CHAPTER-3

PHYSIOLOGICAL, PSYCHOLOGICAL AND RADIOLOGICAL
FEATURES OF THE STUDENTS

3.1 STUDENT:

A Student, also Pupil, is a learner, or someone who attends an educational institution. A person formally engaged in learning, especially one enrolled in a school or college; pupil.

The student community is the asset of the family, society and world. Student life is an important period in the life of every individual. The followings should be a part of education imparted to the students.

- Literary skills,
- Knowledge of Trade,
- Discipline and
- Laws of Nature

But, the students today are taught only the literary and trade skills at various institutions which help them achieve economic progress alone. The students as well as the country can progress only if education includes inculcation of cultural values. The laws of Nature, Discipline and Good manners should also be taught for love, peace, contentment and happiness to find place in the life of the students. Such an education provides an opportunity for the noble qualities of morality, honesty and a sense of duty and service to blossom in the minds of the students, which paves the way for success and prosperity in their lives.

3.2 PHYSIOLOGICAL FEATURES:

3.2.1 INTRODUCTION:

Physiology is the study of how living systems function. Scientists who study physiology are called physiologists. Physiologists attempt to describe biological phenomena in physical and chemical terms. Physiologists come to the field with extremely diverse backgrounds and apply their specialized skills and knowledge to understanding the function of living systems.
Physiologists study living systems from the sub cellular level (molecules and organelles) all the way to the level of the whole organism and how organisms adapt to vastly different environmental conditions such as hot, cold, dry, humid, or high altitude. In their attempt to elucidate the mechanisms operating in living systems, physiologists make use of an enormous array of experimental techniques. Techniques of cell and molecular biology, genetics, genomics, bioinformatics, chemistry, physics, and engineering, all find applications in the study of living systems by physiologists.

Physiology is the basis for all of the biomedical sciences, and forms the bridge between all of the other biomedical sciences. Physiology enables information gained by molecular biology, cell biology, genetics, pharmacology, biophysics, biomathematics, and biochemistry to be described in an integrated manner that can be applied to human medicine. Much of clinical medicine is based on a sound understanding of molecular, cellular, and organ-system physiology.

3.2.2 HOMEOSTASIS:

Homeostasis in a general sense refers to stability, balance or equilibrium. Maintaining a stable internal environment requires constant monitoring and adjustments as conditions change. This adjusting of physiological systems within the body is called homeostatic regulation. It involves three parts or mechanisms: 1) Receptor, 2) Control center and 3) Effector.

The Receptor receives information that something in the environment is changing. The Control center or integration center receives and processes information from the receptor. And lastly, the Effector responds to the commands of the control center by either opposing or enhancing the stimulus.

A metaphor to help us understand this process is the operation of a thermostat. The thermostat monitors and controls room temperature. The thermostat is set at a certain temperature that is considered ideal, the set point. The function of the thermostat is to keep the temperature in the room within a few degrees of the set point. If the room is colder than the set point, the thermostat receives information from the thermometer (the receptor) that it is too cold. The effectors within the thermostat then will turn on the heat to warm up the room. When the room temperature reaches the set point, the receptor receives the information, and the thermostat "tells" the heater to turn off. This also works when it is too hot in the room. The thermostat receives the
information and turns on the air conditioner. When the set point temperature is reached, the thermostat turns off the air conditioner.

Our bodies control body temperature in a similar way. The brain is the control center, the receptor is our body's temperature sensors, and the effector is our blood vessels and sweat glands in our skin. When we feel heat, the temperature sensors in our skin send the message to our brain. Our brain then sends the message to the sweat glands to increase sweating and increase blood flow to our skin. When we feel cold, the opposite happens. Our brain sends a message to our sweat glands to decrease sweating, decrease blood flow, and begin shivering. This is an ongoing process that continually works to restore and maintain homeostasis. Because the internal and external environments of the body are constantly changing and adjustments must be made continuously to stay at or near the set point, homeostasis can be thought of as a dynamic equilibrium.

3.2.3 CELL PHYSIOLOGY:

Cells are the microscopic fundamental units of all living things. Every living thing has cells: bacteria, protozoans, fungi, plants, and animals are the main groups (Kingdoms) of living things. Some organisms are made up of just one cell (e.g. bacteria and protozoans), but animals, including human beings, are multi-cellular. An adult human body is composed of about 100 trillion cells! Each cell has basic requirements to sustain it, and the body's organ systems are largely built around providing the many trillions of cells with those basic needs (such as oxygen, food, and waste removal).

There are about 200 different kinds of specialized cells in the human body. When many identical cells are organized together it is called a tissue (such as muscle tissue, nervous tissue, etc). Various tissues organized together for a common purpose are called organs (e.g. the stomach is an organ, and so are the skin, the brain, and the uterus).

Ideas about cell structure have changed considerably over the years. Early biologists saw cells as simple membranous sacs containing fluid and a few floating particles. Today's biologists know that cells are infinitely more complex than this. Therefore, a strong knowledge of the various cellular organelles and their functions is important to any physiologist. If a person's cells are healthy, then that person is healthy. All physiological processes, growth and development, and
disease can be described at the cellular level. Although there are specialized cells - both in structure and function - within the body, all cells have similarities in their structural organization and metabolic needs.

3.2.4 INTEGUMENTARY SYSTEM:

The integumentary system consists of the skin, the subcutaneous tissue below the skin, hair, nails and assorted glands. The most obvious function of the integumentary system is the protection that the skin gives to underlying tissues. The skin not only keeps most harmful substances out, but also prevents the loss of fluids.

There are four types of glands in the integumentary system: Sudoriferous glands, Sebaceous glands, Ceruminous glands, and Mammary glands. Sudoriferous glands are sweat producing glands. These are important to help maintain body temperature. Sebaceous glands are oil producing glands which help inhibit bacteria, keep us waterproof and prevent our hair and skin from drying out. Ceruminous glands produce earwax which keeps the outer surface of the eardrum pliable and prevents drying. Mammary glands produce milk.

Skin: Skin is an organ of the integumentary system made up of a layer of tissues that guard underlying muscles and organs. As the interface with the surroundings, it plays the most important role in protecting against pathogens. Its other main functions are insulation, temperature regulation, sensation and vitamin D and B synthesis. Skin is considered as one of the most important parts of the body.

Skin has pigmentation, melanin, provided by melanocytes, which absorbs some of the potentially dangerous radiation in sunlight. It also contains DNA repair enzymes which reverse UV damage, and people who lack the genes for these enzymes suffer high rates of skin cancer. One form predominantly produced by UV light, malignant melanoma, is particularly invasive, causing it to spread quickly, and can often be deadly. Human skin pigmentation varies among populations in a striking manner. This has sometimes led to the classification of people on the basis of skin color.

Hair: Humans have three different types of hair:

1. Lanugo, the fine hair that covers nearly the entire body of embryos.
2. Vellus hair, the short, fine, "peach fuzz" body hair that grows in most places on the human body in both sexes.

3. Terminal hair, the fully developed hair, which is generally longer, coarser, thicker, and darker than vellus hair.

Pathological impacts on hair: Drugs used in cancer chemotherapy frequently cause a temporary loss of hair, noticeable on the head and eyebrows, because they kill all rapidly dividing cells, not just the cancerous ones. Other diseases and traumas can cause temporary or permanent loss of hair, either generally or in patches.

