


UNIVERSITY OF KENTUCKY
APPLICATION FOR CHANGE IN EXISTING COURSE: MAJOR & MINOR

1. Submitted by College of Medicine Date 4-16-07
Department/Division offering course Anatomy & Neurobiology
2. Changes proposed:
(a) Present prefix & number ANA 605 Proposed prefix & number ANA 605
(b) Present Title Principles of Neurobiology
New Title Neurobiology of CNS Injury and Repair
(c) If course title is changed and exceeds 24 characters (Including spaces), include a sensible title (not to exceed 24 characters) for use on transcripts:
CNS Injury and Repair
(d) Present credits: 4 Proposed credits: 3
(e) Current lecture: laboratory ratio Lecture only Proposed: Lecture only
(f) Effective Date of Change: (Semester & Year) Fall 2009
3. To be Cross-listed as: PGY 605 
Prefix and Number Signature: Department Chair
4. Proposed change in Bulletin description:
(a) Present description (including prerequisite(s)):
See attachment:

(b) New description:
See attachment:

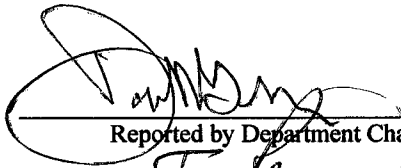
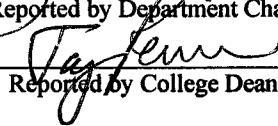
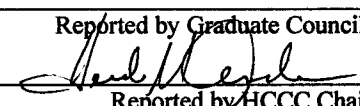
(c) Prerequisite(s) for course as changed: See attachment:
5. What has prompted this proposal?
See attachment:
6. If there are to be significant changes in the content or teaching objectives of this course, indicate changes:
The course will be shifted from a focus on general neurobiology principles to the pathophysiology of neural injury and restorative processes including potential therapeutic strategies. (See attached Syllabus)
7. What other departments could be affected by the proposed change?
The Department of Physiology (PGY) also contributes students to this class listed in their course offerings as PGY 605
8. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky? Yes No
9. Will changing this course change the degree requirements in one or more programs?
If yes, please attach an explanation of the change. (NOTE – If “yes,” program change form must also be submitted.) Yes No
10. Is this course currently included in the University Studies Program?
If yes, please attach correspondence indicating concurrence of the University Studies Committee. Yes No

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11. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales. Check here if 400G-500.
12. Is this a minor change? Yes No
 (NOTE: See the description on this form of what constitutes a minor change. Minor changes are sent directly from the Dean of the College to the Chair of the Senate Council. If the latter deems the change not to be minor, it will be sent to the appropriate Council for normal processing.)
13. Within the Department, who should be consulted for further information on the proposed course change?

Name: Edward Hall, Ph.D. Phone Extension: 323-4678

Signatures of Approval:

<p style="text-align: center;"><i>April 16, 2007</i></p> <hr/> <p style="text-align: center;">Date of Approval by Department Faculty</p> <p style="text-align: center;"><i>E. Hall</i> 6-20-07</p> <hr/> <p style="text-align: center;">Date of Approval by College Faculty</p> <p style="text-align: center;"><i>C. Starnes</i> 4-16-07</p> <hr/> <p style="text-align: center;">*Date of Approval by Undergraduate Council</p> <p style="text-align: center;"><i>NO</i></p> <hr/> <p style="text-align: center;">*Date of Approval by Graduate Council</p> <p style="text-align: center;">8/21/07</p> <hr/> <p style="text-align: center;">*Date of Approval by Health Care Colleges Council (HCCC)</p> <hr/> <p style="text-align: center;">*Date of Approval by Senate Council</p> <hr/> <p style="text-align: center;">*Date of Approval by University Senate</p>	<div style="text-align: center;">  <hr/> <p>Reported by Department Chair</p> </div> <div style="text-align: center;">  <hr/> <p>Reported by College Dean</p> </div> <div style="text-align: center;"> <hr/> <p>Reported by Undergraduate Council Chair</p> </div> <div style="text-align: center;"> <hr/> <p>Reported by Graduate Council Chair</p> </div> <div style="text-align: center;">  <hr/> <p>Reported by HCCC Chair</p> </div> <div style="text-align: center;"> <hr/> <p>Reported by Senate Council Office</p> </div> <div style="text-align: center;"> <hr/> <p>Reported by Senate Council Office</p> </div>
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*If applicable, as provided by the Rules of the University Senate.

