



General Information								
Course Title:	Neurobiology II			Course Designation:	NEURO 511		Credits: 3	
Semester:	Spring		Year:	2008				
Department:	Neuroscience							
Director:	Robert Milner	Phone #	6407	Email:	rmilner@psu.edu	Office Rm #	C3802C	
Time :	Various		Days:	Various			Location:	LRA, MDL

**Course Information**

**Description and/or Overview:**

The Neurobiology II (NEURO 511) Course provides an overview of the anatomy of the vertebrate nervous system using the human central nervous system as a model. The goal is for students to understand the structure of the human nervous system as a foundation for understanding the biological mechanisms that underlie the functions of the nervous system and the neural bases of behavior. More detailed course objectives listed below.

The course will build on material covered in other neuroscience graduate courses. Students will be expected to know the cellular biology of the nervous system and the properties of electrically-excitabile cells, the general principles of pharmacology, and the mechanisms of signal transduction. Course material will be presented in the form of lectures, handouts, and readings from textbooks. Laboratory sessions, demonstrations, and review sessions will complement the lecture topics. Computer-based instruction will be available and course material will be posted on ANGEL and on the course website.

A central theme of the course is the concept of functional localization within the central nervous system, an idea that has important clinical and experimental implications. The laboratory sessions, in particular, will provide the key opportunity for students to develop their own visualization of the three-dimensional organization of the nervous system.

**Goals and/or Objectives:**

**By the completion of this course students will be expected to be able to**

- demonstrate a thorough working knowledge of **the three-dimensional structure** of the brain, spinal cord and their internal components; and be able to interpret images of the nervous system obtained by radiological and related techniques.
- describe the normal and abnormal **development** of the nervous system.
- describe the concept of the blood-brain barrier, the dynamics of fluid flow within the central nervous system, and their pathologic complications.
- define the neural pathways for **sensory** input (including special senses) and for **motor** output (including extra-pyramidal systems), and explain the consequences of damage to these systems.
- describe the cortical and limbic mechanisms subserving **cognition, language**, and other specialized motor skills.
- describe the neural regulation of the **autonomic** and **endocrine** systems.

**Pre-requisites:** None

**Requirements; course-specific policies and expectations:**

**LABORATORY:**

Laboratory sessions will be held in the Multidisciplinary Labs (MDL). Instructions for the Neuroanatomy Laboratory are provided in the manual, which will be handed out at the beginning of the laboratory section of the course. Each group of students will receive a set of glass slides and a set of Kodachrome slides. The laboratory resources are valuable: students are responsible for their care and safe return at the end of the course. *Final grades will not be issued to any student in a lab group until all materials (glass slides and Kodachrome sets) have been returned in good condition.*

**Required Texts and Resources:**

**Required texts:** Alloway, K.D. & Pritchard, T.C., *Medical Neuroscience*, 2nd edition, Hayes Barton Press, 2008. ISBN 1-59377-200-9.

Haines, D.E., *Neuroanatomy, An Atlas of Structure, Sections and Systems*, 7<sup>th</sup> edition., Williams and Wilkins, New York, 2007.

Chapters from the text are assigned for each lecture: students are expected to read this material prior to the lecture.

**Electronic Links:**

ANGEL will be used to provide all course information and material, including handouts. The ANGEL website will be for the **NBS 725** (Neural & Behavioral Science) course. Handouts and other readings will be posted on this site prior to each lecture: students are expected to download this material & print as they wish.

The ANGEL site includes a link to the **NBS Course Website**, which contains information for the neuroanatomy laboratory. The NBS Course Website is also available via the internet on the Penn State Course Server: the URL is: [http://www.courses.psu.edu/nbs/nbs725\\_rjm11/index.html](http://www.courses.psu.edu/nbs/nbs725_rjm11/index.html); this site is password-protected and requires your PSU Access Account user ID and password.

**Attendance Policy:**

Students are expected to attend all lectures. Students are held responsible for all material covered in the course and should be aware that irregular attendance may affect their performance.

**Examination Policy:**

There will be two content examinations: a **midterm** and a **final**; both exams will consist of written and laboratory components. As far as possible, questions will be distributed evenly across the topics presented in lecture and laboratory sessions. The Final Exam will not be cumulative, beyond the expected accumulation of knowledge across the course. The **Quiz** on Monday January 14, 2008 will focus on the basic neuroanatomy covered in the first two weeks of the course and is worth approximately 10% of the final grade.