Nails: The fingernail is an important structure made of keratin. The fingernails generally serve two purposes. It serves as a protective plate and enhances sensation of the fingertip. The protection function of the fingernail is commonly known, but the sensation function is equally important. The fingertip has many nerve endings in it allowing us to receive volumes of information about objects we touch. The nail acts as a counterforce to the fingertip providing even more sensory input when an object is touched. The structure of the nail is divided into six specific parts - the root, nail bed, nail plate, eponychium, perionychium, and hyponychium.

3.2.5 THE NERVOUS SYSTEM:

The nervous system is comprised of two major parts, or subdivisions, the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS includes the brain and spinal cord. The brain is the body's "control center". The CNS has various centers located within it that carry out the sensory, motor and integration of data. These centers can be subdivided to Lower Centers (including the spinal cord and brain stem) and Higher Centers communicating with the brain via effectors. The PNS is a vast network of spinal and cranial nerves that are linked to the brain and the spinal cord. It contains sensory receptors which help in processing changes in the internal and external environment. This information is sent to the CNS via afferent sensory nerves. The PNS is then subdivided into the autonomic nervous system and the somatic nervous system. The autonomic has involuntary control of internal organs, blood vessels, smooth and cardiac muscles. The somatic has voluntary control of skin, bones, joints, and skeletal muscle. The two systems function together, by way of nerves from the PNS entering and becoming part of the CNS, and vice versa.
Central Nervous System:

The CNS is conceived as a system devoted to information processing, where an appropriate motor output is computed as a response to a sensory input. Many threads of research suggest that motor activity exists well before the maturation of the sensory systems, and senses only influence behavior without dictating it. This has brought the conception of the CNS as an autonomous system.

Brain: The brain is found in the cranial cavity. Within it are found the higher nerve centers responsible for coordinating the sensory and motor systems of the body (forebrain). The brain stem houses the lower nerve centers (consisting of midbrain, Pons, and medulla).

Medulla: The medulla is the control center for respiratory, cardiovascular and digestive functions.

Pons: The Pons houses the control centers for respiration and inhibitory functions. Here it will interact with the cerebellum.

Cerebrum: The cerebrum, or top portion of the brain, is divided by a deep crevice, called the longitudinal sulcus. The longitudinal sulcus separates the cerebrum into the right and left hemispheres. In the hemispheres, the cerebral cortex, basal ganglia and the limbic system are located. The two hemispheres are connected by a bundle of nerve fibers called the corpus callosum. The right hemisphere is responsible for the left side of the body while the opposite is true of the left hemisphere. Each of the two hemispheres are divided into four separated lobes: the frontal in control of specialized motor control, learning, planning and speech; parietal in control of somatic sensory functions; occipital in control of vision; and temporal lobes which consists of hearing centers and some speech. Located deep to the temporal lobe of the cerebrum is the insula.

Cerebellum: The cerebellum is the part of the brain that is located posterior to the medulla oblongata and Pons. It coordinates skeletal muscles to produce smooth, graceful motions. The cerebellum receives information from our eyes, ears, muscles, and joints about what position our body is currently in. It also receives output from the cerebral cortex about where these parts should be. After processing this information, the cerebellum sends motor impulses from the brain.
stem to the skeletal muscles. The main function of the cerebellum is coordination. The cerebellum is also responsible for balance and posture. It also assists us when we are learning a new motor skill, such as playing a sport or musical instrument.

The Limbic System: It is a complex set of structures found just beneath the cerebrum and on both sides of the thalamus. It combines higher mental functions, and primitive emotion, into one system. It is often referred to as the emotional nervous system. It is not only responsible for our emotional lives, but also our higher mental functions, such as learning and formation of memories. The Limbic system explains why some things seem so pleasurable to us, such as eating and why some medical conditions are caused by mental stress, such as high blood pressure. There are two significant structures within the limbic system and several smaller structures that are important as well. They are: Hippocampus, Amygdala, Thalamus, Hypothalamus, Fornix and Para-hippocampus, Cingulate Gyrus.

Memory:

Memory is defined as, the mental faculty of retaining and recalling past experiences, the act or instance of remembering recollection. Learning takes place when we retain and utilize past memories. There are three basic types of memory:

- Sensory Memory,
- Short Term Memory,
- Long Term Memory.

Sensory Memory: It acts as a buffer for stimuli through senses. A sensory memory retains an exact copy of what is seen or heard: iconic memory for visual, echoic memory for Aural and haptic memory for touch. Information is passed from sensory memory into short term memory. Some believe it lasts only 300 milliseconds, it has unlimited capacity. Selective attention determines what information moves from sensory memory to short term memory.

Short Term Memory: It acts as a scratch pad for temporary recall of the information under process. For instance, in order to understand this sentence we need to hold in our mind the beginning of the sentence as we read the rest. Short term memory decays rapidly and also has a limited capacity. Chunking of information can lead to an increase in the short term memory.
capacity; this is the reason why a hyphenated phone number is easier to remember than a single long number. The successful formation of a chunk is known as closure. Interference often causes disturbance in short term memory retention. This accounts for the desire to complete a task held in short term memory as soon as possible.

Long Term Memory: It is used for storage of information over a long time. Information from short to long term memory is transferred after a short period. Unlike short term memory, long term memory has little decay. Long term potential is an enhanced response at the synapse within the hippocampus. It is essential to memory storage. The limbic system is not directly involved in long term memory necessarily but it selects them from short term memory, consolidates these memories by playing them like a continuous tape, and involves the hippocampus and amygdala.

**Peripheral Nervous System:**

The peripheral nervous system includes 12 cranial nerves 31 pairs of spinal nerves. It can be subdivided into the Somatic and Autonomic systems. It is a way of communication from the Central Nervous System to the rest of the body by nerve impulses that regulate the functions of the human body. Spinal nerves take their origins from the spinal cord. They control the functions of the rest of the body. In humans, there are 31 pairs of spinal nerves: 8 cervical, 12 thoracic, 5 lumbar, 5 sacral and 1 coccygeal.

The Autonomic System: It deals with the visceral organs, like the heart, stomach, gland, and the intestines. It regulates systems that are unconsciously carried out to keep our body alive and well, such as breathing, digestion (peristalsis), and regulation of the heartbeat. The Autonomic system consists of the sympathetic and the parasympathetic divisions. Both divisions work without conscious effort, and they have similar nerve pathways, but the sympathetic and parasympathetic systems generally have opposite effects on target tissues. By controlling the relative input from each division, the autonomic system regulates many aspects of homeostasis. One of the main nerves for the parasympathetic autonomic system is Cranial Nerve 10, the Vegas nerve.

The Sympathetic System: It activates what is often termed the ‘Fight or Flight’ response, as it is most active under sudden stressful circumstances (such as being attacked). This response is also known as sympathethico-adrenal response of the body, as the pre-ganglionic sympathetic fibers
that end in the adrenal medulla (but also all other sympathetic fibers) secrete acetylcholine, which activates the secretion of adrenaline (epinephrine) and to a lesser extent nor-adrenaline (nor-epinephrine) from it. Therefore, this response that acts primarily on the cardiovascular system is mediated directly via impulses transmitted through the sympathetic nervous system and indirectly via catecholamines secreted from the adrenal medulla.

The parasympathetic nervous system: It is sometimes called the ‘rest and digest’ system or feed and breed. The parasympathetic system conserves energy as it slows the heart rate, increases intestinal and gland activity, and relaxes sphincter muscles in the gastrointestinal tract.

