



Government of West Bengal  
Government General Degree College at Kharagpur-II  
Department of Physiology  
Madpur, Paschim Medinipur – 721149, West Bengal

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## Government General Degree College at Kharagpur II

Department of Physiology  
B.Sc. Honours in Physiology  
Programme Outcome (PO)  
&  
Course Outcome (CO)



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Department of Physiology  
B.Sc. Honours in Physiology

Programme Outcome (PO)

*Syed Benazir Firdaus*



### Programme outcome

At the end of the course B.Sc. Honours in Physiology, students are expected to:

- Gain the basic knowledge about Human Physiology.
- Understand clearly the working and various mechanisms of the functioning of the different organs and organ systems of the human body.
- Understand about the biophysics and biochemistry and their role and significance in Physiology.
- Develop knowledge about the various disciplines pharmacology, nutrition and dietetics, genetics, molecular biology, ergonomics etc., and their interactive role in the regulation of human health and disease.
- To learn about the molecular aspects of certain physiological processes.
- To develop a compact understanding of the various public health conditions & hazards and to gain an insight to design solution to those.
- To recognize any particular epidemiological condition in the society through survey method, to analyze the epidemiological data and to suggest the ways out of any adverse pathogenic condition.
- To gain a detailed knowledge about hematology and significant clinical findings so as to address any clinical or pathological condition with a clear scientific outlook.
- To gain knowledge about the mechanisms and working of various modern medical technologies and analytical instruments in order to understand their application in analyzing health and disease conditions.
- To gain an insight in the sports science and to develop understanding about the various methods of training etc.
- To learn about the application of thermodynamics, heights, weather conditions, pathogens and various other substances like the free radicals, nutraceuticals, cosmoceuticals etc., on the human body.
- To perform various experiments in biochemistry, human experimental, animal experimental, histology, biophysics etc.
- To develop basic necessary knowledge about the working of the human body, pharmacology, pathology and interactive biomolecules.
- To learn different skills in the field of physiology in order to be fit and equipped to make their place in further advanced learning of Physiology and allied subjects.
- To learn the basic digital skills necessary for employment and higher studies.
- To gain an all round knowledge in the subject of Human Physiology so that they may be confident enough to seek jobs for which they may be eligible completing the undergraduate certificate course.
- To be competent enough to pursue their future career in teaching, research, industry and other professions in Physiology and allied science, following completion of the course.



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B.Sc. Honours in Physiology

Course Outcome (CO)

*Syed Benazir Kirdaus*  
— HEAD  
Department of Physiology  
Govt. General Degree College, KGP-II  
Madpur, Paschim Medinipur, 721149





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**B.Sc. Honours in Physiology**  
**(Under CBCS system; revised syllabus with effect from 2022-23)**

**Course Outcomes**

Semester	Paper code & Name	Outcomes
Semester I (Revised Syllabus from 2022-23)	<b>C-1T</b> <b>(Theory)</b> <b>Structural Units in Human Systems &amp; Functional Principals</b>	This course helps the students to gain knowledge about the cellular organization, the electron microscopic structures of various cellular components, the tissue organization of human body, and also to learn about the biochemical and biophysical principles of various physiological systems.
	<b>C-1P</b> <b>(Practical)</b> <b>Histology</b>	Students learn the basic staining techniques of fresh tissues and also use the compound microscope to identify the microscopic sections of various mammalian tissues
	<b>C-2T</b> <b>(Theory)</b> <b>Biomolecules and Enzymes</b>	This course helps the students to understand the chemistry of biomolecules. It also helps the students to learn about the biochemical structures and functions of the biomolecules like proteins, carbohydrates, lipids, nucleic acids etc., in our body. Students also learn about enzymology, the kinetics of enzyme substrate reaction, mechanism of action of enzymes and clinical significance of enzymes.
	<b>C-2P</b> <b>(Practical)</b> <b>Biochemistry</b>	Students learn about the qualitative and quantitative analytical techniques of various biomolecules.
Semester II (Revised Syllabus from 2022-23)	<b>C-3T</b> <b>(Theory)</b> <b>Muscular responses and blood as body fluid</b>	The course helps the students to learn about nerve muscle Physiology and the structural and functional details of the various components of the nervous system including the neuromuscular junctions as well as the mechanism and details of degeneration and regeneration of nerves. The course also helps the students to gain knowledge about the blood and body fluids, the various components of human body fluid, their functions and details mechanisms of formation of blood cells and



