

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills, Kumaraswamy Layout,

Bengaluru - 560078, Karnataka.

SCHOOL OF HEALTH

SCIENCES COLLEGE OF

PHYSIOTHERAPY



SCHEME & SYLLABUS FOR

BACHELOR OF PHYSIOTHERAPY (BPT) – 2017 (ANNUAL SCHEME)

(1st to 4th Year) (With Effect from 2017-18)

YEAR – I

SL.	COURSE CODE	COURSE TITLE	M / S	NO. OF TEACHING HOURS			SCHEME OF EVALUATION							TOTAL
				D	C L	P	THEORY				PRACTICAL			
							W	VV	CA	IA	P	CA	IA	
1	17PT101	HUMAN ANATOMY	M	04	--	-	100	30	10	10	--	--	--	150
2	17PT102	HUMAN PHYSIOLOGY	M	05	--	-	100	30	10	10	--	--	--	150
3	17PT103	BIOCHEMISTRY	M	02	--	-	80	--	10	10	--	--	--	100
4	17PT104	KINESIOLOGY	M	04	--	-	100	30	10	10	--	--	--	150
5	17PT105	PSYCHOLOGY (SEC- A)	M	02	--	-	40	--	05	05	--	--	--	50
	17PT106	SOCIOLOGY (SEC – B)	M	02	--	-	40	--	05	05	--	--	--	50
6	17PT171	HUMAN ANATOMY	M	--	--	4	--	--	--	--	40	05	05	50
7	17PT172	HUMAN PHYSIOLOGY	M	--	--	2	--	--	--	--	40	05	05	50
8	17PT173	KINESIOLOGY	M	--	--	2	--	--	--	--	40	05	05	50
GRAND TOTAL				19	--	8	460	90	50	50	120	15	15	800
9	17PT191	BASIC NURSING / FIRST AID & CPR	S	02	--	-	40	--	10	--	--	--	--	50
10	17PT192	ENGLISH	S	02	--	-	40	--	10	--	--	--	--	50
11	17PT193	KANNADA	S	01	--	-	40	--	10	--	--	--	--	50
12	17PT194	ORIENTATION TO PHYSIOTHERAPY	S	01	--	-	40	--	10	--	--	--	--	50
13	17PT195	INDIAN CULTURE & HERITAGE	S	01	--	-	40	--	10	--	--	--	--	50
GRAND TOTAL				07	--	-	--	--	--	--	--	--	--	--
TOTAL NUMBER OF HOURS/WEEK				34	--	-	--	--	--	--	--	--	--	--

Note: M- Main Course, S – Subsidiary Course , D – Didactic, CL – Clinical, P – Practical, W – Written, VV

– Viva Voce, CA – Continuous Assessment, IA – Internal Assessment

YEAR : I YEAR
COURSE CODE : 17PT101

TITLE OF THE COURSE : HUMAN ANATOMY

COURSE OBJECTIVES

THE STUDY OF ANATOMY WILL INCLUDE IDENTIFICATION OF ALL GROSS ANATOMICAL STRUCTURES. PARTICULAR EMPHASIS WILL BE PLACED ON DESCRIPTION OF BONES, JOINTS, MUSCLES, BRAIN, CARDIO-PULMONARY AND NERVOUS SYSTEMS AS THESE ARE RELATED TO THE APPLICATION OF PHYSIOTHERAPY PATIENTS.

COURSE OUTCOMES

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES, DEMONSTRATIONS AND PRACTICALS THE STUDENT WILL HAVE IN DEPTH KNOWLEDGE OF HUMAN ANATOMY AND WILL BE ABLE TO IDENTIFY BONES, JOINTS, MUSCLES, BRAIN, CARDIO-PULMONARY AND NERVOUS SYSTEMS AS NEEDED FOR THE STUDY AND PRACTICE IN PHYSIOTHERAPY.

UNIT -1

(36 hours)

1. Musculoskeletal Anatomy - (All the topics to be taught in detail) 06HRS

- a) Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc.)
- b) Connective tissue classification.
- c) Bones- Composition & functions, classification and types according to morphology and development.
- d) Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.
- e) Muscles – origin, insertion, nerve supply and actions

2. Upper Extremity: 15HRS

- a) Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
- b) Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.

- c) Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
- d) Arches of hand, skin of the palm and dorsum of hand.

3. Histology:

05HRS

General Histology, study of the basic tissues of the body; Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS, Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue, Skin and its appendages.

4. Thorax:

a) Cardio – Vascular System

10HRS

Mediastinum: Divisions and contents

Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.

b) Respiratory system:10HRS

Outline of respiratory passages

Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on bronchopulmonary segments

Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.

Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action.