3.2.6 SENSES:

Senses are the physiological methods of perception. The senses and their operation, classification, and theory are overlapping topics studied by a variety of fields. Sense is a faculty by which outside stimuli are perceived.

We experience reality through our senses. Many neurologists disagree about how many senses there actually are due to a broad interpretation of the definition of a sense. Our senses are split into two different groups. Our Exteroceptors detect stimulation from the outsides of our body, for example, smell, taste and equilibrium. The Interoceptors receive stimulation from the inside of our bodies. For instance, blood pressure dropping, changes in the glucose and Ph levels. Children are generally taught that there are five senses (sight, hearing, touch, smell, taste). However, it is generally agreed that there are at least seven different senses in humans, and a minimum of two more observed in other organisms. Sense can also differ from one person to the next. Take taste for an example, what may taste great to one, will taste awful to someone else. This all has to do with how our brains interpret the stimuli that is given.

3.2.7 THE MUSCULAR SYSTEM:

The muscular system is the biological system of humans that allows us to move. The muscular system, in vertebrates, is controlled through the nervous system, although some muscles, like cardiac muscle, can be completely autonomous.

Muscle is contractile tissue and is derived from the mesodermal layer of embryonic germ cells. Its function is to produce force and cause motion, either locomotion or movement within internal
organs. Much of muscle contraction occurs without conscious thought and is necessary for survival, like the contraction of the heart or peristalsis, which pushes food through the digestive system. Voluntary muscle contraction is used to move the body and can be finely controlled, such as movements of the finger or gross movements that of the biceps and triceps.

Muscle is composed of muscle cells, sometimes known as "muscle fibers". Within the cells are myofibrils; myofibrils contain sarcomeres which are composed of actin and myosin. Individual muscle cells are lined with endomysium. Muscle cells are bound together by perimysium into bundles called fascicles. These bundles are then grouped together to form muscle, and is lined by epimysium. Muscle spindles are distributed throughout the muscles, and provide sensory feedback information to the central nervous system.

Skeletal muscle, which involves muscles from the skeletal tissue, is arranged in discrete groups. An example of which includes the biceps brachii. It is connected by tendons to processes of the skeleton. In contrast, smooth muscle occurs at various scales in almost every organ, from the skin (in which it controls erection of body hair) to the blood vessels and digestive tract (in which it controls the caliber of a lumen and peristalsis).

The ten types of muscle have significant differences. However, all but three use the movement of actin against myosin to create muscle contraction and relaxation. In skeletal muscle, contraction is stimulated by action potential electrical impulses transmitted by the nerves, the motor nerves and motoneurons in particular. All skeletal muscle and many smooth muscle contractions are facilitated by the neurotransmitter acetylcholine.

Muscular activity accounts for most of the body's energy consumption. Muscles store energy for their own use in the form of glycogen, which represents about 1% of their mass. This can be rapidly converted to glucose when more energy is necessary.

### 3.2.8 BLOOD PHYSIOLOGY:

Blood is a circulating tissue composed of fluid plasma and cells. Anatomically, blood is considered a connective tissue, due to its origin in the bones and its function. Blood is the means and transport system of the body used in carrying elements (e.g. nutrition, waste, heat) from one location in the body to another, by way of blood vessels.
The primary function of blood is to supply nutrients and constitutional elements to tissues and to remove waste products. Blood also enables cells and different substances to be transported between tissues and organs. Problems with blood composition or circulation can lead to downstream tissue malfunction. Blood is also involved in maintaining homeostasis by acting as a medium for transferring heat to the skin and by acting as a buffer system for bodily pH.

Oxygen (O2) is carried throughout the body by the blood circulation. Pulmonary circulation happens when blood leaves the heart, enters the lungs, and becomes saturated with oxygen. Once this saturated blood exits the heart, it delivers the oxygen to all organs throughout the body. This oxygen depleted blood is then delivered back to the lungs to be renewed with fresh oxygen. Blood is made of two parts:

1. Plasma which makes up 45-55% of blood volume.

2. Formed cellular elements (red and white blood cells, and platelets) which combine to make the remaining blood volume.

Plasma: It is made up of 90% water, 7-8% soluble proteins, 1% electrolytes, and 1% elements in transit. One percent of the plasma is salt, which helps with the pH of the blood. The largest group of solutes in plasma contains three important proteins. There are: albumins, globulins, and clotting proteins.

Red Blood Cells:

RBC’s are formed in the myeloid tissue or most commonly known as red bone marrow, although when the body is under severe conditions the yellow bone marrow, which is also in the fatty places of the marrow in the body will also make RBC’s. The formation of RBC’s is called erythropoiesis (erythro / red; poiesis / formation). Red blood cells lose nuclei upon maturation, and take on a biconcave, dimpled, shape. They are about 7-8 micrometers in diameter. There are about 1000x more red blood cells than white blood cells. RBC’s live about 120 days and do not self repair. RBC’s contain hemoglobin which transports oxygen from the lungs to the rest of the body, such as to the muscles, where it releases the oxygen load. The hemoglobin gets its red color from their respiratory pigments.
The main function is the transportation of oxygen throughout the body and the ability of the blood to carry out carbon dioxide which is called carbamino – hemoglobin. Maintaining the balance of blood is important. The balance can be measured by the acid and base levels in the blood. This is called pH. Normal pH of blood ranges between 7.35-7.45; this normal blood is called Alkaline (less acidic than water). A drop in pH is called Acidic. This condition is also called Acidosis. A jump in pH higher than 7.45 is called "Alkalis". To maintain the homeostasis, the blood has tiny molecules within the RBC that help prevent drops or increases from happening.

**White Blood Cells:**

White blood cells are different from red cells in the fact that they are usually larger in size 10-14 micrometers in diameter. White blood cells do not contain hemoglobin which in turn makes them translucent. Many times in diagrams or pictures white blood cells are represented in a blue color, mainly because blue is the color of the stain used to see the cells. White blood cells also have nucleii, that are somewhat segmented and are surrounded by electrons inside the membrane.

Functions: White blood cells are made in the bone marrow but they also divide in the blood and lymphatic systems. The different types of WBC's are Basophils, Eosinophils, Eeutrophils, Monocytes, B- and T-cell lymphocytes. Basophils store and synthesize histamine which is important in allergic reactions. They enter the tissues and become "mass cells" which help blood flow to injured tissues by the release of histamine. Eosinophils are chemotaxic and kill parasites. Neutrophils are the first to act when there is an infection and are also the most abundant white blood cells. Neutrophils fight bacteria and viruses by phagocytosis which means they engulf pathogens that may cause infection. The life span of a Neutrophil is only about 12-48 hours. Monocytes are the biggest of the white blood cells and are responsible for rallying the cells to defend the body. Monocytes carry out phagocytosis and are also called macrophages. Lymphocytes help with our immune response. There are two Lymphocytes: the B- and T- cell. B-Lymphocytes produce antibodies that find and mark pathogens for destruction. T-Lymphocytes kill anything that they deem abnormal to the body.
3.2.9 THE CARDIOVASCULAR SYSTEM:

The heart is a hollow, muscular organ about the size of a fist. It is responsible for pumping blood through the blood vessels by repeated, rhythmic contractions. The heart is composed of cardiac muscle, an involuntary muscle tissue that is found only within this organ. The term "cardiac" means "related to the heart" and comes from the Greek word kardia, for "heart." It has a four chambered, double pump and is located in the thoracic cavity between the lungs.