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		coagulation of blood etc.
	<b>C-3P</b> <b>(Practical)</b> <b>Hematology and histology</b>	Students learn the practical techniques for hematological analysis like measuring haemoglobin, making haemin crystals etc., some significant histological techniques including staining methods and histological structural details of some tissues.
	<b>C-4T</b> <b>(Theory)</b> <b>Circulation and Air-trafficcking</b>	The course helps the students to learn about the cardiovascular physiology, circulation and respiratory physiology. Students learn about various details of cardio-respiratory system and concepts of clinical techniques like ECG, measurement of blood pressure, used for understanding the cardiovascular and respiratory systems. Concepts of life saving techniques like artificial respiration etc., is also learnt by the students.
	<b>C-4P</b> <b>(Practical)</b> <b>Clinical Physiology</b>	Students learn about performing and interpreting the results of some important practical clinical techniques like measuring the blood pressure, respiratory rate, heart rate, determining vital capacity, measuring the different waves of ECG etc. The course also helps the students to learn about using various portable instruments for measuring various respiratory parameters like the peak flow meter, pulse oxymeter etc.
<b>Semester III</b> <b>(Revised Syllabus from 2022-23)</b>	<b>C5T: Digestion and metabolism</b>	The students develop proper insights into the histology and functions of digestive organs. They learn digestion and absorption of carbohydrates, lipid, proteins and nucleoproteins. They also gain a comprehensive knowledge in mineral metabolism-their functions and deficiencies.
	<b>C5P: Analytical biochemistry (Practical)</b>	This helps the students to develop analytical skills and learn to estimate: <ul style="list-style-type: none"><li>❖ Free and total acidity in supplied gastric juice</li><li>❖ Lactose and calcium from milk free amino acids by ninhydrin method and total protein by quantitative biurette reagent method from pulses</li><li>❖ Vit-C from lemon juice</li><li>❖ Acid value and iodine number from fat.</li><li>• The students also learn to identify food adulterants from common food stuffs.</li></ul>
	<b>C6T: Neurophysiology and Skin functions</b>	This course is designed to study neurophysiology and the students learn about: <ul style="list-style-type: none"><li>❖ The organization and basic functions of the nervous system – central and peripheral.</li></ul>





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	<ul style="list-style-type: none"><li>❖ The physiological basis of different types of sleep, changes in EEG.</li><li>❖ The higher functions of nervous system: memory, conditioning and learning</li><li>❖ The CSF-formation, circulation and functions</li><li>❖ The chemical transmission and central control of the autonomic nervous system</li></ul> <p>In the skin and body temperature regulation section the students:</p> <ul style="list-style-type: none"><li>❖ Know the skin and body temperature regulation</li><li>❖ Learn histological structure of skin., organization of sweat gland, composition and functions of sweat, regulation of sweat secretion, insensible and sensible perspiration, composition and functions of sebum and triple response.</li></ul> <p>Learn regulation of body temperature and the role of higher centers of the brain including physiological basis of fever.</p>
<b>C6P:</b> Experimental Physiology	<p>This helps to develop experimental physiology related skills in students They learn to use kymograph, induction coils, key and tuning fork and apply them to study effects of various physical factors like temperature and load on the contraction of muscle recorded in a gastrocnemius -sciatic preparation. They study:</p> <ul style="list-style-type: none"><li>❖ The effects of temperature, summation and load (after-load) on muscle contraction using a kymograph.</li></ul> <p>The students also study the beats of a perfused heart of a toad using kymograph, preparation of amphibian Ringer solution. They learn the effects of acetylcholine and excess calcium ion on perfused heart.</p>
<b>C7T:</b> Special senses, work and exercise	<p>The students know about classification of general and special senses and their receptors, mechanism of transduction of sensory stimuli, laws of sensory perception and adaptation of receptors.</p> <p>They learn about physical work and classification of physiological work. They understand the concept and applications of anthropometry, work-rest cycle and learn about the occupational health hazard. They are trained to understand the important role of physiology to ensure application of ergonomics in work environment to ensure maximum worker's safety as well as productivity in any industrial setting. They develop concepts of aerobic and anaerobic training in sports, cardio-respiratory entrainment and application of physiology to</p>