UNIT II:

(54 hours)

5. Lower Extremity:

20HRS

a) Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.

b) Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.

c) Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.

6. Trunk & Pelvis: 14HRS

- a) Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
- b) Soft tissue: Pre and Para vertebral muscles, intercostal muscles, anterior abdominal wall muscles, Inter-vertebral disc.
- c) Pelvic girdle and muscles of the pelvic floor

7. .Abdomen: 10HRS

Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.

Large blood vessels of the gut: Location, size, shape, features, blood supply, nerve supply and functions of the following: Stomach, liver spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

8. Pelvis: 10HRS

Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.

UNIT III: 60HRS

9. Head and Neck: 13HRS

- a) Osteology: Mandible and bones of the skull.
- b) Soft parts: Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck, Gross anatomy of eyeball, nose, ears and tongue.

10. Neuro Anatomy: 30HRS

- a) Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system
- b) Cranial nerves
- c) Peripheral nervous system
 - i. Peripheral nerve
 - ii. Neuromuscular junction
 - iii. Sensory end organs
- d) Central Nervous System
 - a. Spinal segments and areas
 - b. Brain Stem
 - c. Cerebellum
 - d. Inferior colliculi

- e. Superior Colliculi
- f. Thalamus
- g. Hypothalamus
- h. Corpus striatum
- i. Cerebral hemisphere
- j. Lateral ventricles
- k. Blood supply to brain
- l. Basal Ganglia
- m. The pyramidal system
- n. Pons, medulla, extra pyramidal systems
- o. Anatomical integration

11. Embryology:

07HRS

- a) Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.
- b) Development of skin, Fascia, blood vessels, lymphatic.
- c) Development of bones, axial and appendicular skeleton and muscles, Neural tube, brain vessels and spinal cord.
- d) Development of brain and brain stem structures

12. Endocrine glands:

10HRS

Position, shape, size, function, blood supply and nerve supply of the following glands: Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus.

Recommended Text books:

1. B.D Chaurasia's Human Anatomy – Regional And Applied; Volume I, Volume II And Volume III.
2. SINGH [Inderbir], Text book of Anatomy with colour atlas: Introduction, Osteology, Upper Extremity, Lower Extremity. Vol I. P Brothers, New Delhi 1996.
3. SINGH [Inderbir], Text book of Anatomy with colour Atlas: Thorax and Abdomen. Vol II. JP Brothers, New Delhi 1996
4. SINGH [Inderbir], Text book of Anatomy with colour Atlas: Head and Neck Central Nervous System. Vol III. JP Brothers, New Delhi 1996
5. SINGH [Inderbir], Human Osteology. JP Brothers, New Delhi 1990, p191

Reference Books

1. SNELL [Richard S], Clinical Anatomy for Medical students : Ed. 5. Little Brown and Company Boston. 1995, p898

2. MOORIE[KiethL], Clinically Oriented Anatomy. Ed.3., Williams and Wilkins, Baltimore, 1992, p917
3. DATTA[A.K], Essentials of human Anatomy: Thorax and Abdomen Ed 2. Vol. I Current Book International, Culcutta 1994, p433,
4. DATTA[A.K], Essentials of human Anatomy: Head and Neck Ed 2. Vol. II, Current Book International, Culcutta 1995, p363,

YEAR : I YEAR
COURSE CODE : 17PT171

TITLE OF THE COURSE : HUMAN ANATOMY PRACTICALS

PRACTICAL : 90HRS

List of Practical

Demonstrations

Topics

1. Upper extremity including surface Anatomy[15Hrs]
2. Lower extremity including surface Anatomy[15Hrs]
3. Head & Neck, Spinal cord and Brain including surface Anatomy[15Hrs]
4. Thorax & abdominal organs including surface anatomy, [10Hrs]
5. Histology-Elementary tissue [10Hrs]
6. Embryology-models, charts & X-rays[05Hrs)
7. Demonstration of the muscles of the whole body and organs in thorax and abdomen in a cadaver[05Hrs]
8. Demonstration of movements in important joints. [05Hrs]
9. Surface making of the lung, pleura, fissures and lobes of lungs, heart, liver, spleen, Kidney, cranial nerves, spinal nerves and important blood vessels [05Hrs]
10. Identification of body prominences on inspection and by palpation especially of extremities. Points of palpation of nerves and arteries [05Hrs]

Recommended Text books:

1. ROMANES [G J], Cunningham manual of practical anatomy: upper and lower limb ed 15Vol 1 Oxford Medical Publication, Oxford 1996, P263
2. ROMANES [G J], Cunningham manual of practical anatomy : Thorax and abdomen ed15 Vol II Oxford Medical Publication, Oxford 1996, P298
3. ROMANES [G J], Cunningham manual of practical anatomy : Head and Neck and Brained 15 Vol II Oxford Medical Publication, Oxford 1996, P346

