you obtain a copy of at least one of the recommended neuroscience texts for your reference****.* Instructors are also likely to assign required or optional reviews, or chapters from additional specialized texts, and post them as PDFs on Sakai.

**Recommended textbooks:**

These texts will be on reserve at the Health Sciences Library. Although internet searches /resources may be okay for quick reference, make sure to read primary (cited) materials or peer reviewed review articles and other primary research publications (Especially never cite an article you have not actually read). The texts below have been slaved over lovingly by the authors, reviewers, and editors and, as a result, have few errors. The different texts all have different strengths.

Kandel et al., (2012) Principles of Neural Science (5th Ed.) McGraw-Hill Companies Inc. (pdf in sakai)

Squire, L.R. et al (2008) Fundamental Neuroscience (3rd Ed.) Academic Press (online).

Luo, Linqun (2016) Principles of Neurobiology, Garland Science, (one hard copy at HSL, another hard copy with the SSM, no electronic version available at this time)

**Assigned original research papers:**

For most sessions, original research papers will be assigned. A group of students will be assigned to present this paper and lead the discussion of it in the second hour of the class session. The papers will either be "short" (a 5-10 page paper from a journal such as Science, PNAS, or Neuron), or, if longer, the faculty member will assign particular sections or figures within the paper to present. Clearly the reading must be done **before** the class session if a lively and informative discussion is to ensue. **All students are expected to read the papers, whether or not they are presenting.**

A set of questions will be provided for each original paper to guide your reading. These questions will form a basis for class discussion. Typical questions that should be asked while reading any paper are:

* What is the hypothesis being tested?
* Is the hypothesis good, and how does it fit with the existing literature?
* How strong is the evidence in support of the hy­pothesis?
* What is the point of each of the figures?
* Is there a central, most important figure?
* Are the experiments direct or indirect?
* Did the authors do the proper controls?
* Does the text of the paper deal completely with the data presented in the figures or are points overlooked?

**Problem sets and Quizzes:**

Some sessions will include assigned problem sets or brief in-class quizzes. Problem sets give the faculty an idea of what the students know, and where there are weaknesses. When assigned, problem sets are required to be handed in, and will be included in your grade. Some sessions may also include short quizzes given at the beginning of class at the discretion of the instructor.

**Exams and grading:**

Blocks traditionally end in a take-home exam. A student receives a separate grade for each Block based on a combination of the exam grade (usually the major component), problem set or quiz grades, and on class participation. *Active participation in the discussions, as well as clear and well-organized presentations during the Block, can tip a marginal Block grade in the favorable direction (see previous page).*

Take-home exams are open book. They will be handed out at the end of each Block (usually a Friday). Exams are due either two or three days later (usually “Exam Monday” at 4PM). Class will not be held between the time the exam is handed out and the day the exam is due. This information is posted on the class schedule; plan your life and your experiments around the exams. You should hand in your exam (and course evaluation—see below) to Denise Kenney (NRB 3106) unless instructed otherwise. Faculty will hand the corrected exam back ~7-10 days later as noted on the course schedule.

Exams will usually consist of multiple questions; in some larger blocks there may be more questions and you may have the opportunity to select a subset. Exam questions often will ask you to *think*: e.g. to de­sign an exper­iment or set of experiments to address a particular hypothesis, complete with controls and a discussion of feasibility (as one must do in preparing a grant appli­cation). Notes, papers, and texts may be consulted, but you may not confer with other students, col­leagues, or instructors. Any questions regarding an exam question should be directed to the Block Head. Instructors will try to design questions, based on the discussions of the material of the Block, that provoke the thought pro­cesses we all must go through in planning or evaluating a series of experiments.

EXAMS ANSWERS MUST BE TYPED. Neat hand lettering of figures or hand-written math is acceptable. Usually a satisfactory answer can be written in several direct, succinct para­graphs; some questions give sentence or word limits. These exams provide exercise for the brain and the chance to experiment with elegance and clarity in writing style, which will be critical for future activities such as writing papers or grants. Exams are released on Sakai and returned to the student's dropbox in Sakai by a specific due date/time. Graphs or other models may be hand drawn and photographed or attached as a digital image. However, the entire exam must be returned to the student's dropbox in Sakai as a single digital file.

Exams are graded blind by the instructors--that is, they will not know whose exam it is only your PID number appears on it. Only the course director and SSM have the key to connect the PID numbers to students. Faculty will either provide comments to the answers on the exam itself or they may hand out a sheet in which they discuss the possible answers to their question.

THE EXAMS ARE NOT TO BE KEPT OR CIRCULATED TO ANYONE AT ANYTIME. THEY MUST NOT BE STORED OR SHARED EVEN AFTER THE EXAM IS COMPLETED.

**Course evaluations-important!**

An anonymous evaluation is required for each Block. The evaluation is on-line and will be posted on Sakai at the end of each Block.

You may feel that filling out an evaluation for every Block is a burden and return a casually filled-in evaluation. We ask you please not to do this but to take the evaluation process very seriously for three reasons:

* First, we faculty take your comments seriously, incorporating your constructive suggestions into our future iterations of the course or even making changes within the current course year if warranted.
* Secondly, the faculty need feedback on how they are perceived. This is particularly true for younger faculty who may not yet have had a lot of experience and are trying to figure out how best to be effective teachers.

Third, these evaluations go into a faculty member's teaching portfolio, so if you have complaints, please be diplomatic and constructive! If you have praise, it truly helps the faculty member if you spell out what you enjoyed about their teaching and why. **Honor Code**: Students should follow the UNC honor code, however, students are welcome and encouraged to discuss reading materials outside of class to stimulate discussion of ideas and better understanding of the topic. Working in groups outside of class is permitted. However, tests or problem sets will be individual exercises unless specified otherwise. Terms for individual exams will be clearly defined and would be solely the work of the individual student. If open internet/open book is allowed that will also be clearly defined.

**Accomodations**: The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in difficulties with accessing learning opportunities. Students must document their need for accommodations with Accessibility Resources & Service before any accommodations can be implemented.

**Expectations & Attendance**: Attendance and participation are determinants of class grades. Therefore, missing class for many students will impact the grade a student can receive.