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		maximize the performance of sportspersons considering their health and physical parameters.
<b>C7P: Human experiments &amp; Anthropometric measurements</b>		<p>The students learn to measure arterial blood pressure at rest, after exercise and at different postural conditions by sphygmomanometer. They also learn to determine physical fitness of human subjects. They know how to measure breathing rate before and after exercise. They learn to determine VO<sub>2</sub> max by Queen's College method.</p> <p>They study the effect of graded exercise (by Bicycle ergometer/Treadmill) on heart rate. Besides the course also helps the students to:</p> <ul style="list-style-type: none"><li>❖ Study of the pneumographic effects of talking, laughing, coughing, exercise, hyperventilation and breath holding.</li><li>❖ Study of spirometric measurement of vital capacity.</li><li>❖ Determine of hand and foot reaction time.</li><li>❖ Learn anthropometric parameters: Weight, stature, eye height, shoulder height, elbow height, bi-acromion breadth, head breadth, head circumference and neck circumference. Mid upper arm circumference, chest circumference, waist circumference, hip circumference, waist hip ratio, BMI, BSA.</li><li>❖ Study of visual acuity, perimetry, color blindness, deafness, knee jerk, planter reflex.</li></ul> <p>The students develop a complete knowledge about how to ascertain health and fitness of human subjects through different experiments and physical measurements.</p>
<b>SEC-1: Nutrition and Dietetics, Diet Survey</b>		<p>The students develop basic concept of nutrition, nutrients, nutraceutical, cosmeceutical, nutrigenomics. They learn to:</p> <ul style="list-style-type: none"><li>❖ Evaluate Glycemic Index (GI)</li><li>❖ Classify dietary fibers with potential of health benefit</li><li>❖ Identify resistant starch</li><li>❖ Nutritional evaluation of proteins: essential and non- essential amino acids, Protein Efficiency ratio (PER), nitrogen balance, Net protein utilization (NPU), Biological value of protein, protein spares, nutritive value of major food groups (basic concepts).</li></ul>





