



## ANAT 151 - Human Anatomy and Physiology II

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Discipline: Biological Sciences (Anatomy)

**Department:** Biological Science

**Department:** Physical and Biological Sciences

Term Effective: Fall 2002

### Requisites

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Prerequisite: ANAT 150

Departmental Recommendation: ENGL C1000

### Entrance Skill

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A. Requisite Skills:

None

B. Recommended Skills:

None

### Units and Hours

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**Semester Units:** 4.000

**Semester Hours:**

Instructional Categories	Units	Contact Hours	Out of Class Hours
Lecture	3	48 - 54	96 - 108
Independent Study	0	0	0
Lab/Field	1	48 - 54	0
Activity	0	0	0

<b>Instructional Categories</b>	<b>Units</b>	<b>Contact Hours</b>	<b>Out of Class Hours</b>
<b>Total</b>	4	96 - 108	96 - 108
<b>Total Student Learning Hours</b>	192 - 216		

Recommended Course Enrollment: 32

## Need for the Course

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ANAT 151 is designed for biology and non-biology majors. This course meets the college's general education requirements for graduation by providing for both lecture and laboratory sessions. ANAT 151 meets the course requirements for transfer to allied health programs such as: Registered Respiratory Therapist, Registered Nursing, Physician's Assistant, Physical Therapy Assistant, Occupational Therapist, Speech Pathologist, and other bachelor or masters degrees which require a lower division science and laboratory course. This course meets transfer requirements for UC and CSU, and may be applied to General Education requirements.

## Goals for the Course

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ANAT 151 provides the student with an advanced summary of the structure and functions of the human body. The student will be introduced to the organization of the human body, from the division of the nervous system through the male and female reproductive systems. These concepts are essential for anyone entering any of the Allied Health Professions.

## Catalog Description

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Advanced understanding of the structural and functional aspects of the human body. Second in a two semester series; covers hematology, somatic and special senses, the body's nutritional needs, pregnancy and maturation, electrolyte and acid/base balance, and the endocrine, lymphatic, immune, respiratory, cardiovascular, digestive, urinary, and reproductive systems.

## Schedule Description

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Advanced understanding of the structural and functional aspects of the human body. Second in a two semester series; covers hematology, somatic and special senses, the body's nutritional needs, pregnancy and maturation, electrolyte and acid/base balance, and the endocrine, lymphatic, immune, respiratory, cardiovascular, digestive, urinary, and reproductive systems.

## Student Learning Outcomes:

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Upon satisfactory completion of the course, students will be able to:

1. Identify gross anatomy of the Endocrine, Cardiovascular, Digestive, Respiratory, and Reproductive systems.
2. Explain the functions of the Endocrine, Cardiovascular, Digestive, Respiratory, and/or Reproductive systems.
3. Recognize the histological structures of the Endocrine, Cardiovascular, Digestive, Respiratory, and/or Reproductive systems.
4. Comprehend the overall physiological processes of the organ systems in the human body.

## Course Objectives

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Upon satisfactory completion of the course, students will be able to:

1. Name and list the different kinds of receptors of the somatic and special senses, and describe their sensations.
2. Explain how the eye functions and identify the parts of the eye from cornea to optic nerve.
3. Explain how the ear functions and identify the parts of the ear from the auricle to the vestibular and cochlear nerves.
4. Describe the structure and functions of the special connective tissue known as blood.
5. Compare and contrast the agranulocytes and granulocytes.
6. Explain how a differential white cell count can assist in diagnosis of pathology.
7. Discuss the components of plasma and the importance and relative concentrations of plasma proteins.
8. Explain how blood is an important transport media, a regulator of body temperature, and important in the defense of the body.
9. List all of the components of the cardiovascular system including the structure of the heart and its physiological functions, blood vessels, circulatory pathways, and blood pressure.
10. Trace the flow of blood through the heart.
11. Compare and contrast the systemic and pulmonary circulations.
12. Explain the complications of partial occlusion of the coronary arteries.
13. Trace the flow of food through the alimentary canal.
14. Discuss the steps of digestion, their sequence and relative importance.
15. Explain how the digestive system with chemicals caustic enough to digest any protein, does not digest itself in the process.
16. Explain and discuss nutrition and the metabolic processes which aid digestion and

health.

