

# **Human Anatomy & Physiology Syllabus**

**2023-2024**

Contact Information

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## **What is Human Anatomy & Physiology?**

Anatomy (from the Greek word anatome,"dissection"), is a branch of natural science dealing with the structural organization of living things. It is an old science, having its beginnings in prehistoric times. For centuries anatomical knowledge consisted largely of observations of dissected plants and animals. The proper understanding of structure, however, implies a knowledge of function in the living organism. Anatomy is therefore almost inseparable from physiology, which is sometimes called functional anatomy. As one of the basic life sciences, anatomy is closely related to medicine and to other branches of biology.

## **Required Materials:**

- Materials required include a notebook, pencil, and a three ring binder.
- A textbook and chromebook will be provided by the district.
- Optional materials include a set of colored pencils for diagram assignments.
  - Each student will be expected to attend class every day with these required materials. The student is expected to bring their chromebook to every class with a fully charged battery.
  - Students will also be expected to arrive to class with their completed/duel assignments or assignments we are still working on.
    - No passes will be given for students who do not show up to class with these required materials.

## **Course Description:**

Welcome to the wonderful world of anatomy and physiology! A class designed to explore one of the most amazing machines ever assembled, of course, we are talking about the human body!

Human Anatomy & Physiology is a year-long course where the completion of this course will provide students with equivalent knowledge and skills of pre-major and/or elective college course requirements. This Human Anatomy and Physiology class is intended for those students interested in pursuing a degree in the sciences in college or possibly a career in a health field. Prerequisites for this class are successful completion of Biology and Chemistry. A grade of at least a "B" in both prerequisite courses is recommended. The level of understanding and performance expected in this course strongly relies on the material presented in these prerequisites. Extensive daily memorization of anatomical terminology is required to succeed in this class.

During the course of study, we will investigate the following topics and systems:

- Orientation of the Body
- Chemistry of Life
- Cellular Structure and Function
- Histology
- Integumentary
- Skeletal System
- Muscular System
- Nervous System
- Special Senses
- Endocrine System
- Blood
- Cardiovascular System
- Lymphatic System
- Immune System
- Respiratory System
- Digestive System
- Urinary System

We are going to approach this class from an introductory perspective. Anatomy and physiology can be quite a challenging discipline on many levels. The intention of this course is to cover the essential information of each unit. Students will have the opportunity to learn thousands of new terms and concepts and the course may even be considered as learning a whole new language. The challenges will be great, but the rewards will be worth the effort!

Upon completion, students should be able to demonstrate an in-depth understanding of principles of anatomy and physiology and their interrelationships. Laboratory work includes dissection of a preserved specimen, microscopic study, physiologic experiments, computer simulations, peer teaching and curriculum development, and multimedia presentations. Comparative anatomy is an essential tool to learn about the human body. Participation in these activities is required and is critical to success in the course.

## **Grading:**

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Grades will be updated weekly.

Homework/Projects/Labs/Discussions: 20%	A+ (100%+)	A (94-99%)	A- (90-93)
Tests: 50%	B+ (87-89)	B (84-86)	B- (80-83)
Quizzes: 30%	C+ (77-79)	C (74-76)	C- (70-73)
	D+ (67-69)	D (64-66)	D- (60-63)
	E (0-59)		

## **Learning Outcomes:**

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Upon completion of this course, the student will demonstrate basic knowledge in the following:

1. Describe the major anatomical components of each human body system studied, describe briefly their anatomical locations and general structures, and explain their physiological functions at all levels from molecular components to cells, tissues, organs, organ systems and complete multicellular organisms.
2. Describe the regulation of the human body and explain how body systems studied are integrated.
3. Apply the concepts learned in the lecture to understand and analyze laboratory activities and observations.
4. Create valuable labs, activities and assessments for peers in the discipline of anatomy and physiology.

## **Outline of Instruction:**

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### I. Orientation of the Body

- A. Anatomical Terminology
- B. Directional Terminology
- C. Planes and Regions of the Body
- D. Overview of Body Systems

### II. Chemistry of Life

#### Basic Inorganic Chemistry Review

- A. Atoms, Molecules, Compounds, Bonding
- B. pH, Acids, Bases, Salts

#### Basic Organic Chemistry Review

- C. Macromolecules, Proteins, Enzymes, DNA, RNA, Lipids, Carbohydrates

### III. Cellular Structure and Function

- A. Cell Types, Organelles, Structure and Function
- B. Cellular Transport, Communication, Reproduction
- C. Cell Differentiation, Cell Cycle Regulation, Stem Cells, Cancer

### IV. Histology

- A. Tissue Types and Functions, Characteristics
- B. Microscopy

### V. Integumentary

- A. Receptors: Touch, Pressure, Nociceptors, Chemoreceptors, Mechanoreceptors
- B. Structure, Functions, Accessory Organs (Hair, Nails, Glands)
- C. Burns, Wound Healing, Skin Cancer

