

2005 Mississippi Curriculum Framework

Adult Short-Term Sectional Anatomy

(Program CIP: 26.0403 – Medical Radiologic Technology)

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American Society of Radiologic Technologists

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Workplace Skills for the 21st Century

Secretary's Commission on Achieving Necessary Skills

ISTE National Educational Technology Standards for Students

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Program Description

This Adult Short-Term program for Sectional Anatomy consists of one course and is designed for individuals interested in the study of sectional anatomy, particularly those interested in pursuing careers in the medical sciences. This program provides instruction in basic sectional anatomy, with a focus on the knowledge of sectional anatomy needed for careers in Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). This course may be taken as partial preparation for credentialing by the American Registry of Radiologic Technologists (ARRT) or be used as continuing education credits for health care personnel.

The industry standards referenced in this course are taken from the American Society of Radiologic Technologists (ASRT) Magnetic Resonance Curriculum.

Suggested Course Sequence*
Adult Short-Term
Sectional Anatomy

3 sch Sectional Anatomy (CSA 2113)

* Students who lack entry level skills in math, English, science, etc. will be provided related studies.

Sectional Anatomy Courses

Course Name: Sectional Anatomy

Course Abbreviation: CSA 2113

Classification: Adult Short-Term

Description: This course is designed to study human sectional anatomy, including location, structure, and function, as well as relationships among structures. Radiographs, Computed Tomography (CT) images, and Magnetic Resonance Imaging (MRI) images may be used to demonstrate the characteristic appearance of anatomic structures. (3 sch: 3 hr. lecture)

Prerequisite: Anatomy and Physiology I (BIO 2514) and Anatomy and Physiology II (BIO 2524)

Competencies and Suggested Objectives
1. Describe the anatomy and physiology of the human body. <ol style="list-style-type: none">Review the location of the structures of human body.Review the function of the structures of the human body.
2. Identify the structures of each of the anatomical regions as they appear in sectional illustrations. <ol style="list-style-type: none">Identify the structures of the head and brain as they appear in sectional illustrations.Identify the structures of the neck as they appear in sectional illustrations.Identify the structures of the chest and mediastinum as they appear in sectional illustrations.Identify the structures of the abdomen as they appear in sectional illustrations.Identify the structures of the pelvis as they appear in sectional illustrations.Identify the structures of the musculoskeletal system and spine as they appear in sectional illustrations.
3. Locate the structures of each of the anatomical regions as they appear on a CT image and an MRI image in the transaxial, coronal, sagittal, and oblique planes. <ol style="list-style-type: none">Locate the structures of the head and brain as they appear in sectional illustrations.Locate the structures of the neck as they appear in sectional illustrations.Locate the structures of the chest and mediastinum as they appear in sectional illustrations.Locate the structures of the abdomen as they appear in sectional illustrations.Locate the structures of the pelvis as they appear in sectional illustrations.Locate the structures of the musculoskeletal system and spine as they appear in sectional illustrations.

STANDARDS*Standards Based on the ASRT Magnetic Resonance Curriculum*

- SEC1 Differentiate between sagittal, coronal, and axial planes of the body.
SEC4 Identify normal anatomical structures on sectional images.

Related Academic Standards

- C1 Interpret written material.
C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
C3 Listen, comprehend, and take appropriate actions.
C4 Access, organize, and evaluate information.
C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.
M5 Explore the geometry of one-, two-, and three-dimensions.
S1 Explain the Anatomy and Physiology of the human body.
S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

Workplace Skills for the 21st Century

- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

National Educational Technology Standards for Students

- T2 Social, ethical, and human issues
T4 Technology communications tools
T5 Technology research tools
T6 Technology problem-solving and decision-making tools

Adult Short-Term Sectional Anatomy

Suggested References

- Abrahams, P. H., Marks, S. C., & Hutchings, R. (2002). *McMinn's color atlas of human anatomy* (5th ed.). St. Louis, MO: Mosby.
- Applegate, E. (2001). *The sectional anatomy learning system* (2nd ed.). Philadelphia: WB Saunders.
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- Barrett, C. P. (1994). *Primer of sectional anatomy with MRI and CT correlation*. Philadelphia: Lippincott Williams & Wilkins.
- El-Khoury, G. Y., Bergman, R. A., & Montgomery, W. J. (1994). *Sectional anatomy by MRI/CT* (2nd ed.). New York: Churchill Livingstone.
- Kelley, L. L., & Peterson, C. M. (1997). *Sectional anatomy for imaging professionals*. St. Louis, MO: Mosby.
- Lane, A., & Sharfai, H. (1997). *Modern sectional anatomy*. Philadelphia: WB Saunders.
- Moller, T. B. (2001). *Pocket atlas of sectional anatomy: CT and MRI: Thorax, abdomen and pelvis* (2nd ed.). New York: Thieme Medical Publishers.
- Radiologic Technology*. (Journal). Albuquerque, NM: American Society of Radiologic Technologists.
- Radiology*. (Journal). Oakbrook, IL: Radiological Society of North America.
- Seminars in ultrasound, CT and MRI*. (Journal). Philadelphia: WB Saunders.

