

Program outcomes of Physiology (Honours)

The CBCS syllabus of Physiology undergraduate honours course covers the basic physiological mechanism of human with emphasis on different systems. The course designed also helps to understand how these separate systems interact to yield integrated physiological responses to different challenges like environmental and pathological challenges. Students get a holistic understanding of the subject giving substantial weightage to both the core content and techniques used in Physiology. They also get acquainted with important physiological processes of human body, some communicable and non communicable diseases and their preventive measures.

The course content provides a substantial knowledge and weightage of

1. Appreciation, understanding and inter relation of human physiology, biophysical principles and biochemistry.
2. Understanding and recognising principal tissue and cellular micro architecture in normal and pathological conditions.
3. Understanding the functions of important physiological systems including the cardio-respiratory, renal, reproductive and metabolic systems.
4. Integrated response of different systems during performance of exercise, in metabolic and endocrine disorders, high and low altitude.
5. Understanding basic microbiological techniques for culture, isolation and identification of different microbes by staining as mentioned in the undergraduate curriculum.
6. Achieve fundamental knowledge of computational biology (classification, tabulation, analysis of physiological data) using different statistical softwares and tools.
7. Understanding salient physiological aspects of major environmental limiting factors and also pollutants, adulterants, pesticides, industrial effluents and their toxicological impacts.
8. Comprehend elemental pharmacology and xenobiotics and their importance in physiology and biomedical sciences.
9. Identification and quantification of different occupational hazards of people working in organized and unorganized sectors and designing of ergonomic workplaces.
10. Identification and analysis of different nutritional disorders and energy deficiency using anthropometry.
11. Fundamental knowledge of nanomedicine and nanotechnology and also application of these in modern health sciences.
12. Fundamental knowledge of bioinformatics and its applications.

Majority of students after completion of Honours Course in Physiology continue their M.Sc. in Human Physiology, Biological Sciences, Sports Physiology or Molecular Biology/Biotechnology. After completion of UG Physiology, students also opt for professional courses like paramedical sciences, physiotherapy, clinical biochemistry, medical transcription for their career.

The course outcome of Physiology (Honours)

Courses		Outcome
Core Courses		
Semester I	CCT1 and CCP1 (Cellular basis of Physiology)	<p>CCT1: Apprehension of fundamentals of different organs, microstructure of tissues and cell, functional morphology of cell, cellular transport and signalling in normal and unusual physiological conditions.</p> <p>CCP1: Recognize the histological identification of different mammalian tissues and organs.</p>
Semester I	CCT2 and CC P2 (Biological Physics and Enzymes)	<p>CC T2: Learning the fundamentals of biophysical principles and its correlation with different physiological processes, applications of biological physics, structure of enzymes, modulation of enzyme activities and different factors regulating enzyme activities.</p> <p>CCP2: Experimental learning of determination of blood pressure by auscultatory methods and determination of different enzyme activities by spectrophotometric methods.</p>
Semester II	CCT3 and CCP3(Physiology of nerve and muscle cells)	<p>CCT3: Acquire a brief overview about morphology, properties of nerve, muscle, neurotrophins and synapse. Mechanism of synaptic transmission, synaptic plasticity, chemistry and functions of different neurotransmitters, coding of sensory information and different clinical aspects.</p> <p>CCP3: Experimental learning of kymographic tracing of mechanical responses of gastrocnemius muscle of amphibian model like toad in different conditions and determination of nerve conduction velocity.</p>
Semester II	CCT4 and CCP4 (Chemistry of Biomolecules)	<p>CCT4: Apprehension of classification and structure of carbohydrate, protein, lipid, Detailed structure of DNA and different types of RNA.</p> <p>CCP4: Experimental learning of identification of different biomolecules by systematic biochemical processes.</p>
Semester III	CCT5 and CCP5 (Circulating Body Fluids)	<p>CCT5: Learning the overview of human circulatory system, components of blood and lymph, structure and functions of haemoglobin, concept of hemostasis.</p> <p>CCP5: Experimental learning of haematological techniques e.g., preparation and staining of blood film, haemoglobin estimation, preparation of haemin crystal, determination of bleeding time, clotting time.</p>
Semester III	CCT6 and CCP6 (Circulation)	<p>CCT6 :Apprehension of functional anatomy of heart, electrical activity of cardiac muscle, ECG, genesis and complications of cardiomyopathy, cardiovascular regulatory mechanism including neuronal and hormonal regulators, circulation through special regions and cardiovascular homeostasis.</p> <p>CCP6: Hands on practical on amphibian cardiovascular preparation (perfused heart of toad) and effect of changes in pressure and temperature, effect of drugs and ions on movements of heart.</p>
Semester III	CCT7 and CCP7(Functions of nervous system)	<p>CCT7: Learning of concepts of sensation, reflexes, mechanisms involved in the sensory, motor, autonomic functions and higher functions of nervous system, neurophysiological basis of consciousness and sleep, overview of electrical activity of brain, neural basis of behaviour and emotions.</p>