The cardiac muscle is self-exiting, meaning it has its own conduction system. This is in contrast with skeletal muscle, which requires either conscious or reflex nervous stimuli. The heart's rhythmic contractions occur spontaneously, although the frequency or heart rate can be changed by nervous or hormonal influence such as exercise or the perception of danger.

The heart is the life-beating, always-thumping muscle in our chest. From inside the womb until death, the thump goes on. The heart for the average human will contract about 3 billion times; never resting, never stopping to take a break except for a fraction of a second between beats. If a person lives to be 80 years old, his heart will continue to beat an average of 100,000 times a day. Many believe that the heart is the first organ to become functional. Within weeks of conception the heart starts its mission of supplying the body with nutrients even though the embryo is no bigger. The primary function of the heart is to pump blood through the arteries, capillaries, and veins. There is an estimated 60,000 miles of vessels throughout an adult body. Blood then transports oxygen, nutrients, disease causing viruses, bacteria, hormones and has other important functions as well. The heart is the pump that keeps blood circulating properly.

3.2.10 THE IMMUNE SYSTEM:

The Immune system is a complex system that is responsible for protecting us against infections and foreign substances. The immune system is closely tied to the lymphatic system, with B and T lymphocytes being found primarily within lymph nodes. Tonsils and the thymus gland are also considered lymph organs and are involved in immunity. We often don't realize how effective the immune system is until it fails or malfunctions, such as when the lymphocytes are attacked by HIV in an AIDS patient.
The immune system is a silent wonder. While we are very aware of our heart beating and the breaths we take, we are much less aware of our immune system that protects us from thousands of potentially deadly attacks every day. A good way to start understanding the immune system is to liken it to a castle. It has three lines of defense:

A moat and drawbridge: The first line of defense in our bodies are physical and chemical barriers - our skin, stomach acids, mucous, tears, vaginal opening, of which the last three mostly produce lysozyme to destroy harmful incoming pathogens.

Sentries and archers who stand on the castle wall: The second line of defense is non-specific immune responses - marcophages, neutrophils, interferons, and complement proteins. This line of defense also includes fever and inflammatory response as nonspecific defenses.

Soldiers within the castle: Our third line of defense is specific immune responses - T Cells and B Cells. There are many types of each which work like a close knit team to destroy pathogens.

If pathogens (invaders) try and succeed in penetrating the first line of defense, then the second line of defense is ready to act. If both the first and second line of defense fails, then the third line of defense will act. It is when all three lines of defense are breached that we get sick and are subject to disease. The immune system is a set of mechanisms of defense, protecting an organism from infection by identifying and attacking pathogens. This is a difficult task, since pathogens range from viruses to parasitic worms and must be detected with absolute specificity as they are "hidden" amongst normal cells and tissues. Pathogens are also constantly changing themselves to avoid detection and successfully infect and destroy their hosts.

3.2.12 THE RESPIRATORY SYSTEM:

The organs of the respiratory system make sure that oxygen enters our bodies and carbon dioxide leaves our bodies. The respiratory tract is the path of air from the nose to the lungs. It is divided into two sections as follows.

Upper Respiratory Tract: It consists of the nose and the pharynx. Its primary function is to receive the air from the external environment and filter, warm, and humidify it before it reaches the delicate lungs where gas exchange will occur.
Air enters through the nostrils of the nose and is partially filtered by the nose hairs, then flows into the nasal cavity. The nasal cavity is lined with epithelial tissue, containing blood vessels, which help warm the air; and secrete mucous, which further filters the air. The endothelial lining of the nasal cavity also contains tiny hair like projections, called cilia. The cilia serve to transport dust and other foreign particles, trapped in mucous, to the back of the nasal cavity and to the pharynx. There the mucus is either coughed out, or swallowed and digested by powerful stomach acids. After passing through the nasal cavity, the air flows down the pharynx to the larynx.

Lower Respiratory Tract: The lower respiratory tract starts with the larynx, and includes the trachea, the two bronchi that branch from the trachea, and the lungs themselves. This is where gas exchange actually takes place. The larynx, colloquially known as the voice box, is an organ in our neck involved in protection of the trachea and sound production. The larynx houses the vocal cords, and is situated just below where the tract of the pharynx splits into the trachea and the esophagus. The larynx contains two important structures: the epiglottis and the vocal cords.

The epiglottis is a flap of cartilage located at the opening to the larynx. During swallowing, the larynx (at the epiglottis and at the glottis) closes to prevent swallowed material from entering the lungs; the larynx is also pulled upwards to assist this process. Stimulation of the larynx by ingested matter produces a strong cough reflex to protect the lungs. Choking occurs when the esophagus fails to cover the trachea, and food becomes lodged in our windpipe.

The vocal cords consist of two folds of connective tissue that stretch and vibrate when air passes through them, causing vocalization. The length the vocal cords are stretched determines what pitch the sound will have. The strength of expiration from the lungs also contributes to the loudness of the sound. Our ability to have some voluntary control over the respiratory system enables us to sing and to speak. In order for the larynx to function and produce sound, we need air. That is why we can't talk when we're swallowing.

3.2.13 THE GASTROINTESTINAL SYSTEM:

Gastrointestinal tract (GI tract), The 30+ foot long tube that goes from the mouth to the anus is responsible for the many different body functions. The GI tract is imperative for our well being and our life-long health. A non-functioning or poorly functioning GI tract can be the
source of many chronic health problems that can interfere with our quality of life. In many instances the death of a person begins in the intestines.

The Gastrointestinal System is responsible for the breakdown and absorption of various foods and liquids needed to sustain life. Many different organs have essential roles in the digestion of food, from the mechanical disrupting of the teeth to the creation of bile (an emulsifier) by the liver. Bile production of the liver plays an important role in digestion: from being stored and concentrated in the gallbladder during fasting stages to being discharged to the small intestine. During digestion two main processes occur at the same time.

Mechanical digestion: larger pieces of food get broken down into smaller pieces while being prepared for chemical digestion. Mechanical digestion starts in the mouth and continues into the stomach.

Chemical digestion: starts in the stomach and continues into the intestines. Several different enzymes break down macromolecules into smaller molecules that can be absorbed.

The GI tract starts with the mouth and proceeds to the esophagus, stomach, small intestine (duodenum, jejunum, ileum), and then to the large intestine (colon), rectum, and terminates at the anus. We could probably say the human body is just like a big donut. The GI tract is the donut hole.

3.2.14 THE ENDOCRINE SYSTEM:

The endocrine glands are ductless glands that secrete chemicals called hormones to help our body function properly. Hormones are chemical signals that coordinate a range of bodily functions. The endocrine glands work to regulate certain internal processes. Exocrine glands, such as sweat and salivary glands, secrete externally and internally via ducts. Whereas Endocrine glands secrete hormones internally, using the bloodstream.

The endocrine glands help control the following processes and systems:

- Growth and Development,
- Homeostasis,
- Metabolism,
- Reproduction,
- Response to stimuli.

The endocrine system completes these tasks through its network of glands, which are small but highly important organs that produce, store, and secrete hormones. They are:

1. Pineal Gland
2. Pituitary Gland
3. Thyroid, Parathyroid
4. Thymus
5. Adrenal
6. Pancreas
7. Ovaries and Testes

These glands produce different types of hormones that evoke a specific response in other cells, tissues, and/or organs located throughout the body. The hormones reach these faraway targets using the blood stream. Like the nervous system, the endocrine system is one of our body’s main communicators. But instead of using nerves to transmit information, the endocrine system uses blood vessels to deliver hormones to cells.

