B. Sc. General in Physiology

Programme Specific Outcome (PSO)

- By studying Physiology a student can gathering the information how his/her body functions works.
- The students learn how multiple cells forms a tissue, multiple tissues form a organ and multiple organ makes a body and these body controlled by brain with nervous andendocrine system.
- The students learn how nervous system (brain) is responsible for think, speech, sleep and emotion.
- The students learn how after a scene (impulse) we react.
- The students learn how endocrine system is responsible for body development and specific function like sex separation, metabolism etc.
- The students learn how Blood nourish the body and make connected to each other.
- The students learn how Lungs purified the blood by expiratory out CO_2 and inspiratory in O_2 .
- The students learn how we metabolize different type of foods through digestive tract.
- The students learn how kidneys execrate toxic elements from body.
- The students learn how the skin is responsible for body temperature control.
- The students learn how our immune system functioning against pathogen.
- The students learn how vitamins works in our body.
- The students learn how a fertilized cell can form a multi cellular human body.
- By studying physiology students can make diet chart and could be evolved as dietician.
- By studying physiology students can test laboratory and can make their self as Lab technician in future.
- By studying physiology students can make their self a sport physiologist.
- By studying this physiology syllabus students can prepare themselves in CSIR-UGC NET, GAET, SLET, ICMR, TIFR. Exam. They also go for School Service Commission exam.

Course Outcome (CO)

PhysgCC01: Cellular Physiology, Biophysical Principles, Biochemistry, Digestive system &Metabolism(Th)

Outcomes

Cellular Physiology, Biophysical Principles

- Student will get the concept of cell tissue organ
- Students will able to know how the cell functioning and make communication to each other.
- Students will make the concept on different cellular organelles and their specific function.
- Students will able to know the Physiological importance of : Diffusion, Osmosis, Dialysis, Ultrafiltration, Surface tension, Adsorption, Absorption, pH and buffers in human body.
- Students will able to know the role of enzyme in our body and their regulation.Biochemistry
- By studying this students will get the concept how different biochemical compounds make our body, giving energy and protect our body from illness.
- Students will get the concept on Carbohydrates, lipid & protein (Their structure, metabolism and biological role).
- Students will know about the different metabolism pathway like Glycolysis, TCA cycle, Glycogenesis, Glycogenolysis, Gluconeogenesis, and their role in energy production.
- Students will get the concept of role of different vitamins and their availability/sources.

Digestive System:

- Students will know the structure of our (human) digestive tract/ alimentary cannel.
- Students will know about the accessory gland which helps in digest like salivaryglands, liver and pancreas.
- Students will know how and where the foods digest and how it absorbed and producesenergy.
- Students will make the concept of hungry and appetite mechanisms.

PhysgCC01: Cellular Physiology, Biophysical Principles, Biochemistry, Digestive system &Metabolism(Pr)

Outcomes

: Fresh tissue experiments& Identification of permanent slides

- By this practical students can able to collect different fresh tissues (columnar, ciliated,Skeletal muscle) and their staining and make the scene about their cellular arrangement.
- By studying permanent slide they can know about the body's different type tissues histological structure and cellular arrangement by which they can able to detect the pathological differentiation on disease condition.

Physg ge-01T1:
Blood and Immune System and Cardiovascular system

Outcomes

- By studying the blood vascular system students will know how blood makes nourishour body.
- Students will make concept about the homeostasis maintained by blood.
- They will know about different blood cell and their physiological role.
- Students will make concept about the blood clotting mechanism.
- Students will know how our body make the defence mechanism to virus, bacteria and fungus.
- Students will know about innate and adaptive immunity, Antigens & antibody.
- They will get idea how vaccines were prepared and their physiological role to prevent disease.
- Student will know about HIV, and different autoimmune diseases like Arthritis, Graves disease, Myasthenia Graves etc.
- By studying the cardiovascular system students can able to make the idea about heart and its structure and cardiac cycle and its role in circulate blood supply throughout body .
- Students can make scene how the junctional tissue is responsible for rhythmatic heart beats.
- Students can gathering the information about bradicardia, tachycardia, ECG,

Artifificial pacemaker etc.