YEAR : I YEAR
COURSE CODE : 17PT102

TITLE OF THE COURSE : HUMAN PHYSIOLOGY

COURSE OBJECTIVES

THIS COURSE HELPS THE STUDENT TO UNDERSTAND THE BASIS OF NORMAL HUMAN PHYSIOLOGY WITH SPECIAL EMPHASIS ON THE FUNCTIONING OF THE CARDIOVASCULAR, MUSCULOSKELETAL, NERVOUS SYSTEM AND RESPIRATORY SYSTEM.

COURSE OUTCOMES

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES, DEMONSTRATIONS, AND LAB AND PRACTICAL THE STUDENT WILL BE ABLE TO DEMONSTRATE AN UNDERSTANDING OF ELEMENTARY HUMAN PHYSIOLOGY.

UNIT I:

1. General Physiology [2 Hours]

Cell: Morphology. Organelles: their structure and functions

Transport Mechanisms across the cell membrane

Body fluids: Distribution, composition. Tissue fluid – formation.

2. Blood [10 Hours]

Introduction: Composition and functions of blood.

Plasma: Composition, formation, functions. Plasma proteins.

RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticulo-endothelial system (in brief) Hemoglobin - Anemia (in detail), types of Jaundice.

Blood indices, PCV, ESR.

WBC: Classification. Morphology, functions, count, its variation of each. Immunity

Platelets: Morphology, functions, count, its variations

Hemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders. Anticoagulants.

Blood Groups: Landsteiner's law. Types, significance, determination,

Erythroblastosis foetalis.

Blood Transfusion: Cross matching. Indications and

complications. Lymph: Composition, formation, circulation and functions. edema

3. Nerve Muscle Physiology [15 Hours]

Introduction: Resting membrane potential. Action potential – ionic basis and properties. Nerve: Structure and functions of neurons. Classification, Properties

and impulse transmission of nerve fibres. Nerve injury – degeneration and regeneration.

Neuroglia: Types and functions.

Muscle: Classification.

Skeletal muscle: Structure, mechanism of contraction.

Neuromuscular junction: Structure.

Neuromuscular transmission, myasthenia gravis, Excitation-Contraction coupling, Rigor mortis. Motor unit. Properties of skeletal muscles, Strength- Duration curve, Length-tension relationship, fatigue, load.

Smooth muscle: Structure, types, mechanism of contraction. Plasticity.

4. Cardiovascular System[20 Hours]

Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organization of CVS.

Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties. Conducting system: Components. Impulse conduction

Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves.

Heart sounds – causes, character.

ECG: Definition. Different types of leads. Waves and their causes. P-R interval.

Heart block.

Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation.

Arterial Blood Pressure: Definition. Normal values and its variations.

Determinants. Peripheral resistance. Regulation of BP. Arterial pulse.

Shock – Definition. Classification–causes and features

Regional Circulation: Coronary, Cerebral and Cutaneous circulation.

Cardiovascular changes during exercise.

UNIT II:

1. Respiratory System [15 Hours]

Introduction: Physiological anatomy – Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system.

Respiratory muscles. Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Chest expansion.

Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions.

RDS

Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.

Dead Space: Types and their definition.

Pulmonary Circulation. Ventilation-perfusion ratio and its importance.
Transport of respiratory gases: Diffusion across the respiratory membrane.
Oxygen transport – Different forms, oxygen-hemoglobin dissociation curve.
Factors affecting it. P50, Haldane and Bohr Effect. Carbon dioxide transport:
Different forms, chloride shift.
Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation.
Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygen therapy.
Acclimatization
Hypercapnia. Asphyxia. Cyanosis – types and features. Dysbarism
Disorders of Respiration: Dyspnea. Orthopnea. Hyperpnoea, hyperventilation, apnea, tachypnea. Periodic breathing – types
Artificial respiration
Respiratory changes during exercise.

2. Digestive System [5 Hours]

Introduction: Physiological anatomy and nerve supply of alimentary canal.
Enteric nervous system
Salivary Secretion: Saliva: Composition. Functions. Regulation.
Mastication (in brief) swallowing: Definition. Different stages. Functions.
Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.
Pancreatic Secretion: Composition, production, function. Regulation.
Liver: Functions of liver. Bile secretion: Composition, functions and regulation.
Gall bladder: Functions.
Intestine: Succus entericus: Composition, function and regulation of secretion.
Intestinal motility and its function and regulation. Mechanism of Defecation.

