**Bio Medical Core**
**Health Sciences 1110**
**Course Objectives**

*Module 1- Introduction to Body Organizational Metrics*

The purpose of this introductory module of biomedical sciences core class is to acquaint the student with basic terminology, with relationships of human anatomy and with the units of measurement used in the metric system. It is a basic module because all of these terms, relationships and units will be the keys to understanding the content of the remainder of the course.

**Objective 1**
Define anatomy and its specific branches and contrast it with physiology.

**Objective 2**
Identify the relationship between structure and function in living things.

**Objective 3**
Define, cell, tissue, organ, and system.

**Objective 4**
Arrange, in order, the six levels of structural organization.

**Objective 5**
Identify functions of the eleven organ systems of the body.

**Objective 6**
Describe the human anatomical position

**Objective 7**
Identify the following anatomical terms:
- Cranial, Orbital, Buccal, Cervical, Thoracic, Axillary;
- Cubital, Inguinal, Femoral, Carpal, Metacarpal, Patellar, Gluteal, Plantar, Tarsal.

**Objective 8**
Define the directional terms used in human anatomy.

**Objective 9**
Identify the planes commonly used to divide the body into portions.

**Objective 10**
Locate the following body cavities:
- Dorsal, cranial, vertebra, ventral, thoracic, mediastinal, pericardial, pleural Abdominal, pelvic

**Objective 11**
Locate the following organs:
- Superior vena cave; omentum (greater); liver; stomach; lungs; small intestine; diaphragm; heart; thyroid gland; esophagus; aorta; kidneys; ureters; urinary bladder, inferior vena cava; trachea; large intestine

**Objective 12**
Identify the most specific body cavity in which the following organs are located: heart; lungs; bronchi; intestines; kidneys; spinal cord; stomach; brain; urinary bladder; sex organs

**Objective 13**
Distinguish the nine abdominipelvic regions from the four abdominoplevic quadrants.
Objective 14
Identify the abdominopelvic quadrant in which each of the following organs is located: liver; spleen; left kidney; cecum; appendix; left ovary.

Objective 15
Locate the following bones:
- Skull
- Sternum
- Clavicle
- Pelvic girdle
- Ulna radius
- Humorous
- Femur
- Patella
- Tibia
- Fibula
- Vertebral column

Objective 16
Define homeostasis; stress; and identify the relationship between them.

Objective 17
Define negative and positive feedback and describe the negative feedback systems that are responsible for maintaining nervous system homeostasis of blood pressure and endocrine system.

Objective 18
Apply knowledge of the metric system to solve problems such as those in the “Basic Metrics” Supplement of the study notes.

Module 2 - Inorganic Chemistry

Objective 1
Define the following terms:
- Weight
- Mass
- Density
- Matter
- State of matter
- Element
- Atom

Objective 2
Given the atomic symbol of any element; identify the name of the element.

Objective 3
Define the major function(s) performed in living organisms by the following elements: calcium; phosphorus; chlorine; sulfur; potassium; sodium; magnesium; iodine; iron; oxygen; carbon.

Objective 4
Define the following: Proton; neutron; electron; atomic number; atomic weight; mass number; isotopes.

Objective 5
Given a representative section from the periodic chart determine for the average atom of any element the atomic weight and mass number; the number of electrons in a neutral atom; the number of protons and number in the nucleus.

Objective 6
Given a representative section form the periodic chart, predict the number of electrons in the outer shell and whether the atom prefers to give away, accept, or share electrons when undergoing a chemical reaction.

Objective 7
Define the following terms:
- Ion
- Cation
- Anion

Objective 8
Considering the number of electrons given or accepted during a chemical reaction, predict the charge on the resulting ion(s).

Objective 9
Describe the characteristics of ionic, covalent, and hydrogen bonds.
Objective 10
Define the following terms:
Compound; molecule; molecular; H2O; CO2

Objective 11
Given the chemical formula of a compound identify the constituent atoms and the number of each in one molecule of the compound.

Objective 12
Given a compound containing any atoms, name the compound.

Objective 13
Given the formula for a polyatomic ion, name it.

Objective 14
Distinguish the relative size of the particles present in solutions, colloids, and suspensions.

Objective 15
Distinguish the properties of solutions and suspensions.

Objective 16
Identify one important difference between crystalloid and colloids.

Objective 17
Define dilute solution, concentrated solution and specify the procedure for preparing a percent solution.