PHYSG GE-01P1:

Blood and immune system and cardiovascular system

Outcomes

- By practicing of TC of WBC, DC of WBC, Haemoglobin estimation, Haemin crystal, BT, CT & Blood group students can performed the haematological lab test of an human patients.
- Students can able measurement of HR, screening of PFI, Step Test.
- Students can detect BP: systolic, diastolic, mean arterial blood pressure, pulse pressure of a human subject.

PHYSGDS-1B:

Blood, body fluid and immune System, Cardiovascular System and Respiratory System(Th)

Outcomes

Blood & Body fluids

- Students will know about the blood vascular system.
- Students will know the process of different type of blood cell formation from bonemarrow (Haemopoiesis)
- Students will know the process blood grouping ABO system.
- They will know about the blood transfusion health hazards.
- Student will get the knowledge how blood clot after a wound.

Immune System

- Students will know innate immunity, acquired immunity, active and passive immunity
- Students will know about T & B cells, Complement system, Antigen antibody MHCmolecules etc.
- Students will get information about autoimmunity disease.
- Students will know about the graft rejection.
- Student also know about the immunization processes

Cardiovascular system:

- By studying the cardiovascular system students can able to make the idea about heart and its structure and cardiac cycle, cardiac output, and its role in circulate blood supply throughout body .

- Students can make scene about different sounds and their sources.
- Students can gathering the information about bradicardia, tachycardia, ECG and significance of different waves, Artifificial pacemaker etc.
- Students will know about different regional circulations: Coronary, Pulmonary, Renal,Cutaneous, Hepatic and Cerebral circulation.
- Stdents will get the concept of regulation of blood pressure through Baroreceptor,Chemoreceptor and Renin Angiotensin system.

Respiratory System:

- Students will know about the Respiratory process how gaseous exchanges performedthrough lungs.

PHYSGDS-1B:
Blood, body fluid and immune System, Cardiovascular System and Respiratory System(Pr)
Outcomes

- Students can know about different type of microscope.
- Students can prepare blood film and stain. Learn about Identification of differenttypes of blood corpuscles.
- Students will learn about Determination of TC of RBC and WBC by haemocytometer.
- Students will learn about Differential count of WBC
- Students will learn about determination of ESR of human blood.
- Students will learn about estimation of haemoglobin by haemoglobinometer.
- Students will learn about preparation of haemin crystals.
- Students will learn about determination of Blood groups.
- Students will learn about determination of clotting time, bleeding time, prothrombin time.
- Students will learn about determination of osmotic fragility of Red Blood Corpuscle.
- Students will learn about preparation and staining of bone marrow. Measurement of diameter of megakaryocyte. Reticulocyte staining
- Students will learn about different Human Experiment:
- Students will learn about measurement of arterial blood pressure by

Sphygmomanometer at rest and after exercise, Calculate the mean arterial blood pressure (MABP)

- Students will learn about measurement of heart rate and pulse rate (30 beats methods) during rest and exercise and graphical plotting.
- Students will learn about Modified Harvard step test and determination of physical fitness.
- Students will learn about Pneumographic recording of respiratory movements along with the effect of drinking of water, talking, laughing, coughing, exercise, hyperventilation and breathe holding.

- Students will get demonstrate about Measurement of oxygen saturation by pulse oxymeter before and after exercise. Measurement of Peak Expiratory Flow Rate. Measurement of forced expiratory volume (FEV) in first second.

PhysgGE 2 T :

Developmental Biology / Embryology

Outcomes

- Students will know about the process of Gametogenesis: Spermatogenesis & Oogenesis. ,
- Students will know about the structure of sperm and ovum of human.
- Students will know about the Fertilization process of Sea-urchin and mammals.
- Students will know how the human body formed after fertilization.
- Students will know clear concept about cleavage process in mammals. Blastula formation: mammals Morphogenetic movements, Gastrulation, Concept of induction, determination, and differentiation. Organogenesis.

GE2 P: Practical

- Students can stain ovarian tissue sections and identified Graafian follicle, Corpus Luteum by studying their structure and get demonstration of preserved mammalian embryo.