**3.3 PSYCHOLOGICAL FEATURES:**

**3.3.1 INTRODUCTION:**

Psychology is the study of mind and behavior. It is an academic discipline and an applied science which seeks to understand individuals and groups by establishing general principles and researching specific cases. In this field, a professional practitioner or researcher is called a psychologist and can be classified as a social, behavioral, or cognitive scientist. Psychologists attempt to understand the role of mental functions in individual and social behavior, while also exploring the physiological and biological processes that underlie cognitive functions and behaviors.

Psychologists explore concepts such as perception, cognition, attention, emotion, intelligence, phenomenology, motivation, brain functioning, personality, behavior, and interpersonal relationships, including psychological resilience, family resilience, and other areas. Psychologists of diverse orientations also consider the unconscious mind. Psychologists employ empirical methods to infer causal and correlational relationships between psychosocial variables.
In addition, or in opposition, to employing empirical and deductive methods, some—especially clinical and counseling psychologists—at times rely upon symbolic interpretation and other inductive techniques. Psychology has been described as a "hub science", with psychological findings linking to research and perspectives from the social sciences, natural sciences, medicine, humanities, and philosophy.

While psychological knowledge is often applied to the assessment and treatment of mental health problems, it is also directed towards understanding and solving problems in several spheres of human activity. By many accounts psychology ultimately aims to benefit society. The majority of psychologists are involved in some kind of therapeutic role, practicing in clinical, counseling, or school settings. Many do scientific research on a wide range of topics related to mental processes and behavior.

3.3.2 ETYMOLOGY:

The word psychology derives from Greek roots meaning study of the Psyche, or Soul. The Latin word psychologia was first used by the Croatian humanist and Latinist Marko Marulić in his book, ‘Psichiologia de ratione animae humanae’ in the late 15th century or early 16th century. The earliest known reference to the word psychology in English was by Steven Blankaart in 1694 in The Physical Dictionary which refers to "Anatomy, which treats the Body, and Psychology, which treats of the Soul."

In 1890, William James defined psychology as "the science of mental life, both of its phenomena and their conditions". This definition enjoyed widespread currency for decades. However, this meaning was contested, notably by radical behaviorists such as John Watson, who in his 1913 manifesto defined the discipline of psychology as the acquisition of information useful to the control of behavior. Also since James defined it, the term more strongly connotes techniques of scientific experimentation. Folk psychology refers to the understanding of ordinary people, as contrasted with that of psychology professionals.

3.3.3 SUB FIELDS OF PSYCHOLOGY:

Many sub fields have emerged in the field of psychology i.e. Abnormal psychology, Anomalistic psychology, Clinical psychology, Community psychology, Comparative
psychology, Consulting psychology, Developmental psychology, Environmental psychology, Evolutionary psychology, Forensic psychology, Health psychology, Social psychology, Industrial-Organizational psychology, Legal psychology, Media psychology, Occupational Health psychology, Quantitative psychology, Religion/Spirituality psychology etc

Now, let us discuss some sub fields which are related to the affairs of student community.

**School Psychology:**

School is a very influential part of a student’s life, and for good reason. Students typically spend a large amount of times attending school, starting at the age of five or even younger. Besides getting their first tastes the world of academia, students will also experience a number of other first while in school - first friends, first enemies, first loves, and first heartbreaks. It is also in school when students first begin to really learn about their strengths and weaknesses. These sudden changes can be hard to adjust to for some students. Other situations and problems, like family discord and learning disabilities, can also make doing well in school very difficult for some students.

School psychology is a branch of psychology that concentrates on students and how to help them make the best of their education. This area of psychology focuses not only on the students' academics, but also social, behavioral, emotional, and personal factors that might also influence their education.

The main purpose of school psychology is to help create happy, health, safe, supportive, and effective learning environments for all students. Professionals in this field are adamant about making sure that the needs and welfare of students are put first at all times.

Young students' minds are very impressionable, and the events that they experience in school will often stick with them for the rest of their lives. For this reason, it is very important to mold our young future leaders to become relatively emotionally stable, socially adept, and intelligent - not sociopaths. Students who have a rough time in school may be impacted for the rest of their lives, or they might have trouble learning like they should. This can cause problems later on in life or impede them from being accepted at a good college. School psychologists help the
students adjust better to their schools and peers, which can help them become happier and more successful adults.

Counseling Psychology:

Counseling psychology is a type of applied psychology that can be used to help people gain control of their feelings. This type of psychology focuses on treating individuals with a variety of different emotional, behavioral, and social problems or disorders. Along with clinical psychology, counseling psychology is one of the most common and widespread psychological specialties.

Because the two are so similar, clinical psychology and counseling psychology are often mistaken for each other. Although these two areas are very similar, they are also somewhat different as well. Clinical psychologists and counseling psychologists both treat wide variety of mental and emotional problems, for instance. However, Counseling psychologists typically focus on individuals whose symptoms are less severe, such as those coping with everyday stresses and adjusting to life's rollercoaster ride. Clinical psychologists, on the other hand, often treat patients with more serious symptoms and disorders.

A cognitive psychologist's goal is often to help his patients overcome their negative thoughts and emotions. In general, a psychologist will try to treat patients with a variety of different problems, including depression and anxiety. Those looking to pursue counseling psychology careers, can also choose to specialize in certain areas, like grief counseling or vocational stress. The number of patients that a counseling psychologist works with at one time can also vary. Some only work with their patients on a one-on-one situation, while others may work with small groups of people.

The majority of counseling psychologists interact with their patients each and every day. They are often presented with a wide range of mental and emotional problems that people face every day. In order to treat their patients, counseling psychologists will typically create a comfortable and inviting atmosphere. They should also be understanding and non-judgmental, so that patients will open up to them. Cognitive psychologists will then encourage their patients to talk about their feelings and behaviors, possibly asking questions occasionally. By getting to know their
patients, cognitive psychologists can then work to help them deal with and remedy their problems.

**Educational Psychology:**

Educational psychology is the study of how students learn and retain knowledge, primarily in educational settings like classrooms. This includes emotional, social, and cognitive learning processes. Areas of focus in this branch of psychology might include teaching and testing methods, classroom environment, and learning, social, and behavioral problems that may impede learning.

The majority of educational psychology is geared toward students, from infancy to adolescence. With more adults continuing their education in recent years, however, many educational psychology studies have also focused on adult students. This research can help adult students overcome obstacles, such as learning disabilities.

An educational psychologist will conduct research and studies that are relevant to education. They may conduct research on how well students learn in certain settings or with a certain type of instruction. With this research, they can then try to develop new and improved teaching techniques and learning methods in order to help those that are struggling with their education.

Another common duty of an educational psychologist is to evaluate and analyze certain teaching methods, testing methods, and educational programs. Studying these areas of education allows the psychologist to gain insight into any flaws or problems that may make it difficult for some people to learn. Along with evaluating existing educational resources, an educational psychologist might also create and develop new ones, which make it easier for certain groups of people to learn. These resources might include textbooks, worksheets, lesson plans, tests, and instructional videos.

