

**Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001**



FACULTY OF PHARMACY

SYLLABUS

FOR

BACHELOR OF PHYSIOTHERAPY

(4.5 YEARS PROGRAMME)

2023 BATCH ONWARDS

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**MRSPTU BACHELOR OF PHYSIOTHERAPY
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SCHEME

1 st Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BPHTS1-101	Human Anatomy-1	3	1	0	40	60	100	4
BPHTS1-102	Human Physiology -1	3	1	0	40	60	100	4
BPHTS1-103	Biochemistry	3	0	0	40	60	100	3
BPHTS1-104	Sociology	2	0	0	50	0	50	2
BPHTS1-105	Human Anatomy-1 Practical	0	0	6	60	40	100	3
BPHTS1-106	Human Physiology -1 Practical	0	0	2	60	40	100	1
Foundation Course - Internal Examination								
BPHTS1-107	Introduction to Healthcare Delivery System in India	2	0	0	50	0	50	2
BPHTS1-108	Basic computer and information science	1	0	0	50	0	50	1
BPHTS1-109	Basic computer and information science Practical	0	0	2	50	0	50	1
BPHTS1-110	English, Communication and soft skills	1	0	0	50	0	50	1
BPHTS1-111	English, Communication and soft skills Practical	0	0	2	50	0	50	1
BPHTS1-112	Introduction to Yoga- Basic theory, science and techniques	1	0	0	50	0	50	1
BPHTS1-113	Introduction to Yoga- Basic theory, science and techniques Practical	0	0	2	50	0	50	1
BPHTS1-114	PBL/Assignment/ICT learning	0	0	4	0	50	50	2
BPHTS1-115	Community orientation and clinical visit	0	0	2	0	50	50	1
Total		16	2	17	640	360	1000	28

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2 nd Semester		Contact Hrs.			Marks			Credits
Subject Code	Subject	L	T	P	Int.	Ext	Total	
BPHTS1-201	Human Anatomy-2 (Including Applied Anatomy)	3	1	0	40	60	100	4
BPHTS1-202	Human Physiology -2 (Including Applied Physiology)	3	1	0	40	60	100	4
BPHTS1-203	General and Clinical Psychology	2	1	0	40	60	100	3
BPHTS1-204	Basic principles of Biomechanics	2	1	0	40	60	100	3
BPHTS1-205	Human Anatomy-2 (Including Applied Anatomy) – Practical	0	0	6	60	40	100	3
BPHTS1-206	Human Physiology -2 (Including Applied Physiology– Practical	0	0	4	60	40	100	2
BPHTS1-207	General and Clinical Psychology – Practical	0	0	2	30	20	50	1
BPHTS1-208	Basic principles of Biomechanics – Practical	0	0	2	30	20	50	1
Foundation Course - Internal Examination								
BPHTS1-209	Medical terminology and record keeping	2	0	0	50	-	50	2
BPHTS1-210	PBL/Assignment/ICT learning/Integrated seminar	0	0	4	50	-	50	2
BPHTS1-211	Clinical observation	0	0	6	-	100	100	3
Total		12	4	24	440	460	900	28

FIRST SEMESTER

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HUMAN ANATOMY-1

Subject Code: BPHTS1-101

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body.

Course Outcomes:

- Describe the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
- Explain the gross morphology, structure and functions of various organs of the human body.
- To study the gross morphology, structure and functions of nervous, respiratory, urinary and reproductive systems in the human body.
- To know about detail anatomical knowledge and outline of muscular anatomy system

Unit-1 (10 Hours)

Histology : 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.

Unit-2 (15 Hours)

Embryology

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

Unit-3 (20 Hours)

Regional Anatomy

Thorax:

- **Cardio – Vascular System 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.
- **Respiratory system** - 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.

Abdomen:

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- **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.

Unit-4 (15 Hours)

- **Pelvis:** Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.
- **Endocrine glands:** 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 / Reference Books:

- 1. Ross and Wilson, 'Anatomy & Physiology.
- 2. Clark, 'Anatomy and Physiology: Understanding the Human Body'.
- 3. Pearce, 'Human Anatomy for Nurses.

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HUMAN ANATOMY – I (PRACTICAL)

Subject Code: BPHTS1-105

L T P C

Duration: 90 (Hrs.)

0 0 6 3

Course Objectives:

Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body.

Course Outcomes:

- Describe the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
- Explain the gross morphology, structure and functions of various organs of the human body.
- To study the gross morphology, structure and functions of nervous, respiratory, urinary and reproductive systems in the human body.
- To know about detail anatomical knowledge and outline of muscular anatomy system

Experiment

- Demonstration of various parts of body
- Demonstration of cell and tissues of body
- Demonstration of parts of brain
- Demonstration of various parts of appendicular skelton system
- Demonstration of various parts of Axial skelton system
- Demonstration of structural differences between skeletal, smooth and cardiac muscles
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section (TS) of artery and vein.
- Demonstration of various parts of Human heart.
- To study the various endocrine gland
- To study the anatomical of peritoneum

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HUMAN PHYSIOLOGY-1

Subject Code: BPHTS1-102

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objective:

The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Course Outcome:

CO-1 General Physiology: Understand the basis of normal human physiology with special emphasis on the functioning of the cardiovascular, musculo-skeletal and nervous systems & its application in practice of physiotherapy.