17. Compare vitamins and minerals and their respective functions.
18. Explain and discuss the organs of the urinary system, both macroscopic and microscopic makeup.
19. Explain the physiological processes that filter the blood and form urine.
20. Illustrate how the kidney controls blood pressure and protects itself in the bargain.
21. Compare and contrast chemical buffers and physiological buffers.
22. Describe and identify all of the anatomical structures of the male reproductive system.
23. Discuss the physiology of the male reproductive system.
24. Describe and identify all of the anatomical structures of the female reproductive system.
25. Discuss the physiology of the female reproductive system.
26. Explain the role of the sex hormones in the formation and regulation of the sexual characteristics and reproduction cycles.
27. Discuss pregnancy, parturition, and infant development.
28. Explain possible complications and pathologies of pregnancy, parturition, and infant development.
29. Show how genetics affects an individual's anatomy and physiology, and discuss the advances in genetics that may remove some long standing problems and diseases.
30. Indicate important differences between hormonal and neural controls of body functioning.
31. List the major endocrine organs, describe their locations in the body, and discuss their respective hormones and hormone actions.
32. Describe the general location, histological structures, and functions of lymph nodes.
33. Describe the structure and distribution of lymphatic vessels, and note their important functions.
34. Compare and contrast the nonspecific and specific body immune defenses.
35. Explain the nonspecific cellular and chemical defenses of the immune system.
36. Compare and contrast the cell-mediated and humoral immune responses.
37. Identify the organs forming the respiratory passageway(s) in descending order until the alveoli are reached.
38. Describe the makeup of the respiratory membrane, and relate its structure to its function.
39. Explain and compare the various lung volumes and capacities. Indicate the types of information that can be gained from pulmonary function tests.
40. Compare the causes and consequences of chronic bronchitis, emphysema, and lung cancer.

## Course Content

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### Lecture Outline

#### Lecture:

- A. The divisions of the nervous system including the protective coverings of the central nervous system, spinal cord, brain, peripheral nervous system, and autonomic nervous system.
- B. Anatomical and physiological features of the somatic and special senses.
- C. Anatomy and physiology of sight.
- D. Anatomy and physiology of hearing.
- E. Anatomy and physiology of balance.
- F. The study of blood and blood cells, blood plasma, hemostasis, and blood groupings.
- G. The anatomical and physiological study of the cardiovascular system, structure of the heart, heart action, blood vessels, blood pressure, paths of circulation, and circuits.
- H. The anatomical and physiological study of the lymphatic and immune system including lymphatic pathways, tissue fluid and lymph, lymph transport, lymph organs, non-specific and specific immune defenses, cell mediated immunity and anti-body immunity.
- I. The anatomical and physiological study of the digestive system, general characteristics of the gastrointestinal tract, primary and secondary structures, mechanical and chemical digestion, absorption, and elimination of wastes.
- J. The study of nutrition and metabolism; why we eat; nutrients, vitamins, minerals; and their uses by the body.
- K. Anatomy and physiology of the respiratory system including organs, breathing mechanisms, control of breathing, structures of the upper and lower airway, gas transport and gas exchange.
- L. The study of the structure and functions of the urinary system; the macro and microscopic study of the kidney; urine formation and elimination.
- M. The study of water, electrolyte, and acid-base balance.
- N. The anatomical and physiological study of the male and female reproductive system.
- O. Endocrine system structure and function, and constituent hormones.
- P. Micro and macro structure of the lymphatic system and the relationship to and

with the immune system.

- Q. Respiratory system structure and function, including high altitude and diving respiratory physiology.

#### Lab Outline

#### **Lab:**

- A. Identify the various types of general sensations.
- B. Locate the various sensory receptors in the skin on an anatomical model.
- C. Define the different receptors and their functions on an anatomical model.
- D. Locate, draw, and label a Pacinian and Meissner's corpuscle in a histology slide under the light microscope.
- E. Perform the 2-point discrimination test, warm & cool receptors, temperature receptor mapping, light touch mapping, touch adaptation, and proprioception on a lab partner.
- F. Identify the different special senses and their functions.
- G. Locate, draw, and label the taste buds and olfactory epithelium in a histology slide under the light microscope.
- H. Demonstrate scientific testing for taste and olfaction on a lab partner.
  - I. Identify the various structures and functions of the external and internal eye on an anatomical model.
  - J. Describe the visual pathway from the retina to the occipital lobe.
- K. Locate, draw, and label the different layers of the retina in a histology slide under the light microscope.
- L. Locate, draw, and label the various structures of the cochlea and crista ampullaris in a histology slide under the light microscope.
- M. Perform, record, analyze, and interpret the results of a visual acuity, astigmatism, blind spot, near point of accommodation, color blindness, pupillary light reflex tests on a lab partner.
- N. Perform, record, analyze, and interpret the results of a Weber, Rinne's, and Romberg's tests on a lab partner.
- O. Perform a wet specimen dissection of a sheep eyeball.
- P. Locate and identify the various structures and functions of the sheep eyeball in a wet specimen dissection.
- Q. Identify the various components, functions, and locations of the endocrine

system on an anatomical model.