Objective 18
Given the ions formed when a compound is placed in water, classify it as an acid or base or salt.

Objective 19
Define pH

Objective 20
Given the pH of a solution, categorize it as acidic, basic, or neutral

Objective 21
Given the pH of two solutions compare their relative hydrogen ion concentrations.

Objective 22
Distinguish between “neutral” pH and the “average” pH range of blood.

Objective 23
Define weak acid, strong acid, and contrast their effects on disruption of human physiology.

Objective 24
Explain the function of buffer systems.

Objective 25
Distinguish inorganic from organic compounds

Objective 26
Given a chemical reaction, classify it a synthesis, decomposition, exchange, or reversible.

Objective 27
Identify the four most abundant elements in living systems.

Objective 28
Distinguish inorganic from organic compounds.

Objective 29
Given any of the properties of water, provide an example of how this property is utilized in the human body.
Module 3- Organic Chemistry

Objective 1
Define protoplasm

Objective 2
Name the major kinds of inorganic and organic substances found in living protoplasm

Objective 3
Name the basic building blocks of carbohydrates, proteins and lipids.

Objective 4
Given any one of the following formulas for a simple compound, determine the others: The electron dot formula, the structural formula, the molecular formula; the abbreviated structure formula.

Objective 5
Identify the formulas of the four smallest hydrocarbons.

Objective 6
Explain why it is possible to have such a wide variety of carbon compounds.

Objective 7
Recognize the general structure of the basic building block of carbohydrates.

Objective 8
Classify representative carbohydrates as mono, di- or polysaccharides.

Objective 9
Explain the overall function of carbohydrates.

Objective 10
Describe the major physiological role of the following carbohydrates:
Glucose; ribose; deoxyribose; glycogen; sucrose

Objective 11
Recognize the general structure of the basic building blocks of protein.

Objective 12
Distinguish dipeptides; tripeptides; polypeptides and proteins.

Objective 13
Describe primary, secondary, tertiary, and quaternary structure of proteins.

Objective 14
Define denaturation.

Objective 15
Describe the major physiological role of the six classes of proteins and give an example of each.

Objective 16
Explain the function of enzymes.

Objective 17
Describe the nomenclature of enzymes.

Objective 18
Recognize the general structure of the basic building block of fat (triglycerides).

Objective 19
Distinguish saturated fats, monounsaturated fats and polyunsaturated fats.

Objective 20
Describe the major physiological role of the following lipids:
Fats; phospholipids; steroids and prostaglandins.

Objective 21
Contrast the general meaning of hydrolysis and dehydration synthesis.

Objective 22
Compare hydrolysis and dehydration synthesis in carbohydrates; proteins and fats.

Objective 23
Compare the energy yield of carbohydrates, proteins and fats.

Objective 24
Describe the ATP<--> ADP + P + ENERGY conversion which occurs when the body needs energy and when the body stores energy.

Objective 25
Describe the method for detecting the presence of energy.

Objective 26
Given the force required to move an object and the distance it moves, calculate the amount of work done.

Objective 27
State the first and second laws of thermodynamics and discuss the implications.

Objective 28
Distinguish kinetic energy verse potential energy.

Objective 29
Contrast the way that kinetic energy and momentum are related to the velocity of an object.

Objective 30
Distinguish heat versus temperature and note how they are measured.

Objective 31
Identify the freezing point of water, the boiling point of water and “average body temperature” of the Fahrenheit and Celsius scales.

Objective 32
Explain the implications of the fact that water has high specific heat.

Objective 33
Correlate the heat transfer involved during a “change of the state” of water.

Objective 34
Explain why a steam burn is likely to be more severe than a boiling water burn, even if they are both at the same temperate.

Objective 35
Identify the relationship between atmospheric pressure and the temperature at which water boils and suggest a practical consequence of this fact.

Objective 36
Describe the internal sources of heat in a normal person.

Objective 37
Identify and rank the four major processes by which heat is lost from the human body. Calculate a specific example for evaporation.

Objective 38
Discuss the limitation of the concept of “normal body temperature.”
Module 4: The Cell

The first three units laid the groundwork necessary to study the cell, which is the unit of structure in all living things. During the study of the cell, you will note the close relationship between structure and function. The remarkable organization of organic and inorganic materials to produce living protoplasm will be evident. You will also begin to see that chemistry and physics are very much a part of the living system.

