

BIOL 40C: HUMAN ANATOMY & PHYSIOLOGY III

Foothill College Course Outline of Record

Heading	Value
Units:	5
Hours:	4 lecture, 3 laboratory per week (84 total per quarter)
Prerequisite:	BIOL 40B or equivalent.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- The student can analyze and evaluate the relationship between digestive system structure and function, and the role of the digestive system in maintaining homeostasis in the human body.
- The student can analyze and evaluate the relationship between urinary system structure and function, and the role of the urinary system in maintaining homeostasis in the human body.
- The student can analyze and evaluate the relationship between lymphatic system structure and function, and the role of the lymphatic system in maintaining homeostasis in the human body.
- The student can analyze and evaluate the relationship between endocrine system structure and function, and the role of the endocrine system in maintaining homeostasis in the human body.
- The student can analyze and evaluate the relationship between reproductive system structure and function, and the role of the reproductive system in maintaining homeostasis in the human body.

Description

Anatomy and physiology of the digestive system; metabolism; urinary system; fluid, electrolyte and acid/base balance; lymphatic system; endocrine system; and reproductive system.

Course Objectives

The student will be able to:

- Describe the structures and functions of chemicals, cells, tissues, and organs of the digestive system in health and disease.
- Discuss the fates of organic macromolecules in the body.
- Describe the structures and functions of chemicals, cells, tissues, and organs of the urinary system in health and disease.
- Discuss the homeostatic mechanisms for balancing water and solutes in the body and disease-related deviations from fluid and solute homeostasis.
- Describe the structures and functions of chemicals, cells, tissues, and organs of the lymphatic system in health and disease.
- Describe the structures and functions of chemicals, cells, tissues, and organs of the endocrine system in health and disease.
- Describe the structures and functions of chemicals, cells, tissues, and organs of the reproductive system in health and disease.

Course Content

- Digestion:
 - Introduction
 - Mechanical vs. chemical digestion
 - Hydrolysis reviewed
 - General survey of the system; organs and general histology
 - Oral cavity
 - Mouth
 - Tongue
 - Salivary glands: types and locations
 - Mastication and salivation
 - Amylase and starch digestion
 - Anatomy and physiology of deglutition (swallowing)
 - Esophagus
 - Location, anatomy and histology
 - Physiology
 - Stomach
 - Location, anatomy and histology
 - Mechanical digestion and storage
 - Chemical digestion: roles of mucus, hydrochloric acid, enzymes
 - Regulation of secretion and motility
 - Pancreas
 - Location, anatomy and histology
 - Pancreatic juice: enzymes and their substrates
 - Regulation of secretion
 - Liver
 - Location, anatomy and histology
 - Blood supply
 - Bile
 - Physiology: neutralizing toxins, buffering, plasma proteins, storage, red blood cell destruction
 - Gallbladder: anatomy and physiology
 - Small intestine
 - Location, anatomy and histology
 - Peristalsis and segmentation
 - Enzymes and their substrates
 - Absorption: carbohydrates, lipids, proteins, water, and electrolytes
 - Large intestine
 - Location, anatomy and histology
 - Motility
 - Absorption and feces formation
 - Defecation
- Metabolism:
 - Introduction
 - Metabolism of:
 - Carbohydrates
 - Lipids
 - Proteins
 - Absorptive and postabsorptive state
- Urinary system:
 - Introduction to anatomy and physiology of system
 - Renal anatomy and histology
 - Renal physiology: nephron, collecting ducts, renal circulation
 - Glomerular filtration
 - Regulation of the glomerular filtration rate (GFR)
 - Tubular reabsorption
 - Tubular secretion
 - Urinary tract function and urinalysis
 - Renal diseases
- Fluid, electrolyte and acid-base balance:
 - Fluid compartments and fluid balance

