

Course Title: Human Physiology
Course Number: Psyc 5334 - 001
Course Location and Time: Wedn 4:00 – 6:50 pm, LS 101

Instructor: Dr. Yuan Bo Peng

Office: LS 503

Phone: 817/272-5222

Mailbox: 19528

Email: ypeng@uta.edu

Instructor website: <http://www.uta.edu/psychology/faculty/peng/peng.htm>

Course website: For lecture notes and announcements, please go to Canvas

Office Hours: W 1:00 - 2:00, or by appointment

Course Information

Course Prerequisites: None, but prefer some exposure to biology-related courses.

Section Information: Psyc 5334 – 001, Human Physiology

Time and Place of Class Meetings: Wedn 4:00 – 6:50 pm, LS 101

Description of Course Content: This course will provide a comprehensive review of human physiology that is categorized into 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).

Student Learning Outcomes: 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

Required Textbooks and Other Course Materials: Textbook of Medical Physiology (14th Ed) by Arthur C. Guyton and John E. Hall, ISBN:978-0-323-59712-8

Cost of course materials: Please look up the costs of the course materials by either going through [MyMav Schedule of Classes](#) or through the [UTA Bookstore](#). The cost varies a lot depending on the quality and combination of materials (e.g., cheaper for the used book). The cost to print on campus can be found at <https://libraries.uta.edu/services/technology/printing>

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.

Descriptions of major assignments and examinations (Tentative Exam Schedule**):**

Exam 1, Wednesday, 3/1/2023, 4:00 – 6:50 pm

Exam 2, Wednesday, 4/12/2023, 4:00 – 6:50 pm

Exam 3 (Final exam**), Friday, 5/10/2023, 2:00 – 4:30 pm**

Examinations: There will be *THREE exams*. The final exam will **NOT** be comprehensive. The format for exams will be essay questions. You are required to take all three 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.

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.

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

Technology Requirements

Although it is planned as a regular in-person course, in case of a pandemic, the online teaching tools you will use include Canvas, Teams, Respondus Lockdown, or other proctoring tools, etc. Students can access tutorials on these tools by clicking on the “Get Started” Box on their Canvas Homepage. Also, students will need a webcam or other equipment to succeed in online exams (if needed).

Grading Information

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 $A \geq 90\%$, $B \geq 80\%$, $C \geq 70\%$, $D \geq 60\%$, $F < 60\%$.

Make-up Exams: 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.

Expectations for Out-of-Class Study: A general rule of thumb is this: for every credit hour earned, a student should spend 3 hours per week working outside of class. Hence, a 3-credit course might have a minimum expectation of 9 hours of reading, study, etc. Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least additional hours per week of their own time in course-related activities, including reading required materials, preparing for exams, etc.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. For undergraduate courses, see Undergraduate Grading Policies; for graduate courses, see Graduate Grading Policies. For student complaints, see Student Complaints.

Location: Life Sciences Building, Room 313, 501 S. Nedderman Dr., Arlington, TX 76019. Mailing address: P.O. Box 19528. Phone: 817-272-2281. Fax: 817-272-2364. Student Grievance Form - University of Texas at Arlington can be found at: <https://www.uta.edu/academics/schools-colleges/science/departments/psychology/degree-programs/graduate/graduate-resources/student-grievance-form>

Course Schedule (Grayed sections will most unlikely be covered)

UNIT I: Introduction to Physiology: The Cell and General Physiology

1. Functional Organization of the Human Body and Control of the “Internal Environment”
2. The Cell and Its Functions
3. Genetic Control of Protein Synthesis, Cell Function, and Cell Reproduction

UNIT II: Membrane Physiology, Nerve, and Muscle

4. Transport of Substances Through Cell Membranes
5. Membrane Potentials and Action Potentials
6. Contraction of Skeletal Muscle
7. Excitation of Skeletal Muscle: Neuromuscular Transmission and Excitation-Contraction Coupling
8. Excitation and Contraction of Smooth Muscle

UNIT III: The Heart

9. Cardiac Muscle; The Heart as a Pump and Function of the Heart Valves
10. Rhythmical Excitation of the Heart
11. Fundamentals of Electrocardiography
12. Electrocardiographic Interpretation of Cardiac Muscle and Coronary Blood Flow Abnormalities: Vectorial Analysis
13. Cardiac Arrhythmias and Their Electrocardiographic Interpretation

UNIT IV: The Circulation

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

UNIT V: The Body Fluids and Kidneys

25. Regulation of Body Fluid Compartments: Extracellular and Intracellular Fluids; Edema
26. The Urinary System: Functional Anatomy and Urine Formation by the Kidneys
27. Glomerular Filtration, Renal Blood Flow, and Their Control
28. Renal Tubular Reabsorption and Secretion
29. Urine Concentration and Dilution; Regulation of Extracellular Fluid Osmolarity and Sodium Concentration
30. Renal Regulation of Potassium, Calcium, Phosphate, and Magnesium; Integration of Renal Mechanisms for Control of Blood Volume and Extracellular Fluid Volume
31. Acid–Base Regulation
32. Diuretics and Kidney Diseases

UNIT VI: Blood Cells, Immunity, and Blood Coagulation

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

UNIT VII: Respiration

38. Pulmonary Ventilation
39. Pulmonary Circulation, Pulmonary Edema, and Pleural Fluid
40. Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through the Respiratory Membrane
41. Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids
42. Regulation of Respiration
43. Respiratory Insufficiency—Pathophysiology, Diagnosis, Oxygen Therapy

UNIT VIII: Aviation, Space, and Deep-Sea Diving Physiology

44. Aviation, High Altitude, and Space Physiology
45. Physiology of Deep-Sea Diving and Other Hyperbaric Conditions

UNIT IX: The Nervous System: A. General Principles and Sensory Physiology

46. Organization of the Nervous System, Basic Functions of Synapses, and Neurotransmitters
47. Sensory Receptors, Neuronal Circuits for Processing Information
48. Somatic Sensations: I. General Organization, Tactile and Position Senses

49. Somatic Sensations: II. Pain, Headache, and Thermal Sensations

UNIT X: The Nervous System: B. The Special Senses

- 50. The Eye: I. Optics of Vision
- 51. The Eye: II. Receptor and Neural Function of the Retina
- 52. The Eye: III. Central Neurophysiology of Vision
- 53. The Sense of Hearing
- 54. The Chemical Senses—Taste and Smell

UNIT XI: The Nervous System: C. Motor and Integrative Neurophysiology

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

UNIT XII: Gastrointestinal Physiology

- 63. General Principles of Gastrointestinal Function—Motility, Nervous Control, and Blood Circulation
- 64. Propulsion and Mixing of Food in the Alimentary Tract
- 65. Secretory Functions of the Alimentary Tract
- 66. Digestion and Absorption in the Gastrointestinal Tract
- 67. Physiology of Gastrointestinal Disorders

UNIT XIII: Metabolism and Temperature Regulation

- 68. Metabolism of Carbohydrates and Formation of Adenosine Triphosphate
- 69. Lipid Metabolism
- 70. Protein Metabolism
- 71. The Liver
- 72. Dietary Balances; Regulation of Feeding; Obesity and Starvation; Vitamins and Minerals
- 73. Energetics and Metabolic Rate
- 74. Body Temperature Regulation and Fever

UNIT XIV: Endocrinology and Reproduction

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

UNIT XV: Sports Physiology

- 85. Sports Physiology

Institutional Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the [Institutional Information](#) page

(<https://resources.uta.edu/provost/course-related-info/institutional-policies.php>) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

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 the 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>.