CO-2 Nerve Physiology & Muscles Physiology: To know about detail anatomical knowledge of nervous system and outline of muscular anatomy system & its application in practice of physiotherapy.

CO-3 Bloods: Detail knowledge of different type and function of blood cells. Brief outline of cardiovascular and respiratory system & its application in practice of physiotherapy.

CO-4 Respiration: To learn and understand the skills of assessment of Breath sound, Blood pressure, Respiratory rate, Heart rate and Pulmonary Function Tests, & its application in practice of physiotherapy.

CO-5 Cardiovascular System & Exercise Physiology: How the activities of organs are integrated for maximum efficiency in Physical Activity and exercise & its application in practice of physiotherapy

CO-6 GIT: To learn and understand the skill of assessment of breath sound, blood pressure, respiratory rate, heart rate and pulmonary function test and its application in practice of physiotherapy

Unit 1 (15 Hours)

General Physiology

- Cell: Morphology. Organelles: their structure and functions
- Transport Mechanisms across the cell membrane
- Body fluids: Distribution, composition.

Blood

- Introduction: Composition and functions of blood.
- Plasma: Composition, formation, functions. Plasma proteins.
- RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticuloendothelial system (in brief) Haemoglobin –structure, function and derivatives 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

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- 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.

Unit 2 (15 Hours)

Nerve Muscle Physiology

- Introduction: Resting membrane potential. Action potential – ionic basis and properties.
- Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibers. Nerve injury – degeneration and regeneration.
- Neuroglia: Types and functions.
- Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction: Structure. Neuromuscular transmission, myasthenia gravis. Excitation- Contraction coupling. Rigomortis.

Cardiovascular System

- Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organisation 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. Their variations
- 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 3 (15 Hours)

Respiratory System -

- 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.

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- Pulmonary Circulation. Ventilation-perfusion ratio and its importance.
- Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin 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 Hypercapnoea. Asphyxia. Cyanosis – types and features. Dysbarism
- Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea, tachypnoea. periodic breathing – types Artificial respiration
- Respiratory changes during exercise.

Digestive System -

- 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. Function.
- 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.

Unit 4 (15 Hours)

Endocrine System -

- 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, and Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome.

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- 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).

Recommended Text Books / Reference Books:

- Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
- Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
- Human Physiology (vol 1 and 2) by Dr. C.C. Chatterjee ,Academic Publishers Kolkata
- Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
- Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
- Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

HUMAN PHYSIOLOGY – I (PRACTICAL)

Subject Code: BPHTS1-106

L T P C

Duration: 30 (Hrs.)

0 0 2 1

Course Objective:

- The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Course Outcome:

- Practical classes include hematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.

Experiment

- Hematology: To be done by the students
 - a. Study of Microscope and its uses
 - b. Determination of RBC count
 - c. Determination of WBC count
 - d. Differential leukocyte count
 - e. Estimation of hemoglobin
 - f. Calculation of blood indices
 - g. Determination of blood groups
 - h. Determination of bleeding time
 - i. Determination of clotting time
- Demonstrations only
 - j. Determination of ESR
 - k. Determination of PCV
- Amphibian Experiments – Demonstration and Dry charts Explanation. Instruments used for frog experiments. Kymograph, heart liver, Muscle trough, stimulator.
 - a. Simple muscle curve.
 - b. Effect of increasing the strength of the stimuli
 - c. Effect of temperature on muscle contraction
 - d. Effect of two successive stimuli.
 - e. Effect of Fatigue.
 - f. Effect of load on muscle contraction
 - g. Genesis of tetanus and clones.
 - h. Velocity of impulse transmission.

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BIOCHEMISTRY

Subject Code: BPHTS1-103

L T P C

Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

Students will be able to learn the terminology of the subject and basic knowledge of basic chemistry and biochemistry involved in physiology of human body. They will be able to understand the reports generated by laboratory and shall be able to convey the surgeon about any critical alert.

Course Outcomes:

CO-1 Cell & Chemistry of Bimolecules: Demonstrate comprehensive understanding of biochemistry. Acquire the knowledge in biochemistry that is required to be practiced in community and at all levels of health care system.

CO-2 Carbohydrate: To Understand the carbohydrate, protein and lipid metabolism.

CO-3 Nucleic Acid: Understand relevant Nucleic Acid which will help to know about the important medical conditions.

CO-4 Vitamins (Fat & Water Soluble) & Enzymes & Hormones: Demonstrate empathy and have a human approach towards patients & respect their sensibilities.

