

**VIMALA COLLEGE (AUTONOMOUS),
THRISSUR**



**SYLLABUS OF HUMAN PHYSIOLOGY
AS
COMPLEMENTARY COURSE OF BSc
PSYCHOLOGY**

**UNDER CHOICE BASED CREDIT AND SEMESTER SYSTEM
(CBCSSUG 2019)**

SCHEME AND SYLLABUS

2020 ADMISSION ONWARDS

Regulations, Scheme and Syllabus for B.Sc. Human Physiology (Complementary)

A candidate seeking admission to B. Sc Psychology must pursue Human Physiology as one of the compulsory complementary courses. Curriculum: Study of complementary course consists of two academic years with four semesters.

Course structure and distribution of marks

Part	No. of courses	External	Internal	Max. marks	Total marks
Theory	4	60	15	75	300

Internal assessment: Assessment includes seminar, assignment, written test and marks for attendance with the following split up of marks: Seminar - 4 marks; Assignment - 4 marks; written test - 8 marks; Attendance - 4 marks; Total 20 marks.

Credit and Mark distribution for the complimentary course in Human Physiology

Sem ester	Course title	Course code	Contact hours/ Week	Marks			Credits
				Internal	External	Total	
I	Human Physiology I	PSG1CO1	4	15	60	75	3
II	Human Physiology II	PSG2CO1	4	15	60	75	3
III	Human Physiology III	PSG3CO1	5	15	60	75	3
IV	Human Physiology IV	PSG4CO1	5	15	60	75	3
Total						300	12

Pattern of Question paper (Similar for all four semesters):

Questions shall be asked from the whole syllabus pertaining to the respective semester. Weightage for each module while setting the question papers, should be in proportion to the instructional hours allotted to the respective topic in the syllabus.

Duration	Pattern	Total No. of Questions	Questions to be answered	Marks for each question	Total marks for each section
3 hours	One sentence	10	10	1	10
	Short answer	10	5	2	10
	Paragraph type	8	5	4	20
	Essay	4	2	10	20
Grand Total					60

B.Sc. PSYCHOLOGY PSG1C01: Human Physiology

OBJECTIVES

This course familiarizes the student of Psychology with the most essential and fundamental aspects of cell biology and basics of genetics that are essential for understanding the anatomy and physiology of the nervous system in general and of the CNS that they are to master in the following semesters.

Module 1 Cellular organization

Cell structure, plasma membrane (fluid mosaic model), and cell organelles.

Cell inclusions-brief description on the structure of carbohydrates, lipids and proteins.

Cell theory, cell principle.

Unicellularity to multicellularity, differentiation. Brief mention of spatial and temporal control of gene activity.

Tissues- brief description of major types. **(Hours - 20)**

Module 2 Genes and chromosomes

Structure of D.N.A, D.N.A replication.

Concept of a gene - genetic code, introns, exons.

Morphology of chromosomes-size, shape, karyotype, idiogram, kinds of chromosomes.

Linkage and crossing over, sex linked chromosomes. **(Hours - 14)**

Module 3 Cell division

Cell cycle.

Mitosis.

Meiosis. **(Hours - 12)**

Module 4 Elements of heredity and variation

Mendel's work and laws of inheritance (monohybrid cross, dihybrid cross, test cross).

Brief explanation of terms-alleles, homozygosity, heterozygosity, genotype, phenotype.

Brief description of other patterns of inheritance and genotype expression-incomplete dominance, co-dominance, multiple alleles, epistasis, pleiotropy.

(Hours - 12)

Module 5 Mutations and Genetic disorders

Gene mutation-Kinds of mutation, classification (Somatic, gametic, point, spontaneous, induced, dominant, recessive and silent mutations).

Gene mutation disorders - albinism, phenylketonuria, alkaptonuria, galactosemia, brachydactyly.

Autosomal anomalies - Down's syndrome, Edward's syndrome, Cri du chat syndrome.

Sex chromosomal anomalies - Klinefelter's syndrome and Turner's syndrome.

(Hours – 14)

REFERENCES

1. Dewitt-Saunders, Biology of the cell.
2. Strickberger W.M-Mac Millon, Genetics.
3. Gerald Karp, Cell and Molecular Biology: Concept and Experiments.
4. Roothwell, Human Genetics, Prentice Hall.
5. Lodish;Verk; et.al; Molecular Cell Biology, W.H. Freeman publishers.
6. De Robertis, E. D. P. and De Robertis, E. M. F., Cell and molecular Biology, 7 Edn, Hol- Saunders International Editions.
7. Harold Harper, Review of Physiological chemistry, Marusan Co.
8. Lehninger Albert, Biochemistry, Kalyani publications, N. Delhi.
9. Plummer David T, An introduction to practical Biochemistry, Tata Mac Graw Hill.
10. Stryer Lubert & Hall John E, Biochemistry, Freeman.