3. Excretory system [8 Hours]

Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary.
Juxta- glomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.
Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.
Tubular Reabsorption: Reabsorption of Na⁺, glucose, HCO₃⁻, urea and water. Filtered load.
Renal tubular transport maximum. Glucose clearance: T_{mG}. Renal threshold for glucose.

Tubular Secretion: Secretion of H⁺ and K⁺. PAH clearance.

Mechanism of concentrating and diluting the Urine: Counter-current mechanism.

Regulation of water excretion. Diuresis. Diuretics.

Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.

Acid-Base balance (very brief)

Artificial Kidney: Principle of hemodialysis. Skin and temperature regulation.

Functions of skin

4. Endocrine System [10 Hours]

Introduction: Major endocrine glands. Hormone: classification, mechanism of action.

Functions of hormones

Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.

Pituitary-Hypothalamic Relationship.

Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxedema, Cretinism, Grave's disease.

Parathyroid hormones: secretory cell, action, regulation of secretion.

Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.

Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome. Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Pheochromocytoma.

Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon.

Glucose metabolism and its regulation. Disorder: Diabetes mellitus.

Calcitriol, Thymus and Pineal gland (very brief). Local Hormones. (Briefly).

5. Reproductive System [5 Hours]

Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation.

Male Reproductive System: Functions of testes. Pubertal changes in males.

Spermatogenesis. Testosterone: action, Regulation of secretion. Semen.

Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: estrogen and progesterone-action. Regulation of secretion. Menstrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods

6. Special Senses [10 Hours]

Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.

Visual Pathway and the effects of lesions.

Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.

Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation. Color vision – color blindness. Nyctalopia.

Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.

Taste: Taste buds. Primary tastes. Gustatory pathway.

Smell: Olfactory membrane. Olfactory pathway.

Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders

UNIT III:

1. Nervous System [20 Hours]

Introduction: Organization of CNS – central and peripheral nervous system.

Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.

Sensory Mechanism: Sensory receptors: function, classification and properties.

Sensory pathway: The ascending tracts – Posterior column tracts, lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereo gnosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. tabes dorsalis, sensory ataxia.

Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and

functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.

Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex– structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL Spinal cord Lesions: Complete transection and Hemi section of the spinal cord. Cerebellum: Functions. Cerebellar ataxia.

Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.

Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome
Reticular Formation and Limbic System: Components and Functions.

Basal Ganglia: Structures included and functions. Parkinson's disease.

Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.

EEG: Waves and features. Sleep: REM and NREM sleep.

CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance.

Blood brain barrier. Hydrocephalus.

ANS: Features and actions of parasympathetic and sympathetic nervous system.

2. Physiology of Exercise [15 Hours]

A. Effects of acute and chronic exercise on [10 Hours]

- 1) O₂ transport
- 2) Muscle strength/power/endurance
- 3) B.M.R. /R.Q.
- 4) Hormonal and metabolic effect
- 5) Cardiovascular system
- 6) Respiratory system
- 7) Body fluids and electrolyte

B. Effect of gravity / altitude / acceleration / pressure on physical parameters [05 Hours]

3. Applied Physiology [15Hours]

More detailed study of the physiology and practical applications of the following selected topics with emphasis on aspects, which should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy.

a. Pulmonary Functions [03 Hrs]

1. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
2. Respiratory adjustments in exercises.
3. Artificial respiration
4. Breath sounds.

b. Cardio vascular Functions [04 Hrs]

1. Blood flow through arteries, arterioles, capillaries, veins and venuoles.
2. Circulatory adjustment in exercise and in postural and gravitational changes,
3. Pathophysiology of fainting and heart failure.

c. Muscles and Nervous System Functions [05 Hrs]

1. Peripheral nervous system, Types of nerve fibres.
2. EMG, VEP, NCV
3. Degeneration and regeneration of nerve, Reactions of denervations.
4. Voluntary motor action, clonus, Rigidity, Dyscoordination,

d. Blood functions [01 Hrs]

1. Thalassemia Syndrome, Hemophilia, VWF
2. Leukocytosis
3. Bone marrow transplant

e. Metabolic Functions [02Hrs]

Physiological basis of Peptic Ulcer, Jaundice, GIT disorders, Vitamins deficiency

Recommended Text books:

1. Text book of medical physiology – Guyton Arthur
2. Concise medical physiology – Chaudhuri Sujit K.
3. Human Physiology – Chatterjee C.C.