If circumstances arise that make it difficult for a student to sit for an examination, a make-up exam will be arranged. Major illness or death of a family member are two such legitimate circumstances. Please inform the course director prior to the exam; in the case of illness, a note from a physician is required.

Corrected papers will be available for students to review shortly after each examination; the distribution of scores will be posted. Students should look over their exams as soon as they are returned: if questions arise, students should consult with a faculty member within five working days after the exams are returned; no changes to grades will be made after this period.

**Grading Criteria:**

Grade points (total of 250 points) will be distributed as follows:

	WRITTEN	PRACTICAL	TOTAL
QUIZ	25 points		25 points
MIDTERM:	100 points	50 points	150 points
FINAL:	60 points	15 points	75 points
		TOTAL:	250 points

Grades for the course will be determined by the course director. Students will receive standard letter grades. Students who are failing or who have marginal grades after the Quiz and/or midterm examination will be notified.

## Academic Integrity

Academic Integrity at Penn State is defined by Faculty Senate Policy 49-20 as “the pursuit of scholarly activity in an open, honest and responsible manner”. The University's Code of Conduct states that “all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others”. Academic dishonesty (including, but not limited to cheating, plagiarism, or falsification of information) will not be tolerated and can result in academic or disciplinary sanctions such as a failing (F) grade in the course.

## Statement on Remediation

The basis for grades, as stated in [Senate Policy 47-20](#), is "...the instructor's judgment of the student's scholastic achievement..." Occasionally, a disagreement arises in the assignment of a grade. A student who wishes to question or challenge the grade assigned in a course must first discuss grading practices and assignments with the instructor. It is expected that the student and instructor will try to eliminate any misunderstandings and will attempt to work out any disagreements over grades.

On the rare occasion that a student and instructor fail to resolve the grade dispute through informal means, the student may request that the head of the academic program offering the course act as a mediator. If this mediation does not resolve the dispute, the student who is a graduate student may request further mediation from the associate dean for graduate studies.

[For more information, see: <http://www.psu.edu/dept/oue/aappm/G-10.html> ]

## Educator's Code of Conduct

**The Penn State Milton S. Hershey Medical Center and Penn State College of Medicine are dedicated to developing and maintaining a strong commitment to ethical teaching practices at all levels of the education process.**

The foundation for this Educator's Code of Conduct is provided by the Penn State University Graduate School Statement on Teaching Ethics (1). The development of this Graduate School statement was based on a special issue of the journal, *New Directions for Teaching and Learning*. In this special issue, entitled *Ethical Dimensions of College and University Teaching: Understanding and Honoring the Special Relationship between Teachers and Students* (2), several authors provided theoretical and practical guidelines for honing ethical college teaching skills. Some of the authors' recommendations have been used to formulate the Educator's Code of Conduct provided herein. Some of these recommendations were modified to specifically fit the needs of both educators and students at the Hershey Medical Center and the Penn State College of Medicine. Both the Unified Campus Commitment to Excellence of the Hershey Medical Center and Penn State College of Medicine (3) and the Code of Ethical Behavior of the Hershey Medical Center, Policy A-20 HAM (4) were also consulted in preparing this Educator's Code of Conduct.

### Four Norms to Govern Teaching

#### **Honesty**

Honesty and integrity must be practiced during all aspects of the education process.

#### **Promise-Keeping**

Promise keeping requires the educator to fulfill the "promises" made at the beginning of the semester or any other learning activity. Syllabi, assignments, grading principles, and class and office hour schedules each involve promises that are made to students and that must be adhered to under normal circumstances.

#### **Respect for Persons**

The educator must approach the learner with personal respect. In addition, the educator ought to encourage mutual respect among students. In particular, respect for race, religion, sexual orientation, disability gender, age, marital status, cultural differences, and political conviction should be supported and encouraged in all aspects of the educational process. Additionally, educators ought to show respect and common courtesy for students both during interpersonal interactions and in responding promptly to students' need for guidance and feedback. An environment free from harassment and discrimination, verbal abuse, physical violence, and intimidation in any form must also be provided for all learning activities.

#### **Fairness**

Recognizing the inherent subjectivity involved in grading, an educator ought to ensure that their grading practices are as objective as possible by creating and adhering to unambiguous criteria.

### Principles of Ethical College and University Teaching

#### **Content Competence**

An educator maintains a high level of subject matter knowledge and ensures that the content of the educational experience is current, accurate, representative, and appropriate to the position of the learning experience within the students' program of study. The educator must be capable of approaching each learner with a commitment to meeting his or her educational needs.

