BAREILLY INTERNATIONAL UNIVERSITY

Pilibhit Bypass Road, Bareilly - 243006 (U.P) India
Phone: 0581-2526051, 053, 153
Email: info@biu.edu.in Website : www.biu.edu.in

Course Work - Ph. D.

Syllabus – Faculty of Medicine

Paper-II (100 Marks)

Physiology (Code – 91146)

Credits : 04
Hrs. : 60

UNIT-I

General Physiology

1. Cell – structure and function.
2. Structure of cell membrane, function, Intercellular communication.
3. Transport across cell membrane and across capillary wall.
4. Membrane potential, action potential.
5. Homeostasis, Body fluids compartments, ECF & ICF – composition
6. Nernst equation, Equilibrium potential & Goldman constant field equation.

Blood

1. Blood composition and Function
2. Plasma Protein.
3. R.B.C, Reticulocyte, E.S.R.
4. Hemoglobin, Jaundice, Iron metabolism.
5. Anemia, Polycythemia, Blood indices.
6. WBC – Types, Leucopoiesis, Variations, Leukemias.
7. Platelets, Hemostatic mechanism, Coagulation, Anticoagulants, Disorders.
8. Blood group, Rh- incompatibility, Blood banking and transfusion.
9. Immunity-Types, Immune response, Immunoglobulin.

Nerve Physiology

1. Neurons- Structure, Functions, Classification, Neuroglia.
2. Action potential: Monophasic, Biphasic, compound, Local Response. Chronaxie, Rheobase.
3. Nerve fibers- Classification & Types, Physiology properties.
4. Nerve injury- Classification, Degeneration & Regeneration.
5. Neuromuscular junction & transmission, Synapse.
6. Neurotransmitter, Neuromuscular blocking, Myasthenia Gravis.

UNIT-II

Muscle Physiology

1. Skeletal Muscle- Structure & types, Excitation contraction Coupling, Relaxation, Isometric & Isotonic contraction, Rigor Mortis Myasthenia Gravis.
2. Smooth Muscle-Structure & types, Mechanism of contraction, Properties, Visceral & Multi unit smooth muscle, Nerve supply & Chemo-transmitters.

Cardiovascular Physiology

1. Heart – Functional Anatomy, Properties of cardiac Muscle, Conducting System of Heart
2. Cardiac Action potential – ionic basis.
3. Hemodynamics
4. Cardiac Cycle, Heart Sounds, Heart Rate, Regulation
5. Cardiac Output and Measurement

6. Blood pressure, regulation of BP, Hypertension and its pathophysiology
7. Electrocardiography and its principles, Normal ECG, Significance, Vector cardiography, axis deviation, variations of ECG.
8. Cardiovascular Homeostasis- Muscular Exercise, Hypoxia.
9. Circulation through different regions: Cerebral, Coronary, Pulmonary, Renal & foetal..
10. Venous & Lymphatic circulation.

Excretory Physiology

1. Kidney – Physiological Anatomy & Functions, Renal blood flow & Autoregulation
2. Nephron – Structure & Types, Juxta - Glomerular Apparatus, Renin-Angiotensin System
3. Glomerular filtration & Regulation
4. Functions of renal tubule – Urine formation, Counter Current System, Concentration & Dilution of urine.
5. Acidification of urine, Role of kidney in regulation of acid base balance, Hormonal influence on urine formation.
6. Renal function tests, Physiology of Micturition, Applied aspect

UNIT-III

Digestive Physiology

1. GI tract- General organization, Physiological anatomy, Enteric Nervous system.
2. Salivary gland- Function, Secretion & Regulation.
3. Stomach- Structure & Function, Gastric secretion & Regulation.
4. Small intestine- Structure, Function, Secretion & Regulation.
5. Pancreas- Secretion & Function.
6. Large intestine - Structure, Functions, Movements.
7. Absorption in GIT
8. Movement of GIT & Regulation.
9. GI tract hormones.
10. Liver & Gall bladder- Structure, Function & Secretion, Liver function test.
11. Peptic ulcer, Dumping syndrome, Diarrhea, Constipation, Dietary Fibres, Achalasia, Hirschsprung's disease.