### VI. Skeletal

- A. Types of Bone
- B. Bones and Bone Markings
- C. Osteogenesis, Bone Growth and Remodeling

- D. Fractures, Healing, Pathology
- E. Articulations

#### VII. Muscular

- A. Types and Names of Muscles, Shapes, Structure and Function
- B. The Sarcomere, Excitation-Contraction-Coupling-Relaxation
- C. Epimysium, Perimysium, Endomysium
- D. Graphical Analysis of Muscle Contraction (Smooth, Cardiac, Skeletal)
- E. Length-Tension Relationship, Twitch, Wave Summation, Tetanus
- F. Energy Use in the Muscle, Short-Term, Intermediate, and Long-Term Energy Supply and Demand
- G. Types of Contractions, Concentric, Eccentric, Isotonic, Isometric
- H. Pathology

#### VIII. Nervous

- A. Types of Neurons and Support Cells
- B. Neuron Action Potentials
- C. Epineurium, Perineurium, Endoneurium (Fiber Size)
- D. Recruitment, Nerve Impulse Velocity (Myelinated vs Unmyelinated)
- E. Brain Structure and Function
- F. Memory, Emotion, and Learning
- G. Cranial and Spinal Nerves
- H. Somatic and Autonomic Divisions of the Nervous System
- I. Sympathetic and Parasympathetic Control
- J. Spinal Cord, Nerves, Reflexes
- K. Pathology

#### IX. Endocrine system

- A. Hypothalamic, Anterior Pituitary, Posterior Pituitary Hormones
- B. Endocrine Glands
- C. Feedback mechanisms
- D. Pathology

#### X. Blood

- A. Basic Hematology - Plasma and Cellular Components
- B. Hemostasis, Hematopoiesis
- C. Hemoglobin Production, Iron Cycle, Oxygen Transport
- D. Microscopy, Blood Cell Identification
- E. Blood Groupings

#### XI. Cardiovascular system

- A. The Heart, Structure, Function
- B. Regulation of Cardiovascular System, Cardiac Conduction System
- C. EKG, Normal vs Abnormal Rhythms
- D. Blood Pressure Determinations
- E. Peripheral Circulation, Blood Vessel Names and Identification
- F. Special Circulations, Hepatic Portal, Fetal, and Circle of Willis

#### XII. Lymphatic System

- A. Lymphatic Organs Structure and Function
- B. Nonspecific and Specific Defense Mechanisms
- C. Hypersensitivity and Tissue Rejection
- D. HIV and AIDS

### XIII. Digestive System

- A. General Plan of the Alimentary Canal
- B. Organs of Digestion
- C. Application of Macromolecule Breakdown, Absorption, and Biosynthesis
- D. Metabolism and Nutrition

### XIV. Respiratory System

- A. Pulmonary Anatomy
- B. Mechanics of Breathing
- C. Measurement of Pulmonary Function
- D. Control of Breathing
- E. Gas Laws and Gas Exchange
- F. Gas Transport Mechanisms

### XV. Urinary System

- A. Anatomy of Urinary System Structure and Function
- B. The Nephron
- C. Urine Formation and Control
- D. Composition of Urine
- E. Pathology
- F. Micturition

## **Mrs. Sirk's Classroom Rules:**

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1. **No Disruptive Behaviors** - Please avoid disruptive talking during lectures, assignments, etc. If you have a question, raise your hand. Please do not get up during an active lecture to throw things away, sharpen pencils, ask to use the restroom, ect. I welcome communication and questions and want you to feel comfortable and participate, but we do need to create an effective learning environment for ALL students.
2. **No Food or Drinks** - Do not bring food or beverages into class. Water is permitted with a lid.
3. **Only Use Electronic Devices with Permission** - Keep your cell phones away during all lectures and presentations. If a cell phone is being used in ANY fashion without my prior permission, I will take it and the student can pick the phone back up after school upon completion of their after school detention with Mrs. Sirk (15 minutes). If the student refuses to turn in their phone, they will be asked to leave the classroom and will not be permitted to return until the issue is resolved with administration.
4. **Earbuds Out of Ears** - It's disrespectful to have your earbuds in your ears when someone is speaking or presenting (even if you're not listening to music). The same protocol will be followed with earbuds as cell phones.
5. **Feet on The Floor** - Please refrain from putting your feet on the tables/desks.
6. **Keep Your Area Clean** - Please do not leave anything (papers, old pencils, etc.) on the floor when you leave.

7. **Remain in Your Assigned Seats** - Stay in your assigned seat during the class period. You are dismissed from your seat only once the bell rings.

8. **Keep Your Table / Desk Orderly** - Make sure you get a textbook from the cart when needed and return it neatly when finished. Please keep your backpacks in your locker per school policy.

9. **Turn in Assignments and Books Neatly** - When books are returned to the shelf, make sure they are stacked neatly upright and in order. Assignments are to be turned in on the front table in a neat stack.

