Unit 1 – Language of Anatomy & Physiology

Overview of A&P

* Define A&P
* Describe their subdivisions
* Explain the principle of complementarity

Maintaining life

* All living things have same basic characteristics and functions to maintain life
* Molecular level – organisms (brief overview)
* Survival needs
* Concepts of Homeostasis
  + Positive and negative feedback

Anatomical Positions

* Landmarks
* Body regions
* Relative positions and directions
* Body sections
* Major cavities and their subdivisions

Unit 2 – Cell Physiology

Principles of the Cell Theory

* Smallest structural and functional unit
* Activities of each cell depend on specific structural properties
* Building blocks of all multicellular organisms
* New cells come from pre-existing
* Cells of all organisms are fundamentally similar in structure and function

Overview of Cell Structure

* Cell Organelles – structure and function
* Plasma Membrane – structure and function
* Extracellular specializations – cilia, flagella, cellular junctions
* Cellular transports

Unit 3 – Principles of the Nervous System

Divisions of Nervous System and Neurons

* Central Nervous System and Peripheral Nervous System
* Anatomy and classification of neurons

Neural Communication

* Neurons and Action Potentials
* All or None Principle
* Structure and Function of Synapse
* Neurotransmitters

Central Nervous system

* Development
* Brain
  + Major divisions
  + Ventricles
  + Motor and Sensory Divisions
  + Memory
  + Limbic System
* Spinal Cord
  + White vs gray
  + Nerve highway
  + Reflex arc

Peripheral Nervous System

* Cranial Nerves
  + I-XII
  + Location and function
* Spinal Nerves
* Nerve Plexuses
  + Cervical
  + Brachial
  + Lumbar
  + Sacral
* Reflexes
  + Stretch reflex
  + Knee jerk reflex
  + Withdrawal reflexes
  + Flexor reflexes
* Sensory and Motor Pathways
* Autonomic Nervous system
  + Sympathetic division
  + Parasympathetic division
* Aging and the Nervous System
* Common disorders of the nervous system

Unit 4 – Endocrine System

* Overview
  + Structure of hormones
  + Mechanisms of hormonal action
  + Secretion and distribution
  + Control of endocrine activity
* Pituitary gland
* Thyroid gland
* Parathyroid glands
* Adrenal glands
* Pineal glands
* Pancreas
* Endocrine tissue and other organ systems
* Patterns of hormonal interaction
* Integration with other systems

Unit 5 – The Skeletal System (should be before Muscular)

* Bone as an active tissue
* Bone Structure
  + Macroscopic anatomy
    - Axial skeleton
    - Appendicular skeleton
  + Microscopic anatomy
* Bone Development and Growth
  + Intramembranous
  + Endochondral
* Bone Function
  + Major functions of bone
* Joints and Disorders

Unit 6 – The Muscular System

Types of Muscle

* Skeletal – basics
* Cardiac - basics
* Smooth – basics

The Anatomy of Skeletal Muscles

* Gross Anatomy
  + Endomysium
  + Perimysium
  + Epimysium
* Microanatomy
  + Sarcolemma
  + Sarcoplasm
  + Sarcoplasmic reticulum
  + Transverse tubules
  + Myofibrils
  + Actin and myosin
  + Z lines
  + Active sites and cross-bridges
  + Tropomyosin and troponin
* Sliding Filament Theory

The Control of Muscle Fiber Contraction

* Neuromuscular Junction
  + Synaptic terminal
  + Synaptic cleft
  + Motor end plate
  + ACh
  + AChE
* The Contraction Cycle

Muscle Mechanics

* Frequency of Muscle Fiber Stimulation
  + Twitch
  + Summation
  + Tetanus
* Number of muscle fibers involved
  + Motor units
  + Recruitment
  + Muscle tone
  + Atrophy
* Isotonic and Isometric Contractions
* Muscle Elongation

The Energetics of Muscular Activity

* ATP and CP reserves
* ATP generation
* Muscle Fatigue
* Recovery Period

Muscle Performance

* Force
* Endurance
* Types of skeletal muscle fibers
  + Fast
  + Slow
* Physical conditioning

Anatomy of the Muscular System

* Origins, insertions and actions
* Names of skeletal muscles
  + Axial
  + Appendicular
* Aging and the muscular system
* Integration with other systems

Unit 7 – The Cardiovascular System

The Functions and Composition of Blood

* Blood Collection and Analysis
* Plasma proteins
* Production of formed elements
* Red blood cells
* White blood cells
* Platelets
* Hemostasis
* Clotting process
* Clot retraction and removal

The Heart

* Surface anatomy
* Heart wall
* Blood supple to the heart
* The heartbeat
  + Contractile cells
  + Conducting systems
  + Ekg
  + Cardiac cycle
* Heart dynamics

Circulation

* Circulatory physiology
  + Factors affecting blood flow
  + Cardiovascular pressures within the systemic circuit
* Cardiovascular regulations
* Patterns of cardiovascular response
* Blood vessels
* Aging and the cardiovascular system

Unit 8 – The Lymphatic System

Organization of the lymphatic system

* Functions
* Vessels
* Lymphocytes
* Lymphoid nodules
* Organs

Nonspecific Defense

* Physical barriers
* Phagocytes
* Immunological surveillance
* Interferon
* Complement
* Inflammation
* Fever