Cell physiology depends to a great extent upon the ability of the cell membrane to control substances which enter and leave the cell. Some of the processes involved are physical processes which involve random physical movement of molecules. Other processes require expenditure of energy by the cell. The necessary physical and biochemical backgrounds will be provided so that these processes within cell membranes will have meaning for the biomedical student.

The study of the cell is a fascinating voyage into one of the most intricate and delicate structures in the entire known universe. It is also the gateway to understanding every organ system to follow. You will find that a thorough knowledge of the principles presented here will give you the key to unlock the treasure house of the human body.

Objective 1
Describe the four principle parts of a generalized animal cell.

Objective 2
Define (selective permeability) semipermeable membrane

Objective 3
Describe the cell membrane in terms of its structure and major functions.

Objective 4
Select the factors the enable molecules to penetrate a cell membrane most easily.

Objective 5
Identify the factors which determine whether a transport process will be classified as active of passive.

Objective 6
Define each of the following transport processes and classify them as active of passive.

Objective 7
Given the concentrations on the two sides of the membrane of a substance to which the membrane is preamble, determine the direction in which net diffusion will occur when the substance moves down a concentration gradient.

Objective 8
Describe the fate of a red blood cell if placed in either a hypotonic or a hypertonic solution.

Objective 9
Given two solutions separated by semi-permeable membrane, predict the direction in which the molecules of water will move by the process of osmosis.

Objective 10
Describe the purpose of the microvilli found on the membranes of certain cells.
**Objective 11**  
Identify the location, composition, and function of cytoplasm.

**Objective 12**  
Select the major function of the cell nucleus.

**Objective 13**  
Describe the following structures within the cell nucleus:  
- Nucleoli  
- Gene  
- Chromatin  
- Chromosome

**Objective 14**  
Describe the major function of the following organelles:  
- Ribosomes  
- Endoplasmic reticulum  
- Golgi complex  
- Mitochondria  
- Lysomes  
- Peroxisomes  
- Microfilaments  
- Microtubules  
- Centrioles  
- Centrosome  
- Flagella  
- Cilia

**Objective 15**  
Define “cell inclusion” and identify one example.

**Objective 16**  
Identify the functions of extracellular (interstitial) material.

**Objective 17**  
Identify one example of an amorphous matrix material and one example of a fibrous matrix material.

**Objective 18**  
Describe cell division and the overall processes involved.

**Objective 19**  
Define the process of mitosis and identify two general purposes served by mitosis.

**Objective 20**  
Identify a major characteristic of each of the four stages of mitosis.

**Objective 21**  
Describe the process of DNA duplication (replication) which occurs during interphase. Also define nucleotide, codon and mutation.

**Objective 22**  
Given any one of the four nitrogen bases of DNA, identify it complementary nucleotide.

**Objective 23**  
Distinguish transcription and translation and identify the rule played by each of the following during the manufacture of a specific kind of protein:  
- DNA: m-RNA; t-RNA; r-RNA

**Objective 24**  
Identify the location in the cell where synthesis of the following molecules occurs:  
- Lipids  
- Carbohydrates  
- Nucleic acids
Module 5- Microbiology

Microbiology is the study of living things which are so small that a microscope is required to see them. We are surrounded by microorganisms (microbes). Some of these are very important and beneficial to us. Others are harmful and cause disease, spoilage, etc.

Objective 1
Compare the principal differences between eukaryotic and prokaryotic cells and list the groups of organisms that are included within each category.

Objective 2
Identify the characterized the three obligate microbial parasites.

Objective 3
Identify free living microorganisms.

Objective 4
Describe shapes and groupings of bacteria.

Objective 5
Characterize bacterial cell wall composition and relate it to staining; compare characteristics of gram-positive (gram+) and gram-negative (gram-) bacteria.

Objective 6
Describe bacterial sporulation and germination and identify the involved groups.

Objective 7
Describe the nutritional patterns among organisms.

Objective 8
Describe bacterial growth; compare the phases of growth.

Objective 9
Describe viral replication and its consequences to the host cell; cite examples of viral diseases.

Objective 10
Characterize the three types of symbiotic relationships between microorganisms and their hosts.

Objective 11
Define normal flora; identify areas of the human host that consistently harbor normal flora and their major inhabitants.

Objective 12
Contrast the four routes for disease transmission.

Objective 13
Differentiate among the portals of entry for pathogenic microbes.

Objective 14
Describe the pathogenic mechanisms of bacteria and related to endotoxins and exotoxins.

