Course Change Request

Indiana University

Check Appropriate Boxes: Undergraduate credit [ ]
Graduate credit [X] Professional credit [ ]

1. School/Division: GRADUATE MEDICAL NEUROSCIENCE
2. Academic Subject Code: GRAD
3. Current Course Number: 6744
4. Current Credit Hours: 1
5. Current Title: NEUROPHARMACOLOGY OF SYNAPTIC TRANSMISSION
6. Effective Semester/Year for changes listed below: SPRING 2011
7. Instructor: NICOL

Type of Change Requested (Check appropriate boxes and indicate changes)

☐ 8. Change course number to: __________________________ (must be cleared with University Enrollment Services)
☐ 9. Current course title:
   Change to:
   Recommended abbreviation (optional)
   (Limited to 32 Characters including spaces)

☒ 10. Current credit hours fixed at: 1 or variable from: __________ to __________
    Change to credit hours fixed at: 2 or variable from: __________ to __________

☒ 11. Current lecture contact hours fixed at: 3/WK or variable from: __________ to __________
    Change to lecture contact hours fixed at: 6/WK or variable from: __________ to __________

☐ 12. Current non-lecture contact hours fixed at: __________ or variable from: __________ to __________
    Change to non-lecture contact hours fixed at: __________ or variable from: __________ to __________

☐ 13. Is this course currently graded with S-F (only) grades? Yes ______ No ______
    Change to S-F (only) grading? Yes ______ No ______

☐ 14. Does this course presently have variable title approval? Yes ______ No ______
    Is variable title approval being requested? Yes ______ No ______

☐ 15. Is this course being discontinued? For all campuses ______ or for this campus only ______

☐ 16. Current course description: SEE ATTACHED

Change course description to (not to exceed 50 words)

SEE ATTACHED

17. Justification for change

(Use additional paper if necessary)

18. Are the necessary reading materials currently available in the appropriate library? Yes ______ No ______

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of this course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: __________________________
Department Chairman/Division Director

Date 6/10/2010

Approved by: __________________________
Dean

Date 6/17/15

Dean of Graduate School (when required)

Date

Chancellor/Vice-President

Date

University Enrollment Services

Date

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.
G744: Neuropharmacology of Synaptic Transmission
(SPRING 2010)

Overview: This module is designed to introduce the student to the fundamental concepts involved in chemical neurotransmission in the central nervous system, from a neurochemical and neuropharmacological prospective. We will provide you with the essential materials to understand, and critically evaluate the current literature on chemical neurotransmission, and signaling in neurons. You will be exposed to information covering various methodologies used in neurochemical and neuropharmacologic studies of the nervous system, from receptor binding assays to signal transduction analyses. We will also have in depth discussions of many of the chemical neurotransmitter systems (dopamine, norepinephrine, serotonin, GABA, glutamate, peptides, etc.), and will discuss their metabolism, receptor interactions, and pharmacology.

Emphasis on the basics. We will attempt to make sure that basic neurochemical and neuropharmacologic principles are covered, with the understanding that not all aspects of all transmitter systems can receive comprehensive coverage.

Association between transmitter systems and receptors/signaling elements. We will provide information on specific chemical transmitters and their association with specific receptors and signaling cascades, but will also attempt cover and discuss these elements independent of each other. This will hopefully provide the student with a more complete picture of chemical neurotransmission, and the effects of drugs on this process.

Structure and Procedures of G744: During the first couple of weeks, this module will consist primarily of basic lectures and class discussion lead by faculty members along with reading material from textbooks and review articles. For the remainder of the course, the focus will switch to class discussion of an assigned original research article (bold type) with lectures to fill in gaps in knowledge.

Reading Assignments: Students should always read assigned material before coming to class. On the block schedule, required reading will be indicated by an asterisk (*). This includes original articles for discussion and textbook chapters. Supplemental optional articles (e.g. reviews) which may help your understanding of the material are indicated in italics. Textbook readings are mostly from Fundamental Neuroscience, From Neuron to Brain (4th ed), Neuroscience (3rd ed) and Psychopharmacology: Drugs, the Brain, and Behavior, 2004. Additional optional readings may also included.