Recommended Tools and Equipment

CAPITALIZED ITEMS

1. Human cross-sectional model

NON-CAPITALIZED ITEMS

1. Viewbox (4 bank)

INSTRUCTIONAL AIDS

1. Computer
2. LCD projector
3. VCR
4. Television

Student Competency Profile for Sectional Anatomy

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each course. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Sectional Anatomy (CSA 2113)

- _____ 1. Describe the anatomy and physiology of the human body.
- _____ 2. Identify the structures of each of the anatomical regions as they appear in sectional illustrations.
- _____ 3. Locate the structures of each of the anatomical regions as they appear on a CT image and an MRI image in the transaxial, coronal, sagittal, and oblique planes.

Appendix A: Standards Based on the American Society of Radiologic Technologists (ASRT) Magnetic Resonance Curriculum¹

- SEC1 Differentiate between sagittal, coronal and axial planes of the body.
- SEC2 Review the principles of imaging for imaging modalities using relevant terminology.
- SEC3 Compare the imaging modalities for application to radiation therapy.
- SEC4 Identify normal anatomical structures on sectional images.
- SEC5 Identify topographic anatomy used to locate underlying internal structures.

¹ The American Society of Radiologic Technologists. (2003). *Magnetic resonance curriculum*. Albuquerque, NM: Author.

Appendix B: Related Academic Standards

RELATED ACADEMIC TOPICS FOR COMMUNICATIONS

- C1 Interpret written material.
- C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
- C3 Listen, comprehend, and take appropriate actions.
- C4 Access, organize, and evaluate information.
- C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
- C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.

EXPANDED TOPICS FOR COMMUNICATIONS

TOPIC C1: Interpret written material.

- C1.01 Read and follow complex written directions.
- C1.02 Recognize common words and meanings associated with a variety of occupations.
- C1.03 Adjust reading strategy to purpose and type of reading.
- C1.04 Use sections of books and reference sources to obtain information.
- C1.05 Compare information from multiple sources and check validity.
- C1.06 Interpret items and abbreviations used in multiple forms.
- C1.07 Interpret short notes, memos, and letters.
- C1.08 Comprehend technical words and concepts.
- C1.09 Use various reading techniques depending on purpose for reading.
- C1.10 Find, read, understand, and use information from printed matter or electronic sources.

TOPIC C2: Interpret visual materials (maps, charts, graphs, tables, etc.).

- C2.01 Use visuals in written and in oral presentations.
- C2.02 Recognize visual cues to meaning (layout, typography, etc.).
- C2.03 Interpret and apply information using visual materials.

TOPIC C3: Listen, comprehend, and take appropriate action.

- C3.01 Identify and evaluate orally-presented messages according to purpose.
- C3.02 Recognize barriers to effective listening.
- C3.03 Recognize how voice inflection changes meaning.
- C3.04 Identify speaker signals requiring a response and respond accordingly.
- C3.05 Listen attentively and take accurate notes.
- C3.06 Use telephone to receive information.
- C3.07 Analyze and distinguish information from formal and informal oral presentations.

