Course Title: Human Physiology
Course Number: Psyc 5334 - 001
Course Location and Time: Wedn 4:00 – 6:50 pm at LS 424

Instructor: Dr. Yuan Bo Peng
Office: LS 503
Office Hours: W 1:00 - 2:00, or by appointment
Phone: 817/272-5222
Mailbox: 19528
Email: ypeng@uta.edu
Instructor web site: http://www.uta.edu/psychology/faculty/peng/peng.htm
Course web site: For lecture notes and announcement, please go to Blackboard
Course Prerequisites: None
Required Textbook(s) and Materials: Textbook of Medical Physiology (12th Ed) by Arthur C. Guyton and John E. Hall

Course Description: This course will provide a comprehensive review of the human physiology that is categorized in 15 sections and 84 Chapters (see Contents in Appendix). We will not be able to cover all of them. Some of them will be covered by different courses, such as Neuroscience, Immunology and Endocrinology (see sections that are highlighted in gray).

Course Learning Goals/Objectives: Students are expected to learn how the human body works and what the underlying mechanisms that control the physiological responses are. In case of damage to these systems, what will happen to the body as a whole and the impact on behaviors? Topics (tentative) will include:

UNIT I: Introduction to Physiology: The Cell and General Physiology
UNIT II: Membrane Physiology, Nerve, and Muscle
UNIT III: The Heart
UNIT IV: The Circulation
UNIT V: The Body Fluids and Kidneys
UNIT VI: Blood Cells, Immunity, and Blood Clotting
UNIT VII: Respiration
UNIT XII: Gastrointestinal Physiology
UNIT XIII: Metabolism and Temperature Regulation

Attendance and Drop Policy: No mandatory attendance. If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office. You may not continue to attend class until your Enrollment Lien has been applied to outstanding tuition fees.

Tentative Exam Schedule:

Exam 1, Wednesday, 2/13/2019, 4:00 – 6:50 pm
Exam 2, Wednesday, 3/27/2019, 4:00 – 6:50 pm
Exam 3 (Final exam), 5/8/2019, 4:00 – 6:50 pm

Specific Course Requirements: This is an intensive course. Students are expected to know a lot of detailed information. Be sure to read textbook before attending lectures.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week.

Examinations: There will be ***THREE exams***. The final exam will **NOT** be comprehensive. The format for exams will be a combination of multiple questions and assay questions. You are required to take all two exams. If you miss an exam, a

grade of zero will be given. There is no provision for taking a make-up exam in this course unless documentation for a University-approved excuse (see Catalog) is received within one week of the exam date.

Grade Calculation: The three exams will contribute 90%, and classroom participation will contribute 10% to the calculation of the final grade. The letter grade will be assigned where A $\geq$ 90%, B $\geq$ 80%, C $\geq$ 70%, D $\geq$ 60%, F < 60%.

Americans With Disabilities Act (ADA): The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference to Public Law 93112 – The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act – (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

If you are a student who requires accommodations in compliance with the ADA, please consult with me at the beginning of the semester. As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Your responsibility is to inform me of the disability at the beginning of the semester and provide me with documentation authorizing the specific accommodation. Student services at UTA include the Office for Students with Disabilities (located in the lower level of the University Center) which is responsible for verifying and implementing accommodations to ensure equal opportunity in all programs and activities.

Student Support Services: The University supports a variety of student success programs to help you connect with the University and achieve academic success. They include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

Academic Honesty: Academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form at The University of Texas at Arlington. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. See procedures at http://www.uta.edu/studentaffairs/judicialaffairs/

> "Academic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2., Subdivision 3.22).

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Bomb Threats: If anyone is tempted to call in a bomb threat, be aware that UTA will attempt to trace the phone call and prosecute all responsible parties. Every effort will be made to avoid cancellation of presentations/tests caused by bomb threats. Unannounced alternate sites will be available for these classes. Your instructor will make you aware of alternate class sites in the event that your classroom is not available.

***Library Information:** Andy Herzog is the Psychology Librarian: Central Library, RM. 313; Tel: 817-272-7517; email at amherzog@uta.edu. You will find useful research information for psychology at http://www.uta.edu/library.