Small Group Work: During the first week of class, the instructors will divide the class into small groups. If class size is limited, students may be asked to work independently. Each small group (or individual) will be required to lead the discussion of assigned original research papers.

Discussion participation: A major part of the class is the discussion of original papers. These papers were selected because they illustrate one or more key concepts. The instructors will introduce the key concepts in a lecture format, but a significant part of understanding the concepts is for the students to read, question, discuss, and understand the data that support the concepts. Discussion papers are in bold on the block schedule.
Each of the small groups (or individuals) will be required to lead the discussion of assigned discussion papers. Discussions should include the following elements:

- Background information. What key experiments and/or developments led up to the present paper?
- General overview. What's the big picture?
- Experimental details. What techniques were used? What are some of the strengths and weaknesses of the techniques employed?
- Results from individual figures. What data are shown? Are there any additional techniques that need to be described to understand the figure? What conclusions are drawn from the data? Do the data fully support the conclusions drawn? Are there any weaknesses in the data that lead you to question the validity of the conclusions? What additional experiments do the data suggest?

Small groups should meet before their class to decide:

3. How to cover the main points, and

4. Who will be responsible for leading the discussion of each figure.

ALL students (NOT just the small group presenting a paper) are responsible for reading the paper before class and participating in the discussions. Study questions, prepared by the participating faculty, will be included to help focus your effort on the key figures.

Examinations: Evaluation of student performance in this course will be accomplished by a single take-home exam composed of 3-5 questions requiring approximately 8 hours to complete in an open book environment. The score on this exam will constitute 85% of the final grade. The remaining 15% will be determined by subjective evaluation of class participation and presentation.

CHEATING AND PLAGIARISM

Students are instructed to make themselves aware of University regulations concerning plagiarism, the maintenance of academic honesty, and the definitions of unacceptable behavior and cheating. Academic misconduct of any sort will not be tolerated and will be dealt with as outlined in the Code of Student Conduct, which can be viewed at:

http://www.iupui.edu/code/

Examples of misconduct include but are not limited to:

1. Cheating
   - A student must not use or attempt to use unauthorized assistance, materials, information, or study aids in any academic exercise

2. Fabrication
   - A student must not falsify or invent any information or data in an academic exercise including, but not limited to, records or reports, laboratory results, and citations to the sources of information.

3. Plagiarism
   - A student must not adopt or reproduce ideas, words, or statements of another person without appropriate acknowledgment. A student must give credit to the originality of others and acknowledge an indebtedness whenever he or she does any of the following:
a. Quotes another person’s actual words, either oral or written  
b. Paraphrases another person’s words, either oral or written  
c. Uses another person's idea, opinion, or theory; or  
d. Borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

4. Interference
   a. A student must not steal, change, destroy, or impede another student's work.  
b. A student must not give or offer a bribe, promise favors, or make threats with the intention of affecting a grade or the evaluation of academic performance.

