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

Government General Degree College at Kharagpur II

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

Syed Benazir Firdaus
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Department of Physiology
Govt. General Degree College, KGP-II
Madpur, Paschim Medinipur, 721149

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Programme Outcome (PO)

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B.Sc. General in Physiology
(Under CBCS system; revised syllabus with effect from 2022-23)
Programme outcome

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

- Gain the basic and compact knowledge about Human Physiology.
- Understand the mechanisms of the functioning of the different organs and organ systems of the human body.
- Understand about CellularPhysiology, BiophysicalPrinciples, Biochemistry,Digestive system & Metabolism.
- Develop knowledge about the various physiological systems includingblood, body fluid and immune System, Cardiovascular System,Respiratory System,Nervous System,SensoryPhysiology, Endocrinology, Reproductive System, Renal Physiology etc.,
- To develop knowledge about Nerve –Muscle Physiology, Skin and Body temperature regulation.
- To develop a compact understanding of the different public health issues and to gain an insight to design solution to those.
- To lean to recognize any particular epidemiological condition in the society through survey method, to analyze the epidemiological data and to suggest the ways out of anyadverse pathogenic condition.
- To gain knowledge about the mechanisms and working of various modern medical technologies and analytical instruments in order to understand their application.
- To learn about clinical Biochemistry and clinical Hematology and their applications. ,
- To gain insights about Microbiology and Biotechnology in context to human Physiology.
- To perform various experiments in biochemistry, human experimental, animal experimental, histology, hematology, biophysics etc.
- To learn different basic skills in the field of classical and clinical Physiology so that they may applythose for further learning in allied fields.
- To learn the basic digital skills necessary for employment and higher studies.
- To gain a complete 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 paramedical, pharmacology, teaching, industry and other professions in Physiology and allied science, following completion of the course.

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Course Outcomes

Semester	Paper code & Name	Outcomes
Semester I(Revised Syllabus from 2022-23)	**DSC-1AT (Theory) Cellular Physiology, Biophysical Principles, Biochemistry, Digestive system & Metabolism**	This course helps the students to gain knowledge about the cellular organization, membrane physiology, structure and functions of the various cellular components, the tissue organization of human body, Physicochemical principles and physiological importance of certain biophysical processes like diffusion, osmosis etc.,. Students also get to learn about the biochemistry of the different components of food and gains a compact knowledge about enzymology, kinetics of enzyme substrate reaction, mechanism of action of enzymes, clinical significance of enzymes, metabolism and metabolic processes. Students also learn about the basic details of the digestive system.
	DSC-1AP (Practical) Fresh tissue experiments & Identification of permanent slides	Students learn the compound microscope, basic staining techniques of fresh tissues and to identify the microscopic sections of various permanent slides of some major mammalian tissues.
Semester II(Revised Syllabus from 2022-23)	**DSC-1B (Theory) Blood, body fluid and immune System, Cardiovascular System and Respiratory System**	This course helps the students to understand and learn about blood and body fluids. They learn about the various components of blood, their functions,their formation processes, synthesis of haemoglobin, the abnormal hemoglobins, various diseases associated with blood, the process and abnormalities of coagulation of blood etc. Students also learn about the blood groups and their clinical significance, body fluids, the composition of body fluids, their significance, water balance in our body, lymph and lymph nodes. Students learn about the immune system, various components of the immune system, antigen, antibody, vaccines and the defense mechanism of our body against pathogens. The course

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		helps students to learn about cardiovascular system including the details about the structure and mechanism of function of our heart, pace maker, electrocardiography, regional circulations and their peculiarities. students learn about the respiratory system, the various components of the respiratory system, lung compliance, transport of the respiratory gases and the various respiratory diseases like anoxia, asphyxia, asthma etc.,.
	DSC1BP (Practical) Haematology & Human Experiment	Students learn about theuse of compound microscope, various hematological experiments like estimation of haemoglobin, Bleeding time, clotting time, haemincrystal,TC,DC, ESR,blood group etc.,.students also learn about the practical methods of measuring blood pressure by using sphygmomanometer, recording heart rate, respiratory rate, estimating physical fitness etc., They also get to know about the practical use of pulse oxymeter and peak flow meter.
Semester III(Revised Syllabus from 2022-23)	**DSC1CT: Nerve – Muscle Physiology, Nervous system, Skin and Body Temperature Regulation**	Students develop insights in Nerve-Muscle Physiology. They know about the different types of muscle and their structures,properties of muscle, structure and classification of nerves, degeneration and regeneration of nerve fibres,myelination and properties of nerve fibres. Besides they also know about synapse, neurotransmitters, and electromyography. They develop concepts on the structural and functional organization of the nervous system. They learn about CSF, receptors, reflexes and the detailed organization and function of the autonomic nervous system. In the skin and body temperature regulation section they know about the histological structure of skin,colour of the skin,organization of sweat gland,composition, function and regulation of the secretion of sweat. They know about the composition and function of sebum,triple response,normal body temperature and the physiological mechanism involved in its regulation.
	DSC-1CP: Practical	This section of the course helps the students to develop skills in isolation and staining of nerve fibers with node(s) of Ranvier (AgNO3), staining of skeletal and cardiac muscles by methylene blue stain, measurement of grip strength, recording of body temperature and the study of the response of the skin to blunt injury (triple response). The students also learn about how to perform neurological tests like superficial (plantar) and deep (knee jerk) reflex, reaction time by stick drop test and two-point