- TOPIC C4: Access, organize, and evaluate information.
- C4.01 Distinguish fact from opinion.
 - C4.02 Use various print and non-print sources for specialized information.
 - C4.03 Interpret and distinguish between literal and figurative meaning.
 - C4.04 Interpret written or oral communication in relation to context and writer's point of view.
 - C4.05 Use relevant sources to gather information for written or oral communication.
- TOPIC C5: Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
- C5.01 Select appropriate words for communication needs.
 - C5.02 Use reading, writing, listening, and speaking skills to solve problems.
 - C5.03 Compose inquiries and requests.
 - C5.04 Write persuasive letters and memos.
 - C5.05 Edit written reports, letters, memos, and short notes for clarity, correct grammar, and effective sentences.
 - C5.06 Write logical and understandable statements, phrases, or sentences for filling out forms, for correspondence or reports.
 - C5.07 Write directions or summaries of processes, mechanisms, events, or concepts.
 - C5.08 Select and use appropriate formats for presenting reports.
 - C5.09 Convey information to audiences in writing.
 - C5.10 Compose technical reports and correspondence that meet accepted standards for written communications.
- TOPIC C6: Communicate ideas and information using oral and written forms for a variety of audiences and purposes.
- C6.01 Give complex oral instructions.
 - C6.02 Describe a business or industrial process/mechanism.
 - C6.03 Participate effectively in group discussions and decision making.
 - C6.04 Produce effective oral messages utilizing different media.
 - C6.05 Explore ideas orally with partners.
 - C6.06 Participate in conversations by volunteering information when appropriate and asking relevant questions when appropriate.
 - C6.07 Restate or paraphrase a conversation to confirm one's own understanding.
 - C6.08 Gather and provide information utilizing different media.
 - C6.09 Prepare and deliver persuasive, descriptive, and demonstrative oral presentations.

RELATED ACADEMIC TOPICS FOR MATHEMATICS

- M1 Relate number relationships, number systems, and number theory.
- M2 Explore patterns and functions.
- M3 Explore algebraic concepts and processes.

- M4 Explore the concepts of measurement.
- M5 Explore the geometry of one-, two-, and three-dimensions.
- M6 Explore concepts of statistics and probability in real world situations.
- M7 Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

EXPANDED TOPICS FOR MATHEMATICS

TOPIC M1: Relate number relationships, number systems, and number theory.

- M1.01 Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real world and mathematical problem situations.
- M1.02 Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers.
- M1.03 Understand and apply ratios, proportions, and percents in a wide variety of situations.
- M1.04 Investigate relationships among fractions, decimals, and percents.
- M1.05 Compute with whole numbers, fractions, decimals, integers, and rational numbers.
- M1.06 Develop, analyze, and explain procedures for computation and techniques for estimations.
- M1.07 Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
- M1.08 Use computation, estimation, and proportions to solve problems.
- M1.09 Use estimation to check the reasonableness of results.

TOPIC M2: Explore patterns and functions.

- M2.01 Describe, extend, analyze, and create a wide variety of patterns.
- M2.02 Describe and represent relationships with tables, graphs, and rules.
- M2.03 Analyze functional relationships to explain how a change in one quantity results in a change in another.
- M2.04 Use patterns and functions to represent and solve problems.
- M2.05 Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.
- M2.06 Use a mathematical idea to further their understanding of other mathematical ideas.
- M2.07 Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and business.

TOPIC M3: Explore algebraic concepts and processes.

- M3.01 Represent situations and explore the interrelationships of number patterns with tables, graphs, verbal rules, and equations.
- M3.02 Analyze tables and graphs to identify properties and relationships and to interpret expressions and equations.

- M3.03 Apply algebraic methods to solve a variety of real world and mathematical problems.
- TOPIC M4: Explore the concepts of measurement.
- M4.01 Estimate, make, and use measurements to describe and compare phenomena.
M4.02 Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.
M4.03 Extend understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass.
M4.04 Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs.
- TOPIC M5: Explore the geometry of one-, two-, and three-dimensions.
- M5.01 Identify, describe, compare, and classify geometric figures.
M5.02 Visualize and represent geometric figures with special attention to developing spatial sense.
M5.03 Explore transformations of geometric figures.
M5.04 Understand and apply geometric properties and relationships.
M5.05 Classify figures in terms of congruence and similarity and apply these relationships.
- TOPIC M6: Explore the concepts of statistics and probability in real world situations.
- M6.01 Systematically collect, organize, and describe data.
M6.02 Construct, read, and interpret tables, charts, and graphs.
M6.03 Develop an appreciation for statistical methods as powerful means for decision making.
M6.04 Make predictions that are based on exponential or theoretical probabilities.
M6.05 Develop an appreciation for the pervasive use of probability in the real world.
- TOPIC M7: Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.
- M7.01 Use computers and/or calculators to process information for all mathematical situations.
M7.02 Use problem-solving approaches to investigate and understand mathematical content.
M7.03 Formulate problems from situations within and outside mathematics.
M7.04 Generalize solutions and strategies to new problem situations.

RELATED ACADEMIC TOPICS FOR SCIENCE

- S1 Explain the Anatomy and Physiology of the human body.

- S2 Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.
- S3 Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.
- S4 Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
- S5 Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
- S6 Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
- S7 Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance, population genetics, the structure and function of DNA, and current applications of DNA technology.
- S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

EXPANDED TOPICS FOR SCIENCE

TOPIC S1: Explain the Anatomy and Physiology of the human body.