CO-5 Nutrition & Special Topics: Understand relevant investigations which will help to know about the important medical conditions

Unit- 1 (5 Hours)

- Nutrition –
 - a. 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.
 - b. Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person
 - c. Balanced diet
 - i. Recommended dietary allowances
 - ii. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers
 - iii. Role of lipids in diet iv. 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
 - iv. Nutritional disorders.
- Carbohydrate Chemistry –
 - a. Definition, general classification with examples, Glycosidic bond
 - b. Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides.
 - c. Glycosaminoglycan (mucopolysaccharides)

Unit- 2 (10 Hours)

- Lipid Chemistry –
 - a. Definition, general classification
 - b. Definition, classification, properties and functions of Fatty acids, Triacylglycerol,

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- Phospholipids, Cholesterol
- c. Essential fatty acids and their importance
- d. Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies
- Amino-acid Chemistry –
 - a. Amino acid chemistry: Definition, Classification, Peptide bonds
 - b. Peptides: Definition, Biologically important peptides
 - c. Protein chemistry: Definition, Classification, Functions of proteins,
- Enzymes –

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)
- Nucleotide and Nucleic acid Chemistry -
 - a. Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.
 - b. 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.
- Digestion and Absorption -

General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.
- Carbohydrate Metabolism -
 - a. Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation.
 - b. Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle
 - c. Hormonal regulation of glucose, Glycosuria, Diabetes mellitus.

Unit 3 (15 Hours)

- Lipid Metabolism -
 - a. Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids,
 - b. Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues
 - c. Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test.
 - d. Cholesterol metabolism: synthesis, degradation, cholesterol transport
 - e. Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver
- Amino acid and Protein Metabolism -
 - a. Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle

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- b. Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.
- Vitamins -
 - a. Definition, classification according to solubility,
 - b. Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.
- Mineral Metabolism-

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.
- Cell Biology -

Unit 4 (15 Hours)

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

- Muscle Contraction -

Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.
- Biochemistry of Connective tissue -

Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.
- Hormone Action -

Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.
- Acid-Base balance -

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.
- Water balance -

Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre.
- Electrolyte balance -
 - a. Osmolarity. Distribution of electrolytes.
 - b. Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF.
- Clinical Biochemistry -

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 / Reference Books:

1. Applied Biochemistry Professional Publications; First Edition
2. Fundamentals Of Applied Biochemistry Auris Publishing

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SOCIOLOGY

Subject Code: BPHTS1-104

L T P C

Duration: 30 (Hrs.)

2 0 0 2

Course Objective: Sociology will introduce student to the basic sociology concepts, principles and social process, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

Course Outcome:

- Sociology & Health – Social factors affecting Health Status, Social Consciousness & Perception of Illness, Decision Making in taking Treatment
- Socialization – Definition, Influence, of Social Factors, on Personality, Socialization in the Hospital & Rehabilitation of the patients.
- Community Role of Rural & Urban communities in Public Health, Role of community in determining Beliefs, Practices & Home Remedies in Treatment.
- Social Change, Organization: Student learns and critically evaluate the explanation of human behaviour social phenomena and social process locally and globally.
- Social Problems of the Disabled: Understanding the social problem and learning outcome of those prevailing problems affecting health care sector.

Unit- 1 (7 Hours)

Introduction:

- a. Meaning- Definition and scope of sociology
- b. Its relation to Anthropology, Psychology, Social Psychology.
- c. Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.
- d. Importance of its study with special reference to Health Care Professionals.

Social Factors in Health and disease situations:

- a. Meaning of social factors
- b. Role of social factors in health and illness

Socialization:

- a. Meaning and nature of socialization.
- b. Primary, Secondary and Anticipatory socialization.
- c. Agencies of socialization.

Unit- 2 (8 Hours)

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.

Family:

- a. The family, meaning and definitions.
- b. Functions of types of family
- c. Changing family patterns
- d. 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.

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Community:

- e. Rural community: Meaning and features –Health hazards of ruralities, health hazards to tribal community.
- f. Urban community: Meaning and features- Health hazards of urbanities.

Unit- 3 (7 Hours)

Culture and Health:

- g. Concept of Health
- h. Concept of Culture
- i. Culture and Health
- j. Culture and Health Disorders

Social change:

- k. Meaning of social changes.
- l. Factors of social changes.
- m. Human adaptation and social change
- n. Social change and stress.
- o. Social change and deviance.
- p. Social change and health programme
- q. The role of social planning in the improvement of health and rehabilitation.

Unit 4 (8 Hours)

Social Problems of disabled: Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems.

- a. Population explosion
- b. Poverty and unemployment
- c. Beggary
- d. Juvenile delinquency
- e. Prostitution
- f. Alcoholism
- g. Problems of women in employment
- h. Geriatric problems
- i. Problems of underprivileged.

Social Security:

Social security and social legislation in relation to the disabled.

Social worker:

- a. Meaning of Social Work
- b. The role of a Medical Social Worker.