		CCP7: Knowledge of hands on experiments on superficial (plantar) and deep (knee jerk) reflex, hand grip strength measurement, reflex action by reaction time by stick drop test, short term memory test (like identification of shape, picture word), two point discrimination test.
Semester IV	CCT8 and CCP8 (Energy balance, Metabolism and Nutrition)	CCT8: Apprehension of metabolic processes, integration of metabolism, indicators of nutrition and application of biological, biochemical and physiologic scientific principles to nutrition practice. CC P8: Knowledge of hands on biochemical quantitative estimation of metabolites.
Semester IV	CCT9 and CCP9 (Gastrointestinal functions)	CCT9: Acquire fundamental structure of gastrointestinal tract and glands, the process of digestion and absorption of nutrients, chemistry and functions gastrointestinal hormones, regulation of gastrointestinal functions. CCP9: Experimental performances and recording the effects of hypoxia and different drugs on isolated intestinal preparation of rat in Dale's apparatus.
Semester IV	CCT10 and CC P10 (Respiration)	CCT10: Learning of fundamental structure and functions of respiratory tract, gaseous exchange procedure, oxygen and carbon dioxide transport, Mechanics and regulation of breathing and respiratory adjustments in different conditions, brief overview about artificial respiration. CCP10: Knowledge of the respiratory human experiments e.g., measurement of peak expiratory flow rate, oxygen saturation etc. and clinical correlations.
Semester V	CCT11 and CCP11 (Special senses)	CCT11: Learning the fundamentals of anatomical considerations and neuronal pathways of different special senses (vision, hearing and equilibrium, olfaction, gustation), clinical aspects of special senses. CCP11: Hands on knowledge of studying the visual functions like colour blindness and visual acuity.
Semester V	CC T12 and CCP12 (Endocrinology)	CCT12: Learning the fundamental knowledge of the functions of different endocrine glands, molecular mechanism of actions of different hormones and disorders of different glands. CCP12: Hands on training of bioassay of important hormones and neurotransmitters on isolated tissue preparations in Dale's bath.
Semester VI	CCT 13 and CCP 13 (Reproductive Functions)	CCT13: Learning the key anatomical features and development of male and female reproductive system, endocrine control and functions of the gonads, accessory sex organs, and associated diseases. CCP13: Hands on training of estimation of reproductive hormones, study of estrous cycle, rapid immunological test for detection of early pregnancy.
Semester VI	CC T14 and CCP 14 (Formation and excretion of urine)	CCT14: Learning the basic anatomy of urinary system, structure and functions of nephron, the principles of acid base balance of body and renal electrolyte physiology, non-excretory functions of kidney, renal disorders. CCP14: Hands on qualitative biochemical identification of urinary constituents in normal and pathological conditions.
Skill Enhancement Courses (SEC)		
Semester III	SEC T1 (Haematological Techniques)	Apprehension of different laboratory techniques for studying the haematological parameters including some marker enzymes in different physiological and pathological conditions.