4. Text book of practical Physiology – Ranade.
5. Text of Physiology – A.K.Jain.
6. Basics of Medical physiology- Venkatesh D &Sudhakar H H
7. Manipal Manual of Physiology – Prof. C N Chandrashekar

Reference Books

1. Review of Medical Physiology – Ganong William F.
2. Physiological basis of Medical practice – Best & Taylor

YEAR : I YEAR
COURSE CODE : 17PT172

TITLE OF THE COURSE : HUMAN PHYSIOLOGY PRACTICALS

PRACTICAL

I. Hematology [20 Hours]

To be done by the students

1. Study of Microscope and its uses
2. Determination of RBC count
3. Determination of WBC count
4. Differential leukocyte count
5. Estimation of hemoglobin
6. Calculation of blood indices
7. Determination of blood groups
8. Determination of bleeding time
9. Determination of clotting time

Demonstrations only

1. Determination of ESR
2. Determination of PCV

II. Clinical Examination [20 Hours]

1. Examination of Radial pulse.
2. Recording of blood pressure
3. Examination of CVS
4. Examination of Respiratory system
5. Examination of Sensory system
6. Examination of Motor System
7. Examination of reflexes
8. Examination of cranial nerves

III. Amphibian Experiments – Demonstration and Dry charts Explanation. [15 Hrs]

1. Instruments used for frog experiments. Kymograph, heart liver, Muscle trough, stimulator.
2. Simple muscle curve.
3. Effect of increasing the strength of the stimuli
4. Effect of temperature on muscle contraction.

5. Effect of two successive stimuli.
6. Effect of Fatigue.
7. Effect of load on muscle contraction
8. Genesis of tetanus and clonus.
9. Velocity of impulse transmission.
10. Normal cardiogram of amphibian heart.
11. Properties of Cardiac muscle
12. Effect of temperature on cardiogram.

IV. Recommended Demonstrations [5 Hours]

1. Spirometry
2. Artificial Respiration
3. ECG
4. Perimeter
5. Mosso's Ergometer

Recommended Text books:

1. Text book of practical physiology – G k Pal
2. Text book of practical Physiology – Ranade.
3. Text book of practical Physiology – A.K.Jain.
4. Text book of practical Physiology – Ghai C L

YEAR : I YEAR
COURSE CODE : 17PT103

TITLE OF THE COURSE : BIOCHEMISTRY

COURSE OBJECTIVES

THIS COURSE PROVIDES THE KNOWLEDGE AND SKILLS IN FUNDAMENTAL ORGANIC CHEMISTRY AND INTRODUCTORY BIOCHEMISTRY THAT ARE ESSENTIAL FOR FURTHER STUDIES. IT COVERS BASIC BIOCHEMICAL, CELLULAR, BIOLOGICAL AND MICROBIOLOGICAL PROCESSES, BASIC CHEMICAL REACTIONS IN THE PROKARYOTIC AND EUKARYOTIC CELLS, THE STRUCTURE OF BIOLOGICAL MOLECULES, INTRODUCTION TO THE NUTRIENTS I.E. CARBOHYDRATES, FATS, ENZYMES, NUCLEIC ACIDS AND AMINO ACIDS.

COURSE OUTCOMES

THE STUDENT WOULD KNOW:

1. VARIOUS BIOMOLECULES WHICH ARE PRESENT IN THE BODY AND FUNCTIONS
2. THE FORMATION AND FATE OF THESE BIOMOLECULES
3. THEIR NORMAL LEVELS IN BODY FLUIDS REQUIRED FOR FUNCTIONING AND THEIR ABNORMAL LEVELS TO UNDERSTAND THE DISEASE PROCESS.

UNIT I:

1. Nutrition [7 Hours]

Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance
Energy requirement of a person -
Basal metabolic rate: Definition, Normal values, factor affecting BMR
Special dynamic action of food
Physical activities - Energy expenditure for various activities.
Calculation of energy requirement of a person
Balanced diet
Recommended dietary allowances
Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers Role of lipids in diet
Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non-essential amino acids. Nitrogen balance
Nutritional disorders

2. Carbohydrate Chemistry

[3 Hours]

Definition, general classification with examples, Glycosidic bond
Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides.

Glycosaminoglycans (mucopolysaccharides)

3. Lipid Chemistry

[3 Hours]

Definition, general classification

Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol

Essential fatty acids and their importance

Lipoproteins: Definition, classification, properties, Sources and function

Ketone bodies

4. Amino-acid Chemistry

3 Hours

Amino acid chemistry: Definition, Classification, Peptide bonds

Peptides: Definition, Biologically important peptides

Protein chemistry: Definition, Classification, Functions of proteins,

5. Enzymes

[3 Hours]

Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)

UNIT II:

6 Nucleotide and Nucleic acid Chemistry

[2 Hours]

Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.

Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.