Recommended Text Books / Reference Books:

- Textbook of Sociology for Physiotherapy Students by KP Neeraja
- Sociology for Physiotherapists by Dibyendunarayan Bid

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INTRODUCTION TO HEALTHCARE DELIVERY SYSTEM IN INDIA

Subject Code: BPHTS1-107

**L T P C
2 0 0 2**

Duration: 30 (Hrs.)

Course Objective: The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

Course Outcome:

- Describe the health systems of various Countries including India
- Discuss and learn public health care system in India
- Develop, implement and manage various public health programs
- Critically analyze the various components of health care delivery system in India
- Apply various principles of planning and management in implementing health projects and programmes.
- Recognize the various sections of healthcare legislations in India and initiate appropriate actions in public health practice
- Describe the principles, history and methods of epidemiological studies

Unit 1 (10 Hours)

- Introduction to healthcare delivery system
 - a. Healthcare delivery system in India at primary, secondary and tertiary care
 - b. Community participation in healthcare delivery system
 - c. Health system in developed countries.
 - d. Private Sector
 - e. National Health Mission
 - f. National Health Policy
 - g. Issues in Health Care Delivery System in India
- National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.

Unit 2 (5 Hours)

- Introduction to AYUSH system of medicine
 - a. Introduction to Ayurveda.
 - b. Naturopathy
 - c. Unani
 - d. Siddha
 - e. Homeopathy
 - f. Need for integration of various system of medicine
- Health scenario of India- past, present and future

Unit 3 (10 Hours)

- Demography & Vital Statistics-
 - a. Demography – its concept
 - b. Vital events of life & its impact on demography
 - c. Significance and recording of vital statistics
 - d. Census & its impact on health policy

Unit 4 (5 Hours)

- Epidemiology
 - a. Principles of Epidemiology
 - b. Natural History of disease
 - c. Methods of Epidemiological studies
 - d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Recommended Text Books / Reference Books:

Model Curriculum – General Duty Assistant. NSQF level 4, HSS/Q5101. Healthcare Sector Skill Council.

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**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BASIC COMPUTER AND INFORMATION SCIENCE

Subject Code: BPHTS1-108

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective: The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

Course Outcome:

Upon completion of the course the student shall be able to

- Know the various types of application of computers.
- Know the various types of databases
- Know the various applications of databases
- Knows the computer network

Unit 1 (2 Hours)

Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).

Processor and memory: The Central Processing Unit (CPU), main memory.

Unit 2 (3 Hours)

Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Unit 3 (5 Hours)

Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Unit 4 (5 Hours)

Introduction of Operating System: introduction, operating system concepts, types of operating system.

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Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet. Application of Computers in clinical settings.

Recommended Text Books / Reference Books:

- Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
- Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

BASIC COMPUTER AND INFORMATION SCIENCE PRACTICAL

Subject Code: BPHTS1-109

L T P C

Duration: 30 (Hrs.)

0 0 2 1

Course Objective: The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

Course Outcome:

Upon completion of the course the student shall be able to

- Know the various types of application of computers.
- Know the various types of databases
- Know the various applications of databases
- Knows the computer network

Experiment

- Learning to use MS office: MS word, MS PowerPoint, MS Excel.
- To install different software.
- Data entry efficiency

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

ENGLISH, COMMUNICATION AND SOFT SKILLS

Subject Code: BPHTS1-110

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective

- The students will be able to appreciate communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
- The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

Course Outcome

- Projecting the first impression
- Use simple forms of polite expressions to establish basic social contact and to perform everyday functions including making requests and offers, conducting simple phone conversations, asking and telling time, giving simple directions, asking about price, ordering a meal, etc.
- Students learn to use general, social and professional language.
- Polishing manners to behave appropriately in social and professional circles.
- Handling difficulty situations with grace style and professionalism

UNIT-1 (3 Hrs)

Basic Language Skills: Grammar and Usage.

Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

UNIT-2 (2 Hrs)

Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.

Basic concepts & principles of good communication

UNIT-3 (5 Hrs)

Special characteristics of health communication

Types & process of communication

Barriers of communication & how to overcome.

UNIT-4 (5 Hrs)

Soft Skills - with important sub-elements:

- i. Communication Styles
- ii. Team work
- iii. Leadership Skills
- iv. Effective & Excellent Customer Service
- v. Decision Making & Problem Solving
- vi. Managing Time and Pressures
- vii. Self-Management & Attitude.

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SYLLABUS 2023 BATCH ONWARDS**

Recommended Text Books / Reference Books:

- Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011
- Communication N Soft Skills Paperback – 2013 by Niraj Kumar, Chetan Srivastava

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SYLLABUS 2023 BATCH ONWARDS**

ENGLISH, COMMUNICATION AND SOFT SKILLS PRACTICAL

Subject Code: BPHTS1-111

L T P C

Duration: 30 (Hrs.)