- R. Locate, draw, and label the various parts of the pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, ovary and testis on a histology slide under the light microscope.
- S. Discuss the various diseases associated with the Endocrine System.
- T. Perform a random or fasting Blood Glucose Test using the Accu-Chek Diabetic Test Kit.
- U. Discuss the various outcomes and interpret the results of the Blood Glucose Test.
- V. Define the various components and functions of whole blood.
- W. Identify the erythrocytes and their function on an anatomical model.
- X. Identify an erythrocyte, thrombocyte, basophil, neutrophil, lymphocyte, monocyte, and eosinophil on an anatomical model.
- Y. Identify the structures and functions of the thrombocyte on an anatomical model.
- Z. Locate, draw, and label an erythrocyte, thrombocyte, basophil, neutrophil, lymphocyte, monocyte, and eosinophil on a peripheral blood smear in a histology slide under the light microscope.
- AA. Perform and analyze known ABO/Rh blood typing using simulated blood samples on a Blood Test Card.
- AB. Determine an assigned unknown ABO/Rh blood typing using simulated blood sample on a Blood Test Card.
- AC. Locate, draw, and label a sickle cell on a peripheral blood smear in a histology slide under the light microscope.
- AD. Recognize the orientation and location of the heart in a human anatomical model.
- AE. Identify the 4 chambers of the heart on an anatomical model.
- AF. Identify the 4 valves of the heart on an anatomical model.
- AG. Identify the blood vessels of the heart on an anatomical model.
- AH. Locate, draw, and label the various structures of a cardiac cell in a histology slide under the light microscope.
- AI. Trace the path of blood flow through the heart on an anatomical model.
- AJ. Identify the blood vessels of the heart on an anatomical model.
- AK. Discuss the changes in the heart with aging.
- AL. Recognize diseases associated with the heart and the components of the heart.

- AM. Define the different waves of an electrocardiogram.
- AN. Perform an electrocardiogram on your lab partner.
- AO. Analyze and calculate the different waves and intervals on your lab partner's electrocardiogram tracing.
- AP. Recognize a few abnormal EKG waves on an EKG tracing.
- AQ. Auscultate your own heart sounds using a stethoscope.
- AR. Dissection of a sheep heart wet specimen.
- AS. Identify the external and internal structures of the sheep heart on a wet specimen dissection.
- AT. Recognize the various circulatory circuits of the body on an anatomical model.
- AU. Understand the structures and functions of the circulatory system.
- AV. Identify the structural differences between artery and vein on an anatomical model.
- AW. Locate, draw, and label the various structures of an artery, vein, and capillary on a histology slide under the light microscope.
- AX. Understand the properties of arteries, veins, and capillaries of the body.
- AY. Identify the various arteries and veins throughout the body on an anatomical model.
- AZ. Trace the flow of blood and its structure in fetal circulation on an anatomical model.
- BA. Understand the principle of blood pressure.
- BB. Recognize the physiological range of blood pressure.
- BC. Understand and classify various degrees of Hypertension.
- BD. Demonstrate the use of a sphygmomanometer and stethoscope to perform, analyze, and classify a blood pressure recording on a lab partner.
- BE. Identify the overall functions of the lymphatic system.
- BF. Identify the structures and functions of the various structures of the lymphatic system on an anatomical model.
- BG. Locate, draw, and label the structures and functions of the lymph node, appendix, tonsil, spleen, thymus, and ileum in a histology slides under the light microscope.
- BH. Recognize the drainage of lymph fluids from the various parts of the body on an anatomical model.
- BI. Identify the structures and functions of the respiratory system on an anatomical model.
- BJ. Locate, draw, and label the various structures and functions of the trachea and

alveolus in a histology slides under the light microscope.