PHYSGDS01:

Nerve –Muscle Physiology, Nervous system, Skin and Body Temperature Regulation

Outcomes

Nerve-muscle Physiology

- Students will learn about structure of muscle their blood supply, neuromuscular junction
- Students will differentiate Red and white muscles. Skeletal, smooth, and cardiacmuscle
- Students will know about the Motor Uniit and motor point.
- Students will learn about the mechanism of muscular contraction.
- Students will get knowledge about Properties of nerve fibre: all or none law, rheobase, chronaxie, refractory period etc.
- Students will learn the mechanism of impulse transmission to muscle spindle throughnerve fiber.
- Students will learn about Synapse.
- Students will learn about EMG(electromyography)

Nervous System:

- Students will learn about central and peripheral nervous system.
- Students will learn about different parts of the brain and spinal cord.
- Students will learn about different type of Receptors.
- Students will learn about how Reflex mechanism performed by nervous system.
- Students will learn about EEG of brain and their different waves with significance.
- Students will learn about Hypothalamus, reticular system , cerebral cortex.
- Students will learn about Sleep, Hunger, Thirst mechanism.
- Students will learn how brain control of Posterior Pituitary Secretion, Control ofAnterior pituitary Secretion, Temperature Regulation, fever etc.
- Students will learn about how brain control movement and posture.
- Students will learn about Neural Basis of instinctual Behavior & Emotions,

Limbicsystem: Sexual Behavior, Fear & Rage, Motivation, Papez circuit.

- Students will learn about neural basis of memory and

learningSkin and Body temperature regulation:

- Students will know about the structure & of skin.
- Students will learn about role of melanocyte in Colour of the skin.
- Students will know about the sweat gland, Ecrine gland & apocrine glads.
- Students will know about the body temperature regulation.
- Students will know about the neural regulation of sweating.
- Students will know about the heat stress and heat cramp.

PHYSGDS01:

Nerve –Muscle Physiology, Nervous system, Skin and Body Temperature Regulation(Pr)

Outcomes

- Students will learn about Isolation and Staining of nerve fibers with node(s) ofRanvier (AgNO3).
- Students will learn about Staining of skeletal and cardiac muscles by Methylene Bluestain.
- Students will learn about Measurement of hand grip strength.
    - Students can perform and know the signification of Experiments on superficial (plantar) and deep (knee jerk) reflex.
    - Students can perform and know the signification of Reaction time by stick drop test.
    - Student can perform and know the signification of Short term memory test (shape,picture word).
    - Student can perform and know the signification of Two point discrimination test.
    - Students
    - Students get Demonstration on Kymograph, Induction coil, Key used to study mechanical responses of skeletal muscle. Kymographic recording of mechanical responses of gastrocnemius muscle to a single stimulus and two successive stimuli. Kymographic recording of the effects of variations of temperature and load (after-load) on single muscle twitch. Calculation of work done by the muscle. Determinationof nerve conduction velocity.

PHYGSE-01:

Environmental Epidemiology

Outcomes

- Students will learn about man - environment relation
- Students will learn about epidemiology.
- Students will learn Hills criteria- emergence of new diseases
- Students will learn about how the environment changes cause extinctions of plantsand animals.
- Students will learn about Types of sampling and sampling method.
- Students will learn about methods in Field study – questionnaire preparation; Dataanalysis; Report writing.
- Students will learn about Environmental hazards and Public health management.
- Students will learn about sources and effects of Air, water and noise pollution.
- Students will learn about how Waste management will performed.
- Students will learn about case histories on Bhopal gas tragedy, Chernobyl disaster, Seveso disaster and Three Mile Island accident and their effects.
- Students will learn about Infectious like Bacterial-Tuberculosis, Typhoid; Viral - AIDS, Poliomyelitis, Hepatitis; Protozoan- Leishmaniasis, Malaria etc; Inherited/genetic diseases, Immunological diseases; Cancer.

PHYSGGE3T:

Community and Public Health

Outcomes

- Students gets the basic idea about community health
- Students will know the causes of malnutrition
- Students will know about the risk factor of obesity.
- Students can formulate the Diet Chart of different age group and different workloaded person as a dietician.
- They can make diet chart of pregnant woman and athelete.
- Students will know about composition and nutritional value of different Indian foodstuffs.
- They get basic idea on PCM, marasmus, kwashiorkor and their prevention, Iron andiodine deficiency symptoms and preventive measure.

- They will become aware about Sound pollution and effects of sound pollution onhuman health.

PHYSGGE3P:

Community and Public Health Outcomes

- The students can able to perform a diet survey and by this survey they can alsoanalysed the health status of that area.
- They can able to measure sound level by using sound level meter.