2. Water
 - a. Intake and regulation
 - b. Output and regulation
3. Distribution of electrolytes in body fluids
4. Movement between fluids
 - a. Plasma and interstitial fluids
 - b. Interstitial fluids and intracellular fluids
5. Acid-base balance
 - a. Buffers
 - b. Respiratory acidosis and alkalosis
 - c. Metabolic acidosis and alkalosis
- E. Lymphatic system:
 1. Introduction
 - a. Lymphatic vessels: structure and location
 - b. Lymph nodes
 - c. Lymph: composition, origin, flow pattern and fate
 2. Resistance to disease
 - a. Nonspecific resistance
 - 1) Skin and mucus membranes
 - 2) Antimicrobial substances
 - 3) Phagocytosis
 - 4) Inflammation
 - 5) Fever
 - b. Specific resistance: immunity
 - 1) Formation of T cells and B cells
 - 2) Antigens
 - 3) Cell-mediated immunity
 - 4) Antibody-mediated immunity
 - 5) Immunological memory
 - 6) Immune system disorders; allergies, autoimmunity, tissue transplants, cancer
 - F. Endocrine system:
 1. Introduction to concept of hormonal control and regulation of homeostasis
 2. Overview of hormone effects
 3. Hormones
 - a. Chemistry
 - b. Classification
 - c. Circulating and local hormones
 - d. Hormone transport
 - e. Receptors
 - f. Second messengers
 4. Survey of major endocrine glands; hormones produced and their actions and result of hyper and hypo secretions
 - a. Hypophysis
 - 1) Interactions with hypothalamus
 - 2) Anterior and posterior lobe
 - b. Thyroid gland
 - c. Parathyroid gland
 - d. Adrenal gland
 - 1) Adrenal medulla
 - 2) Adrenal cortex
 - e. Pancreas
 - G. Reproduction:
 1. Male anatomy and histology
 2. Physiology
 - a. Spermatogenesis
 - b. Sperm delivery
 3. Female anatomy and histology
 4. Physiology
 - a. Oogenesis
 - b. Ovulation

- c. Menstrual cycle: menarche and menopause
- d. Hormonal regulation of female reproduction, pregnancy and physiology of birth control
5. Variations in the reproductive system based on sex and age

Lab Content

A. Laboratory topics (hands-on exploration of models, specimens, and/or digital renderings in the following areas):

1. Digestive system
 2. Urinary system, including urinalysis
 3. Endocrine system
 4. Immune system
 5. Reproductive system
 6. Histology of systems covered
- B. Laboratory skills:
1. Identification of tissues and structures on prepared histology slides of systems covered
 2. Use of laboratory materials such as general laboratory equipment, models and microscopes
 3. Dissection and identification of structures on preserved specimens, such as sheep kidney
 4. Ability to follow a protocol, make experimental observations and draw conclusions for experiments involving topics, such as metabolism, urinalysis, and the use of blood typing as a tool to learn about antigens and antibodies

Special Facilities and/or Equipment

- A. Lecture room and biology laboratory equipped with instructor's computer, internet access, ceiling projector, document camera (visualizer), VCR and DVD player.
- B. Fully equipped biology laboratory with support of laboratory technician.
- C. Materials and equipment to teach anatomy and physiology, including: instructor's microscope with attached camera for slide projection, anatomy models, student microscopes, histology slides, preserved specimens, dissection equipment, posters and videos.
- D. Laboratory equipment and supplies, such as water-bath, glassware, and other chemical or biological reagents for studying the biochemical nature of cell and human physiology.
- E. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

Method(s) of Evaluation

Methods may include but are not limited to the following:

- A. Lecture and laboratory exams consisting of subjective and objective items. Exams written to assess knowledge and critical thinking ability. Exams may include short answer/essay questions, discussion questions, diagramming, questions relevant to laboratory experiments, lab practical component, or questions generated from models, histology slides, dissection specimens or images of the same.
- B. Lab reports, pre-lab or post-lab assignments.
- C. Evaluation of case studies and clinical scenarios.

Method(s) of Instruction

Methods may include but are not limited to the following:

- A. Lecture
- B. Laboratory
- C. Cooperative learning lab exercises
- D. Lab demonstration utilizing models, slides or other lab materials

E. Demonstration of specimen dissection

Representative Text(s) and Other Materials

Tortora and Derrickson. Principles of Anatomy and Physiology. 14th ed. New Jersey: John Wiley and Sons Publishers, 2014. ISBN:9781118345009

Openstax. Anatomy and Physiology. 17th ed. Openstax, 2017. ISBN: 9781938168130

Allen and Harper. Laboratory Manual for Anatomy and Physiology. 5th ed. New Jersey: John Wiley and Sons Publishers, 2014. ISBN:9781118344408

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

A. Read assigned lecture textbook chapters (approximately 20-30 pages per week) and corresponding instructional materials (such as lecture notes, chapter readings, study guides, online quizzes, and online resources) in preparation for in-class exams.

B. Read assigned lab textbook chapters (approximately 10-20 pages per week) and corresponding instructional materials (such as lecture notes, study guides, online quizzes, and online resources) in preparation for in-class exams.

C. In-class laboratory exercises.

Discipline(s)

Biological Sciences