



Mahishadal Raj College
Department of Physiology
PO, CO, & PSO Programme For Under Graduate
Session: 2020-2021

B.Sc PHYSIOLOGY PSO:

The students understand the basic concepts in System Physiology, Biochemistry, Microbiology, Immunology and Molecular biology. He / she has been updated with the recent trends in the subject. The students also build a sound base for various post graduate courses in Physiology, biotechnology, clinical nutrition, biomedical science and in the field of other related subjects of life science.

Semester – I (Hons)		
Sl. No.	Name of the Course	Outcomes
1.	C1T:Cellular Basis of Physiology C1P:Histology	<ul style="list-style-type: none"> ➤ Provides basic knowledge regarding types of cell, plasma membrane , structure and function of different cellular organelles, different tissues, development with organization of different organ and systems ,basic principle and use of different microscopes and spectrophotometer. ➤ Students are able to identify different stained sections of mammalian tissue and organs.
2.	C2T:Biological Physics and Enzymes C2P: Biological Physics and Enzymes	<ul style="list-style-type: none"> ➤ Understand and learn about units for measuring concentration of solutes , bonds and forces in biomolecules, biophysical and biochemical principles , basic concept and principle as well as use of different types of microscope and chromatography ,electrophoresis and ultracentrifugation , ,nanoparticles and its application in physiology,laminar and streamline flow ,concept of enzyme, its classification as well as enzyme kinetics, regulation and role of enzyme in clinical diagnosis. ➤ The students are able to determine blood pressure and enzyme actions.

Semester – II (Hons)

SLno.	Name of the Course	Outcomes
1.	C3T: Physiology of Nerves & Muscle Cells(Theory) C3P: Histological Study , Experiments of Nerves and Muscle(Lab)	<ul style="list-style-type: none">➤ Creates understanding about nerve cell and its properties as well as electrical events within the nerve cells , electrical and mechanical properties and morphology of different muscles, synaptic and junctional transmission, initiation of impulses in sense organ.➤ Enable to isolate and stain nerve fibre with node of ranvier and muscle fibres as well as perform different types of kymographic recording with the help of nerve and muscle preparation of toad.
2.	C4T: Chemistry of Biomolecules (Theory) C4P:Biological chemistry(Lab)	<ul style="list-style-type: none">➤ Know about the classification,structure, properties and function of carbohydrate, protein,lipid, structure as well as type and function of DNA and RNA. → Enable to identify different physiologically important substance with the help of various qualitative tests.

Semester – III (Hons)

SLno.	Name of the Course	Outcomes
1.	C5T : Circulating Body Fluids C5P:Hematological Experiments	<ul style="list-style-type: none"> ➤ Provides the knowledge regarding blood, bone marrow, blood cell, immune mechanism, blood types, plasma, hemostasis and lymph etc. ➤ Performs some experiments on hematology.
2.	C6T: Circulation C6P:Cardiovascular Physiology Experimental	<ul style="list-style-type: none"> ➤ This course aims to enlighten the students on origin of the heartbeat and electrical activity of heart,mechanical events of the cardiac cycle and cardiac output, dynamics of blood and lymph flow, cardiovascularregulatory mechanism, circulation through special regions, cardiovascular homeostasis in health and disease. ➤ Enable to perform normal movement of perfused heart and also able to study the effect of change of the heart movement by applying excess calcium and potassium ion concentration as well as different drugs etc.
3.	C7T : Function of the Nervous System C7P: Neurological Experimental	<ul style="list-style-type: none"> ➤ Provides the ideas about reflexes, cutaneous as well as deep and visceral sensation, arousal mechanism as well as sleep and electrical activity of the brain, control of posture and movement, the autonomic nervous system and central regulation of visceral function, neural basis of instinctual behaviour and emotions,higher function of nervous system, learning and memory. ➤ Enable to perform some neurological experiment by using different tools and technique.
4.	SEC1T: Clinical biochemistry	<ul style="list-style-type: none"> ➤ Imparts knowledge about photo-colorimetric estimation of blood constituents, measurement of blood glucose and blood inorganic phosphate,measurement of serum total proteinand determination albumin globulin, determination of serum etc.

