

**SYLLABUS**  
**PSYCHOBIOLOGY**  
**PSYC3458**  
**SPRING SEMESTER 2011**

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INSTRUCTOR: DR. LESLEY RICCI

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Office hours Monday 12-2 pm

HOURS: M.W. 2:50 PM- 4:30 PM

TEXT: COURSE NOTES AVAILABLE ON LINE

**Recommended:**

*FOUNDATIONS OF PHYSIOLOGICAL PSYCHOLOGY* (7<sup>TH</sup> ED.) CARLSON

COURSE DESCRIPTION: This course details and explains the physiological mechanisms underlying psychological function both normal and abnormal. Also, this course describes brain mechanisms used by the main medical therapies for abnormal behavior, pharmaceuticals. Lastly we will examine possible biological underpinnings for mental illness.

COURSE OUTCOMES: After successful completion of this course students will be able to think critically about the physiology of psychology. In addition, students will gain an understanding of pharmacological and medical interventions dealing with psychological and neurological illnesses.

METHODOLOGY: The course will consist of in-class lectures, audio-visual media, class participation in the form of in-class discussion.

RULES AND REQUIREMENTS: You are responsible for all the material covered in the class notes for each block in addition to lecture material (3 sections 3-4 Blocks each), for your exams. Your grade will consist of (3) in-class exams. Each exam is worth 33% of your grade (**THERE ARE NO MAKE UP EXAMS**).

**TOPICAL OUTLINE**  
**SPRING SEMESTER 2011**

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**BLOCK 1. The Cellular Basis of Behavior.**

- ❑ Neuron Doctrine Versus Reticular Theory.
- ❑ The Plasma Membrane.
- ❑ Genetics in a Nutshell.
- ❑ Some Proteins Important to Cell Function.
- ❑ The Active Neuron.

**BLOCK 2. Communication Among Neurons: The Membrane Potential.**

- ❑ The Basics of Chemistry.
- ❑ A Semi-Permeable Membrane.
- ❑ The Nernst Equation and the Goldman Equation.
- ❑ Measuring the Membrane Potential.
- ❑ Three Forces and Three Gates.

**BLOCK 3. Communicating Among Neurons: The Action Potential.**

- ❑ The Electrically Excitable Domain.
- ❑ The Action Potential Explained.
- ❑ Functions of the Sodium Channel.
- ❑ Functions of the Potassium Channel. Heterogeneity and Homology.
- ❑ Discovering Channel Structure.
- ❑ Special Channels for Calcium.

**BLOCK 4. Communicating Among Neurons: The Synaptic Potential.**

- ❑ The Chemically Excitable Domain.
- ❑ Summation and Integration.
- ❑ Special Channels for Calcium.
- ❑ Receptor Theory.
- ❑ The Importance of Poisons and Toxins.
- ❑ Acetylcholine.
- ❑ Gamma-Amino Butyric Acid (GABA) - How GABA Blocks the Action Potential.  
Glutamate,
- ❑ Aspartate, and Glycine. Catecholamines, Indolamines, and Histamine.
- ❑ Parkinson's Disease and Homeostasis.
- ❑ Peptide Synthesis - The Concept of Neuromodulation.
- ❑ Criteria for Transmitter Identification.

**EXAM 1**

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## **BLOCK 5. The Spinal Cord and Brain**

- ❑ A Functional Segregation.
- ❑ Sensory Pathways.
- ❑ Motor Pathways.
- ❑ Diseases of the
- ❑ Upper and Lower Motor Neuron.
- ❑ Integrative Circuits in the Cord.
- ❑ Orientation and Gross Subdivisions of Brain.
- ❑ Brainstem Projections to the Forebrain.
- ❑ Basal Ganglia.
- ❑ Limbic System.
- ❑ Hypothalamus, Pituitary and Thalamus.
- ❑ Neocortex.
- ❑ Ventricles. Meninges and the Blood Brain Barrier.

## **BLOCK 6. Sensory/Motor Systems.**

- ❑ Somatosensory Systems.
- ❑ Homunculi.
- ❑ Auditory System.
- ❑ Olfaction and Gustation.
- ❑ Vision.
- ❑ The Frontal and Parietal Lobes.
- ❑ The Basal Ganglia.
- ❑ The Cerebellum.
- ❑ The Importance of Inhibition.

## **BLOCK 7. Pleasure and Pain.**

- ❑ The Problem of Definitions.
- ❑ Is There a “Pleasure Circuit” in the Brain?
- ❑ Motivation and “Drive”.
- ❑ Ascending Nociceptor Systems.
- ❑ Descending Analgesia Systems.
- ❑ The Mechanism of Opioid Peptide Action.
- ❑ Chronic Pain and Stimulation - Produced Analgesia
- ❑ Placebo and Opioid Peptides.

## **EXAM 2**

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## **BLOCK 8. Hormones, Sex, and Reproduction.**

- ❑ Hormones and “the Master Gland”.
- ❑ The Determination of Gender.
- ❑ Mammals are Basically Female, with Male Characteristics Added
- ❑ Conception, Pregnancy, and Birth. Pheromones. Neural Circuits for Mating and Reproduction.

## **BLOCK 9. Psychopharmacology.**

- ❑ Agonists and Antagonists.
- ❑ Pharmacokinetics.
- ❑ Addiction, Tolerance, and Withdrawal.
- ❑ Central Nervous System Depressants.
- ❑ The GABA Receptor Complex.
- ❑ Central Nervous System Stimulants.
- ❑ The Problem of Specificity.
- ❑ Hallucinogens.
- ❑ Opiates.

## **BLOCK 10. The Biology of Mental Illness.**

- ❑ Taxonomy of Mental Illness: The DSM IV.
- ❑ Schizophrenia.
- ❑ Affective Disorders.
- ❑ John Cade and the Discovery of Lithium.
- ❑ Ugo Cerletti and Electroconvulsive Shock.
- ❑ Anxiety Disorders.
- ❑ The Hazards of Medication

**EXAM 3 – DURING FINALS WEEK**