**3.4 RADIOLOGICAL FEATURES:**

**3.4.1 INTRODUCTION:**

Radiology is a medical specialty that deals with diagnostic images of anatomic structures made through the use of electromagnetic radiation or sound waves and that treats disease through the
use of radioactive compounds. Radiological imaging techniques include X-rays, Computed Tomography (CT) scans, Positron Emission Tomography (PET) scans, Magnetic Resonance Imaging (MRI) scans and Ultra Sonograms.

The acquisition of medical imaging is usually carried out by the radiographer, often known as a radiologic technologist. Depending on location, the diagnostic radiologist, or reporting radiographer, then interprets or "reads" the images and produces a report of their findings and impression or diagnosis. This report is then transmitted to the physician who ordered the imaging, either routinely or emergently. Imaging exams are stored digitally in the Picture Archiving and Communication System (PACS) where they can be viewed by all members of the healthcare team within the same health system and compared later on with future imaging exams.

Some techniques working under the concept of Electromagnetic radiation are.

1. Aura & Chakras Photography,
2. EEG (Electroencephalography),
3. QRMA (Quantum Resonance Magnetic Analyzer).

**3.4.2 AURA & CHAKRAS PHOTOGRAPHY:**

**Aura:**

Aura is a concrete, existing energy field that surround all living creatures. The Aura is formed by subtle color radiances which surround the body of a human being. These radiances can be perceived by a psychic. Each color signifies a certain vibration which has different meanings. The Aura which is connected with the activity of Chakra reflects the individual state of consciousness, emotions, abilities and vital energies of a person.

Vethathiri Maharishi defines this Aura as ‘Causal body’ or ‘Bio-Magnetic body’ constituted by the waves given up by the life energy particles in the Astral body. Ancient Indians represented the Aura by a circle of light behind Gods and Saints.
Chakras:

‘Chakra’ is a Sanskrit word and it means "Wheel" or "Vortex". Each Chakra is like a solid ball of energy interpenetrating the physical body, in the same way that a magnetic field can interpenetrate the physical body. The Chakras are seven in number and are not physical; they are the aspects of consciousness in the same way that the Aura is aspect of consciousness. The Chakras are more dense than the Auras but not as dense as the physical body.

Ancient Indians situated temples above seven hills to indicate the seven Chakras. They found ways to rouse the Chakras through breathing practices and chanting Mantras. For instance, ‘Om Namah Shivaya’ Mantra arouses the Chakras. Shiva Vakkiyar, A Tamil Saint, denotes in his poem that pronunciation of Om-starts at Mooladhara and ends at Thuriya, Na –activates Swadhistana, Mah- Manipuraga, Shi- Anahatha, Va- Visuddhi, Ya- Agna[1]. The seven rainbow colors are associated with our seven Chakras.

Both Aura and Chakras, if enhanced well, bring many spiritual personalities like intuition, enlightenment, healing, extra sensory perception, mind reading, thought transmission etc as said in the spiritual world. These can be achieved through the Nine-Centre meditation.

Mooladhara Chakra:

This Chakra is with Red color and is located at the end of the spine. The Mooladhara Chakra is associated with the reproductive glands. It is the centre of physical energy, grounding and self-preservation. The Mooladhara Chakra governs the back, feet, hips, spine and legs. The Mooladhara Chakra is about being physically there and feeling at home in situations. If it is open, we feel grounded, stable and secure. If we tend to be fearful or nervous, our Mooladhara Chakra is probably under-active. We would easily feel unwelcome. If this Chakra is over-active, we may be very materialistic and greedy. We are probably obsessed with being secure and resist change.
Swadhistana Chakra:

It is with Orange color. The Swadhistana or Sacral Chakra is associated with the sexual organs, bladder, bowel and lower intestine. This Chakra is about feeling and sexuality. When it is open, our feelings flow freely and are expressed without being over emotional. We are open to intimacy and we can be passionate and lively. We have no problems dealing with our sexuality. If we tend to be stiff and unemotional or have a poker face, the Sacral Chakra is under-active. We are not very open to people. If this Chakra is over active, we tend to be emotional all the time. We will feel emotionally attached to people and can be very sexual.

Manipuraga Chakra:

It is with Yellow color. The Manipuraga or Navel Chakra is associated with the Pancreas, stomach, upper intestines, upper back and upper spine. This Chakra is about asserting ourselves in a group. When it is open, we feel in control and we have sufficient self esteem. When this Chakra is under-active we tend to be passive and indecisive. We are probably timid and don't get what we want. If this Chakra is over active we are domineering and probably even aggressive.

Anahata Chakra:

It is with Green color. The Anahatha or Heart Chakra is associated with the circulatory system and thymus gland. It is the centre of compassion, love, group consciousness and spirituality. The Heart Chakra governs the heart, lungs, blood and circulation. As the Heart Chakra is about love, kindness and affection, when it is open, we are compassionate and friendly, we work at harmonious relationships. When our Heart Chakra is under-active, we are cold and distant. If this Chakra is over-active, we are suffocating people with our love and our love probably has quite selfish reasons.

Visuddhi Chakra:

It is with Blue color. The Visuddhi or Throat Chakra is associated with the respiratory system and thyroid gland. It is the centre for sound, communication, speech, writing and thought expression. The Throat Chakra governs the throat, thyroid, mouth, teeth, tongue and jaw. This Chakra is about self expression and talking. When it is open, we have no problems expressing
ourselves and we might be doing so in a creative way. When this Chakra is under-active, we tend to not speak as much and we probably are introverted and shy. Not speaking the truth may block this Chakra. If this Chakra is over-active, we tend to speak too much, usually to domineer and keep people at a distance. We are a bad listener if this is the case.

**Agna Chakra:**

It is with Indigo color. The Agna or Third Eye Chakra is associated with the autonomic nervous system/pituitary gland. It is the centre of psychic power, spirit energies, higher intuition and light. The Third Eye Chakra governs the pituitary gland, pineal gland, skull, eyes, brain, nervous system and the senses. This Chakra is about insight and visualization. When it is open, we have a good intuition. We may tend to fantasize. If it is under-active we are not very good at thinking for ourselves and we may tend to rely on authoritative people. We may be rigid in our thinking, relying on beliefs too much. We might even get confused easily. If this Chakra is over-active, we may live in a world of fantasy too much. In excessive cases hallucinations are possible.

**Thuriya Chakra:**

It is with Violet color. The Thuriya or Sahasrara or Crown Chakra is associated with the central nervous system/pineal gland. It is the centre of enlightenment, dynamic thought, truth and oneness. The Crown Chakra governs the top of the spinal cord, brain stem, pain centre and nerves. This Chakra is about wisdom and being one with the world. When this Chakra is open, we are unprejudiced and quite aware of the world and ourselves. If it is under-active, we are not very aware spiritually. We are probably quite rigid in our thinking. If this Chakra is over-active, we are probably intellectualizing things too much. We may be addicted to spirituality and probably ignoring our bodily needs.

**‘Aura Video Station 5’:**

‘Aura Video Station 5’ is an interactive, multimedia biofeedback Aura & Chakra imaging computer system. It is built on the principles, studies and science of biofeedback, color psychology, human energy fields and mind-body knowledge. It uses a camera that captures our
Aura, Chakras and related data, processes it and then displays results on a computer screen in real-time as well as prints physical reports.