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		<ul style="list-style-type: none"><li>❖ Learn about vitamins and water. This includes source, brief chemistry, dietary requirements, functions, deficiency, hyper-vitaminosis, and antioxidant.</li><li>• The students build concept of energy in Human Nutrition- units, calorific and physiological fuel value, respiratory quotient (RQ), total energy expenditure (TEE), basal metabolic rates (BMR) and resting energy expenditure (REE), specific dynamic action (SDA), physical activity ratio (PAR). They study the determination of BMR by Benedict Roth apparatus. Factors affecting BMR. Further, they learn about adult consumption unit (ACU). formulation of balance diet chart for college students, pregnant and lactating mothers and athletes..</li></ul>
	<b>SEC-1P: Practical</b>	<ul style="list-style-type: none"><li>• The students learn to conduct diet survey following nutritional assessment as per ICMR specification (Steps- Introduction, Diet History, Methodology, Dietary Survey, Clinical Examinations, Remarks, Recommendation and Conclusion). They know how to prepare handwritten report after a survey conducted preferably on his/her own family.</li></ul>
<b>Semester IV (old syllabus under CBCS)</b>	<b>C8T: Energy Balance, Metabolism and Nutrition</b>	<p>The students learn about:</p> <ul style="list-style-type: none"><li>❖ Energy metabolism, carbohydrate metabolism, biological oxidation, protein metabolism, fat and cholesterol metabolism</li><li>❖ The integration of carbohydrate, fat and protein metabolism.</li><li>❖ Reactive oxygen species and build basic concepts of nutrients, nutraceutical, cosmoceutical, nutrigenomics.</li><li>❖ The parameters like BMR, RQ, RDA, SDA, NPU, biological value of proteins, vitamins and minerals.</li><li>❖ Concept on energy in Human nutrition.</li></ul>
	<b>C8P: Energy Balance, Metabolism and Nutrition</b>	<p>The students develop analytical skill and learn about:</p> <ul style="list-style-type: none"><li>❖ Quantitative estimation of glucose and sucrose by Benedict's method.</li><li>❖ Quantitative estimation of amino nitrogen [Sorensen's formol titration method (percentage as well as total quantity to be done)].</li><li>❖ Estimation of percentage quantity of lactose in</li></ul>



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		milk by Benedict's method.
<b>C9T: Gastrointestinal Function</b>		<p>The students gain a knowledge about:</p> <ul style="list-style-type: none"><li>❖ Digestion &amp; absorption of carbohydrates, proteins &amp; nucleic acids, lipids.</li><li>❖ Absorption of water &amp; electrolytes.</li><li>❖ Absorption of vitamins &amp; minerals</li><li>❖ Regulation of gastrointestinal function including role of gastro-intestinal hormones.</li><li>❖ The different parts like mouth &amp; oesophagus, stomach, exocrine portion of the pancreas, liver &amp; biliary system, small Intestine, colon.</li><li>• The mechanism, function and regulation of mastication, deglutition, movements of alimentary canal.</li></ul>
<b>C9P: Gastrointestinal Function Lab</b>		<p>The course helps the students to learn how to perform Dale's Experimental and they learn to:</p> <ul style="list-style-type: none"><li>❖ Study the kymographic recording of normal movements of rat's intestine in Dale's apparatus.</li><li>❖ Study the effects of hypoxia, acetylcholine and adrenaline on normal intestinal movements.<ul style="list-style-type: none"><li>❖ This develops a knowledge about how to use a tissue organ bath for pharmacological testing of drugs in laboratory settings.</li></ul></li></ul>
<b>C10T: Respiratory Physiology</b>		<p>The students study pulmonary function and the details include:</p> <ul style="list-style-type: none"><li>❖ Properties of gases, anatomy of the lungs.</li><li>❖ Mechanics of breathing.</li><li>❖ Gas exchange in the lungs.</li><li>❖ Pulmonary circulation.</li><li>❖ Other functions of the Respiratory System like maintain body pH etc.</li></ul>





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		<p>They study gas transport between the lungs &amp; the tissues and learn about:</p> <ul style="list-style-type: none"><li>❖ Oxygen transport, carbon dioxide transport, respiratory acidosis and alkalosis.</li><li>❖ Regulation of respiration which involves neural and chemical control of breathing, nonchemical influences on respiration.</li></ul> <p>They study the respiratory adjustments in health &amp; disease which include:</p> <ul style="list-style-type: none"><li>❖ The effects of exercise, other forms of hypoxia, oxygen treatment, oxygen toxicity, hypercapnia and hypocapnia.</li><li>❖ Other respiratory abnormalities.</li><li>❖ The effects of sleep and increased barometric pressure on respiration.</li><li>❖ Artificial respiration, respiratory failure and high- altitude sickness.</li><li>❖ The Lung Function Tests</li></ul>
	<b>C10P: Respiratory Physiology Lab</b>	<p>The students learn to perform respiratory experiments on human subjects. They know how to:</p> <ul style="list-style-type: none"><li>❖ Measure peak expiratory flow rate.</li><li>❖ Measure oxygen saturation by pulse oxymeter before and after exercise.</li><li>❖ Measure forced expiratory volume (FEV) in first second.</li></ul>
	<b>SEC2T: Computer application in Health science</b>	<p>This section of the course helps the students to acquire knowledge about computer application in biological sciences and medicine. The students learn about:</p> <ul style="list-style-type: none"><li>❖ Brief history of development of computer, generation of computer, classification of computer, computer hardware, computer software and computation of data.</li><li>❖ They also learn graphical representation of data in pie, bar and line diagram using Microsoft excel, Power Point. They know about</li></ul>