Specific Defenses: The Immune system

* Types of immunity
* Properties of immunity
* An overview of the immune response
* T cells and cell-mediated immunity
* B cells and antibody-mediated immunity

Patterns of immune response

* Immune disorders

Integration with other systems

Unit 9 – The Respiratory System

The Functions of the Respiratory System

* The respiratory tract
* The nose
* The pharynx
* The larynx
* Trachea
* Bronchi
* Bronchioles
* Alveolar ducts and alveoli
* Respiratory membrane
* Lungs
* Pleural cavities

Physiology

* Pulmonary ventilation
* Gas exchange
* Gas transport

Respiratory Control

* Local control
* Brain control
* Reflex control
* Control higher centers

Respiratory changes at birth

Aging and the respiratory system

Integration with other systems

Unit 10 – The Digestive System

An overview of the Digestive Tract

* The oral cavity
  + Tongue
  + Salivary glands
  + Teeth
* The pharynx
* Esophagus
* Stomach
* Small intestine
* Pancreas
* Liver
* Gallbladder
* Large intestine
* Digestion and absorption

Nutrition and Metabolism

* Cellular Metabolism
* Diet and nutrition
* Bioenergetics
* Aging and nutritional requirements

Unit 11 – The Urinary System

The organization of the urinary system

* The kidneys
  + Superficial and sectional anatomy
  + Blood supply to the kidneys
  + Nephrons
* Basic principles of urine production
  + Filtration at the glomerulus
  + Reabsorption and secretion along the renal tubule
  + Control of kidney function
* Urine Transport, storage and elimination
* Fluid, electrolyte, and acid-base balance
* Aging and the urinary system
* Integration with other systems

Unit 12 – The Integumentary System

* Structure and Function
  + Epidermis
  + Dermis
  + Subcutaneous layer
  + Accessory structures
* Local control of Homeostasis
  + Injury and Repair
* Aging
* Integration with other systems

Unit 13 – The Reproductive System

* The Male reproductive system
  + Testes
  + Male reproductive tract
  + Accessory glands
  + Semen
  + Penis
  + Hormones of male reproductive function
* The Female reproductive system
  + Ovaries
  + Uterine tubes
  + Uterus
  + Vagina
  + External genitalia
  + Mammary glands
  + Hormones and menstrual cycle
* Physiology of Reproductive system
  + Male function
  + Female function
* Aging and the reproductive system
  + Menopause
  + Male climacteric

Student Contributions/Evaluation

1. Participation/Assignment (15%)— Attendance and participating in class discussions is critical to your understanding. You are responsible for knowing what transpires in class, which may ***include in-class assignments***, announcements of assignment due dates, and other information. Homework assignments are also graded in this category.
2. Lab (30%)—Student attendance in lab is required. Students are required to make up missed lab sessions. Students will work in small groups to complete assignments, but individual lab reports must be submitted. The lab portion of the grade will be based on lab behavior, lab reports and assignments.
3. Quizzes (20%)— Students will have quizzes periodically throughout this course, both pop and scheduled quizzes.
4. Exams (35%)—There will be chapter exams.
5. There is one (1) final. The final is 20% of semester grade.

Grading Scale

100 – 94 A 83 – 80 B- 59 – BELOW F

93 - 90 A- 79 – 70 C

89 – 84 B 69 – 60 D

Classroom Rules:

Handbook rules and regulations are expected to be followed as well.

* Be respectful
* Be prepared for class
* Listen and follow instructions
* Believe you can (give it your best everyday)

Cell Phone Policy: All cell phones, MP3 players and other handheld electronics will be placed in a basket at the beginning of class and will be picked up at the end of the class. If caught with a device after class starts I will keep your device for the rest of the day. If your device is taken more than two times I will turn it into Mr. Dorethy.

MacBook Policy: The MacBook will be used frequently, however, on days that it is not being used the Macbook should be placed in the students backpack. Every lab table has outlets in which the students are allowed to charge their Macbook if needed. Games and videos should not be accessed during class time and consequences will follow the student handbook. If a student has their Macbook taken they will not receive extra time on class projects.

Helpful Hints:

Make sure that you check the website daily. I post notes, assignments, tutorial links and lots of other information daily. When you are absent please check the website for the days tasks.

Read over your notes multiple times. On multiple occasions you will be given a short quiz over the notes taken the day before. Your notes should also be reviewed before any tests.

If you are absent it is fully your responsibility to get any missed assignments and/or notes. You are also required to make up labs, tests and quizzes. The length of time given is based off of the student handbook.

If you have any questions or concerns please come see me! I will be available during RTI, study hall and 3rd hour. I am also available before and after school.

PLEASE DO NOT CHEAT! This is only selling yourself short and makes it more difficult to be successful on the exams. If you do not understand something please ask. If you understand the concept help others, just make sure that you are not giving direct answers. If you had questions or concerns on the assignment, come talk to me before it’s due (like in the morning). If you are caught cheating it will result in a zero for that grade.

I am looking forward to this year and getting to know each of you!