It was developed by Dr. Valerie V. Hunt (1916-2014), a Scientist, Author and Professor Emeritus of physiological science at the University of California, Los Angeles. She was the first to develop the protocols and instrumentation necessary to detect and record the body’s high frequency energy fields with the spectral analysis of bio-energy patterns. She discovered the neuromuscular patterns of non-verbal communication and her groundbreaking research has led to the first truly scientific understanding of the relationship between energy field disturbances, disease, emotional pathologies, human field communication and the energy spectrum of consciousness.

‘Aura Video Station 5’ uses a hand biosensor to measure biofeedback data. A person simply places his hands on the sensor and the electro-dermal activity (electrical conductivity) and temperature of the skin of the hand are measured in real-time. These are then processed and correlated and displayed as an Aura and Chakra images of that person’s energetic activity on a computer screen.

The Aura and Chakras images displayed are representations of the individual’s bio-energetic field, emotional-energetic state, personality type and energetic wellness – components that help us measure the health of one’s internal, spiritual self.

**Concept of Bio-feedback:**

Everyone has an intensely sensitive network of electrical channels moving along the body’s surface. Biofeedback is the information collected from an individual’s overall electrical activity. This information is used to create a profile analysis that is unique to every person. The included data allows users to understand the inner workings of their bodies as well as the way psycho-psychological phenomena are involved in the overall concept of well-being. The internal communications of the body via synaptic nerve connections influence and determine the physical and mental states of an individual. Using today’s technology, biofeedback science can help in understanding our physical bodies as well as assist us in achieving a state of happiness and balance.
The ‘Aura Video Station 5’ measures our Bio-Data through Biofeedback Sensors. This data is analyzed, processed and correlated with specific emotional-energetic states. Finally displays our Aura-Chakra photo and report gives us a colorful, visual and graphical representation of the measured Bio-Data. This information is only for educational and entertaining purposes. For any medical or therapeutic diagnosis, we should consult our health professional.

**Meaning for Aura colors:**

1. Deep Red: Realistic, grounded, active, strong will-power, survival-oriented.
2. Red: Active, powerful, energetic, vitality, competitive, winner, sexual, passionate, relates to the physical body.
3. Orange-Red: Confidence, creative power.
4. Orange: Creative, productive, adventurous, courageous, relates to emotions.
5. Orange-Yellow: Analytical thinker, creative, intelligent, scientific, detail-oriented, perfectionist.
6. Yellow: Creative, intelligent, playful, lightness, optimistic, easy-going, relates to life energy.
7. Yellow-Green: Communicative, creative with heart.
8. Green: Teacher, social, communicator, love people, animals, nature.
10. Blue: Caring, sensitive, loving, helpful, intuition, love to help others.
11. Indigo: Intuitive, sensitive, loyal, deep feelings, visual, relates to the third eye.
12. Violet: Intuitive, artistic, magical, futuristic, idealistic, relates to crown.
14. White: Spiritual, transcendent, higher dimensions, ethereal and non-physical qualities.

**Aura Size:**

The ‘Aura Video Station 5’ displays a red circle which indicates the size of our Aura and is an important indicator of how much energy we radiate around us. There are three major types.

1. Large, Wide Aura (75-100) indicates a strong and powerful radiance. Other people can feel or strong Aura. We can use our charisma and Aura power to achieve our goals and dreams.
2. Middle, Average Aura (40-75) indicates we have a strong presence and radiant energy. We can achieve our goals by increasing our Aura even more and focusing on our goals.

3. Small Aura (0-40) indicates low energy level. Others might perceive us as introverted or with low physical energy. We must try to create a stronger radiance around us and increase our Aura power.

**Chakra size & Shape overview:**

There are variations in the sizes of Chakras as follows:

- **ROUND:** Balanced, harmonious Chakra activity.
- **OVAL:** Slightly unbalanced Chakra.
- **LARGE:** Overactive, high-energy activity.
- **SMALL:** Underactive, low energy activity.
- **BRIGHT:** Balanced, high energy, Positive qualities of Chakra.
- **DARK:** Low energy, unbalanced, stressed Chakra activity.

**Aura-Chakra balance:**

The ‘Aura Video Station 5’ generates a graph to indicate our overall Aura-Chakra balance. It has the following categories.

1. Very balanced. Aura and Chakras are in harmony.

2. Average balance. Aura and Chakras are not fully balanced.

3. Very unbalanced. Aura and Chakras are stressed with low energy.
3.4.3 EEG (ELECTROENCEPHALOGRAPHY):

Electroencephalography is a technique for recording and interpreting the electrical activity of the brain. Hans Berger (1873-1941), a German Psychiatrist, invented Electroencephalography (EEG), the recording of brain waves, in 1924 and discovered the alpha wave rhythm known as "Berger's wave". Electroencephalograph is an instrument that measures and records these brain-wave patterns. The recording produced by such an instrument is called an electroencephalogram, commonly abbreviated EEG.

The nerve cells of the brain generate electrical impulses that fluctuate rhythmically in distinct patterns. To record the electrical activity of the brain, 8 to 16 pairs of electrodes are attached to the scalp. Each pair of electrodes transmits a signal to one of several recording channels of the electroencephalograph. This signal consists of the difference in the voltage between the pair. The rhythmic fluctuation of this potential difference is shown as peaks and troughs on a line graph by the recording channel.

The speed of mind is measured in terms of mental frequency. Scientists have discovered through the use of Electroencephalograph that the mind works at frequencies ranging from 1-40 cycles/sec. These frequencies have been classified into four. They are 1. Beta wave (14-40 cps), 2. Alpha wave (8-13 cps), 3. Theta wave (4-7 cps), 4. Delta wave (1-3 cps).

Mechanism:

The brain's electrical charge is maintained by billions of neurons. Neurons are electrically charged or polarized by membrane transport proteins that pump ions across their membranes. Neurons are constantly exchanging ions with the extracellular milieu, for example to maintain resting potential and to propagate action potentials. Ions of similar charge repel each other, and when many ions are pushed out of many neurons at the same time, they can push their neighbors, who push their neighbors, and so on, in a wave. This process is known as volume conduction. When the wave of ions reaches the electrodes on the scalp, they can push or pull electrons on the metal on the electrodes. Since metal conducts the push and pull of electrons easily, the difference in push or pull voltages between any two electrodes can be measured by a voltmeter. Recording these voltages over time gives us the EEG.
The electric potential generated by an individual neuron is far too small to be picked up by EEG. EEG activity therefore always reflects the summation of the synchronous activity of thousands or millions of neurons that have similar spatial orientation. If the cells do not have similar spatial orientation, their ions do not line up and create waves to be detected. Pyramidal neurons of the cortex are thought to produce the most EEG signal because they are well-aligned and fire together. Because voltage fields fall off with the square of distance, activity from deep sources is more difficult to detect than currents near the skull. Scalp EEG activity shows oscillations at a variety of frequencies. These oscillations have characteristic frequency ranges, spatial distributions and are associated with different states of brain functioning.

An EEG can be used to know the brain waves during meditation and to monitor activity during brain surgery. It is also performed to determine the level of brain activity in someone who is in a coma. An EEG cannot provide a measurement of intelligence and is not used to diagnose mental illness.

**Benefits of subtle brain wave frequencies:**

All the negative emotions like anger, vengeance etc occur only in Beta wave frequency. When the brain wave reduces to Alpha and Theta, we will become peaceful. This state will streamline our characters automatically. For students, it will reflect in their behavior with parents, teachers and friends. They will become humble, sincere and obedient to parents and teachers, lovely with friends, helping, committed, truthful etc.