Objective 15
Describe the cytopathetic effects of viruses and mechanisms of host injury used by other microbes.

Objective 16
Describe nonspecific protective mechanisms that guard against the establishment of infectious diseases in a human host.

Objective 17
Describe specific protective mechanisms that guard against the establishment of infectious diseases in a human host.
Objective 18
Define nosocomial infections; identify causes of these infections and state their importance.

Objective 19
Characterize the features and patterns of primary acute, and secondary acute, chronic, latent, and subclinical infections; identify systemic host alterations.

Objective 20
Identify the major steps to determine the specific bacteria causing an infection in an individual patient.

Objective 21
Other than causing disease in humans, cite ways in which microbes are beneficial or harmful to humans.

Objective 22
Describe the prevention and control of cross infection and autogenous infection.

Objective 23
Define the terms that indicate destruction and/or suppression of microbes.

Objective 24
Identify the mode of action for physical and chemical methods of microbial control.

Objective 25
Estimate the time of survival for microbes at ambient temperatures.

Objective 26
Identify the range and spectrum of antibiotic activity; describe the mode of action for antibiotics.

Objective 27
Identify the three general methods by which bacteria acquire drug resistance to antibiotics and cite examples.

Objective 28
Explain the preparation of vaccines to prevent disease and identify hepatitis B vaccines available to health care professionals; speculate on an AIDS vaccine.

Module 6- Tissues

The skin or cutaneous membrane, with its related structures, forms the integumentary system. We will study this system and its role in body defense and temperature regulation.

Objective 1
Define tissue and histology

Objective 2
Identity the major function of each of the principle types of tissue:
Epithelial; connective; muscular; nervous; reproductive

Objective 3
Identify the general characteristics of epithelial tissue.

Objective 4
Distinguish epithelial cell shapes, layering, location, and function.

Objective 5
Define endothelium
Objective 6
Identify the type of epithelium found in the following places: Air sacs of lungs (alveoli); kidney tubules; intestines and stomach, upper respiratory tract; lining of the mouth; outer skin; lining of the urinary bladder

Objective 7
Identify the function of the following structures as well as the kind of epithelium in which all three structures can be found:
- Microvilli
- Goblet cells
- Cilia

Objective 8
Contrast the basic function of glandular epithelium with functions of lining and covering epithelium.

Objective 9
Contrast exocrine and endocrine glands

Objective 10
Contrast the general characteristics and function of epithelial tissue vs. connective tissue.

Objective 11
Identify the basic types of adult connective tissue.

Objective 12
Contrast the structural characteristics of areolar connective tissue versus that of cartilage.

Objective 13
Describe the structural and functional characteristics of each of the three types of fibers produced by fibroblasts.

Objective 14
Describe the functions of the following structures found in loose (areolar) connective tissue: hyaluronic acid; macrophages; plasma cells; mast cells; fibroblasts.

Objective 15
Define the following structures found in cartilage (the third major type of connective tissue).

Objective 16
Contrast epithelial membrane and synovial membrane. Describe the general body location of each of the principle types of membranes.

Objective 17-18
Distinguish between the parietal and the visceral portions of serous membranes.

Objective 19
Select the correct body cavity location of the pleura, the pericardium and the peritoneum.
Module 7- Nervous System Part 1

In every system we study, we refer to the influence of the nervous system. The nervous system is the great communications medium and with the endocrine system, serves to integrate and coordinate all of the systems into one unified whole.

The nervous system has some similarity to an electrical conduction system. Therefore, in this module, we will take a look at some of the physical principles of electricity, and some applications of electricity to medicine.

Objective 1
Select three broad functions of the nervous system

Objective 2
Label an organizational chart of the nervous system

Objective 3
Compare the function of neuroglia and neurons.

Objective 4
Identify the functions performed in a neuron by each of the structures below.

Objective 5
Match the structural features of a neuron with the proper classification: multipolar, bipolar, or unipolar and describe structural variations of neurons.

Objective 6
Identify the functions of afferent (sensory), efferent (motor), and internuncial (association) neurons.

Objective 7
Describe the conditions under which nerve tissue can regenerate.

Objective 8
Cite the mechanism which establishes and maintains the resting potential of the neuron membrane.

Objective 9
Given a list of events which occur when a nerve impulse is initiated and transmitted, select the correct sequence of events.

Objective 10
Define the “all-or-none” principle of nerve impulse transmission and define salutatory transmission.