PHYSGDS1DT:

Sensory Physiology, Endocrine and Reproductive System, Renal Physiology outcomes

Sensory Physiology

- Students will learn about special senses and their receptors.
- Students will learn about Weber – Fechner Law.
- Students will learn about Mechanism of transduction of stimuli from sensory receptors touch, pressure, pain, thermal and kinaesthetic sensation.
- Students will learn about Olfaction and Gustation
- Students will learn about Audition & Equilibrium, Auditory pathways and centres.
- Students will learn about Vision, Light reflex. Accommodation and Visual acuity,Binocular vision.

Endocrinology:

- Students will learn about Hormones - classification.
- Students will learn about Hormone receptor and cell signalling.
- Students will learn about Positive and negative feedback mechanism.
- Students will learn about Hypothalamo - Hypophysial axis.
- Students will learn about why Pituitary gland called as master gland.
- Students will learn about Thyroid gland, Parathyroid gland, Adrenal Cortex.

- Students will learn how blood sugar controlled by pancreas.

Reproductive Physiology:

- Students will learn about spermatogenesis, spermiogenesis and oogenesis.
- Students will learn about fertilization and implantation.
- Students will learn about Parturition and Lactation

process.Renal Physiology:

- Students will learn about Microanatomy of a nephron.
- Students will learn about Juxtaglomerular apparatous and its role.
- Students will learn about mechanism of formation of urine.
- Students will learn about Counter current system, counter current multiplier and exchanger. Students will learn about Dialysis and Artificial kidney.

PHYSGDS1DP:
Sensory Physiology, Endocrine and Reproductive System, Renal Physiology outcomes

- Students will learn about Staining and identification of kidney and ureters.
- Students will learn about Silver nitrate preparation of corneal cell space.
- Students will learn about Study of estrous cycle.
- Students will learn about Identification of normal and abnormal constituents of urine.
- Students will learn about Tests for Urinary deposits, albumin, specific gravity of urine
- Students will learn about Determination of visual acuity by Snellen's chart / Landolt'schart.
- Students will learn about Determination of colour blindness by Ishihara chart.
- Students will learn about Exploration of conductive and perceptive deafness by tuningfork method.

Students will learn about Sperm count and sperm motility in rat

- Students will get demonstration about effects of oxytocin on uterine contraction, effects of adrenaline on intestinal / uterine movements, Pregnancy test from humanurine by kit method, Quantitative estimation of Urea in Urine

SEC2T: Biochemical Techniques

- Students will learn about UV- Visible absorption spectrophotometry.
- Students will learn about Flourimetry.
- Students will learn about chromatography, its types and uses.
- Students will learn about HPLC.
- Students will learn about gel electrophoresis.
- Students will learn about Isoelectric Focusing point of proteins.
- Students will learn about different type of centrifuge.
- Students will learn about Southern, Northern and Western blotting techniquesand its uses.

PHYSGGE4T:
Excretory System & Body Temperature Regulation

Outcomes

Renal Function & Micturition:

- Students will get concept about Kidney and renal system.
- Students will get concept about Juxta Glomerular Apparatus, GFR, counter-current mechanism, Water Excretion, Acidification of the Urine & Bicarbonate Excretion, Regulation of Na^+ & Cl^- Excretion, Renal Circulation, Diuretics.
- Student will know about disorders of Renal Functions.
- Student will know about Non-excretory function of kidney.

Skin and Body temperature regulation:

- Students will know about the structure of skin. Colour of the skin.
- Students will know about the sweat gland, Ecrine gland & apocrine glads.
- Students will know about the regulation of sweat secretion.
- Students will know about the role body temperature regulation by sweating.
- Students will know about the heat loss and heat gain process.
- Students will know about the Regulation of body temperature: role of Higher centreand mechanism of regulation. Hypothermia and Hyperthermia.
- Students will know about the Physiological basis of fever.

- Students will know about the Cold stress & heat stress, how body Acclimatized tocolds.
- They can know about the triple response of the skin.

PHYSGGE4T:
Excretory System & Body Temperature Regulation
Outcomes

- Students will know about the Identification of normal & abnormal constituents of urine.
- Students will test Urinary deposits and quantitative analysis of albumin and urea.
- Students can scientifically record Body Temperature in different portion (core and peripheral) and they can get idea about body temp. regulation in different temp. exposure.