Contents (Grayed sections will most unlikely to be covered)

UNIT I: Introduction to Physiology: The Cell and General Physiology
CHAPTER 1: Functional Organization of the Human Body, and Control of the "Internal Environment" Cells as the Living Units of the Body
CHAPTER 2: The Cell and Its Functions
CHAPTER 3: Genetic Control of Protein Synthesis, Cell Function, and Cell Reproduction

UNIT II: Membrane Physiology, Nerve, and Muscle
CHAPTER 4: Transport of Substances Through the Cell Membrane

CHAPTER 5: Membrane Potentials and Action Potentials
CHAPTER 6: Contraction of Skeletal Muscle
CHAPTER 7: Excitation of Skeletal Muscle: A. Neuromuscular Transmission and B. Excitation-Contraction Coupling
CHAPTER 8: Contraction and Excitation of Smooth Muscle

UNIT III: The Heart
CHAPTER 9: Heart Muscle; The Heart as a Pump and Function of the Heart Valves
CHAPTER 10: Rhythmical Excitation of the Heart
CHAPTER 11: The Normal Electrocardiogram
CHAPTER 12: Electrocardiographic Interpretation of Cardiac Muscle and Coronary Blood Flow Abnormalities: Vectorial Analysis
CHAPTER 13: Cardiac Arrhythmias and Their Electrocardiographic Interpretation

UNIT IV: The Circulation
CHAPTER 14: Overview of the Circulation; Medical Physics of Pressure, Flow, and Resistance
CHAPTER 15: Vascular Distensibility, and Functions of the Arterial and Venous Systems
CHAPTER 16: The Microcirculation and the Lymphatic System: Capillary Fluid Exchange, Interstitial Fluid, and Lymph Flow
CHAPTER 17: Local Control of Blood Flow by the Tissues; and Humoral Regulation
CHAPTER 18: Nervous Regulation of the Circulation, and Rapid Control of Arterial Pressure
CHAPTER 19: Dominant Role of the Kidney in Long-Term Regulation of Arterial Pressure and in Hypertension: The Integrated System for Pressure Control
CHAPTER 20: Cardiac Output, Venous Return, and Their Regulation
CHAPTER 21: Muscle Blood Flow and Cardiac Output During Exercise; the Coronary Circulation and Ischemic Heart Disease
CHAPTER 22: Cardiac Failure
CHAPTER 23: Heart Valves and Heart Sounds; Dynamics of Valvular and Congenital Heart Defects
CHAPTER 24: Circulatory Shock and Physiology of its Treatment

UNIT V: The Body Fluids and Kidneys
CHAPTER 25: The Body Fluid Compartments: Extracellular and Intracellular Fluids; Interstitial Fluid and Edema
CHAPTER 26: Urine Formation by the Kidneys: I. Glomerular Filtration, Renal Blood Flow, and Their Control
CHAPTER 27: Urine Formation by the Kidneys: II. Tubular Processing of the Glomerular Filtrate
CHAPTER 28: Regulation of Extracellular Fluid Osmolarity and Sodium Concentration
CHAPTER 29: Renal Regulation of Potassium, Calcium, Phosphate, and Magnesium; Integration of Renal Mechanisms for Control of Blood Volume and Extracellular Fluid Volume
CHAPTER 30: Regulation of Acid-Base Balance
CHAPTER 31: Kidney Diseases and Diuretics

UNIT VI: Blood Cells, Immunity, and Blood Clotting

CHAPTER 32: Red Blood Cells, Anemia, and Polycythemia
CHAPTER 33: Resistance of the Body to Infection: I. Leukocytes, Granulocytes, the Monocyte-Macrophage System, and Inflammation
CHAPTER 34: Resistance of the Body to Infection: II. Immunity and Allergy
CHAPTER 35: Blood Groups; Transfusion; Tissue and Organ Transplantation
CHAPTER 36: Hemostasis and Blood Coagulation