Semester IV	SEC T2 (Histopathological Techniques)	Concepts of in depth histological tissue preparation, tissue staining and its application in pathology.
Discipline Specific Electives (DSE)		
Semester V	DSE 1 (Biological Statistics)	DSET1: Apprehension of knowledge on principles of statistical analysis of biological data, data handling, concept of probability and distribution, overview of testing of hypothesis. DSEP1: Computation of mean, median, standard deviation and standard error of mean, graphical representation of data, statistical analysis and its application in biological research.
Semester V	DSE 2 (Microbiology and Immunology)	DSET2: Apprehension of knowledge of cellular structure of microorganisms, growth, metabolism and genetics of bacteria, different bacteriological techniques involved in microbiology, understand the components of human immune system, human defence mechanisms and immunopathology. DSEP2 : Hands on identification of bacteria from culture and spore by staining.
Semester VI	DSE 3 (Sports and Exercise Physiology)	DSE T3 : Apprehension of knowledge of bioenergetics, concept of cardio respiratory responses during different grades of exercise, measurement and application of aerobic work capacity, outlines of principles of training, nutritional supplements and ergogenic aids, basic idea of sports rehabilitation and sports medicine. DSE P3 : Hands on measurement of changes of blood pressure and heart rate after standard exercise, hands on determination of physical fitness index of subjects, pneumographic recording of different physiological states.
Semester VI	DSE 4 (Human nutrition and Dietetics)	DSET4: Learning the chemistry of food constituents and its physiological importance, nutrient needs across the lifespan and altered metabolic phases, application of nutritional concepts to evaluate and improve nutritional health. DSEP4: Knowledge of calculation and interpretation of nutrient composition and nutrient value of food, comprehensive nutrition assessment of family/community by diet survey.

Program Outcomes of Physiology (Program Course)

The CBCS syllabus of Physiology undergraduate general course covers the basic physiological mechanism of human with emphasis on different systems. The course designed also helps to understand how these separate systems interact to yield integrated physiological responses to different challenges like environmental and pathological challenges.

Course outcomes of Physiology (General Course)

Courses		Outcome
Core Courses		
Semester I	PCC1 (Circulatory body fluids)	PCCT1: Learning the overview of human circulatory system, components of blood and lymph, structure and functions of haemoglobin, concept of hemostasis. PCCP1: Experimental learning of haematological techniques e.g. preparation and staining of blood film, haemoglobin estimation, preparation of haemin crystal, determination of bleeding time, clotting time from blood sample.
Semester II	PCC 2 (Physiology of nerve and muscle cells)	PCCT2: Acquire a brief overview about morphology, properties of nerve, muscle, neurotrophins and synapse. Mechanism of synaptic transmission, synaptic plasticity, chemistry and functions of different neurotransmitters, coding of sensory information and different clinical aspects. PCCP2: Experimental learning of kymographic tracing of mechanical responses of gastrocnemius muscle of toad in different conditions.
Semester III	PCC3 (Formation and excretion of urine)	PCCT3: Learning the basic anatomy of urinary system, structure and functions of nephron, the principles of acid base balance of body and renal electrolyte physiology, non-excretory functions of kidney, renal disorders. PCCP3: Hands on qualitative biochemical identification of urinary constituents in normal and pathological conditions.
Semester IV	PCC4 (Biological Physics and Enzymes)	PCCT4: Learning the fundamentals of biophysical principles and its correlation with different physiological processes, applications of biological physics, structure of enzymes, modulation of enzyme activities and different factors regulating enzyme activities. PCCP4: Experimental learning of determination of blood pressure by auscultatory methods and determination of different enzyme activities by spectrophotometric methods.
Skill Enhancement Courses (SEC)		
Semester III	SEC1(Haematological Techniques)	Apprehension of different laboratory techniques for studying the haematological parameters including some marker enzymes in different physiological and pathological conditions.
Semester IV	SEC2(Histopathological Techniques)	Concepts of in depth histological tissue preparation, tissue staining and its application in pathology
Semester V	SEC3 (Clinical Biochemistry)	Apprehension of determination of clinically significant enzymes from serum or plasma from blood sample. Clinical correlation of the enzymes with disease process.

Semester VI	SEC4 (Diet survey and formulation of diet chart)	Apprehension of organize and conduct diet survey at different population by questionnaire method, assessment of quantities of food items and nutrients consumed by family or individual, formulation of diet chart according to nutritional need.
Discipline Specific Electives (DSE)		
Semester V	Elective 1 (Microbiology and Immunology)	DSET1: Apprehension of knowledge of cellular structure of microorganisms, growth, metabolism and genetics of bacteria, different bacteriological techniques involved in microbiology, understand the components of human immune system, human defence mechanisms and immunopathology. DSEP1: Hands on identification of bacteria from culture media and spore by staining
Semester VI	Elective 2 (Human Nutrition and Dietetics)	DSET2: Learning the chemistry of food constituents and its physiological importance, nutrient needs across the lifespan and altered metabolic phases, application of nutritional concepts to evaluate and improve nutritional health. DSEP2: Knowledge of calculation and interpretation of nutrient composition and nutrient value of food, comprehensive nutrition assessment of family/community by diet survey.