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		<p>preparation of body text and table by using MS word, slide preparation for Physiological items and presentation of study material by using power point.</p> <ul style="list-style-type: none"><li>❖ They learn to use e-mail and internet.</li><li>❖ They learn about the application of computer in physiology and medicine, application of computer in physiological data analysis, use of computer by dietitian and dietary computation.</li><li>❖ They understand application of computer in physiological modelling, medical field for computer assisted imaging and therapy in health science.</li></ul>
	<b>SEC2P: Computer application in Health science</b>	<p>The students develop computer application skills and become adept in using information and technology tools for academic, research and industrial purposes. They learn the following the things for the same purpose:</p> <ul style="list-style-type: none"><li>❖ Basic operation of computer: Operations of WINDOWS; data entry.</li><li>❖ Graphical presentation of data.</li><li>❖ Computer tabulation of physiological data.</li><li>❖ Making charts with Ms Excel - bar diagram, line diagram, pie diagram for representing physiological data.</li><li>❖ Computation of frequency and percentage distribution of different physiological parameters in different age groups, in different communities, percentage distribution of blood groups.</li><li>❖ Significance of testing by 't' test with interpretation – Paired observation, standard/population mean.</li><li>❖ Power point - making slide for any topic related to physiology or medicine, editing, slide show.</li><li>❖ Preparation of case history of a patient and feeding of information in the hard disc</li></ul>
<b>Semester V (old syllabus under CBCS)</b>	<b>C-11T (Theory) Sensory Physiology</b>	<p>This helps to the students to:</p> <ul style="list-style-type: none"><li>❖ Study the classification of general and special senses and their receptors.</li><li>❖ Understand the neural pathway of touch, pressure, pain, thermal and kinesthetic sensation.</li><li>❖ Acquire knowledge about the vision, visual pathway, and the various biological mechanisms associated with vision.</li></ul>



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		<ul style="list-style-type: none"><li>❖ Learn about the Hearing and Equilibrium, sound waves, auditory pathway and disorders associated with the mechanisms.</li><li>❖ Study the smell and taste sensation: Receptors, Pathways, Physiology of Taste and Features of Taste sensation.</li></ul>
<b>C-11P (Practical) Histological and Human Experiments</b>	The students gain knowledge about	<ul style="list-style-type: none"><li>❖ The principles of fixation and staining.</li><li>❖ Determination of visual acuity &amp; color blindness.</li><li>❖ Mapping the peripheral field of vision with perimeter and physiological blind spot.</li><li>❖ Recording of auditory and visual reaction time and exploration of conductive and perceptive deafness.</li></ul>
<b>C-12T (Theory) Endocrinology</b>	The students understand the concept of endocrine systems, glands, hormones, types of endocrine glands. They also learn about the experimental and clinical methods of studying the endocrine glands. The course also helps the students to:	<ul style="list-style-type: none"><li>❖ Study the morphology, structure, function, and regulation of pituitary gland.</li><li>❖ Learn about the anatomical considerations, electron microscopic structure, functions of thyroid gland and thyroid hormones; diseases associated with thyroid gland.</li><li>❖ Know about the hormonal control of calcium metabolism and the physiology of bone.</li><li>❖ Acquire knowledge about the adrenal medulla and adrenal cortex.</li><li>❖ Understand the endocrine functions of the kidneys, heart and pineal gland.</li><li>❖ Study the endocrine functions of the pancreas and the regulation of carbohydrate metabolism.</li></ul>
<b>C-12P (Practical) Endocrinology</b>	The students acquire the hands-on training and they can perform the following tasks:	<ul style="list-style-type: none"><li>❖ Fix, stain and identify of endocrine Glands.</li><li>❖ Study the effects of oxytocin and adrenaline on uterine contraction of albino rat in tissue organ bath.</li><li>❖ Estimate estrogen by spectrophotometric method and plasma level of any hormone using ELISA.</li></ul>
<b>DSE-1T (Theory) Biostatistics</b>	The students gain knowledge about:	<ul style="list-style-type: none"><li>❖ The scope of statistics– utility and misuse,</li></ul>





