**Neuroscience Today – NCB 333 - Syllabus – Spring Q. 2008** **M.D. Goldfinger, Ph.D., Department. Neuroscience, Cell Biology, & Physiology**

Classes: M, W, F: 4:10 – 5 PM Rm. 202 M&M Bldg.; ***Help***: 065 Med.Sci.; 775-4180; 253-5704; mel.goldfinger@wright.edu * Ref. Text: *Introductory Neurophysiology*

| Date (2008) | Topic | Sub-topics | Reference Readings (pages) * |
|---|---|---|---|
| Mon 31 Mar | Introduction & student info.; Dualism | Syllabus review; the Mind-Brain Problem | |
| Wed 1 Apr | JP has a stroke – the brain during cerebral stroke | Macro events | 6-20 – 6-25 |
| Fri 4 Apr | What went wrong for JP - A closer look | Micro events | Appendix 12 |
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| Mon 7 Apr | Neuronal substrates ; neuronal geography | Brain tour; membrane proteins | Appendix 7 |
| Wed 9 Apr | The action potential – impulse, spike | Conductance, current, voltage, capacitance | 1-38 |
| Fri 11 Apr | Impulse propagation; Take-home Exam I | Info coding in space-time | 1-47 – 1-52 |
| | | | |
| Mon 14 Apr | How do we move? + Exam I due | motor unit; motor cortex | 4-1 – 4-5; 6-12 – 6-17 |
| Wed 16 Apr | Who does what to Alpha motoneurons? | Reflexes; muscle mechanoreceptors | 4-6 – 4-13 |
| Fri 18 Apr | Movement as behavior | Sensorimotor integration, escape reaction | 4-13 – 4-18 |
| | | | |
| Mon 21 Apr | Motor control | Gamma MNs; extrapyramidal circuits | 5-1 – 5-5 |
| Wed 23 Apr | Motor dysfunction | Decerebrate rigidity as disease model | 5-5 – 5-9 |
| Fri 25 Apr | Review | Student questions | |
| | | | |
| Mon 28 Apr | Exam II | In class, written | |
| Wed 30 Apr | Intro. to sensory systems | Shared features, design strategies | Chap. 8 |
| Fri 2 May | Skin & Muscle senses | Receptive fields, differential bandwidth | Chap. 9 |
| | | | |
| Mon 5 May | Pain & Itch | PNS & CNS aspects; scratch reflex | Chap. 10 |
| Wed 7 May | Vision – eye level | Dioptrics; retinal processing; color | Chap. 11 |
| Fri 9 May | Vision – CNS level | Brain-derived acuity; processing circuitry | Chap. 12 |
| | | | |
| Mon 12 May | Audition | Peripheral & central mechanisms | Chap. 13 |
| Wed 14 May | Vestibular & chemical senses | Vestibulospinal reflexes; genomic diversity | Chap. 14 |
| Fri 16 May | Review; Take-home Exam III | Student questions | |
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| Mon 19 May | Intercellular communications; Exam III due | Synapses, ligands, receptors, gap junctions | 3-20 – 3-36; 3-50 – 3-51 |
| Wed 21 May | Chemical synaptic mechanisms | Receptor-level phenomena; pharmacology | 3-2 - 3-9; |
| Fri 23 May | Synaptic plasticity | Quanta; frequency bias; learning/memory | 3-44 – 3-50 |
| | | | |
| Mon 26 May | Memorial Day – no class | | |
| Wed 28 May | Drugs & the brain | Anesthetics; neurotoxins; drugs | 3-2 – 3-9 |
| Fri 30 May | CNS evolution & development | Ontogeny recapitulates phylogeny | 15-9 – 15-20 |
| | | | |
| Mon 2 Jun | CNS responses to injury | Release & remodeling phenomena | 15-2 – 15-8; 15-20 – 15-29 |
| Wed 4 Jun | Neuroscience *Tomorrow* | "Where to, what next?..." (R. Frost) | ?? |
| Fri 6 Jun | Review + student evaluation | Student questions | |
| | | | |
| Week of 9 June | Cumulative Final Exam – date tba | | |

- Required out-of-class activities:
  1 Written report: interview/profile a WSU neuroscientist
  2 Written term paper on a neuroscience topic
  3 practice questions

**II. Grading Policy:** Grades are determined by points earned on the three sectional exams, the cumulative final exam, and the required out-of-class activities. Instructor discretion points award improvement &/or consistent high achievement. Multiple-choice tests will NOT be used.

| Activity | Points | Total points earned | Grade |
|---|---|---|---|
| Exam 1 | 20. | 100-90 | A |
| Exam 2 | 20 | 89-80 | B |
| Exam 3 | 20 | 79-70 | C |
| Fin.Ex. | 20 | 69-60 | D |
| report | 5 | 59-0 | F |
| term paper | 5 | | |
| practice q.s | 5 | | |
| Instr. discr. | 5 | | |
| Total pts. | 100 | | |

**III. Text & other learning aids:** Text: *Introductory Neurophysiology* ( by M.D. Goldfinger); in-class handouts; student research projects (term paper on a neuroscience topic; report on the work of a WSU neuroscientist).

**IV. Course Objectives:** The student will learn current concepts of brain function from an eclectic interdisciplinary perspective.
Emphasis is on problem-solving through experimental and theoretical analyses. Additional insight will be provided by examples from clinical neuroscience (*viz.* neurology; neurosurgery; psychiatry). A further goal is to demonstrate how physics, biology, mathematics, psychology, chemistry, and electrical engineering contribute to defining and elucidating the subject. The presentations will also show how basic science and clinical research shape current understanding and provide a path towards answering what is not known to date.