Objective 11
Describe the relative velocity of nerve impulse conduction over A, B, and C fibers and identify the anatomical reason for the difference.

Objective 12
Define the following terms:
Synapse; synaptic cleft; pre-synaptic neuron; post-synaptic neuron; synaptic vesicle; excitatory transmitter (neurotransmitter) substance; inhibitory transmitter (neurotransmitter) substance.

Objective 13
Select the reason why impulse conduction across synapses is always one way.

Objective 14
Identify the roles of acetylcholine (Ach) and of acetylcholinesterase (AchE) in synaptic transmission.
Objective 15
Define synaptic fatigue and integration.

Objective 16
Select a definition and an example of the following neuronal circuits.

Objective 17
Define the following:
Static electricity; dynamic electricity; electrical charge; polarity; conductor; insulator

Objective 18
Cite the rationale behind preventing the build-up of static electricity in the operating room.

Objective 19
Select a statement which identifies under what condition water will conduct an electrical current.

Objective 20
Define the following:
Ampere; ohm; volt

Objective 21
Identify the factor which is most directly related to the degree of damage done when a person sustains electrical shock.

Objective 22
Identify the usual cause of death in electrocution.

Objective 23
Identify diagnostic measurements based upon body surface potential.

Objective 24
Cite the clinical usefulness of the following treatments: Electrostimulation; electric shock therapy; electrical pacemakers; diathermy; defibrillation

Objective 25
Identify structures comprising white matter and gray matter of nervous tissue.

Objective 26
Define the following:
Nerve; tract; ganglion; nucleus

Objective 27
Describe the following general features of the spinal cord:
The level to which it extends; its gray and white matter; its overall function

Objective 28
Identify the structures responsible for the maintenance and protection of the central nervous system.

Objective 29
Identify the purpose and site of a lumbar puncture.

Objective 30
Identify the structures contained in the following regions in or near the spinal cord: dorsal root; ventral root; columns (white columns); anterior gray horn; posterior gray horn.

Objective 31
Given the name of a tract of the spinal cord, predict its origin; its termination; and whether it is sensory or motor.

Objective 32
Identify the role of each of the components of a reflex arc.
Objective 33
Describe the components and pathways involved in a simple stretch flex, such as the patellar (knee jerk) reflex.

Objective 34
Describe the diagnostic implications of the following reflexes:
  - Patellar reflex
  - Achilles reflex
  - Babinski reflex

Objective 35
List the distribution of the 31 pairs of spinal nerves.

Objective 36
Define the term plexus

Objective 37
Select the plexus from which arises the phrenic nerve and the sciatic nerve.

Objective 38
Select the outcome if transaction of the spinal cord occurs in the following locations:
  - Base of skull
  - At the sixth spinal nerve
  - Between enlargements

Module 8- nervous system part 2

Objective 1
Identify the four principle parts of the brain

Objective 2
Describe the source and composition of cerebrospinal fluid, the area through which it circulates, and the results of an obstruction of CSF

Objective 3
Characterize the features of the blood supply to the brain and define the “blood-brain barrier”

Objective 4
Recognize the relative locations and general functions of three divisions of the brain stem

Objective 5
Describe the meaning and importance of decussation of motor fibers.

Objective 6
Recognize the general function of the two divisions of the diencephalons (thalamus and hypothalamus).

Objective 7
Select a description or a definition of each of the terms below as applied to the cerebrum:
  - Cerebral cortex
  - Convolution
  - Fissure
  - Sulcus
  - Longitudinal fissure
  - Cerebral hemisphere
  - Corpus callosum

Objective 8
Identify the general function of each lobe of the cerebrum

Objective 9
Compare the function of association, commissural and projection tracts.

Objective 10
Describe the general location of the cerebral nuclei (basal ganglia)

Objective 11
Identify the general location and overall function of the limbic system.

Objective 12
Identify the specific source of waves recorded on an electroencephalogram.
Objective 13
Recognize the implications of the split-brain concept (brain lateralization).

Objective 14
Describe the similarities in structural features of the cerebrum and cerebellum.

Objective 15
Cite the major functions of the cerebellum.

Objective 16
Contrast the general function characteristics of the following:
Acetylcholine; norepinephrine; dopamine; serotonin; glutamic acid; aspartic acid; GABA; glycine;
enkephalins; endorphins; dynorphin.

Objective 17
List the general name, number and general function of the 12 pairs of cranial nerves.