Semester – IV (Hons)

SLno.	Name of the Course	Outcomes
1.	C8T : Energy Balance ,Metabolism and Nutrition C8P:Biochemical Estimation	<ul style="list-style-type: none"> ➤ Provides concept about energy metabolism. Carbohydrate metabolism, protein metabolism, Biological oxidation, fat and cholesterol metabolism, reactive oxygen species, nutrients, nutraceutical, cosmoceutical,biological value of protein and vitamins and minerals, energy in human nutrition. ➤ Perform experiments about different biochemical estimation test by different methods and tools.
2.	C9T:Gastrointestinal Function C9TP:Gastrointestinal Function Lab	<ul style="list-style-type: none"> ➤ Learn about digestion and absorption of food particles, regulation of gastrointestinal function and gastrointestinal hormones,mechanism and function as well as regulation of mastication and deglutition and movement of alimentary canals. ➤ Student are able to perform kymographic recordingof normal movement of rat's intestine in dale's appraisers as well as study the effect of rat's intestinal movement by applying different doses of drug and in hypoxic condition.
3.	C10T:Respiratory Physiology C10P:Respiratory Physiology Lab	<ul style="list-style-type: none"> ➤ Imparts knowledge about pulmonary function, anatomy of the lungs, mechanics of breathing, gas transport between the lungs and tissue,regulation of respiration,respiratory adjustments in health and disease etc. ➤ Acquire skills about measurement of peak expiratory flow rate,measurement of forced expiratory volume,measurement of oxygen saturation by pulse oxymeter.
4.	SEC2T:Physiological Techniques and Public Health Assessments SEC2P:Physiological Techniques and Public Health Assessments	<ul style="list-style-type: none"> ➤ Gain knowledge about different physiological techniques and public health assessment. ➤ Students performs experiment on BMI calculation, growth curve preparation,determination of visual acuity and colour blindness, recording of auditory and visual reaction time etc.

Semester – V (Hons)

SLno.	Name of the Course	Outcomes
1.	C11T:Sensory Physiology C11P:Histological and Human Experiments	<ul style="list-style-type: none"> ➤ Provides the concept about classification of general and special senses and their receptors, neural pathway of touch and pain as well as kinaesthetic sensation, vision and visual pathway as well as various biological mechanisms associated with the vision, hearing and equilibrium, smell and taste etc. → Enable to acquire skills and knowledge by performing different experiment on histological and human experiments.
2.	C12T:Endocrinology C12P:Endocrinology (Lab)	<ul style="list-style-type: none"> ➤ Understanding the knowledge about principles of endocrinology, pituitary gland, thyroid gland, hormonal control of calcium metabolism and the physiology of bone, endocrine functions of the pancreas, the adrenal medulla and adrenal cortex, endocrine function of kidney, heart and pineal gland etc. ➤ Students perform experiment on endocrinology.
3.	DSE1T:Biostatistics DSE1P:Biostatistics (Practical)	<ul style="list-style-type: none"> ➤ Basic concept about biostatistics and its many applications, principles of statistical analysis of biological data, variable, population ,sampling , presentation of data, central tendency, degree of freedom, probability, various probability distribution, null hypothesis, student's t test, chi- square test linear correlation and regression etc . ➤ Solve some statistical problem with the help of physiological data.
4.	DSE2T:Sports Physiology ,Work Physiology and Ergonomics DSE2P:Sports Physiology ,Work Physiology and Ergonomics	<ul style="list-style-type: none"> ➤ Provides concepts of physical work and physiological work, cardiovascular and respiratory changes during graded exercise physiology, treadmill and Harvard step test, physical training, ergonomics, anthropometry etc. ➤ Perform different experiment with the knowledge of above mention topic.

Semester – VI (Hons)

SLno.	Name of the Course	Outcomes
1.	C13T:Reproductive physiology ,Embryology and Chronobiology C13P:Reproductive Physiology , Embryology and Chronobiology(Practical)	<ul style="list-style-type: none"> ➤ Provides the concept about sex differentiation and development , the male reproductive system , the female reproductive system , pregnancy , lactation and mammary gland ,exfoliative cytology on gynecological smear ,Reproductive Genetics , human genetics and human reproductive disorder , embryology and chronobiology etc. ➤ Performs different experiment with theknowledge of above mention topic.
2.	C14T:Renal Physiology ,Skin and Body Temperature Regulation ,Biomedical Instrumentation C14P: : Renal Physiology ,Skin and Body Temperature Regulation ,Biomedical Instrumentation (Practical)	<ul style="list-style-type: none"> ➤ Learn about structure of kidney , mechanism of urine formation ,constituents of urine , skin and body temperature regulation ,biomedical basis of disease , basis of biomedical instrumentation ,medical diagnostic techniques related equipment ,biomedical instruments etc. ➤ Acquire skill and knowledge from demonstration as well as different experiment on above mention topics.
3.	DSE3T:Microbiology and Biotechnology DSE3P: Microbiology and Biotechnology (Practical)	<ul style="list-style-type: none"> ➤ Gain knowledge about viruses , bacteriophages , bacteria , different stain , ,bacterial metabolism ,bacterial genetics ,food microbiology ,industrial microbiology ,environmental microbiology, recombinant DNA technology, different blot technique ,tissue culture, hybridoma techniques ,fermentation technology ,bio -plastics and biosensor ,genomics and proteomics etc . ➤ Acquire skill and knowledge from demonstration as well as different experiment on microbiology and biotechnology.

