Clinical Neuroscience, 2007

Meeting Hours for entire semester:

Monday – Friday 1:00-2:20 PM

Room 1200, COM

August 27	August 28	August 29	August 30	August 31
Course introduction, Neurocytology: role of intracellular organelles; role of organelles specific to neurons; structure and function of neurons and glial cells, blood brain barrier Ouimet	**Gross anatomy Orientation and brain development:** three-dimensional structure of the brain and relationships between major brain components in brains sectioned in various planes Ouimet	**spinal cord 1:** structure of and intrinsic connections within the spinal cord; spinal cord nuclei; dorsal root ganglia; dorsal and ventral roots; reflex arcs; ANS Ouimet	**spinal cord 2:** long tracts in the spinal cord with emphasis on the corticospinal tract, the anterolateral system, and the dorsal columns Ouimet	Spinal cord 3: spinal cord clinical correlations Maitland

Sept. 3 Holiday	4 **Resting Potentials** Ions Membranes Proteins Diffusion and Electricity Ohm's Law Equilibrium Potentials Nernst Equation Goldman Equation Potassium Channels Clinical Implications Trombley	5 **Action Potentials** Generation Membrane conductance Voltage-Gated Channel structure and function AP Conduction and Velocity Clinical Implications Trombley	6 **Passive Membrane Properties-Synaptic Integration** Ligand gated ion channels EPSPs IPSPs Cable Properties Length Constant Time Constant Spatial and Temporal Summation Trombley	7 **Medulla:** structure of medulla, cranial nerves number 9, 10, 11 and 12; nuclei of the medulla, long tracts through the medulla Ouimet
Sept. 10 **Pons:** structure of the pons, cranial nerves number 5, 6, 7 and 8; nuclei of the pons, long tracts through the pons Ouimet	11 **Midbrain:** structure of the midbrain, cranial nerves number 3 and 4; nuclei of the midbrain, long tracts through the midbrain Ouimet	12 **The cerebellum:** Cerebellar structure and function, deep cerebellar nuclei, red nucleus, cerebellar peduncles Ouimet	13 **synaptic transmission and receptors I :** synaptic trans-mission, synaptic potentials,neural integration, acetyl-choline, nicotinic receptors, neuron-muscular junctions, myasthenia gravis, neurotoxins Olcese	14 Lab 1. **brainstem and cerebellum:** the cranial nerves, the structure of the brainstem, the cerebellum Ouimet/ /Maitland
Sept. 17 **synaptic transmission and receptors II :** glutamate, glycine, ionotropic and metabotropic receptors, GABA Olcese	18 **synaptic transmission and receptors III:** survey of other neurotransmitters (e.g. dopamine, norepinephrine, epinephrine, neuron-peptides) and their receptors Olcese	19 **Nerve and muscle: neuromuscular** junction, motor-neuron units, nerve muscle interactions, reflexes Meredith	20 **Review and problem solving** Ouimet	21 **Exam 1**
Sept 24 **Nerve and muscle:** Part II **Meredith**	**25** **basal ganglia:** caudate, putamen, globus pallidus, substantia nigra, nucleus subthalamicus,Parkinson's, Huntington's, hemiballismus Ouimet	26 **TBL 1** Maitland and Team	27 **somatosensory system:** sensory systems in skin, muscles, tendons Meredith	28 **Lab 2.** **Basal ganglia** caudate, putamen.globus pallidus, nigra Ouimet/ /Maitland
Oct. 1 **reticular formation:** nuclei of the reticular formation in the midbrain pons, and medulla; functions and connections Ouimet	2 **limbic system:** the emotional brain including amygdala, hippocampus, septum, n. accumbens, Papez circuit and hypothalamus Ouimet	**3** Central Somatosensory System; Peripheral Auditory System Meredith	4 Clinical aspects of motor function Maitland	5 Lab 3. limbic system Ouimet/ /Maitland

Oct. 8 Central Auditory System; Vestibular System; Vision - Photoreceptors Meredith	9 Central Visual System: Retina to Perception Meredith	10 Chemical Senses: Taste and Smell. Meredith	11 **Thalamus:** structure of the thalamus and function of the major nuclei; connection of the major nuclei with cortical and subcortical targets Ouimet	12 Lab 4. White matter: major tracts through brain Ouimet/ Maitland
Oct. 15 **Cortex I:** fundamentals of cortical structure and relationship to thalamus; prefrontal motor and parietal cortex structure and function Ouimet	16 **Cortex 2:** structure and function of temporal and occipital cortex Ouimet	17 TBL 2 Maitland and Ouimet	18 review and problem solving Ouimet	19 **Exam 2**
Oct. 22 **Hypothalamus and Homeostasis:** regulation of feeding, drinking, body temp, hormone release etc. Houpt	23 **Stress and the HPA:** the function of the hypothalamic-pituitary-adrenal axis; biology of chronic and acute stress Houpt	24 TBL 3 Maitland and Ouimet	25 **Depression:** biogenic amines and their pharmacology at the synapse; uptake blockers, MAOI's etc. Houpt	26 **Drugs of abuse:** biological basis of drug abuse; cocaine, amphetamine, nicotine, alcohol etc. Kabbaj
Oct. 29 Persistent vegetative state and neuroethics Spike and Maitland	30 **Plasticity, repair and regeneration**: ability of the brain to change in response to insult Houpt	Oct. 31 TBL 4 Maitland and Ouimet	Nov. 1 **Vasculature and Meninges:** blood supply to the brain and spinal cord; thinking in terms of vascular fields; epidural, subdural and subarachnoid bleeds Ouimet	2 Lab 5. Thalamus, cerebral cortex and vasculature Ouimet/ Maitland

Nov. 5 **Sleep:** circadian structure & control of sleep; sleep homeostasis; adenosine; melatonin; EEG; disorders of sleep (esp. apnea and narcolepsy) Olcese	6 **Learning and memory:** biological basis of synaptic modification Houpt	7 TBL 5 Maitland and Ouimet	8 Pain: Pathways involved in sensing pain and their modulation Berkeley	9 **Aging; brain death;** normal aging, neurodegenerative disorders such as Alzheimer's disease; biological and ethical considerations of brain death. Ouimet/Brummel-Smith
Nov. 12 holiday	133 **Schizophrenia;** dopamine theory of schizophrenia; relationship to limbic system; Ouimet	14 TBL 6 Maitland and Ouimet	15 review and problem solving Ouimet	16 Exam 3
Nov. 19 **Epilepsy:** etiology and clinical manifestations of epilepsy Maitland	20 **primer on neuropharmacology:** drug action at synapses and axons Patrick	21 TBL 7 Maitland and Ouimet.	22 Thanksgiving	23 Thanksgiving
Nov. 26 **Review of peripheral nerves and brachial plexus** **Maitland**	27 Aphasias LaPointe	28 Clinical presentations of demyelinating diseases Maitland	29 coma Maitland	30 review and problem solving Ouimet

December 3	4	5	6 final exam	7 Shelf exam