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		<p>principles of statistical analysis of biological data.</p> <ul style="list-style-type: none"><li>❖ The basic concepts which include variable, population and sampling – parameters as well as presentation of data.</li><li>❖ The statistical tabulation and presentation of data and various statistical methods of data analysis.</li><li>❖ The degrees of freedom, probability and normal distribution.</li><li>❖ Testing of hypothesis and distribution-free test - chi-square test, linear correlation and linear regression.</li></ul>
<b>DSE-1P (Practical)</b> <b>Biostatistics</b>		<p>This course helps the students in the following ways:</p> <ul style="list-style-type: none"><li>❖ Learning about the computation of mean, median, mode, standard deviation and standard error, of the physiological data of human subjects.</li><li>❖ Studying about graphical representation of data in frequency polygon and histogram, student's t test.</li><li>❖ Understanding about Statistical analysis and graphical representation of biological data with computer application program.</li></ul>
<b>DSE-2T (Theory)</b> <b>Sports Physiology,</b> <b>Work Physiology and</b> <b>Ergonomics</b>		<p>The students learn about:</p> <ul style="list-style-type: none"><li>❖ The concepts of physical work and physiological work.</li><li>❖ The concepts of exercise and performance as well as the affecting factors and associated tests.</li><li>❖ The concepts about physical training: general principles and different methods, sports nutrition.</li><li>❖ The basic concepts of sports psychology, Sports Biochemistry, Ergogenic aids and Dietary supplement.</li></ul> <p>This also includes:</p> <ul style="list-style-type: none"><li>❖ Studying Ergonomics – Basic concepts and its application in industry to improve efficiency; Occupational diseases.</li><li>❖ Understanding Anthropometry and its implication in general; Sports Anthropometry.</li></ul>
<b>DSE-2P (Practical)</b>		<p>The students develop skills in carrying out the following experiments:</p> <ul style="list-style-type: none"><li>❖ Measurements of resting and working heart rate using thirty beats and ten beats' methods;</li></ul>





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		<ul style="list-style-type: none"><li>❖ Measurement of blood pressure.</li><li>❖ Determination of Physical Fitness Index, recording of recovery heart rate after standard exercise, cardiac cost of specific work, VO<sub>2</sub> max, endurance time.</li><li>❖ Measurement of some common anthropometric parameters.</li><li>❖ Determination of body surface area, Body Mass Index and body fat percentage.</li></ul>
Semester VI (old syllabus under CBCS)	<b>C-13T (Theory) Reproductive Physiology, Embryology and Chronobiology</b>	This is designed to facilitate: <ul style="list-style-type: none"><li>❖ Learning about the general concepts of reproductive physiology.</li><li>❖ Knowing about the anatomy, control and functions of male and female reproductive system.</li><li>❖ Studying about Pregnancy: Fertilization and the establishment of pregnancy, hormonal control, placenta formation, pregnancy tests and parturition.</li><li>❖ Studying about lactation and mammary gland: structure, function; milk ejection reflex.</li><li>❖ Understanding Reproductive Health, Reproductive Genetics, Human Genetics and Human Reproductive Disorders.</li><li>❖ Building concepts about Embryology and Chronobiology.</li></ul>
	<b>C-13P (Practical) Reproductive Physiology, Embryology and Chronobiology</b>	The students develop skills to perform the following tasks- <ul style="list-style-type: none"><li>❖ Study of estrous cycle; Tissue fixation, microtomy, slide preparation.</li><li>❖ Examination of histological sections of permanent slides of rat/human.</li><li>❖ Pregnancy test from human urine; Sperm count, sperm motility test in rat.</li><li>❖ Study of circadian functions in humans.</li><li>❖ Project work on assessment of individual differences in human circadian rhythms by questionnaire method.</li></ul>
	<b>C-14T (Theory) Renal Physiology, Skin and Body Temperature Regulation, Biomedical Instrumentation</b>	This helps the students in the following ways: <ul style="list-style-type: none"><li>❖ Gaining general concepts about Renal Physiology- structure and function of Kidney.</li><li>❖ Learning about the mechanism of urine formation, constituents of urine, disorders of renal functions.</li><li>❖ Study the physiology of urinary bladder, urine</li></ul>