7 Digestion and Absorption

[3 Hours]

General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance,

8 Carbohydrate Metabolism

[5 Hours]

Introduction, Glycolysis – Aerobic, Anaerobic

Citric acid cycle, Substrate level phosphorylation

Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle

Hormonal regulation of glucose, Glycosuria, Diabetes mellitus,

9 Lipid Metabolism

[5 Hours]

Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids, Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues
Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test
Cholesterol metabolism: synthesis, degradation, cholesterol transport
Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases)
Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver

10 Amino acid and Protein Metabolism

[3 Hours]

Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle
Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.

11 Vitamins

[7 Hours]

Definition, classification according to solubility,
Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity

UNIT III:

12 Mineral Metabolism

[2 Hours]

Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail

13 Cell Biology

[2 Hours]

Introduction, Cell structure, Cell membrane structure and function, various types of absorption.
Intracellular organelles and their functions, briefly on cytoskeleton

14 Muscle Contraction

[2 Hours]

Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.

- 15 Biochemistry of Connective tissue** [2 Hours]
Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans
- 16 Hormone Action** [2 Hours]
Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function
- 17 Acid-Base balance** [2 Hours]
Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system
Role of lungs and kidneys in acid base balance, Acid base imbalance
- 18 Water balance** [1 Hour]
Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre
- 19 Electrolyte balance** [1 Hour]
Osmolarity. Distribution of electrolytes
Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF
- 20 Clinical Biochemistry** [2 Hours]
Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests

Recommended Text books

1. MURRAY [ROBERT KK], Harper's Bio Chemistry Ed 24, Prentice Hall. 1996, p925, R
2. RAMAKRISHNA [S], PRASANNA [KG], RAJAN [R], Text Book of Medical Biochemistry, Ed1, orient Langman, Bombay 1980, p717.
3. VASUDEVAN [DM] and SREE KUMARI [S], Text Book of Bio Chemistry for Medical students, Ed 1, Jaypee Brothers, New Delhi, 1995, p637,
4. DAS [Debajyothi], Biochemistry, Ed. 7, Academic Publishers Calcutta, 1992, p648, R
5. PRASAD RM, RM's Physiotherapy Textbook Series, Text book of Biochemistry for Bachelor of Physiotherapy First Edition, RM Publications, Mangalore.

Reference

1. LEHNINGER [Albert] et. al., Principles of Biochemistry, Ed. 3, LBS Publishers, Delhi, 1993, p1143
2. ORTEN [James M] and NEUHAUS [OHO.W]. Human Biochemistry, Ed. 9, Mosby, St.Louis, 1975 p994.

3. Strayer [LUBERT], Biochemistry, Ed. 4, WH, Freeman & Co., Ny.1995, p1064,
DEVLIN [Thomas M], Biochemistry with Clinical Correalation, Ed. 4, Willey Libs, Ny
1997, p1186

YEAR : I YEAR
COURSE CODE : 17PT104
TITLE OF THE COURSE :
KINESIOLOGY

COURSE OBJECTIVES

THIS COURSE SUPPLEMENTS THE KNOWLEDGE OF ANATOMY AND ENABLES THE STUDENTS TO HAVE A BETTER UNDERSTANDING OF THE PRINCIPLES OF BIOMECHANICS AND THEIR APPLICATIONS IN MUSCULOSKELETAL FUNCTION AND DYSFUNCTION.

COURSE OUTCOMES

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER THE PRESCRIBED HOURS OF LECTURES AND DEMONSTRATIONS IN ADDITION TO CLINICAL THE STUDENT WILL BE ABLE TO DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES OF BIO-MECHANICS AND KINESIOLOGY AND THEIR APPLICATION IN HEALTH AND DISEASE.

UNIT I:

1. Basic Concepts in Biomechanics: Kinematics and Kinetics [3 Hours]

- a) Types of Motion
- b) Location of Motion
- c) Direction of Motion
- d) Magnitude of Motion
- e) Definition of Forces
- f) Force of Gravity
- g) Reaction forces
- h) Equilibrium
- i) Objects in Motion
- j) Force of friction
- k) Concurrent force systems
- l) Parallel force systems
- m) Levers
- n) Pulleys
- o) Work
- p) Moment arm of force
- q) Force components
- r) Equilibrium of levers

2. Joint structure and Function [3 Hours]

- a) Joint design
- b) Materials used in human joints
- c) General properties of connective tissues
- d) Joint function
- e) Joint motion

3. Muscle structure and function [3 Hours]

- a) Mobility and stability functions of muscles
- b) Elements of muscle structure
- c) Muscle function

4. Biomechanics of the peripheral joints (to include kinetics and kinematics) [52Hours]

- a) The shoulder complex: Structure and components of the shoulder complex and their integrated function
- b) The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex.
- c) The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; prehension; functional position of the the wrist and hand.