If a student has a question concerning any of these policies, he/she should direct them to their course instructor or to the IUSM Graduate Division.
<table>
<thead>
<tr>
<th>Session</th>
<th>Day</th>
<th>Date</th>
<th>Lecture / Discussion Topic</th>
<th>Reading (* Required)</th>
</tr>
</thead>
</table>
| 1       | M   | 2/15 | Receptor Theory and Practice  
Competitive binding I: one class of receptors (JS)  
Competitive binding II: multiple receptors and complex data (JS)  
Scatchard, Eadie-Hofstee, Hill, Schild plots (JS)  
Review table for saturation problem set – to be completed for next lecture (JS)                                                                                                                                                                                                                                                            | Receptor Handout pp.1-25  
Lecture material |
| 2       | F   | 2/19 | Binding data analyses from problem set (JS)                                                                                                                                                                                                                                                                                                      | *Have binding problem set completed and ready for discussion |
| 3       | M   | 2/22 | Lecture on Synaptic Transmission (GN)  
GN will discuss del Castillo and Katz  
| 4       | F   | 2/26 | Discuss DA receptor paper (RN) – GROUP I  
Psychopharm-Drugs, The Brain, and Behavior pp 95-97; 120-132  
| 5       | M   | 3/01 | Discuss 5HT receptor paper (RN) – GROUP II  
Psychopharm-Drugs, The Brain, and Behavior pp 151-160  
Psychopharm-Drugs, The Brain, and Behavior pp 70-71 & 90-95  
Zhang, X et al. PNAS 105: 2163-8. 2008 |
| 6       | F   | 3/05 | Discuss GABA R paper (GN) – GROUP III  
Psychopharm-Drugs, The Brain, and Behavior pp 176-182  
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<td>7</td>
<td>M</td>
<td>3/08</td>
<td>Discuss ionotropic glutamate receptor paper (GN) – GROUP I</td>
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<td>8</td>
<td>F</td>
<td>3/12</td>
<td>Discuss metabotropic glutamate receptor paper (GN) – GROUP II</td>
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<td>Lecture on cholinergic receptors (JS)</td>
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<td>9</td>
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<td>NO CLASS, Spring Break</td>
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<td>10</td>
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<td>3/19</td>
<td>NO CLASS, Spring Break</td>
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<td>11</td>
<td>M</td>
<td>3/22</td>
<td>Discuss cholinergic receptor paper (JS) – GROUP III</td>
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<td>Lecture on endocannabinoids (JS)</td>
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<td>12</td>
<td>F</td>
<td>3/26</td>
<td>Discuss cannabinoid receptor paper (JS) – GROUP I</td>
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<td>Take-home exam given out</td>
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<tr>
<td></td>
<td>M</td>
<td>3/29</td>
<td>Take-home exam due, 5 pm</td>
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</tbody>
</table>

Kew and Kemp, Psychopharm. 179: 4–29, 2005
Psychopharm-Drugs, The Brain, and Behavior pp 164-173
Kew and Kemp, Psychopharm. 179: 4–29, 2005
Psychopharm-Drugs, The Brain, and Behavior pp 74-75
mAChR Dragoa, et al., Cell. Mol. Life Sci. 60: 1267, 2003
Psychopharm-Drugs, The Brain, and Behavior pp 146-150
Rathouz et al., JBC 270:14366, 1995
Jonsson et al., Basic & Clin Pharm & Tox 98:124, 2006
Psychopharm-Drugs, The Brain, and Behavior pp 331-333
Horswill et al., Br. J. Pharmacol 152:805-814,
N615: Neuropharmacology of Synaptic Transmission  
(FALL 2006)

Overview: This module is designed to introduce the student to the fundamental concepts involved in chemical neurotransmission in the central nervous system, from a neurochemical and neuropharmacological prospective. We will provide you with the essential materials to understand, and critically evaluate the current literature on chemical neurotransmission, and signaling in neurons. You will be exposed to information covering various methodologies used in neurochemical and neuropharmacologic studies of the nervous system, from receptor binding assays to signal transduction analyses. We will also have in depth discussions of many of the chemical neurotransmitter systems (dopamine, norepinephrine, serotonin, GABA, glutamate, peptides, etc.), and will discuss their metabolism, receptor interactions, and pharmacology.

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Structure and Procedures of N615: During the first couple of weeks, this module will consist primarily of basic lectures and class discussion lead by faculty members along with reading material from textbooks and review articles. For the remainder of the course, the focus will switch to class discussion of an assigned original research article (bold type) with lectures to fill in gaps in knowledge.

Reading Assignments: Students should always read assigned material before coming to class. On the block schedule, required reading will be indicated by an asterisk (*). This includes original articles for discussion and textbook chapters. Supplemental optional articles (e.g. reviews) which may help your understanding of the material are indicated in italics. Textbook readings are mostly from Fundamental Neuroscience, From Neuron to Brain (4th ed), Neuroscience (3rd ed) and Psychopharmacology: Drugs, the Brain, and Behavior, 2004. Additional optional readings may also included.