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		<p>storage and micturition, neural controls.</p> <ul style="list-style-type: none"><li>❖ Acquiring knowledge about skin and body temperature regulation.</li><li>❖ Study about the biomedical basis of diseases and basics of Biomedical Instrumentation.</li><li>❖ Building concepts about medical diagnostic techniques related equipment and biomedical instruments.</li><li>❖ Acquiring knowledge about optics, fiber optics, diathermy equipment, audiometer and laser; application of computer in biomedical field, biotelemetry, physiological modeling.</li></ul>
<b>C-14P (Practical)</b>	This course leads to-	<ul style="list-style-type: none"><li>❖ Learning Tissue fixation, embedding in paraffin, microtomy, slide preparation.</li><li>❖ Identification for normal and abnormal or pathological constituents of urine.</li><li>❖ Learning Tests for urinary deposits, Detection of specific gravity of urine.</li><li>❖ Learning how to Estimate albumin, urea and total phosphates in urine.</li><li>❖ Knowing how to Study the skin to blunt injury - triple response.</li></ul>
<b>DSE-3T (Theory)</b> <b>Medical Biochemistry</b>	The students develop concepts of Clinical Biochemistry - organization of clinical laboratory, instrumentation and automation in clinical biochemistry laboratories, safety regulations and first aid. They learn about specimen collection, types of specimens for biochemical analysis. They know about precision, accuracy, quality control, precautions and limitations. They learn about:	<ul style="list-style-type: none"><li>❖ Evaluation of biochemical changes in diseases.</li><li>❖ Enzymes: Distribution and diagnostic significance</li><li>❖ Hormones: /pathophysiology of hormonal disorders and biochemical diagnosis</li><li>❖ Structural complexities and diseases associated with carbohydrates and lipids</li><li>❖ Vitamins- Deficiency related signs and symptoms and assay of vitamins</li><li>❖ An overview of integrative metabolism that the study of the interplay of insulin and glucagon integration of various metabolic pathways, role of leptin and ghrelin in regulation of body mass, electron transport chain and inhibitors, oxidative phosphorylation, role of uncouplers and</li></ul>