0 0 2 1

Course Objective

- The students will be able to appreciate communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
- The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

Course Outcome

- Projecting the first impression
- Use simple forms of polite expressions to establish basic social contact and to perform everyday functions including making requests and offers, conducting simple phone conversations, asking and telling time, giving simple directions, asking about price, ordering a meal, etc.
- Students learn to use general, social and professional language.
- Polishing manners to behave appropriately in social and professional circles.
Handling difficulty situations with grace style and professionalism

Experiment

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication – verbal, non-verbal and written communication. Upward, downward and lateral communication.
7. Therapeutic communication: empathy versus sympathy.
8. Communication methods for teaching and learning.
9. Communication methods for patient education.
10. Barriers of communication & how to overcome.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

INTRODUCTION TO YOGA- BASIC THEORY, SCIENCE AND TECHNIQUES

Subject Code: BPHTS1-112

L T P C

Duration: 15 (Hrs.)

1 0 0 1

Course Objective:

Class incorporates yoga postures, gentle movement sequences, breath work, supported silent meditation, and guided relaxation to support increased awareness and mindfulness of the breath and body, and quieting of the nervous system.

Course Outcome:

- Knows the Yoga and its types,
- Know the yoga its physiological and Psycho-somatic effects
- Know the physiological effect of yoga practice
- To demonstrate standard yoga postures used by the beginners.

UNIT 1 (5 Hours)

Foundations of Yoga

- Introduction to Yoga and its philosophy
- Brief history, development of Yoga
- Philosophical foundations of Yoga
- Streams & types of Yoga

UNIT 2 (5 Hours)

Yoga and Health

- Concept of body in yoga – Panchakosha theory
- Concept of Health and Disease in yoga
- Stress management through yoga
- Disease prevention and promotion of positive health through yoga

UNIT 3 (5 Hours)

Physiological effects of Yoga practices

- Physiological effects of Shat kriyas
- Physiological effects of Asanas
- Physiological effects of Pranayamas
- Physiological effects of Relaxation techniques and Meditation

Recommended Text Books / Reference Books:

- The yoga sutras of patanjali by sri swami satchidananda
- Eastern body, western mind by anodea Judith

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

**INTRODUCTION TO YOGA- BASIC THEORY, SCIENCE AND TECHNIQUES
PRACTICAL**

Subject Code: BPHTS1-113

**L T P C
0 0 2 1**

Duration: 30 (Hrs.)

Course Objective:

Class incorporates yoga postures, gentle movement sequences, breath work, supported silent meditation, and guided relaxation to support increased awareness and mindfulness of the breath and body, and quieting of the nervous system.

Course Outcome:

- Knows the Yoga and its types,
- Know the yoga its physiological and Psycho-somatic effects
- Know the physiological effect of yoga practice
- To demonstrate standard yoga postures used by the beginners.

List of Practical / Demonstrations

- Sukshma Vyayama/ Sithilikarna Vyayama and Surya Namaskar)
- Loosening exercises of each part of the body particularly of the joints
- 12 step Surya namaskar with prayer and specific mantras

- Yogic kriyas [Observation/ demonstration only] (3 hours)
- Neti (Jala Neti, Sutra Neti)
- Dhauti (Vamana Dhauti, Vastra Dhauti)
- Trataka
- Shankaprakshalana (Laghu & Deergha)
- Yogasanas

- Standing postures
 - i. Tadasana (Upward stretch posture)
 - ii. Ardha Chakrasana (Half wheel posture)
 - iii. Ardha Katicakrasana (Half lumber wheel posture)
 - v. Utkatasana (Chair posture)
 - vi. Pada Hastasana (Hand to toes posture)
 - vii. Trikonasana (Triangle posture)
 - viii. Parshva Konasana (Side angle posture)
 - ix. Garudasana (Eagle posture)
 - x. Vrikshasana (Tree posture)

- Prone positions
 - i. Makarasana (Crocodile posture)
 - ii. Bhujangasana (Cobra posture)
 - iii. Salabhasana (Locust posture)
 - iv. Dhanurasana (Bow posture)
 - v. Naukasana (Boat posture)
 - vi. Marjalasana (Cat posture)

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- Supine postures
 - i. Ardha halasana/ Uttana Padasana
 - ii. Sarvangasana (All limb posture)
 - iii. Pawana muktasana (Wind releasing posture)
 - iv. Matsyasana (Fish posture)
 - v. Halasana (Plough posture)
 - vi. Chakrasana (Wheel posture)
 - vii. Setu Bandhasana (Bridge posture)
 - viii. Shavasana (Corpse posture)

- Sitting postures
 - i. Parvatasana (Mountain posture)
 - ii. Bhadrasana (Gracious posture)
 - iii. Vajrasana (Adamantine posture)
 - iv. Paschimottanasana (Back stretching posture)
 - v. Janushirasana (Head to knee posture)
 - vi. Simhasana (Lion posture)
 - vii. Gomukhasana (Cow head posture)
 - viii. Ushtrasana (Camel posture)
 - ix. Ardha Matsyendrasana (Half matsyendra spine twist posture)
 - x. Vakrasana (Spinal twist posture)
 - xi. Kurmasana (Turtle posture)
 - xii. Shashankasana (Rabbit posture)
 - xiii. Mandukasana (Frog Posture)