The English word ‘Understand’ has come from ‘Stand -Under’. It means, to understand anything, our mind should stand in under frequencies like Alpha, Theta and Delta. Having reached these waves, the students can understand their lessons and memorize well. These will reflect in their academic performance. Further, these subtle frequencies will bring many spiritual benefits like intuition, self-realization, love and constant awareness etc.

**3.4.4 QRMA (Quantum Resonance Magnetic Analyzer):**

QRMA is advanced electronic equipment that collects the weak magnetic field of human cells for scientific analysis, thereby analyzes and determines a person's health status and main problems and puts forward standard prevention recommendations.
Invented by a team of medical and computer experts, this Bio-Magnetic health analyzer was developed based on the study of a hundred million clinical cases over a period of many years. By holding the sensor in our palm, hundreds of health data can be obtained from our body within minutes.

The method of quantum resonant magnetic analysis is an emerging rapid, accurate and non-invasive spectral testing method and particularly suitable for comparison of curative effects medicine and health products, and check of sub-health conditions. QRMA generates reports on the 22 health parameters. They are Cardiovascular and cerebrovascular, Gastro intestinal, Liver function, Gallbladder function, Pancreatic function, Kidney function, Lung function, Brain nerve, Bone disease, Bone Mineral Density, Rheumatoid bone disease, Blood sugar, Basic physical quality, Human toxin, Trace element, Prostate, Male sexual function, Skin, Endocrine system, Immune system, Amino acid and Element of human.

**Concept of Bio-magnetic waves:**

The human body is the aggregates of a large number of cells which are in continuous growth, development, differentiation, regeneration and apoptosis, and the cells constantly self-renew through its own division. 25 million cells are divided at one second in an adult’s body, and the body’s blood cells constantly renew at the rate of about 100 million per minute. In the process of cell division and growth, those charged bodies of atomic nucleuses constituting atoms as the basic unit of cell and the electrons outside the nucleus are in constant high-speed movement and changing, thereby constantly emitting electromagnetic waves.

The electromagnetic wave signals emitted by the human body represent the specific state of the human body, and the emitted electromagnetic wave signals are different under the different conditions of the human body, such as health, If we can determine these specific electromagnetic wave signals, we can determine the status of the body’s life.

Quantum medicine considers that the most fundamental reason of falling sick is that the spin of electrons outside the atomic nucleus and the orbit change, thereby causing the change of atoms constituting a material, the change of small bio-molecules, the change of big bio-molecules, the change of all the cells and finally the change of organs. Because the electron is a charged body, when the spin of electrons outside the atomic nucleus and the orbit change, the electromagnetic
wave emitted by the atoms will change. The energy of the electromagnetic wave changes caused by the changes of the human body’s diseases and physical changes in the nutritional status is extremely weak and usually is only nano gauss to micro gauss. The frequency and energy of the weak magnetic field of hair determined directly or by holding a sensor by hand compare with the resonance spectra of standard quantum of diseases and nutrition indicators set in the instrument after the frequency and energy are amplified by the instrument and processed by the computer, and then the corresponding quantum value being from negative to positive is output. The size of the quantum value indicates the nature and extent of the disease and the nutrition levels. Finally, the testing results are resolved by clinicians.

For example, cancer cells are different from normal cells, and the electromagnetic waves emitted by cancer cells are also different from the electromagnetic waves emitted by normal cells. Quantum resonance testing tumor is to send the standard wave of cancer cells to the specimen. If there are cancer cells in the human body, resonance will occur, and the instrument will detect the signal. The more the number of cancer cells is, the more intense the signal is, and the quantum value tends to the negative value. If there are no cancer cells, resonance will do not occur, and the quantum value tends to the positive value. It’s similar to the principle of listening to broadcasting from the radio. There are many radio waves in the air. If we want to listen to some designated broadcasting, we can transfer the radio to the corresponding frequency, at this moment, resonance occurs, so that we can listen to this broadcasting. QRMA uses this principle for testing.

3.5 CURRENT SCENARIO OF THE STUDENTS:

The student community is the asset of the family and world. Student life is an important period in the life of every individual. Students, nowadays, have more self confidence and expanded knowledge as the use more scientific advancements like internet etc. But they deviate to wrong path in life as their knowledge is not channelized in a good direction. This is not fault of the student community. This state is caused only by the society. To overcome this defect, proper counseling should be given to students. This should be provided to them individually, not as groups. Group counseling will not work here. Because every student comes from different family situations, have different potentials, characters and variety of problems like poverty, family disputes etc. A student’s attitude will be set and altitudes can be achieved only
based on these said factors. A student with tension, worries, impurities etc cannot lead successful life.

At the present time, students are having broad knowledge but they are motivated and directed only to reach high academic scores. Their parents also believe that their children should score more in 10th and 12th standards, only then they can set bright future. Yes, it is acceptable that they can go to higher studies, jobs etc with the help of academic marks. So, it cannot be compromised. But, as we all focus only on marks, students think that they are allowed to do behave in any way they wish if they secure good academic marks. Because of this they stray from right path and resort to smoking, drinking, drug abuse, wrong group behavior, not respecting elders, destructing things, violence in public etc. It is found that some students indulged in rape cases, get imprisonment and even, some have AIDS.

To overcome these problems caused by student society, both parents and teachers should be wakeful always on their behavior. Students should be monitored for, what they are doing; with whom they are moving etc. Parents and teachers also must change their opinion that ‘one is good student only if he scores high marks’ and must come to the opinion that ‘one is good student when one has good ethical behavior’. It is universal truth that a person without mistakes, will progress naturally in all dimensions.

To correct the student community, we should counsel the students individually. It should be known from him that what his wants are, what his problems are, what subject he interests, what his target in life are etc. Only teachers should do this work. Because, parents do not know all the activities and behavior of their children. Also, not all parents are having the abilities to guide their children well. They may lack in education etc. This correction work can be done effectively only by teachers. To execute this task, management of schools and colleges must give their cooperation and encouragement to the teachers.

It is also found that students have unity on community based, religion based and language based etc. and they indulge in violence on these bases. Because they misunderstand that this kind of unity is their strength. When they unite like this, their knowledge and good abilities tend to decrease instead of increase. Thereby, only wrong things happen in their life instead of good and auspicious things. This group attitude and behavior is discussed as group conduct by social
psychologists. In group psychology, attitude of one person is conceived by all in group consciously or unconsciously. For example, if one says to go for a cinema, everyone would agree and say the same. These group attitudes are not always constructive. For example, nowadays we see, cases are filed that students involve in group robbing, gang raping etc. because of the bad habits their physiology is also affected by diseases like heart attack in young age, Hypertension, Diabetes, Cancer and AIDS etc.

It is also found that students desire to progress more with minimum efforts. This is against the nature. Due to this, they face failure. For instance, a student would not have studied his lessons well; but he would believe that he will gain more scores. But he will see the result only based on his efforts.

So, ignorance, laziness and negative emotional moods are the causes for their defective physiological, psychological and radiological health. To conquer these defects, Yoga and Meditations can help them in a great manner. Meditation will rescue them from negative emotions and laziness and provide constant awareness of results of their actions etc. It will erase the negative group mentality. It will maintain one’s good individuality even if he is in a group. Thereby physiological and radiological health also can be maintained well.