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		<p>ionophores</p> <ul style="list-style-type: none"><li>❖ Organ function tests that include:<ol style="list-style-type: none"><li>1. Liver function tests.</li><li>2. Renal function tests and urine analysis</li><li>3. Tests of cardiovascular diseases.</li></ol></li></ul>
<b>DSE-3P</b> <b>Medical Biochemistry</b> <b>(Practical)</b>		<p>The students gain knowledge about how to collect blood and store. They learn to prepare serum and plasma from whole blood and storage.</p> <p>They develop analytical skills and can quantitatively determine the following: following in the whole blood/plasma/serum:</p> <ol style="list-style-type: none"><li>1. Estimation of blood glucose by glucose oxidase peroxides method.</li><li>2. Estimation of blood glucose by Nelson – Somogyi method</li><li>3. Estimation of blood inorganic phosphates by Fiske - Subbaraow method.</li><li>4. Estimation of serum total protein by Biuret method and determination of albumin globulin ratio.</li><li>5. Estimation of HDL/LDL and Triglycerides.</li><li>6. Estimation of bilirubin (direct and indirect).</li><li>7. Quantitative determination of serum creatinine, uric acid and urea.</li><li>8. Determination of serum amylase by iodometric method.</li><li>9. Estimation of creatine kinase.</li><li>10. Estimation of SGOT, SGPT, Acid &amp; Alkaline Phosphatase.</li></ol> <p>They also learn how to-</p> <ol style="list-style-type: none"><li>1. Estimate of Lactate dehydrogenase, beta glucuronidase (Demonstration).</li><li>2. SDS-PAGE Electrophoresis for Protein (Demonstration).</li><li>3. Five case studies based on above quantitative estimations performed.</li></ol>
<b>DSE-4T</b> <b>Community medicine,</b> <b>Epidemiological Data</b> <b>Analysis</b>		<p>This course helps the students to develop-</p> <ul style="list-style-type: none"><li>❖ Concepts of Health and Disease: Definition of health, determinants of health. Agent, host, environmental factors in health and disease and multifactorial etiology of disease.</li><li>❖ Concepts of Epidemiology including its principles and methods; epidemiology of communicable diseases and their diagnosis- clinical and laboratory, treatment and control and health programmes; epidemiology of chronic</li></ul>





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		<p>non-communicable disease and conditions like coronary heart disease, etc.</p> <ul style="list-style-type: none"><li>❖ Concepts of Health &amp; Nutrition and Reproductive &amp; Child Health that encompasses balanced diet, nutrition related disorders like Protein energy Malnutrition etc., It also helps to learn about child health, maternal health, immunization, population control measures.</li><li>❖ Concept of Environment and Occupational Health that includes water pollution and air pollution and their indicators, prevention and control. Study of occupational diseases like silicosis and byssinosis.</li><li>❖ Concepts of health care system in India: health planning, National Health Policy, Primary Health Care, Health Care delivery system in India.</li><li>❖ Concepts of Medicine and Society that include measuring diseases of a society considering the following parameters like<ul style="list-style-type: none"><li>a. Prevalence. b. Incidence</li></ul>They learn to assess the effectiveness of the treatment of diseases by -a. Cost of therapy, b. Resource required to administer the therapy. They also know the socio-cultural context of medicine: a. Doctor- Patient's relationship, b. Illness behavior.</li><li>❖ Concepts of epidemiological data, epidemiologic methods and survey which involve data collection: observational (descriptive and analytical) and experimental studies.</li><li>❖ Concepts of data organization &amp; presentation, statistical modeling and analysis using 'R' on NCRP data and survey conducted by them.</li></ul>
	<p><b>DSE-4P</b> <b>Community medicine, Epidemiological Data Analysis (Practical)</b></p>	<p>The students acquire skills and learn to:</p> <ul style="list-style-type: none"><li>❖ Conduct Surveys/ Community based studies on the topics related to preventive and social medicine.</li><li>❖ Design a questionnaire for survey of prevalence diabetes/ hypertension/ allergy/ respiratory disorders/etc. Determining the target and control populations</li><li>❖ Survey the population for the diseases mentioned above.</li><li>❖ Analyze of data from National Cancer Registry</li></ul>



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		<p>Program (NCRP).</p> <ul style="list-style-type: none"><li>❖ Understand incidence, mortality (rates, ratios and proportions)</li><li>❖ Use 'R' software and analyze data from NCRP data and survey conducted by the students.</li><li>❖ To perform correlation studies, regression studies and probabilistic distribution studies.</li><li>❖ To compare between groups and ascertain statistical significance of differences.</li></ul>
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*Syed Benagir Firdaus*

HEAD  
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