UNIT II:

5. Biomechanics of the peripheral joints

- a) The hip complex: structure and function of the hip joint.
- b) The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint.
- c) The ankle and foot complex.: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot.

6. Goniometry[2hours]: Parts, types, principles and uses of a goniometry. Techniques for measurement of ROM of all peripheral joints

7. Biomechanics of the thorax and chest wall [3 Hours]

General structure and function Rib cage movements and the muscles associated with the rib cage

8. Biomechanics of the vertebral column [10 Hours]

- a) General structure and function
- b) Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region
- c) Muscles of the vertebral column
- d) Ligaments of Vertebral Column

UNIT III:

9. The Temporomandibular Joint [2 Hours]: General features, structure and function

10. Analysis of Posture and Gait [9 Hours] :

- a) Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture,
 - b) General features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running.
11. **Movement Analysis [2 hours] :** ADL activities like sitting – to standing, lifting, various grips , pinches.
12. **Walking Aids [1 hour]:** Parallel bars, crutches, canes, walkers – types, parts and uses.

The following topics are part of applied Biomechanics and are required to be taught but not for examination.

- a General effects of disease, injury and immobilization.
- b Effects of immobilization, injury and aging
- c Changes in normal structure and function in relation to pregnancy, scoliosis and COPD
- d Effects of posture on age, pregnancy, occupation and recreation;

Recommended Text books :

1. Joint Structure and Function – A comprehensive Analysis, JP Bros Medical Publishers, New Delhi.
2. Brunnstrom, Clinical Kinesiology, JP Bros Medical Publishers, Bangalore, 5th Ed 1996, 1st Indian Ed 1998,
3. Clinical Kinesiology for Physical Therapist Assistants, JP Bros Medical Publishers, Bangalore, 1st Indian Ed 1997

YEAR : I YEAR
COURSE CODE : 17PT173

TITLE OF THE COURSE : KINESIOLOGY PRACTICALS

PRACTICAL

PRACTICAL: [90 Hours] shall be conducted for various joint movements and analysis of the same. Demonstration may also be given as how to analyze posture and gait. The demonstrations may be done on models or skeleton.

The student shall be taught and demonstrated to analysis for activities of daily living – ADL – (like sitting to standing, throwing, lifting etc.) The student should be able to explain and demonstrate the movements occurring at the joints, the muscles involved, the movements or muscle action produced, and mention the axis and planes through which the movements occur.

Measurement of Joint ROM using goniometer. Identification of walking aids.

YEAR : I YEAR
COURSE CODE : 17PT105
TITLE OF THE COURSE :
PSYCHOLOGY

COURSE OBJECTIVES

THIS COURSE WILL ENABLE THE STUDENT TO UNDERSTAND SPECIFIC PSYCHOLOGICAL FACTORS AND EFFECTS IN PHYSICAL ILLNESS AND THUS HELP THEM TO HAVE A HOLISTIC APPROACH IN THEIR DEALINGS WITH PATIENTS DURING ADMISSION, REHABILITATION AND DISCHARGE.

COURSE OUTCOMES

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER COMPLETION OF LECTURES AND DEMONSTRATIONS THE STUDENTS WILL BE ABLE TO RECOGNIZE AND HELP WITH THE PSYCHOLOGICAL FACTORS INVOLVED IN DISABILITY, PAIN, DISFIGUREMENT, UNCONSCIOUS PATIENTS, CHRONIC ILLNESS, DEATH, BEREAVEMENT AND MEDICAL – SURGICAL PATIENT / CONDITION.

UNIT I:

1. Introduction to Psychology (6 Hours)

- a. Schools: Structuralism, functionalism, behaviorism, Psychoanalysis.
- b. Methods: Introspection, observation, inventory and experimental method.
- c. Branches: pure psychology and applied psychology
- d. Psychology and physiotherapy

2. Growth and Development (6 Hours)

- a. Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age).
- b. Heredity and environment: role of heredity and environment in physical and psychological development, —Nature v/s Nurture controversy

3. Sensation, attention and perception (6 Hours)

- a. Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense.
- b. Attention: Types of attention, Determinants of attention (subjective determinants and objective determinants)

- c. Perception: Gestalt principles of organization of perception (principle of figure ground and principles of grouping), factors influencing perception (past experience and context)
- d. Illusion and hallucination: different types

UNIT II:

4. Motivation (4 Hours)

- a. Motivation cycle (need, drive, incentive, reward).
- b. Classification of motives.