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		discrimination test. The students are demonstrated how to use a kymograph and study the mechanism of muscle contraction in a nerve-muscle preparation using the gastrocnemius muscle and sciatic nerve of toad. They are taught to calculate the work done by the muscle.
	SEC- 1: Skill Enhancement Course (Theory in: Environmental Epidemiology)	This section of the course is theoretical. The students develop concepts and ideas on man - environment relation; epidemiology-principle, types of study like– descriptive, analytical- cohort and environmental hazards and public health management. They learn about pollution, waste management and health hazards through case histories of Bhopal gas tragedy, Chernobyl disaster, and Three Mile Island accident and their aftermath. They study the infectious diseases (Bacterial-Tuberculosis, Typhoid; Viral - AIDS, Poliomyelitis, Hepatitis; Protozoan-Malaria); Lifestyle and Inherited/genetic diseases. They also come to know about the health impacts and socio-economic factors in the prevalence of such morbidities in population.
Semester IV (Revised Syllabus from 2022-23)	**DSC1DT: Sensory Physiology, Endocrinology and Reproductive Physiology, Renal Physiology**	This theory paper helps the students to learn about sensory Physiology,classification of general and special senses and their receptors along with laws like Weber – Fechner Law, Muller's law etc. They know how receptors function as biological transducer, neural pathway of touch, pressure. olfaction and gustation. They learn about the neuro-physiology of audition (or hearing) and vision.In the endocrinology section they develop concepts on theanatomy of endocrine system,hormones – classification, experimental and clinical methods of study of endocrine glands. The Reproductive Physiology section help them know about the primary and secondary sex organs, anatomy and physiology, secondary sex characters,puberty, precocious &delayed Puberty. They learn in details about the male as well as the female reproductive systems-their anatomy and physiological functions. They know about Renal Physiology. They learn about thestructure and functions of kidney. juxtaglomerular apparatus,mechanism of formation of urine,function of Malpighian corpuscles and renal tubule. They also study the normal and abnormal constituents of urine and their clinical significances. They know aboutrenal threshold. Micturition,non-excretory function of kidney and dialysis.
	DSC1DP: Practical	The students develop skills to stain and identify kidney, corneal cell space and stages of estrous cycle. They also learn to identify the normal and abnormal constituents of urine and specific gravity of urine. They also learn about determination of visual acuity by Snellen's chart / Landolt's chart,determination of colour blindness by Ishihara chart,exploration of conductive and perceptive deafness by tuning fork method. They develop skills forsperm counting. They are demonstrated how to study the effects of adrenaline on intestinal / uterine

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		movements,pregnancy test from human urine by kit method andquantitative estimation of Urea in Urine
	SEC2T: Biochemical Techniques	The skill enhancement course is a theoretical paper. The students learn about the biochemical techniques- their principles and applications. The techniques include spectroscopic techniques-principle of UV- Visible absorption spectrophotometry, fluorimetry,centrifugation, chromatographic techniques and electrophoresis.The insights inculcated will help the students to ascertain the precise technique to be implemented in their future studies.
Semester V Curriculum for B. Sc (General) in Physiology [Choice Based Credit System]	**DSE1AT: Biostatistics**	The theory paper helps the students to learn about the scope of statistics– utility and misuse, principles of statistical analysis of biological data,basic concepts –variable,population and sampling -- parameter, statistic, presentation of data frequency distribution, frequency polygon, histogram, bar diagram and pie diagram. They gain knowledge in different classes of statistics- mean, median, mode, mean deviation, variance, standard deviation, standard error of the mean, standard score, degrees of freedom, probability, normal distribution and Student's t-distribution. They learn to perform testing of hypothesis-null hypothesis, errors of inference, levels of significance, t- test and z score for significance of difference. They also learn Distribution-free test - Chi-square test. They studylinear correlation and linear regression in this section.
	SEC3T: Maternal and Child Nutrition (Theory)	This section of the course is taught as a theory paper. The students learn about nutritional needs during pregnancy, common disorders of pregnancy (Anaemia, HIV infection, Pregnancy induced hypertension), relationship between maternal diet and birth outcome. They also know about how to determine maternal health and nutritional status. Theygain knowledge innutritional needs of nursing mothers and infants, determinants of birth weight and consequences of low birth weight and breastfeeding biology. They learn assessment and management of moderate and severe malnutrition among children, micronutrient malnutrition among preschool children and child health and morbidity, neonatal, infant and child mortality, IMR, U5MR and MMR; link between mortality and malnutrition. They are imparted an overview of maternal and child nutrition policies and programmes.
	DSE1AP: Biostatistics (Practical)	The practical section of the course helps the students to learn about computation of mean, median, mode, standard deviation, standard error of the mean with physiological data like body temperature, pulse rate, respiratory rate, height and weight of human subjects. They know how to perform graphical representation of data in frequency polygon and histogram. They know how

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		to do Student's t test for significance of difference between means. They can carry out statistical analysis and graphical representation of biological data with computer application program (Microsoft Excel).
Semester VI Curriculum for B. Sc (General) in Physiology [Choice Based Credit System]	**DSE1B T: Developmental aspects of embryo**	This section of the course helps the students to develop general concepts of reproductive system, stem cell, gametogenesis and ultra structure of sperm and ovum of mammals. They study about the fertilization, cleavage plane and cleavage process in mammals. They also develop concepts in blastula formation, morphogenetic movements, gastrulation and organogenesis. They develop insights in the development of eye as an example of reciprocal and repeated inductive events.
	DSE1BP: Developmental aspects of embryo (Practical)	The students develop staining and identification skills of sections of reproductive organs. They learn hematoxylin and eosin staining of testicular, ovarian tissue sections; identification of spermatocytes, spermatids, Graafian follicle and Corpus Luteum. They are demonstrated a preserved mammalian embryo.

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