- Meditative postures and Meditation techniques
 - i. Siddhasana (Accomplished pose)
 - ii. Padmasana (Lotus posture)
 - iii. Samasana
 - iv. Swastikasana (Auspicious posture)

- Pranayamas
 - i. The practice of correct breathing and Yogic deep breathing
 - ii. Kapalabhati
 - iii. Bhastrika
 - iv. Sitali
 - v. Sitkari
 - vi. Sadanta
 - vii. Ujjayi
 - viii. Surya Bhedana
 - ix. Chandra Bhedana
 - x. Anuloma-Viloma/Nadishodana
 - xi. Bhramari

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- Relaxation Techniques (2 hours)
 - i. Shavasana
 - ii. Yoga Nidra

COMMUNITY ORIENTATION AND CLINICAL VISIT

Subject Code: BPHTS1-115

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Course Objective:

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations.

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical College, private hospitals, dispensaries and clinics.
2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

SECOND SEMESTER

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

HUMAN ANATOMY-2 (INCLUDING APPLIED ANATOMY)

Subject Code: BPHTS1-201

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objective:

- Studies are concerned with the topographical and functional anatomy of the limbs and thorax. Particular attention is paid to the muscles, bones and joints of the regions. The head and neck and central nervous system (CNS) are studied with particular reference to topics of importance to physiotherapists. The study of the CNS includes detailed consideration of the control of motor function.

Course Outcome:

- Demonstrate knowledge of general overall anatomically principles associated with Musculo Skelton anatomy, lower extremity Neuro anatomy program region.

Unit 1 (15 Hours)

- Musculo Skeletal Anatomy - (All the topics to be taught in detail)
 - 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.
 - f. Upper Extremity
 - i. Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
 - ii. 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.
 - iii. Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
 - iv. Arches of hand, skin of the palm and dorsum of hand.

Unit 2 (15 Hours)

- Lower Extremity
 - i. Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
 - ii. 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.
 - iii. Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.

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SYLLABUS 2023 BATCH ONWARDS**

- Trunk & Pelvis:
- Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
 - i. Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Inter-vertebral disc.
 - ii. Pelvic girdle and muscles of the pelvic floor.
- Head and Neck:
 - i. Osteology: Mandible and bones of the skull.
 - ii. Soft parts: Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck.
 - iii. Gross anatomy of eyeball, nose, ears and tongue.

Unit 3 (15 Hours)

- Neuro Anatomy - Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system
 - i. Cranial nerves
 - ii. Peripheral nervous system
 - iii. Peripheral nerve
 - iv. Neuromuscular junction
 - v. Sensory end organs
 - vi. Central Nervous System
 - vii. Spinal segments and areas
 - viii. Brain Stem

Unit 4 (15 Hours)

- i. Cerebellum
- ii. Inferior colliculi
- iii. Superior Colliculi
- iv. Thalamus
- v. Hypothalamus
- vi. Corpus striatum
- vii. Cerebral hemisphere
- viii. Lateral ventricles
- ix. Blood supply to brain
- x. Basal Ganglia
- xi. The pyramidal system
- xii. Pons, medulla, extra pyramidal systems
- xiii. Anatomical integration

Recommended Text Books / Reference Books:

- Ross and Wilson, 'Anatomy & Physiology.
- Clark, 'Anatomy and Physiology: Understanding the Human Body'.
- Pearce, 'Human Anatomy for Nurses.

HUMAN ANATOMY-2 (INCLUDING APPLIED ANATOMY) - PRACTICAL

Subject Code: BPHTS1-205

**L T P C
0 0 6 3**

Duration: 90 (Hrs.)

List of Practical / Demonstrations

- Upper extremity including surface Anatomy.
- Lower extremity including surface Anatomy.
- Head & Spinal cord and Neck and Brain including surface Anatomy.
- Thorax including surface anatomy, abdominal muscles.
- Histology-Elementary tissue including surface Anatomy.
- Embryology-models, charts & X-rays.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

HUMAN PHYSIOLOGY-2 (INCLUDING APPLIED PHYSIOLOGY)

Subject Code: BPHTS1-202

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objective:

- The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body.
- The major topics covered include the following the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Course Outcome:

- Describe the physiological & Therapeutic uses, merits /demerits of various exercise modes.
- Demonstrate various therapeutic exercises on self & acquire the application skill on models.
- Acquire the skill of assessment of isolated & group muscle strength, & Range of motion of the joints subjectively & objectively.
- Describe the pattern of normal and abnormal movements of various joints and activities

UNIT 1 (20 Hours)

- Special Senses -
 - a. 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.
 - b. Visual Pathway and the effects of lesions.
 - c. Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.
 - d. Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation.
 - e. Color vision – color blindness. Nyctalopia.
 - f. 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.
 - g. Taste: Taste buds. Primary tastes. Gustatory pathway.
 - h. Smell: Olfactory membrane. Olfactory pathway.
 - i. Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders
- Nervous System -
 - a. Introduction: Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.
 - b. Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral

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- 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, stereognosis, 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.
- c. 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.
 - d. 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
 - e. Spinal cord Lesions: Complete transection and Hemisection of the spinal cord.
 - f. Cerebellum: Functions, Cerebellar ataxia.
 - g. Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.
 - h. Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome
 - i. Reticular Formation and Limbic System: Components and Functions.
 - j. Basal Ganglia: Structures included and functions. Parkinson's disease.
 - k. Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.
 - l. EEG: Waves and features. Sleep: REM and NREM sleep.
 - m. CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.
 - n. ANS: Features and actions of parasympathetic and sympathetic nervous system.

UNIT 2 (20 Hours)

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

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- e. Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.
- f. Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.
- g. Acid-Base balance (very brief)
- h. Artificial Kidney: Principle of hemodialysis.
- i. Skin and temperature regulation.
- Reproductive System -
 - a. Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder
 - b. Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.
 - c. Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: estrogen and progesterone-action. Regulation of secretion. Mentrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods
- Physiology of exercise –
 - a. Effects of acute and chronic exercise on
 - i. O₂ transport
 - ii. Muscle strength/power/endurance
 - iii. B.M.R. /R.Q.
 - iv. Hormonal and metabolic effect
 - v. Cardiovascular system
 - vi. Respiratory system
 - vii. Body fluids and electrolyte
 - b. Effect of gravity / altitude /acceleration / pressure on physical parameters
 - c. Physiology of Age
- Applied Physiology -

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.

UNIT 3 (10 Hours)

- Pulmonary Functions
 - a. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
 - b. Respiratory adjustments in exercises.
 - c. Artificial respiration
 - d. Breath sounds.

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- Cardio vascular Functions
 - a. Blood flow through arteries, arterioles, capillaries, veins and venuoles.
 - b. Circulation of Lymph, Oedema
 - c. Factors affecting cardiac output.
 - d. Circulatory adjustment in exercise and in postural and gravitational changes,
 - e. Pathophysiology of fainting and heart failure.

UNIT 4 (10 Hours)

- Muscles and Nervous System Functions
 - a. Peripheral nervous system, neuromuscular transmission, Types of nerve fibers.
 - b. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV
 - c. Degeneration and regeneration of nerve, Reactions of denervations.
 - d. Synaptic transmission, Stretch reflex- Mechanism and factors affecting it.
 - e. Posture, Balance and Equilibrium/Coordination of voluntary movement.
 - f. Voluntary motor action, clonus, Rigidity, incoordination.
 - g. Special senses- Vision, taste, hearing, vestibular, Olfaction
 - h. Sympathetic and Parasympathetic regulation, Thermoregulation.
- Blood functions
 - a. Thalassaemia Syndrome, Hemophilia, VWF
 - b. Anemia, Leukocytosis
 - c. Bone marrow transplant
- Metabolic Functions
 - a. Diabetes Mellitus, Physiological basis of Peptic Ulcer, Jaundice, GIT disorders and Dietary fiber, Thyroid functions, Vitamins deficiency.

Recommended Text Books / Reference Books:

- Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
- Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
- Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata
- Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
- Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
- Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

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HUMAN PHYSIOLOGY-2 (INCLUDING APPLIED PHYSIOLOGY) - PRACTICAL

Subject Code: BPHTS1-206

**L T P C
0 0 4 2**

Duration: 60 (Hrs.)

Clinical Examination

- Examination of Radial pulse.
- Recording of blood pressure
- Examination of CVS
- Examination of Respiratory system
- Examination of Sensory system
- Examination of Motor System
- Examination of reflexes
- Examination of cranial nerves

Amphibian Experiments – Demonstration and Dry charts Explanation.

- Normal cardiogram of amphibian heart.
- Properties of Cardiac muscle
- Effect of temperature on cardiogram.

Recommended Demonstrations

- Spirometry
- Artificial Respiration
- ECG
- Perimetry
- Mosso's Ergometry

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SYLLABUS 2023 BATCH ONWARDS**

GENERAL AND CLINICAL PSYCHOLOGY

Subject Code: BPHTS1-203

**L T P C
2 1 0 3**

Duration: 45 (Hrs.)

Course Objective:

- Human Psychology involves the study of various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups.