Objective 18
Outline the basic components of and the functional differences between the autonomic (visceral efferent) nervous system and the somatic (efferent) nervous system.

Objective 19
List the two divisions of the autonomic nervous system, their place of origin and their general functions.

Objective 20
Distinguish the location and function of autonomic preganglionic and postganglionic neurons.

Objective 21
Describe or define “autonomic ganglia”

Objective 22
Compare the sympathetic and parasympathetic divisions of the autonomic nervous system in terms of chemical transmitters released and the extent of visceral effectors response elicited.

Objective 23
Classify the effect of sympathetic nerve stimulation on the organs listed below:
Heart; breathing; liver; intestines/stomach; adrenals

Objective 24
Define the following:
Dual innervation; rest/repose; flight/fight; visceral autonomic reflex arc

Objective 25
Discuss the therapeutic value of biofeedback and transcendental mediation.

Objective 26
Identify either by cause of symptoms each of the following conditions:
Poliomyelitis (polio); tabes dorsalis; cerebral palsy; parkinsonism; multiple sclerosis; epilepsy; cerebrovascular accidents (CVA or “stroke”); dyslexia

Objective 27
Identify the meaning of the medical terms listed below:
Analgesia; aphasia; coma; neuralgia; neuritis; encephalitis

Objective 28
Select the probable way in which anesthesia produces loss of sensation.

Objective 29
Identify three ways in which microbes can enter the central nervous system.

Objective 30
Cite the common cause of acute inflammation of the meninges (meningitis).
Objective 31
For each of the listed diseases, identify the type of muscle paralysis and the underlying cause of the paralysis.

Module 9- Sensations

In this unit of study, we will study general sensations and our special senses. We will learn about the mechanisms that allow us to be aware of both our internal and our external environments. Often we take our senses for granted, and to not appreciate the marvelous masterpieces of structure and function which they are. After we have studied the sense organs, we will briefly review the principles of physics which apply to the transmission of sound energy and light energy.

Objective 1
Define sensation and the events/components required to produce a summation and the site where sensations occur.

Objective 2
Define the following processes and characteristics of perceived sensations:
- Projection; adaptation; after-image; modality

Objective 3
Describe the location and function of the following:
- Exteroceptors; visceroreceptors; proprioceptors

Objective 4
Given the results of a two-point discrimination test, select the most sensitive area (i.e. the one with the greatest supply of touch receptors).

Objective 5
Identify the location of the receptors for the following general sensations:
- Touch; pressure; heat/cold; pain; proprioception

Objective 6
Differentiate visceral pain; somatic pain; referred pain; and phantom pain

Objective 7
Identify how referred pain is used to help in the diagnosis of myocardial infarction.

Objective 8
Identify the rationale for and the type of surgery performed to relieve pain which does not respond to pain-killing drugs

Objective 9
Describe two theories of how acupuncture works.

Objective 10
Identify the location of the receptors, and trace the nerve pathway to the brain for two of the special senses, olfactory and taste.

Objective 11
Identify a function performed in common by the eyebrows; eyelashes, eyelids and lacrimal apparatus.
Objective 12
Select the sequence of structures through which tears pass from the lacrimal gland to the nasal cavity.

Objective 13
Given a diagram, identify the principle anatomical structures of each of the three tunics of the eye.

Objective 14
Describe the interior structure of the eyeball.

Objective 15
Describe the glaucoma in terms in intraocular pressure, aqueous humor and the canal of schlemm.

Objective 16
Name the four basic processes required to focus light rays (to form an image on the retina).

Objective 17
Define refraction and list the four refractive media of the eye and the order in which light passes through them.

Objective 18
Define accommodation and select the correct definition for the following:
   Accommodation, myopia; hypermetropia; emmetropia; astigmatism

Objective 19
Describe constriction of the pupil and its purposes.

Objective 20
Define convergence as a mechanism by which light rays strike both retinas and corresponding points.

Objective 21
Compare the location and general functions of the intrinsic and extrinsic eye muscles as they relate to accommodation and convergence.

Objective 22
Describe why the retinal image is “inverted” and where the image is turned upright.

Objective 23
Identify and distinguish the structures of the retinal which play a direct role in converting light energy into nerve impulses.

Objective 24
Describe the relationship between the rhodopsin cycle and the ability to adjust for vision under dim lighting.

Objective 25
Trace the afferent pathway of light impulses to the brain and note the function of the optic chiasma.