- S1.01 Recognize common terminology and meanings.
- S1.02 Explore the relationship of the cell to more complex systems within the body.
- S1.03 Summarize the functional anatomy of all the major body systems.
- S1.04 Relate the physiology of the major body systems to its corresponding anatomy.
- S1.05 Compare and contrast disease transmission and treatment within each organ system.
- S1.06 Explore the usage of medical technology as related to human organs and organ systems.
- S1.07 Explain the chemical composition of body tissue.

TOPIC S2: Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.

- S2.01 Identify the major types and structures of plants, viruses, monera, algae protista, and fungi.
- S2.02 Explain sexual and asexual reproduction.
- S2.03 Describe the ecological importance of plants as related to the environment.
- S2.04 Analyze the physical chemical and behavioral process of a plant.

TOPIC S3: Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.

- S3.01 Explain the morphology, anatomy, and physiology of animals.
- S3.02 Describe the characteristics, behaviors, and habitats of selected animals.
- TOPIC S4: Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
- S4.01 Examine minerals and their identification, products of the rock cycle, byproducts of weathering, and the effects of erosion.
- S4.02 Relate the Hydrologic Cycle to include groundwater its zones, movement, and composition; surface water systems, deposits, and runoff.
- S4.03 Consider the effects of weather and climate on the environment.
- S4.04 Examine the composition of seawater; wave, tides, and currents; organisms, environment, and production of food; energy, food and mineral resources of the oceans.
- TOPIC S5: Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
- S5.01 Examine the science of chemistry to include the nature of matter, symbols, formulas and nomenclature, and chemical equations.
- S5.02 Identify chemical reactions including precipitation, acids-bases, and reduction-oxidation.
- S5.03 Explore the fundamentals of chemical bonding and principles of equilibrium.
- S5.04 Relate the behavior of gases.
- S5.05 Investigate the structure, reactions, and uses of organic compounds; and investigate nuclear chemistry and radiochemistry.
- TOPIC S6: Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
- S6.01 Examine fundamentals of motion of physical bodies and physical dynamics.
- S6.02 Explore the concepts and relationships among work, power, and energy.
- S6.03 Explore principles, characteristics, and properties of electricity, magnetism, light energy, thermal energy, and wave energy.
- S6.04 Identify principles of modern physics related to nuclear physics.
- TOPIC S7: Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance; population genetics, the structure and function of DNA, and current applications of DNA technology.
- S7.01 Examine principles, techniques, and patterns of traits and inheritance in organisms.
- S7.02 Apply the concept of population genetics to both microbial and multicellular organism.

S7.03 Identify the structure and function of DNA and the uses of DNA technology in science, industry, and society.

TOPIC S8: Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

S8.01 Apply the components of scientific processes and methods in classroom and laboratory investigations.

S8.02 Observe and practice safe procedures in the classroom and laboratory.

S8.03 Demonstrate proper use and care for scientific equipment.

S8.04 Investigate science careers, and advances in technology.

S8.05 Communicate results of scientific investigations in oral, written, and graphic form.

Appendix C: Workplace Skills for the 21st Century²

- WP1 Allocates resources (time, money, materials and facilities, and human resources).
- WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.
- WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.
- WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.
- WP5 Selects, applies, and maintains/troubleshoots technology.
- WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.
- WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.
- WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

² Secretary's commission on achieving necessary skills. (1991). Retrieved July 13, 2004, from <http://wdr.doleta.gov/SCANS/>

Appendix D: National Educational Technology Standards for Students³

- T1 Basic operations and concepts
- Students demonstrate a sound understanding of the nature and operation of technology systems.
 - Students are proficient in the use of technology.
- T2 Social, ethical, and human issues
- Students understand the ethical, cultural, and societal issues related to technology.
 - Students practice responsible use of technology systems, information, and software.
 - Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.
- T3 Technology productivity tools
- Students use technology tools to enhance learning, increase productivity, and promote creativity.
 - Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- T4 Technology communications tools
- Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
 - Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
- T5 Technology research tools
- Students use technology to locate, evaluate, and collect information from a variety of sources.
 - Students use technology tools to process data and report results.
 - Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
- T6 Technology problem-solving and decision-making tools
- Students use technology resources for solving problems and making informed decisions.
 - Students employ technology in the development of strategies for solving problems in the real world.

³ *ISTE: National educational technology standards (NETS)*. (2000). Retrieved July 13, 2004, from <http://cnets.iste.org/>