- BK. Understand the various respiratory volumes and capacities.
- BL. Measure the various lung volumes using the Vernier computer software and calculating the various lung capacities of individuals and lab averages.
- BM. Define the overall structures and functions of the various parts of the digestive system on an anatomical model.
- BN. Locate the various accessory structures and functions of the digestive tract on an anatomical model.
- BO. Trace the path and processing of food it travels through the entire digestive tract.
- BP. Locate the overall gross structures of urinary system on an anatomical model.
- BQ. Define the processes of the various structures of the urinary system on an anatomical model.
- BR. Identify the various structures and functions of the kidney on an anatomical model.
- BS. Define the various portions and functions of the nephron on an anatomical mode.
- BT. Locate, draw, and label structures and functions of a tooth, parotid, esophagus, stomach, jejunum, large intestine, and liver on a histology slide under the light microscope.
- BU. Recognize the overall functions of the urinary system on an anatomical model.
- BV. Identify the various structures and function of the kidney on an anatomical model.
- BW. Define the various portions and functions of the nephron on an anatomical model.
- BX. Locate, draw, and label the regions of a kidney on a histology slide under the light microscope.
- BY. Locate, draw, and label various parts of the nephron in a histology slide under the light microscope.
- BZ. Identify the external and internal structures of the sheep kidney on a wet specimen dissection.
- CA. Collect, analyze, and interpret your own urine sample using a urinalysis strip
- CB. Determine the pathology of an assigned unknown simulated urine sample using the urinalysis strip.
- CC. Identify the structures and functions of the male external genitalia on an anatomical model.

- CD. Identify the various internal structures and functions of the male reproductive system on an anatomical model.
- CE. Understand the endocrine and exocrine functions of the gonads in the male reproductive system.
- CF. Describe the various activities and hormonal influences in the hypothalamus, anterior pituitary gland, and testis.
- CG. Describe the various physiological changes and hormonal influences of the male reproductive system before and at the onset of puberty.
- CH. Describe the various stages and events of spermatogenesis on an anatomical chart.
- CI. Understand the physiological processes of sperm cell maturation, erection, emission, and ejaculation.
- CJ. Relate the hormones and nervous system roles associated with erection, emission, and ejaculation.
- CK. Locate, draw, and label the various parts of the penis, testis, epididymis, and sperm cell in a histology slide under the light microscope.
- CL. Understand the age-related changes associated with the male reproductive system.
- CM. Recognize the various surgical procedures and diseases associated with the male reproductive system.
- CN. Identify the structures and functions of the female external genitalia on an anatomical model.
- CO. Identify the various internal structures and functions of the female reproductive system on an anatomical model.
- CP. Understand the endocrine and exocrine functions of the gonads in the female reproductive system.
- CQ. Describe the various activities and hormonal influences in the hypothalamus, anterior pituitary gland, ovary, and uterus.
- CR. Describe the various physiological changes and hormonal influences of the female reproductive system before birth, at birth, the onset of puberty, ovulation, pregnancy, and menopause.
- CS. Describe the various stages and events of oogenesis before birth, at birth, the onset of puberty, pregnancy, and menopause on an anatomical chart.
- CT. Understand the physiological processes of the various stages of oocyte development and the hormones associated with them.
- CU. Describe the fate of the follicle after ovulation during pregnancy.

- CV. Describe the events and physiological changes associated with pregnancy.
- CW. Locate, draw, and label the various parts of the uterus, ovary, mammary gland, and vagina in a histology slide under the light microscope.
- CX. Understand the age-related changes associated with the female reproductive system.
- CY. Recognize the various surgical procedures and diseases associated with the female reproductive system.

## Representative Texts and Instructional Materials

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**Textbooks:** Seeley's Anatomy & Physiology, VanPutte, Regan, Russo, McGraw-Hill, 2020

Human Anatomy & Physiology, Elaine N. Marieb, Katja N. Hoehn, Pearson, 2019

**Manuals:** Human Anatomy & Physiology II Laboratory Manual with Clinical Correlations, Truong, S, ., 2019

Seeley's Anatomy & Physiology Laboratory Manual, Eric Wise, McGraw-Hill, 2019

Laboratory Manual for Human Anatomy & Physiology, Terry Martin and Cynthia Prentice-Craver, McGraw-Hill, 2019

## Methods of Instruction

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- Audio Visual Presentations
- Class Activities
- Class Discussions
- Collaborative Group Work
- Computer-aided Instruction
- Demonstration
- Lab
- Lecture
- Other (Specify)
  - A. Correlated laboratory sessions, laboratory reports.

Emergency Remote Instruction Yes

In emergency circumstances that require campus closure, remote instruction may be incorporated. Courses offered remotely will achieve or adapt stated learning outcomes for the remote environment. Instruction will maintain regular effective contact through conferencing and LMS applications. Instructional materials will be adapted to meet ADA compliance. Instructors will be supported through available campus resources including Alternative Media and Assistive Technology Specialist, DSPS Office, PD Lead, DE Lead, and other available resources to help ensure that instructional materials are accessible to persons with disabilities.

## Assignments and Methods of Evaluation

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1. Other: Laboratory activities/reports and practicals. (30-40%)
  2. Quizzes (0-5%)
  3. Examinations (60-70%)
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Last Revision

2021-04-26

Board Approval

2021-06-10