11. Voet Donald & Voet Judith, Biochemistry, John Wiley sons, US.
12. Text book of Medical Physiology, AP Krishna, Scientific publication, New Delhi.
13. Molecular Biology of the Gene by James D. Watson; Michael Levine; Tania A. Baker; Alexander Gann; Stephen P. Bell.
14. Molecular Cell Biology, by Harvey Lodish, Arnold Berk, S Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell.
15. Cell and Molecular Biology by E.D.P . De Robertis and E.M.F. De Robertis Jr.
16. Molecular biology of cells by B. Alberts,D. Bray, J. Lewis.
17. Molecular Cloning: A laboratory manual by Sambrook & Russel.
18. Genetics: Principles and analysis by Daniel L Hartl.

B.Sc. PSYCHOLOGY PSG2C01: Human Physiology

OBJECTIVES

This course imparts extensive information to the Psychology student on the nervous system with special emphasis on the CNS. It also introduces the student to states of brain activities and techniques in neurophysiology.

Module 1 The Nervous System

Divisions (CNS,PNS - somatic and autonomic)

Nervous tissue (neurons, nerve fibres, nerves, synapse).

Non nervous tissue and other materials (neuroglia, meninges, cerebro-spinal fluid, Blood - CSF and blood - brain barriers).

Nerve impulse - generation, conduction, synaptic transmission, role of calcium ions, action of transmitter substances on postsynaptic neuron, types of transmitter substances.

(Hours - 20)

Module 2 The Central Nervous System

Brain - an overview (Forebrain, midbrain, hindbrain).

Spinal cord - an overview of its structure and organization.

Reflex Action - monosynaptic reflex, multisynaptic reflex, crossed extension reflex, mass reflex.

(Hours – 14)

Module 3 The Cerebellum and the Basal Ganglia

The Cerebellum and its motor functions.

Anatomical functions, areas of the cerebellum.

Function of the cerebellum in overall motor control.

The basal ganglia-their motor functions, role of the basal ganglia for cognitive control, functions of neurotransmitters with basal ganglia.

(Hours – 14)

Module 4 The Cerebral Cortex

Functions of the specific cortical areas -association areas (parieto occipito temporal, prefrontal and limbic association areas with special emphasis on Wernike's area and Broca's area), area for recognition of faces, concept of the dominant hemisphere.

Function of the brain in communication - Sensory and Motor aspects of communication.

(Hours – 12)

Module 5 States of brain activity and Techniques in neurophysiology

Sleep -Basic theories of sleep, Brain waves, Slow wave sleep and REM sleep.

Brain imaging - CT, MRI, PET, CBF, EEG, Lesioning and Electrical Stimulation of Brain (ESB).

(Hours - 12)

REFERENCES

1. Schneider A.M & Tarshis B., An introduction to Physiological Psychology, Random House, New York.
2. Guyton & Hall - Textbook of Medical Physiology, 12 Edn., Saunders.
3. Sherwood L, Thomson, Human Physiology.
4. Kalat J.W, Wadsworth C.A, Biological Psychology.
5. Levinthal C.F, Introduction to Physiological Psychology, Prentice Hall, New Delhi.

B.Sc. PSYCHOLOGY PSG3C01: Human Physiology

OBJECTIVES

This course familiarizes the student of Psychology with the sensory systems, pathways and perception of various senses. It also introduces the student to the endocrine system.

Module 1 The Visual System

Structure of the human eye, Organization of retina and visual pathways.

Functioning of the eye, visual coding, chemistry of vision, transduction in the retina, theories of color vision, visual perception.

Visual defects (myopia, hypermetropia, presbyopia, astigmatism, cataract, color blindness, nyktelopia). **(Hours – 18)**

Module 2 Auditory System

Anatomy of the auditory system.

Auditory pathways, auditory perception and hearing abnormalities.

Statoreceptors.

(Hours - 16)

Module 3 Gustatory and Olfactory system

Anatomy of taste buds and its function, primary sensations of taste, taste thresholds and intensity discrimination, taste preferences and control of the diet.

Taste pathways and transmission of signals into the central nervous system.

Organization of the olfactory membrane, sense of smell and stimulation of the olfactory cells.

Categorizing smell, transmission of smell signals into the central nervous system.

(Hours - 16)

Module 4 Cutaneous senses (Somatic sensations)

Classification - the mechanoreceptive somatic senses (tactile and position), the thermoreceptive senses (heat and cold), the pain sense.

Detection and transmission of tactile sensations - tactile receptors, detection of vibration, tickling and itch.