#### **Pedagogical Competence**

A pedagogically competent educator communicates the objectives of the educational experience to students, is aware of alternative instructional methods or strategies, and selects methods of instruction that are effective in helping students to achieve the course objectives.

#### **Dealing with Sensitive Topics**

Topics that students are likely to find sensitive or discomfiting are dealt with in an open, honest, and positive way.

#### **Student Development**

The overriding responsibility of the educator is to contribute to the intellectual development of the student, at least in the context of the educator's own area of expertise, and to avoid actions such as exploitation and discrimination that detract from student development.

### **Dual Relationship with Students**

To avoid conflict of interest, an educator does not enter into dual-role relationships with students that are likely to detract from student development or lead to actual or perceived favoritism on the part of the educator. The establishment of a romantic/sexual relationship between an educator and a student should be reported to the immediate supervisor of the educator. Such relationships should be dealt with consistent with Penn State Administrative Policy AD41 — Sexual Harassment (5).

### **Student Confidentiality**

Student grades, letters of evaluation, attendance records, and private communications are treated as confidential materials and are released only with student consent, for legitimate academic purposes, or if there are reasonable grounds for believing that releasing such information will be beneficial to the student or will prevent harm to the student or to others.

### **Patient Privacy and Confidentiality**

Educators who utilize patient information as part of any educational experience must follow patient privacy and confidentiality guidelines as outlined by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

### **Respect for Colleagues**

An educator respects the dignity of his or her colleagues and works cooperatively with colleagues in the interest of fostering student development.

### **Valid Assessment of Students**

An educator is responsible for taking adequate steps to ensure that the assessment of a student's performance is valid, open, fair, and congruent with the course/educational experience objectives. An educator must be aware that such assessments are important in students' lives and in the development of their careers.

### **Respect for Institution and Profession**

In the interest of student development, an educator is aware of and respects the educational goals, policies, and standards of the institution in which he or she teaches and the profession which he or she represents.

### **Citing Sources of Educational Material**

An educator acknowledges and documents, as appropriate, the sources of information and other materials used for teaching.

## **Violations of the Educator's Code of Conduct**

Should a learner experience conduct that is inconsistent with the Educator's Code of Conduct, he/she is encouraged to first address the issue with either the educator responsible for the inconsistency or the director of the course in which the educator teaches. Should this attempt to resolve the problem fail, or if the nature of the inconsistency is such that the learner does not feel comfortable addressing the issue with either the educator or the course director, the student may consult other individuals. These individuals may include but are not limited to: faculty advisor, student ombudsman, departmental chair, the Vice Dean for Educational Affairs, and the Vice Dean for Faculty and Administrative Affairs. The decision of who to contact may be dependent on the educational program of the learner and/or type of violation that was encountered.

### **References:**

- (1) <http://www.gradsch.psu.edu/research/ethics.html#teaching>)
- (2) <http://cte.uncwil.edu/et/br030697.htm>
- (3) Unified Campus Commitment to Excellence of the Penn State Milton S. Hershey Medical Center and College of Medicine; 05/11/01
- (4) Code of Ethical Behavior of the Hershey Medical Center, Policy A-20 HAM; Effective Date October, 2001
- (5) <http://guru.psu.edu/POLICIES/Ad41.html>