UNIT VII: Respiration
CHAPTER 37: Pulmonary Ventilation
CHAPTER 38: Pulmonary Circulation; Pulmonary Edema; Pleural Fluid
CHAPTER 39: Physical Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane
CHAPTER 40: Transport of Oxygen and Carbon Dioxide in the Blood and Body Fluids
CHAPTER 41: Regulation of Respiration
CHAPTER 42: Respiratory Insufficiency—Pathophysiology, Diagnosis, Oxygen Therapy

UNIT VIII: Aviation, Space, and Deep-Sea Diving Physiology
CHAPTER 43: Aviation, High-Altitude, and Space Physiology
CHAPTER 44: Physiology of Deep-Sea Diving and Other Hyperbaric Conditions

UNIT IX: The Nervous System: A. General Principles and Sensory Physiology
CHAPTER 45: Organization of the Nervous System; Basic Functions of Synapses; "Transmitter Substances"
CHAPTER 46: Sensory Receptors; Neuronal Circuits for Processing Information

CHAPTER 47: Somatic Sensations: I. General Organization; the Tactile and Position Senses
CHAPTER 48: Somatic Sensations: II. Pain, Headache, and Thermal Sensations

UNIT X: The Nervous System: B. The Special Senses
CHAPTER 49: The Eye: I. Optics of Vision
CHAPTER 50: The Eye II. Receptor and Neural Function of the Retina
CHAPTER 51: The Eye III. Central Neurophysiology of Vision
CHAPTER 52: The Sense of Hearing
CHAPTER 53: The Chemical Senses—Taste and Smell

UNIT XI: The Nervous System: C. Motor and Integrative Neurophysiology
CHAPTER 54: Motor Functions of the Spinal Cord; The Cord Reflexes
CHAPTER 55: Cortical and Brain Stem Control of Motor Function
CHAPTER 56: The Cerebellum, the Basal Ganglia, and Overall Motor Control
CHAPTER 57: The Cerebral Cortex; Intellectual Functions of the Brain; and Learning and Memory
CHAPTER 58: Behavioral and Motivational Mechanisms of the Brain—The Limbic System and the Hypothalamus
CHAPTER 59: States of Brain Activity—Sleep; Brain Waves; Epilepsy; Psychoses
CHAPTER 60: The Autonomic Nervous System; and the Adrenal Medulla
CHAPTER 61: Cerebral Blood Flow; the Cerebrospinal Fluid; and Brain Metabolism

UNIT XII: Gastrointestinal Physiology
CHAPTER 62: General Principles of Gastrointestinal Function—Motility, Nervous Control, and Blood Circulation
CHAPTER 63: Propulsion and Mixing of Food in the Alimentary Tract
CHAPTER 64: Secretory Functions of the Alimentary Tract
CHAPTER 65: Digestion and Absorption in the Gastrointestinal Tract
CHAPTER 66: Physiology of Gastrointestinal Disorders

UNIT XIII: Metabolism and Temperature Regulation
CHAPTER 67: Metabolism of Carbohydrates, and Formation of Adenosine Triphosphate
CHAPTER 68: Lipid Metabolism
CHAPTER 69: Protein Metabolism
CHAPTER 70: The Liver as an Organ
CHAPTER 71: Dietary Balances; Regulation of Feeding; Obesity and Starvation; Vitamins and Minerals
CHAPTER 72: Energetics and Metabolic Rate
CHAPTER 73: Body Temperature, Temperature Regulation, and Fever

UNIT XIV: Endocrinology and Reproduction
CHAPTER 74: Introduction to Endocrinology
CHAPTER 75: The Pituitary Hormones and Their Control by the Hypothalamus
CHAPTER 76: The Thyroid Metabolic Hormones
CHAPTER 77: The Adrenocortical Hormones
CHAPTER 78: Insulin, Glucagon, and Diabetes Mellitus
CHAPTER 79: Parathyroid Hormone, Calcitonin, Calcium and Phosphate Metabolism, Vitamin D, Bone, and Teeth
CHAPTER 80: Reproductive and Hormonal Functions of the Male (and Function of the Pineal Gland)
CHAPTER 81: Female Physiology Before Pregnancy; and the Female Hormones
CHAPTER 82: Pregnancy and Lactation
CHAPTER 83: Fetal and Neonatal Physiology

UNIT XV: Sports Physiology
CHAPTER 84: Sports Physiology