NEUS 501 Foundations of Neuroscience I

Course to be held in SEL 4273 from 11.30 to 12.30 Monday Wednesday and Friday.

Course Director: Dr Simon Alford, Office: 4285 SEL

Instructors:

Dr. Simon Alford sta@uic.edu
Dr. David Wirtshafter davew@uic.edu
Dr. Scott Brady stbrady@uic.edu
Dr. Liang-Wei Gong lwgong@uic.edu
Dr. Don Murphy dmurphy@uic.edu
Dr. Mark Rasenick raz@uic.edu
Dr. Janet Richmond jer@uic.edu
Dr. David Featherstone def@uic.edu

Goals and Objectives: To present students with a foundational background in the biophysical, cellular and molecular mechanisms by which the nervous system functions and develops.

Suggested Text (exams will be based on material presented in class):

Principles of Neural Science, Kandel Schwartz and Jessell

Attendance: Attendance is expected at all scheduled lectures; each exam will be based on material discussed in class. Attendance is required at all scheduled exams, except in cases of illness, mandatory religious obligations or official University activities.

Supplementary materials: Will be put on the NEUS501 Website (http://alford.bios.uic.edu)

Examinations: There will be two set exams. Each exam will be based on material discussed in class and include only material presented before that exam. Plagiarism and cheating are not tolerated. The final exam will be cumulative. All exams will be at the current lecture classroom. To be excused from attending an exam an official medical certificate or an affidavit is required. No makeup exams will be given. Official conflicts on final exams should be communicated to Dr Alford at least 10 days in advance.

Course work will be presented from time to time as the lecturers see fit.

Grading: Each student's final grade will be computed from total points obtained from the exams (approx 35% and 55% respectively, the remainder is tentatively set aside for take home material at the discretion of Dr Alford). Exams will include multiple choice questions and other formats including short-essay questions. Students need to properly register for a class in order to earn academic credit. Retroactive enrollments will not be processed.
### Class Schedule

**A) Organization of the nervous system**
1. Introduction to the nervous system *(Wirtshafter)* 08/27  
2. Fine structure – Neurohistology *(Wirtshafter)* 08/29  
3. Cells and signaling *(Alford)* 08/31  

Labor Day September 3

**B) Cells and synaptic function**
4. Membrane potentials *(Alford)* 09/05  
5. Action potentials *(Alford)* 09/07  
6. Action potentials contd. *(Alford)* 09/10

**C) Synapses**
7. Synaptic signaling *(Richmond)* 09/12  
8. The presynaptic terminal – fast synaptic transmission *(Richmond)* 09/14  
9. The presynaptic terminal – fast synaptic transmission *(Richmond)* 09/17  
10. The postsynaptic terminal – fast synaptic transmission *(Richmond)* 09/19  
11. Neuroendocrine cells-vesicle cycling *(Gong)* 09/21  
12. Neuroendocrine cells-vesicle cycling *(Gong)* 09/24  
13. Ligand gated ion channels (excitation) *(Alford)* 09/26

**D) Ligand gated channels and receptors**
14. Ligand gated ion channels (inhibition) *(Alford)* 09/28  
15. Ligand gated ion channels (integrative properties) *(Alford)* 10/01  
16. Discussion and Review *(Alford)* 10/03  
17. Biogenic amines, neuropeptides, synthesis packaging *(Alford)* 10/05  
18. Neuromodulation and modulators *(Alford)* 10/08

Pre exam summary 10/10  
Exam 1 10/12

**Society for Neuroscience**

**E) Signal transduction**
19. Neurotrophic factors, Tyrosine kinases, cadherins etc *(Rasenick)* 10/19  
20. Heterotrimeric G proteins *(Rasenick)* 10/22  
21. Integration of synaptic structure with the cytoskeleton *(Rasenick)* 10/24

22. Axon and dendritic protein transport *(Brady)* 10/26  
23. Axon vs dendritic targeting *(Brady)* 10/29  
24. Discussion and Review *(Alford)* 10/31

**D) Neurodevelopment**
25. Neuroembryology *(Featherstone)* 11/02  
26. Neuroembryology (cont.) *(Featherstone)* 10/05  
27. Cell identity: specification of distinct fates *(Featherstone)* 10/07  
28. Cell identity: contd *(Murphy)* 10/09  
29. Axonal pathfinding *(Murphy)* 11/12
30. Axonal pathfinding: contd (Murphy) 11/14
31. Synapse formation and stabilization (Alford) 11/16
32. Discussion and Review) (Alford) 11/19

33. Discussion and Review
thanksgiving 11/21

E) Plasticity and Integration
34. Synaptic Integration (Alford) 11/26
35. Plasticity and integration (Alford) 11/28
36. Synaptic plasticity (Alford) 11/30

37. Mood and Modulation (Murphy) 12/03

38. Modulators and Disorders of Mind (Murphy) 12/05
39. Discussion (Alford) 12/07

Final Exam 12/12ish