The Minor Change route for courses is provided as a mechanism to make changes in existing courses and is limited to one or more of the following:

- a. change in number within the same hundred series;
- b. editorial change in description which does not imply change in content or emphasis;
- c. editorial change in title which does not imply change in content or emphasis;
- d. change in prerequisite which does not imply change in content or emphasis;
- e. cross-listing of courses under conditions set forth in item 3.0;
- f. correction of typographical errors. [University Senate Rules, Section III - 3.1]

Course Change attachment

4. **Proposed change in Bulletin description:**

(a) Present description (including prerequisite(s)): The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a 'Journal Club' format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents.

(b) New description: The objective of the course will be to provide a general overview of the current state of knowledge concerning the pathophysiology and therapeutic approaches to central nervous system injury. The course will provide a strong working background concerning the issues, techniques and frontiers of neurotrauma therapeutic discovery research aimed at reducing acute post-traumatic neurodegeneration in the injured brain or spinal cord or enabling regeneration and repair. This course is a graduate level course intended for students who are in their second or subsequent years of graduate study and who are pursuing focused research training in neurotrauma research. No special prerequisites, other than graduate standing, are necessary. However, a background in neuroanatomy and neurophysiology is highly recommended.

(c) Prerequisite(s) for course as changed: Permission of Instructor

5. **What has prompted this proposal?** There is no longer a need for the ANA 605 Principles of Neurobiology since the content of that course has been spread across several of the first year IBS courses. In contrast, the growth of the Spinal Cord & Brain Injury Research Center and an increasing number of Anatomy & Neurobiology and Physiology graduate students who are pursuing neurotrauma-directed thesis research and careers has resulted in a need for a course focused on the neurobiology of CNS injury and repair mechanisms.

6. **If there are to be significant changes in the content or teaching objectives of this course, indicate changes:** The course will be shifted from a focus on general neurobiological principles to the pathophysiology of neural injury and restorative processes including potential therapeutic strategies. (See attached Syllabus)

ANA 605: Neurobiology of CNS Injury and Repair (3 Credits)

Syllabus Class meetings: This course meets once per week for 3.0 hrs (Wednesday, 1:00-4:00pm) Location BBSRB 202A

Course Director: Office Telephone e-mail

Edward D. Hall, Ph.D. 383 BBSRB 323-4678 edhall@uky.edu

Course Co-Director:

Jinhui Chen, Ph.D., M.D. 369 BBSRB 323-5688 jchen@uky.edu

Other Faculty:	Office	Phone	Email
Kathryn E. Saatman, Ph.D.	BBSRB 367	323-5145	k.saatman@uky.edu
Patrick G. Sullivan, Ph.D.	BBSRB 375	323-4684	patsull@uky.edu
Alexander G. Rabchevsky, Ph.D.	BBSRB 371	323-0267	agrab@uky.edu
Jimmi Hatton-Kolpek, Pharm.D.	BBSRB 357	323-6127	Jhatt1@email.uky.edu
Jonathan Lifshitz, Ph.D.	BBSRB 377	323-0696	jlifshitz@uky.edu
George M. Smith, Ph.D.	BBSRB 373	323-3541	gmsmith@uky.edu
Stephanie Thompson, Ph.D.	Cubicle across from B367	323-1148	snott2@uky.edu
Franca Cambi, M.D.	L445 Kentucky Clinic	323-6702	franca.cambi@uky.edu
Patrick H. Kitzman, Ph.D.	Wethington 126G	323-1100 (x80580)	phkitz1@uky.edu

Faculty will give lectures, assign readings, and evaluate class discussions and grade midterm and final exam.

Objectives:

1 Introduce students to major concepts and issues of general importance with respect to the degenerative and reparative response of the brain and spinal cord to mechanical injury. 2 Provide students with a broad state of the art background in regards to the pathophysiology and therapeutic approaches for traumatic brain and spinal cord injury so that they will be able to interpret and evaluate research findings in the neurotrauma literature and integrate this information into their own laboratory research. 3 Enhance appreciation for basic and clinical efforts in neurotrauma research. 4 Develop understanding of the process of translation of basic neurotrauma research into clinical trials.