Semester – I (Generic)

SLno.	Name of the Course	Outcomes
1.	GE-1T1: Blood and Immune System and Cardiovascular system	<ul style="list-style-type: none">➤ Important knowledge about Blood composition and their functions, blood related disorders, its hazards.➤ Immunity system innate and acquired, Antigens, antibody-structure, classification and functions. Different Autoimmune diseases.➤ Provides basic knowledge regarding Heart and blood vessels structure and function. Cardiac cycle, Blood pressure. Artificial pacemaker, Angina pectoris, Cardiac hypertrophy, rheumatoid arthritis, Angiography. ECG.
2.	GE-1P1: Practical	<ul style="list-style-type: none">➤ Learns and understand total count of WBC, Different count of WBC, Haemoglobin estimation, Haemin crystal. BT, CT & Blood group.➤ The ability to use of Blood pressure, Heart rate, Pulse pressure measurement.

Semester – II (Generic)

SLno.	Name of the Course	Outcomes
1.	GE 2 T : Developmental Biology / Embryology	<ul style="list-style-type: none">• Learns and understand Gametogenesis - Spermatogenesis & Oogenesis. Ultra structure of sperm and ovum in mammals.• Fertilization in Sea-urchin and mammals.• Cleavage process in mammals.• Gastrulation and Organogenesis.
2.	GE2 P: Developmental Biology / Embryology (Lab)	<ul style="list-style-type: none">• Provides basic knowledge regarding Staining of ovarian tissue sections and identification.

Semester – III (Generic)

SLno.	Name of the Course	Outcomes
1.	GE3T: Community and Public Health	<p>Basic idea about community health and public health issues, Malnutrition and overnutrition in a community.</p> <ul style="list-style-type: none">● Composition and nutritional value of common Indian foodstuffs.● Principles of formulation of balanced diets for different person.● Different community disease.● Sound pollution as a community health issue.
2.	GE-3P: Community and Public Health	<ul style="list-style-type: none">● Provides ideas about Survey on the status of dietary intake in the surrounding area through visits.● To perform Qualitative assessment of noise.

Semester – IV (Generic)

SLno.	Name of the Course	Outcomes
1.	GE4T: Excretory System & Body Temperature Regulation	Creates an idea about anatomy, mechanism and role of kidney in human body, renal related disorders. <ul style="list-style-type: none">• Learns and understand about histological structure of skin, body temperature, fever. Cold stress, Insulating effects. Acclimatization.
2.	GE4P: Excretory System & Body temperature regulation (Lab)	To perform Quantitative estimation of Urea, albumin in Urine, Normal and abnormal constituents of urine; <ul style="list-style-type: none">• To perform Body temperature measurement

Semester – I (General)

SLno.	Name of the Course	Outcomes
1.	[DSC-1AT] : Cellular Physiology, Biophysical Principles, Biochemistry, Digestive system & Metabolism	Learns about structural organization of living body, <ul style="list-style-type: none">● Students learn about Diffusion, Osmosis, Dialysis, Ultrafiltration, Surface tension.● To learn different metabolic process.● Roll of vitamins and minerals on human body, genetic material.● About alimentary canal, role of digestive gland, digestion and absorption.
2.	[DSC-1AP]: Practical: Fresh tissue experiments& Identification of permanent slides	<ul style="list-style-type: none">● Learns and understand characteristics of different tissue of the body, muscle structure.● To observe histological structure of different body part.

Semester – II (General)

SLno.	Name of the Course	Outcomes
1.	DSC1BT: Blood, body fluid and immune System, Cardiovascular System and Respiratory System	<ul style="list-style-type: none">● Learns about body fluid composition and function, blood group, blood related disease.● Students learn about body defence system, vaccine.● Heart beat, hypertension, ECG, about heart block● About breathing system, artificial respiration, respiratory disease.
2.	DSC1BP : Practical: Haematology and Human Experiment.	<ul style="list-style-type: none">● Helps to identify different blood cells, estimate of Haemoglobin and determination of blood group.● Provides basic knowledge about blood pressure, physical fitness.