**Developed by the Unified Campus Academic Team Endorsed by Teams Council — May 21, 2003**

### Course Schedule

Course Title:		Neurobiology II		Course Designation:		NEURO 511		
Course Director:		Robert Milner						
Time :	various			Days:	various		Location:	LRB/LRC*/MDL
Date	Time	Lect/ Lab #	Instructor(s) Last, first	Instruction Type (Lecture or lab)	Projected Lecture Topic - This list is an approximate guide to lecture topics. Titles and content are subject to change			
Jan 3	9 am	1	Pritchard, Thomas	lecture	Introduction to Course			
Jan 3	10 am	2	Milner, Robert	lecture	CNS Organization			
Jan 4	10 am	3	Reichwein, Raymond	lecture	Vascular System			
Jan 4	11 am	4	Kanekar, Sangam	lecture	Neural Imaging			
Jan 4	3-5 pm	5	Pritchard, Thomas; Alloway, Kevin	lab	Lab 1: Brain Anatomy I			
Jan 7	3-5 pm	6	Pritchard, Thomas; Alloway, Kevin	lab	Lab 2: Brain Anatomy II			
Jan 9*	9 am	7	Milner, Robert	lecture	Cortex			
Jan 9*	10 am	8	Pritchard, Thomas	lecture	Language			
Jan 9*	11 am	9	Eslinger, Paul	lecture	Cortical Syndromes			
Jan 9	3-5 pm	10	Pritchard, Thomas; Alloway, Kevin	lab	Lab 3: Brain Anatomy III			
Jan 10*	11 am	11	Alloway, Kevin	lecture	Spinal Cord I			
Jan 11	3-5 pm	12	Pritchard, Thomas; Alloway, Kevin	lab	Lab 4: Brain Anatomy IV			
Jan 14	9 am			QUIZ	<b>QUIZ</b>			
Jan 14	11 am	13	Alloway, Kevin	lecture	Spinal Cord II			
Jan 14	10-12	14	Pritchard, Thomas; Alloway, Kevin	lab	Lab 5: Spinal Cord			
Jan 16	9 am	15	Milner, Robert	lecture	Autonomic Nervous System			
Jan 16	11 am	16	Alloway, Kevin	lecture	Brainstem I			
Jan 16	3-5 pm	17	Pritchard, Thomas; Alloway, Kevin	lab	Lab 6: Brainstem I			
Jan 17	10 am	18	Milner, Robert	lecture	Embryonic Development			
Jan 17	11 am	19	Alloway, Kevin	lecture	Brainstem II			
Jan 18	3-5 pm	20	Pritchard, Thomas; Alloway, Kevin	lab	Lab 7: Brainstem II			
Jan 22	11 am	21	Cantore, William	lecture	Oculomotor System			
Jan 24	11 am	22	Pritchard, Thomas	review	Neuroanatomy Review			
Jan 25				EXAM	<b>Exam I (11 am–5 pm)</b>			
Jan 28	9 am	23	Milner, Robert	lecture	Hypothalamus			
Jan 28	10 am	24	Milner, Robert	lecture	Limbic System			
Feb 4	9 am	25	Milner, Robert	lecture	Thalamus			
Feb 4	10 am		Subramanian, Thyagarajan	lecture	Basal Ganglia			
Feb 6	10 am	26	McEchron, Matthew	lecture	Cerebellum			
Feb 6	11 am	27	Pritchard, Thomas	lecture	Motor System			
Feb 6	3-5 pm	28	Pritchard, Thomas; Alloway, Kevin	lab	Lab 8: Motor Systems			
Feb 7	11 am	29	Pritchard, Thomas	lecture	Taste & Smell			
Feb 11	9 am	29	Pritchard, Thomas	lecture	Hearing & Vestibular Systems			
Feb 11	10:30 am	30	Cantore, William	lecture	Visual System			
Feb 11	1-3 pm	31	Pritchard, Thomas; Cantore,	lab	Lab 8: Sensory Systems			
Feb 29				EXAM	<b>Exam II (8 am–2 pm)</b>			

\* Lectures in LRC; all others in LRB

### Contact Information

Faculty / Title	Department	Phone #	EMAIL	Office Room #	Mail Code
<b>Robert Milner, PhD</b> Course Director	Neural & Behav Science	6407	rmlner@psu.edu	C3802C	H109
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Thomas C. Pritchard, PhD</b> Neuroanatomy Lab Director	Neural & Behav Science	6410	tcp1@psu.edu		H181
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Kevin D. Alloway, PhD</b>	Neural & Behav Science	6413	kda1@psu.edu		H109
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>William A. Cantore, MD</b>	Ophthalmology	8783	wac1@psu.edu		HU19
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Raymond Reichwein, M.D.</b>	Neurology	8692	rreichwein@psu.edu		H037
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Paul J. Eslinger, PhD</b>	Neurology	8692	peslinger@psu.edu	C5522	H037
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Matthew D. McEchron, PhD</b>	Neural & Behav Science	8264	mdm27@psu.edu		H181
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Sangam Kanekar, M.D.</b>	Radiology	6737	skanekar@hmc.psu.edu		H066
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Thyagarajan Subramanian, MD</b>	Neurology	8692	tsubramanian@psu.edu		H037
<i>Comments: (i.e. preferred method of contact, contact hrs.)</i>	<i>Contact by email first.</i>				
<b>Lori Coover, Course Secretary</b>	Graduate Student Affairs	1045	lcoover@psu.edu	C1712	H170