Respiratory System

1. Functional Anatomy.
2. Ventilation: Mechanism, Pressure Changes, Lung compliance- Pressure Volume Interrelationship, Airway Resistance & Alveolar Ventilation.
3. Ventilation: Lung Volumes, Static & Dynamic.
4. Ventilation: Surface Tension, Surfactant & RDS.
5. Perfusion: Pulmonary Circulation, Effect of Hydrostatic Pressure, Capillary Fluid Dynamics, Pulmonary Oedema & Pleural Fluid.
6. Diffusion: Physical Principles, Composition of Gases, Respiratory Membrane, Measurement of Diffusion Capacity & Ventilation Perfusion Ratio.
7. Transportation: Pressures, Oxygen Transport- O2 dissociation curve Carbon-dioxide Transport & Respiratory Exchange.
8. Regulation: Nervous Control, Chemical control, Reflexes, Periodic Breathing & Sleep Apnoea
9. Pulmonary Function tests, Insufficiency: Cyanosis, Emphysema, Pneumonia, Atelectasis & Asthma

Endocrine Physiology

1. Endocrine Glands, Hormones – General principles, Mechanism of action of hormones, Methods of study, Bioassay – RIA, Transport
2. Endocrine Role of Hypothalamus
3. Anterior Pituitary – Physiology and Disorders

4. Posterior Pituitary – Physiology & Disorders
5. Thyroid Gland – Physiology and Disorders
6. Parathyroid and Calcium Metabolism & disorders.
7. Adrenal Cortex – Physiology and Disorders
8. Adrenal Medulla – Physiology & Disorders
9. Endocrine Pancreas, Diabetes Mellitus
10. Applied aspects

UNIT-IV

Special Senses

1. Eye:- Physiological Anatomy, Physiology of Vision, Refractory Media, Retina, Defects of Vision, Accommodation, Color vision, Photochemistry of vision, Visual pathway & lesions, Light Reflex.
2. EAR :- Physiology of Hearing – External, Middle & Internal Ear , Organ of equilibrium, Transmission of sound, Endolymphatic & Cochlear Microphonic potentials, Auditory pathway, Bell & decibel, Hearing disorders, Audiometry
3. Smell :- Physiology of smell, Olfactory Pathway, Olfactory Hallucination, Parosmia, Anosmia. Physiology of Taste – Taste modalities, Taste bud , Taste pathway, Disorders.

Skin & Body Temperature

1. Structure and Functions of skin.
2. Body Temperature: - Shell & Core Temperature , Variations , Regulation.
3. Adaptation to cold & hot weather, Heat stroke

Reproductive Physiology

1. Physiological Anatomy – Male & Female Reproductive system.
2. Sex Differentiation. Dysfunction of sex chromosomes.
3. Testes – Male Sex hormones, spermatogenesis, regulation.
4. Ovary – Female sex hormone, function. Regulation.
5. Ovarian & Menstrual cycle- Regulation, Ovulation, Menopause.
6. Physiology of Pregnancy, Foetoplacental Unit,
7. Parturition, Lactation, Placenta, Physiology of newborn. Family planning Methods indications & practice.

UNIT-V

Neurophysiology

1. Functional Organization of Nervous System-Central and peripheral, Cerebral circulation, CSF, Blood brain barrier, Synapse.
2. Reflex and Reflex arc, Muscle spindle, Golgi tendon organ.
3. General sensations, Sensory receptors, Ascending Tracts, Sensory areas in brain.
4. Effect of lesions at different level in sensory pathway, Brown-Sequard syndrome, Syringomyelia.
5. Pyramidal & extra pyramidal system, UMN & LMN lesion.
6. Physiology of Basal Ganglia – Parkinsonism.
7. Physiology of Cerebellum – Muscle Tone , Posture , Equilibrium.
8. Physiology of Thalamus, Hypothalamus, Cerebral Cortex, Reticular Activating System,
9. Limbic System, Emotion, Behavior and Mood
10. Autonomic Nervous System
11. Higher functions-speech, Learning, Memory,
12. EEG, Sleep & wakefulness, Epilepsy.
13. Formation & circulation of CSF

Physiology of sports, exercise, yoga and meditation:

1. Cardio-respiratory and metabolic adjustments; physiological effects of yoga and meditation.

Applied Physiology including recent advances

1. Patho-physiology pertaining to systemic Physiology
2. Physiological basis of various clinical investigation tests
3. Recent advances relevant to Physiology