Semester – III (General)

SLno.	Name of the Course	Outcomes
1.	DSC1CT: Nerve –Muscle Physiology, Nervous system, Skin and Body Temperature Regulation.	<ul style="list-style-type: none">● Helps to understand different types of muscle and its properties.● Provides idea about nerve and its function.● Helps to understand structure of brain and spinal cord, its function.
2.	DSC1CP: Practical	<ul style="list-style-type: none">● Helps to isolate nerve fibers, measurement of body temperature.● Students can observe muscle contraction.
3.	SEC1T: Environmental Epidemiology	<ul style="list-style-type: none">● Helps to know environmental pollution and its causes, different viral diseases, cancer.● Provides data about extinct and endangered animals.● Helps to statistical analysis.

Semester – IV (General)

SLno.	Name of the Course	Outcomes
1.	DSC1DT: Sensory Physiology, Endocrine and Reproductive System, Renal Physiology	<ul style="list-style-type: none"> ● Learns about Structure of sensory organ and their functions. ● Basic knowledge about Anatomy of endocrine system, Mechanism and modern concepts of hormone action. ● Histology structure and function of testis, ovary. ● Students knows about Fertilization process, pregnancy, Stem cell biology. ● Structure and functions of kidney.
2.	DSC1DP: Practical	<ul style="list-style-type: none"> ● Knows about Identification of normal and abnormal constituents of urine. ● Staining and identification of kidney and ureters. ● Study of the effects of oxytocin on uterine contraction. ● Estimation of estrogen by Spectrophotometric method. ● Study of the effects of adrenaline on intestinal / uterine movements.
3.	SEC2T: Medical Diagnostics Unit-1: Biomedical basis of Diseases Unit-II: Analytical Technology Unit-III: Diagnostic Methods	<ul style="list-style-type: none"> ● Learns about different Infectious diseases (Bacterial, Viral, Protozoan) and Immunological diseases. ● Enables understanding of UV Chromatography Methods- LC, HPLC and GC-MS Nuclear Magnetic Resonance Spectroscopy (NMR) Atomic Force and Scanning Electron Microscopy (AFM and SEM) Electrochemistry Molecular Modeling and Chemical Databases ● Basic idea about hospital histopathology, biochemistry, hematology and microbiology laboratories. ● Provides theoretical knowledge - ECG, Echo, X-ray, CT, MRI, PET, Ultrasonography

Semester – V (General)

SLno.	Name of the Course	Outcomes
1.	DSE1AT: Sports Physiology, Work Physiology and Ergonomics	<ul style="list-style-type: none">● Students know about the role of sports in our body, role of physical training.● Ergonomics design provides more comfort to the worker in an work place without any injury.● Students measure nutritional status by using anthropometry.
2.	DSE1AP: Sports Physiology, Work Physiology and Ergonomics (Practical)	<ul style="list-style-type: none">● Can measure VO2 max, which indicate body's physical condition.● Helps to measure different body dimension.
3.	SEC3T: Maternal and Child Nutrition Unit - I Unit - II Unit - III	<ul style="list-style-type: none">● Learns about pregnancy and nutritional needs during pregnancy, common disorders of pregnancy.● Basic idea about Nutritional needs of nursing mothers and infants, importance breastfeeding.● Assessment and management of moderate and severe malnutrition among children, Micronutrient malnutrition among preschool children.● Provides some nutritional programme of government.

Semester – VI (General)

SLno.	Name of the Course	Outcomes
1.	DSE1BT: Clinical Hematology	<ul style="list-style-type: none"> ● Brief knowledge about Anemia, Hemoglobin. ● This course enables the students to gain knowledge about Causes and significances of leucocytosis, leucopenia, neutrophilia, eosinophilia, basophilia, monocytosis, lymphocytosis, neutropenia, lymphopenia. ● Knows about Hemostasis and Coagulation, its disorders. ● Learn about determination and significance of TC, DC, ESR, Arnth count, PCV, MCV, MHC, MCHC. bleeding time, clotting time, prothrombin time.
2.	DSE1BP: Clinical Hematology (Practical)	<ul style="list-style-type: none"> ● Students can estimation of haemoglobin by various methods, determination of blood groups. ● Demonstration of leukemic slides, thrombin time, malarial slide. ● Staining of bone marrow
3.	SEC4T: Pharmacology and Toxicology	<ul style="list-style-type: none"> ● Students learn about nature and source of drugs, routes of drug administration and their advantages, mechanism of drug action. ● Basic idea of LD50, LC50, TD50 and therapeutic index.
4.	SEC4P: Pharmacology and Toxicology	<ul style="list-style-type: none"> ● To study presence of paracetamol /aspirin in the given sample. ● Determination of Dissolved water (DO) using Winkler's method. ● Students can determine Acid value of the given oil sample.