Sensory pathways for transmitting somatic signals into the central nervous system, somatosensory cortex, position senses, position sensory receptors.

Thermal sensations - thermal receptors, their excitation and transmission of thermal signals.

Pain - purpose, types, pain receptors, pain suppressive system, pain sensation.

(Hours - 20)

Module 5 Endocrine system

Introduction to endocrinology, an overview of the importance of endocrine glands.

Mode of action of hormones and influence on growth and behavior.

Major endocrine glands - their location, structure, hormones produced and its role (Hypothalamus, pituitary, thyroid, adrenal, gonads, thymus, pineal body, placenta).

(Hours - 20)

REFERENCES

1. Guyton & Hall, Textbook of Medical Physiology 12 Edn., Saunders.
2. Barrett E. Kim, Barman M. Susan et.al; Ganong's review of Medical Physiology, Tata McGraw Hill Education Pvt. Ltd.
3. Sarada Subrahmanian and K. MadhavanKutty, A Text Book of Physiology. Oriented Longman Publication.
4. Harold Harper, Review of Physiological chemistry, Marusan Co.
5. Lehninger Albert, Biochemistry, Kalyani publications, N. Delhi.
6. Plummer David T, An introduction to practical Biochemistry, Tata Mac Graw Hill.
7. Stryer Lubert & Hall John E, Biochemistry, Freemann.
8. Voet Donald & Voet Judith, Biochemistry, John Wiley sons, US.

B.Sc. PSYCHOLOGY PSG4C01: Human Physiology

OBJECTIVES

This course familiarizes the student of Psychology with the most essential and fundamental aspects of physiological processes underlying psychological events like hunger, thirst, sexual behavior and emotion. It also dwells on brain damage and Neuroplasticity.

Module 1 Physiological basis of hunger

Neural control of food intake - Role of hypothalamus, Neural centers that influence mechanical process of feeding.

Factors that regulate quantity of food intake, role of hormones (effect of Cholecystokinin, Peptide YY, GLP, Ghrelin).

Short-term regulation of food intake, intermediate and long-term effect of food intake. (Effect of blood concentrations of glucose, aminoacids, lipids on hunger and feeding), temperature regulation of food intake.

Obesity - causes and treatment, Eating disorders (Bulimia, Anorexia, Inanition, Cachexia, Picca).

(Hours - 20)

Module 2 Physiological basis of thirst

Peripheral factors in water regulation.

Central factors in water regulation (cellular dehydration thirst and hypovolemic thirst).

(Hours - 14)

Module 3 Physiological basis of sexual behavior

Hormones and sexual development - Fetal hormones and the development of reproductive organs, Sex differences in the brain, Perinatal hormones and behavioral development, Puberty: hormones and development of secondary sexual characteristics.

Effects of gonadal hormones on adults - Male reproduction related behavior and testosterone, Female reproduction related behavior and gonadal hormones.

Neural mechanisms of sexual behavior - Structural differences between the male hypothalamus and female hypothalamus, the hypothalamus and male sexual behavior, the hypothalamus and female sexual behavior.

(Hours - 20)

Module 4 Neural basis of emotion

Role of frontal lobes.

Behavioural functions of the hypothalamus and associated limbic structures, Reward centers, Rage - its association with punishment centers, placidity and tameness.

Functions of Amygdala.

(Hours - 18)

Module 5 Brain Damage and Neuroplasticity

Causes of brain damage - Brain tumors, Cerebrovascular disorders (Cerebral hemorrhage, Cerebral ischemia), Infections of the brain (Bacterial infections, Viral infections), Neurotoxins, Genetic factors, Apoptosis.

Neuropsychological disorders - Epilepsy (Grand Mal Epilepsy, Petit Mal Epilepsy and Focal Epilepsy), Parkinson's disease, Huntington's disease, Multiple sclerosis, Alzheimer's disease.

(Hours - 18)

REFERENCES

1. Schneider A.M & Tarshis B, An introduction to Physiological Psychology, Random House, New York.
2. Guyton & Hall, Saunders, Textbook of Medical Physiology.
3. Sherwood L, Thomson, Human Physiology.
4. Kalat J.W, Wadsworth C.A, Biological Psychology.
5. Levinthal C.F, Introduction to Physiological Psychology, Prentice Hall, New Delhi.
6. Pines P.J, Biopsychology, Pearson.
7. Neil.R.Carlson, Physiology of behavior, Pearson publishers.
8. Barrett E. Kim; Barman M. Susan et al., Ganong's Review of Medical Physiology; Tata McGraw Hill Education Pvt. Ltd.
9. Alcock John, Animal Behavior, 6th edition, Sinauer Associates, Inc. Sunderland, Massachusetts.
10. Carlson, Neil, R., Physiology of Behavior, 8 edition, Pearson.