Objective 26
Given a diagram of the ear, label all the parts of the outer, middle and inner ear.

Objective 27
Describe the function of the auditory (Eustachian) tube.

Objective 28
Trace the passage of sound waves from the air to the hair cells of the cochlea and name the anatomical part transmitting the vibration.
Objective29
Trace the neural pathway of impulses for sound and site where actual hearing occurs.

Objective30
Identify the structures of the inner ear where the receptor for static equilibrium and dynamic equilibrium are located.

Objective31
Given the symptoms and/or causes of any of the following, identify the disorder.
Cataract; conjunctivitis; Meniere’s disease

Objective32
Define the medical terminology associated with the sense organs.

Objective33
Differentiate between transverse and longitudinal waves and identify the class to which sound waves and light waves belong.

Objective34
Define the following terms associated with waves:
Displacement; amplitude; wavelength; frequency; velocity; reflection; refraction; absorption; transmission; diffraction

Objective35
Distinguish between constructive and destructive interference.

Objective36
Identify the average velocity of sound waves in air at 20°C and compare this with the velocity of sound in liquids and solids.

Objective37
Identify the physical factor which produces the pitch of voice and the loudness of sound.

Objective38
Identify the wavelength range of the spectrum to which the human eye can respond.

Objective39
Describe, in terms of reflection and/or absorbance, why an object appears to have a given color.

Objective40
Describe why the sky appears blue and why the sunset colors are orange and red.

Module 10- Endocrine System

The endocrine system shares with the nervous system the function of controlling and integrating all other systems into one well-coordinated organism. Whereas the organs of all other systems have some physical proximity or physical continuity with each other, the organs which make up the endocrine system are widely scattered. In spite of this, they have mediated influence, not only on each other, but also on the other organs of the body. This influence is mediated through their specific hormone products. The role of the endocrine glands in controlling homeostasis and in meeting stress situations will conclude the study of this module.

Objective1
List the four broad areas of hormonal action

Objective2
Distinguish between endocrine and exocrine glands.
Objective 3
   Identify the relationship between an endocrine gland and a target organ or cells.

Objective 4
   Describe the two proposed mechanisms of hormonal action.

Objective 5
   Characterize prostaglandins and list some of their major functions.

Objective 6
   Distinguish negative versus positive feedback and explain the relative importance of these two mechanisms in regulating hormone levels in the blood.

Objective 7
   Describe the anatomical and physiological relationships between the pituitary (which includes the adenohypophysis and the neurohypophysis) and the hypothalamus.

Objective 9
   Identify the source of the hormones secreted by the neurohypophysis, their target organs; and functions.

Objective 10
   Describe pituitary dwarfism, Simmond’s disease, gigantism, acromegaly and diabetes insipidus.

Objective 11
   Explain how thyroxine is synthesized, stored and transported.

Objective 12
   Identify the physiological effects and regulation of secretion of (thyro) calcitonin.

Objective 13
   Describe the negative feedback mechanism that regulates TSH and thyroxine hormones secretion. Identify stimulus, response, tropic and non-tropic hormones and target organs.

Objective 14
   Cite the clinical symptoms of the abnormalities of thyroid secretion.

Objective 15
   Describe the physiological effects of parathyroid hormone, and how the secretion of parathyroid hormone is regulated.

Objective 16
   Contrast the cause and the symptoms of tetany with the causes and symptoms of osteitis fibrosa cystica.

Objective 17
   Identify the effects of adrenal cortical mineralocorticoids, glucocorticoids and gonadocorticoids.

Objective 18
   Describe the mechanism of control of the mineralocorticoid aldosterone by reninangiotensins.

Objective 19
   Compare the effects of hypo- and hypersecretions of adrenalocortical hormones.

Objective 20
   Compare the effects of adrenal medullary secretions to the effects of sympathetic.

Objective 21 and 22
   Compare the roles of glucagons and insulin in the control of blood glucose levels. Identify the principle effects of hyperinsulinism and hypoinsulinism.

Objective 23
   List the major hormones secreted by ovaries and testes.
Objective 24
Identify the physiological effects of the hormones secreted by the pineal gland.

Objective 25
Define the role of the thymus gland.

Objective 26
Define the general adaptation syndrome and compare homeostatic responses and stress responses.

Objective 27
Identify the body reactions during the alarm, resistance, and exhaustion stages of the general adaptation syndrome.

Objective 28
Define the medical terminology associated with the endocrine system.