- c. Abraham Maslow's theory of need hierarchy

5. Frustration and conflict (2 Hours)

- a. Frustration: sources of frustration.
- b. Conflict: types of conflict.
- c. Management of frustration and conflict

6. Emotions (6 Hours)

- a. Three levels of analysis of emotion (physiological level, subjective state, and overt behavior)
- b. Theories of emotion
- c. Stress and management of stress.

7. Intelligence (6 Hours)

- a. Theories of intelligence.
- b. Distribution of intelligence.
- c. Assessment of intelligence

8. Thinking (4 Hours)

- a. Reasoning : deductive and inductive reasoning
- b. Problem solving: rules in problem solving (algorithm and heuristic)
- c. Creative thinking: steps in creative thinking, traits of creative people

UNIT III:

9. Learning (8 Hours)

- a. Factors effecting learning.
- b. Theories of learning: trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory.

- c. The effective ways to learn: Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.

10. Personality (8 Hours)

- a. Approaches to personality: type & trait, behavioristic, psychoanalytic and humanistic approach.
- b. Personality assessment: observation, situational test, questionnaire, rating scale, interview, and projective techniques.
- c. Defense Mechanisms: denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out.

11. Social psychology (4 Hours)

- a. Leadership: Different types of leaders. Different theoretical approaches to leadership.
- b. Attitude: development of attitude. Change of attitude

Recommended text books:

1. Feldman.R.H(1996). Understanding Psychology. New Delhi: Tata McGraw hill.
2. Morgan et al(2003). Introduction to Psychology. New Delhi: Tata McGraw hill.
3. Lefton(). Psychology. Boston: Alwin&Bacot Company.
4. Mangal, S.K (2002). Advanced Educational Psychology. New Delhi: prentice hall. Atkinson(1996). Dictionary of Psychology.

YEAR: I YEAR

COURSE CODE: 17PT105

TITLE OF THE COURSE:

SOCIOLOGY

COURSE OBJECTIVES

THIS COURSE WILL ENABLE THE STUDENT TO UNDERSTAND SPECIFIC SOCIOLOGICAL FACTORS AND EFFECTS IN PHYSICAL ILLNESS AND THUS HELP THEM TO HAVE A HOLISTIC APPROACH IN THEIR DEALINGS WITH PATIENTS DURING ADMISSION, REHABILITATION AND DISCHARGE.

COURSE OUTCOMES

THE EXPECTED OUTCOMES OF THIS COURSE IS THAT AFTER COMPLETION OF LECTURES AND DEMONSTRATIONS THE STUDENTS WILL BE ABLE TO RECOGNIZE AND HELP WITH THE SOCIOLOGICAL FACTORS INVOLVED IN DISABILITY, PAIN, DISFIGUREMENT, UNCONSCIOUS PATIENTS, CHRONIC ILLNESS, DEATH, BEREAVEMENT AND MEDICAL – SURGICAL PATIENT / CONDITION.

THEORY

UNIT I:

1. Introduction:

Meaning- Definition and scope of sociology

Its relation to Anthropology, Psychology, Social Psychology.

Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.

Importance of its study with special reference to Health Care Professionals.

2. Social Factors in Health and disease situations:

Meaning of social factors

Role of social factors in health and illness

3. Socialization :

Meaning and nature of socialization

Primary, Secondary and Anticipatory socialization

Agencies of socialization

4. Social Groups :

Concepts of social groups influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

UNIT II:

5. Family:

The family. meaning and definitions.

Functions of types of family

Changing family patterns

Influence of family on the individuals health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy.

6. Community :

Rural community: Meaning and features –Health hazards of ruralities, health hazards to tribal community.

Urban community: Meaning and features- Health hazards of urbanities.

7. Culture and Health :

Concept of Health

Concept of Culture

Culture and Health

Culture and health disorders.

8. Social change :

Meaning of social changes.

Factors of social changes.

Human adaptation and social change

Social change and stress.

Social change and deviance.

Social change and health programme

The role of social planning in the improvement of health and rehabilitation.

UNIT III:

9. Social Problems of disabled :

Consequences of the following social problems in relation to sickness and disability,

remedies to prevent these problems.

Population explosion

Poverty and unemployment

Beggary

Juvenile delinquency

Prostitution

Alcoholism

Problems of women in employment

geriatric problems

Problems of underprivileged.

10. Social Security :

Social security and social legislation in relation to the disabled.

11. Social worker :

Meaning of Social Work

The role of a Medical Social Worker

Recommended Text Books:

1. Sachdeva and Vidyabushan, Introduction to the study of sociology

2. INDRANI T K, Text Books of Sociology for Graduates Nurses and Physiotherapy

Students, JP Brothers, New Delhi, 10edition. and Health Disorders