Course Description:

The course will consist of weekly didactic presentations and discussions (3 hrs with 10 min. breaks each hour) regarding assigned readings of relevance to the faculty presentation. Active participation by all class members is expected. Each weekly faculty presentation is designed to provide a general overview of the current state of knowledge in a given area of CNS Injury pathophysiology and therapeutic approaches. The course will provide a strong working background concerning the issues, techniques and frontiers of neurotrauma therapeutic discovery research aimed at reducing acute post-traumatic neurodegeneration in the injured brain or spinal cord or enabling regeneration and repair.

Prerequisites: Permission of Instructor.

Readings:

There is no textbook for this course. With the exception of the first class week, assigned readings will be handed out one week prior to class or will be accessible via Pubmed.

Course Expectations:

1 Attendance and participation in class discussions. Due to the nature of this course, there is no substitute for attendance and participation in class discussions. Students will be expected to compensate for both excused and unexcused absences in consultation with relevant faculty members. 2 Command of assigned readings. Because the course is designed to promote discussion of interdisciplinary research publications, students have a responsibility to the class as a whole to be prepared for discussion of assigned readings (1-3 papers) during class sessions. 3 There will be two take home essay exams (mid-term and final) of equal weight. The final will only include material covered after the mid-term exam. Exams will consist of short answer and brief essay questions.

Grades:

Grades will be determined as follows:

	<u>% of grade</u>
Class Attendance	10
Discussion Participation	10
Mid Term Exam	40
Final Exam	40
	100

Proposed Course Outline:

Week 1: Introduction to CNS Injury (Hall):

Epidemiology of CNS Injury: SCI, TBI, Shaken Baby Syndrome, Ischemia and Hemorrhage
Basic Concepts of Post-Traumatic Pathology and Pathophysiology

- i. Primary vs. secondary injury
- ii. Apoptosis and necrosis
- iii. Anterograde (Wallerian) vs. retrograde degeneration
- iv. Demyelination and its functional consequences
- v. Microvascular dysfunction

- vi. Reactive gliosis
- vii. Influence of secondary insults (e.g. shock, hypoxia, ischemia, hemorrhage)

Week 2: Overview of Traumatic CNS Injury Animals Models

TBI Models (**Saatman**)
Mild TBI Models (**Lifshitz**)
SCI Models (**Rabchevsky**)
Ischemic and hemorrhagic stroke models (**Hall**)

Week 3: Pathophysiology and Models of Stroke (Hall)

Focal Ischemia
Global Ischemia

Subdural, Subarachnoid and Intracerebral Hemorrhage

Week 4: Mechanisms of Secondary Neuronal Injury and Neuroprotective Strategies-Part 1

Excitotoxicity (**Hall**)

Reactive oxygen mechanisms (**Hall**)

Programmed cell death mechanisms (**Nottingham**)

Week 5: Mechanisms of Secondary Neuronal Injury and Neuroprotective Strategies-Part 2

Calcium-mediated injury mechanisms (**Saatman**)

Metabolic and mitochondrial dysfunction (**Sullivan**)

Week 6: Midterm Take Home Essay Exam (Due back on Week 7 class day)**Week 7:** Mechanisms of

Secondary Neuronal Injury and Neuroprotective Strategies-
Part 3 (**Hall**)

Inflammatory mechanisms

Intracellular signaling mechanisms

Influence of growth/trophic factors

Integration of secondary injury mechanisms

Week 8: History of and Lessons Learned from Neuroprotective Clinical Trials

SCI (**Hall**)

TBI (**Hatton**)

Pharmacological principles of neuroprotective therapy evaluation (**Hall**)

Week 9: Post-Traumatic Demyelination and Remyelination (**Cambi/Rabchevsky**)

Week 10: Mechanisms of Post-Traumatic Plasticity and Regeneration- Part 1 (**Smith**)

Week 11: Mechanisms of Post-Traumatic Plasticity and Regeneration- Part 2 (**Chen**)

Week 12: Mechanisms of Neurogenesis and Stem Cell /Progenitor Cell Transplantation Strategies (**Chen**)

Week 13: Neurological Sequelae of SCI

Neuropathic pain (**Smith**)

Autonomic dysfunction (**Rabchevsky**)

Spasticity (**Kitzman**)

Week 14: Final Take Home Essay Exam: covering material since midterm exam.