10. **Be On Time** - Tardies will be recorded unless the student comes in with a tardy (pink) pass from another teacher or administration. If you are more than 10 minutes late to class it will result in an absence for that period. If the student has been marked absent and attendance has been submitted before the student has entered the classroom, it is the student's responsibility to speak with Mrs. Sirk directly after that class period to resolve the issue.

11. **If You Miss Class** - If you are absent, check our Google Classroom & Mrs. Sirk's website. It is your responsibility to make up what you have missed. I will not come to you with your missing work. One day absent allows you one extra day to complete missing work. For example, if you miss Monday, your Monday assignment will be due on Wednesday at the beginning of class. If you miss Thursday and Friday, your Thursday and Friday assignments will be due by Wednesday at the beginning of class. You will be responsible for copying missing notes from another classmate.

12. **Keep Track of Due Dates** - If you miss assignments, fail to complete research papers, forget about test dates, etc. you will struggle to succeed in this class. You are the only one responsible for achieving success. I do not pass or fail you. You do. Please record and keep track of due dates and be responsible for completing tasks on time. Late work is not accepted.

13. **Communicate** - If you have any concerns or worries, please talk with me. If you do not understand the material, ask for assistance. If you are having problems outside of the classroom and it is preventing you from succeeding, please let me know. I am available to help before or after school by appointment.

14. **Smartpass** - Use Smartpass if you need to leave the room. Only one student at a time. No passes are allowed the first 10 minutes of class per school policy.

15. **Cheating** - Cheating of any kind will not be tolerated within the classroom. Cheating or suspected cheating will result in a zero on that assignment or assessment.

## **Failing to Adhere to Mrs. Sirk's Classroom Rules:**

Failing to adhere to Mrs. Sirk's classroom rules will result in the following protocol:

All classroom rules and expectations will be discussed with students at the beginning of the year, so every student is aware of the expectations/consequences that will follow if they fail to adhere to the classroom rules. These expectations/consequences will also have been outlined in a classroom assignment students will have completed along with signatures from each student acknowledging their understanding of the expectations/consequences that will be placed in their student file.

Students will be addressed individually with a concern if Mrs. Sirk feels they have not followed the classroom rules. Students will be treated respectfully as young adults at all times. All discipline within the classroom will be documented within the students classroom file if needed to refer back to at any time.

*First Offense:* A before or after school detention with Mrs. Sirk.

*Second Offense:* A parent phone call or meeting with the student & Mrs. Sirk along with an after school detention.

*Third Offense:* Meeting with administration to determine forward movement in the class. The student will not be allowed to return to class until the meeting has taken place.

## **Lab Safety in the Classroom:**

I like to think that the Anatomy and Physiology experience is supposed to be fun and humor is an essential part of the classroom environment. However, there is a certain element of "potential danger" with chemicals and sharp instruments used in the lab (please see Lab Safety Contract). Therefore, a NO TOLERANCE policy will be observed for behavior problems or safety issues. Behavior problems will first be discussed individually with each student. Students will be treated respectfully as young adults. First-time offenders may be put on lab clean-up duty before or after school. Continued problems would involve conferences with parents, the student, and administrators, and could result in a possible removal from the class. A safe learning environment will be preserved for all students at all times. Safety contracts will be collected and kept on file before students may conduct labs.

## **Tips For Success:**

- Show Up On Time to Class EVERYDAY. Tardies & absences contribute to lost learning experiences that cannot be recovered just by making up assignments.



- Bring All Necessary Materials to Class EVERYDAY. Be prepared to take an active part in teaching and learning.
- Complete & Turn in Assignments Regularly and on Time on Given Due Dates.
- Study Hard and Work Well With Others. Expect to read a minimum of 45 minutes per night. See HW Rubric!
- Keep Up From the Get-Go; It Is Nearly Impossible to Get Out of a Hole Later On.
- Missed Work or Assessments Due to Absence are the Responsibility of the STUDENT. Make up times can be arranged before or after school.

*STUDY TECHNIQUES:*

The most common problem students have is that their study skills are not adequate for high school level classes. Studying for classes involves more than just "cramming the night before a test." Chapter Reviews are provided at the end of each chapter and study resources are posted on Google Classroom & Mrs. Sirks website for each section studied. The following suggestions are listed to help improve your grade in Anatomy and Physiology and other high school courses.

1. Prepare to participate in class before class begins by reading over your notes you have previously written and also read over the sections of your text that will be covered prior that day's scheduled lecture/activity.
2. Use your vocabulary list consistently as you work through each section.
3. Complete all worksheets, study questions, labs, reading assignments, and activities, etc.
4. Keep your handouts, lecture notes, and study questions organized in your three ring binder.
5. Always read assigned material and outline all the main ideas for each section.
6. Pay attention and actively participate in class.
7. Study frequently and consistently in small doses.
8. Closely study figures, sidebars, and diagrams from lecture and from your text.
9. If you are having trouble with the material, get help early. Do not wait until the day before test day!

I am looking forward to an exciting year! Best of luck and may we learn a lot from each other.

Sincerely, Mrs. Sirk