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<tbody>
<tr>
<td>1</td>
<td>W</td>
<td>9/27</td>
<td>Receptor Theory and Practice</td>
<td>Receptor Handout pp.1-13</td>
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<tr>
<td>2</td>
<td>F</td>
<td>9/29</td>
<td>Competitive binding I: one class of receptors (JS)</td>
<td>Receptor Handout pp 14-25</td>
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<td>Competitive binding II: multiple receptors and complex data (JS)</td>
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<td>Review table for saturation problem set – to be completed for next lecture (JS)</td>
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<tr>
<td>3</td>
<td>M</td>
<td>10/2</td>
<td>Binding data analyses from problem set (JS)</td>
<td>*Have binding problem set completed and ready for discussion</td>
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<td>Lecture on G-proteins (JS)</td>
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<td>$G_i$, $G_o$, $G_{alpha}$, beta gamma subunits (JS)</td>
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<td>Lecture on 2nd messengers (JS)</td>
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<td>5</td>
<td>F</td>
<td>10/6</td>
<td>Discuss 2nd messenger paper (TS)</td>
<td>*Roozendaal et al, European Journal of Neuroscience, 15: 553-560, 2002</td>
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<td>M</td>
<td>10/9</td>
<td>Discuss 2nd messenger paper (JS/TS)</td>
<td>Psychopharm-Drugs, The Brain, and Behavior pp 75-77</td>
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<td>Lecture on DA receptors (RT)</td>
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<td>Lecture on 5HT receptors (RT)</td>
<td>Psychopharm-Drugs, The Brain, and Behavior pp 95-97; 120-132</td>
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<td>7</td>
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<td>10/13</td>
<td>Discuss 5HT receptor paper (EE/RT)</td>
<td>Barnes and Sharp, Neupharm, 38:1083–1152, 1999</td>
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<td>Psychopharm-Drugs, The Brain, and Behavior pp 151-169</td>
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<td>*Kristiansen et al, Synapse 58:249-257, 2005</td>
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| 10/20 | F   | Discuss autoreceptor paper (RT/EE)  
Lecture on GABA receptors (TS) |
|       |     | *Psychopharm-Drugs, The Brain, and Behavior pp 70-71 & 90-95*  
Vallone et al from 10-11 class & Barnes and Sharp from 10-13 class (sections pertinent to autoreceptors)  
*Adell et al, J. Neurochem. 79:172-182, 2001* |
| 10/23 | M   | Discuss GABA receptor paper (TS/EE)  
Lecture on ionotropic glutamate receptors (EE) |
|       |     | *Psychopharm-Drugs, The Brain, and Behavior pp 176-182*  
*Ouardouz and Sastry, Neurosci Letters 393:147-149, 2006* |
| 10/25 | W   | Discuss ionotropic glutamate receptor paper (EE/TS)  
Lecture on metabotropic glutamate receptors (TS) |
|       |     | *Kew and Kemp, Psychopharm. 179: 4-29, 2005  
Psychopharm-Drugs, The Brain, and Behavior pp 164-173  
*Sanders et al, JPET 314:1068-1078, 2005* |
| 10/27 | F   | Discuss metabotropic glutamate receptor paper (TS/EE)  
Lecture on cholinergic receptors (JS) |
|       |     | *Psychopharm-Drugs, The Brain, and Behavior pp 74-75  
Chaki et al, Neurosci Letters 404: 182-186, 2006* |
| 10/30 | M   | Discuss cholinergic receptor paper (JS/RT)  
Lecture on neuropeptides (TS) |
|       |     | *Psychopharm-Drugs, The Brain, and Behavior pp 146-150  
| 11/1  | W   | Discuss peptide paper (TS/RT)  
Lecture on cannabinoid receptors (JS) |
|       |     | *Guan et al, Cell 111:483-493, 2002  
www.nature.com/reviews/neuro* |
| 11/3  | F   | Discuss cannabinoid receptor paper (JS/RT)  
*Take-home exam handed out* |
|       |     | *Psychopharm-Drugs, The Brain, and Behavior pp 331-333  
| 11/6  | M   | *Take-home exam due, 5 pm* |