Course Outcome: The Course outcome is to know about the

- Psychosocial assessment of patients in various developmental stages.
- Explain the concept of stress and its relationship to health, sickness and one's profession.
- Identify ego defense mechanisms and learn counseling techniques to help those in need.
- Help them to understand the reason of non – compliance among patients and improve compliance behavior.
- Help them gain insight into the applications of psychology in the field of Physiotherapy

UNIT 1 (15 Hours)

- Introduction to Psychology
 - 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
- Growth and Development
 - 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”.
- Sensation, attention and perception
 - 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.
- Motivation
 - a. Motivation cycle (need, drive, incentive, reward).
 - b. Classification of motives.
 - c. Abraham Maslow's theory of need hierarchy

UNIT 2 (15 Hours)

- Frustration and conflict
 - a. Frustration: sources of frustration.
 - b. Conflict: types of conflict.
 - c. Management of frustration and conflict
- Emotions
 - a. Three levels of analysis of emotion (physiological level, subjective state, and overt behavior).
 - b. Theories of emotion
 - c. Stress and management of stress.
- Intelligence
 - a. Theories of intelligence.
 - b. Distribution of intelligence.
 - c. Assessment of intelligence
- Thinking
 - 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 3 (15 Hours)

- Learning
 - 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.
- Personality
 - 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.
- Social psychology
 - a. Leadership: Different types of leaders. Different theoretical approaches to leadership.
 - b. Attitude: development of attitude. Change of attitude.
- Clinical psychology – Models of training, abnormal behavior assessment, clinical judgment, psychotherapy, self-management methods, physiotherapist patient interaction, aggression, self imaging, stress management, assertive training, Group therapy, Body awareness, Pediatric, child and geriatric clinical psychology.

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

Recommended Text Books / Reference Books:

- Morgan & King, Introduction to Psychology, 3rd Ed, 1994
- Sachdeva D.R. & Bhushan. V, An introduction to Sociology, Kitab Mahal Limited, 1974.
- Clifford T. Morgan – Introduction to Psychology, ELBS, 2 Ed, 1990
- Hilgard & Atkinson - Introduction to Psychology, CBS, 3 Ed, 1994
- Madan. G.R. Indian Social Problems, Vol.1, Chennai Applied Publications, 1973.

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GENERAL AND CLINICAL PSYCHOLOGY - PRACTICAL

Subject Code: BPHTS1-207

**L T P C
0 0 2 1**

Duration: 30 (Hrs.)

Experiment

- Pain assessment
- Psychological approach to pain management
- Cognitive reconceptualising pain
- Relaxation Therapy
- Behavioural Therapy
- Electromyography (EMG)
- Thermal biofeedback
- Neurofeedback/ electroencephalography (EEG)
- Electrodermography (EDG)

**MRSPTU BACHELOR OF PHYSIOTHERAPY
SYLLABUS 2023 BATCH ONWARDS**

BASIC PRINCIPLES OF BIOMECHANICS

Subject Code: BPHTS1-204

**L T P C
2 1 0 3**

Duration: 45 (Hrs.)

Course Objective:

- Biomechanics involves the study of basic concepts of human movement, and application of various biomechanical principles in the evaluation and treatment of disorders of musculoskeletal system. Students are taught to understand the various quantitative and qualitative methods of movement. Mechanical principles of various treatment methods are studied. Study of posture and gait are also included.

Course Outcome:

- Correctly apply fundamental human movement principles, from both natural and social science perspectives, to a variety of contexts and populations
- Demonstrate an applied understanding of the form and function of the human body
- Critically evaluate human movement research in order to design and implement activities to confirm/generate disciplinary knowledge

UNIT 1 (15 Hours)

- Basic Concepts in Biomechanics: Kinematics and Kinetics
 - 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 system
 - m. Work
 - n. Moment arm of force
 - o. Force components
 - p. Equilibrium of levers

UNIT 2 (10 Hours)

- Joint structure and Function -
 - a. Joint design
 - b. Materials used in human joints
 - c. General properties of connective tissues
 - d. Human joint design
 - e. Joint function
 - f. Joint motion
 - g. General effects of disease, injury and immobilization.

UNIT 3 (10 Hours)

- Muscle structure and function -
 - a. Mobility and stability functions of muscles
 - b. Elements of muscle structure
 - c. Muscle function
 - d. Effects of immobilization, injury and aging

UNIT 4 (10 Hours)

- Biomechanics of the Thorax and Chest wall -
 - a. General structure and function
 - b. Rib cage and the muscles associated with the rib cage
 - c. Ventilatory motions: its coordination and integration
 - d. Developmental aspects of structure and function
 - e. Changes in normal structure and function I relation to pregnancy, scoliosis and COPD
- The Temporomandibular Joint-
 - a. General features, structure, function and dysfunction

Recommended Text Books / Reference Books:

- Basics Biomechanics, Susan J hall, 1st edition 1995
- A textbook of Biomechanics, singh arunjith, Singh pritpal 1st edition 2013

BASIC PRINCIPLES OF BIOMECHANICS - PRACTICAL

Subject Code: BPHTS1-208

**L T P C
0 0 2 1**

Duration: 30 (Hrs.)

Experiment

1. Goniometry – measurement of joint ROM
2. Identify Muscle work of various movements in body at different angle.
3. Identify normal and abnormal posture.
4. Normal gait with it parameters and identify abnormal gait with the problems in it.

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SYLLABUS 2023 BATCH ONWARDS**

MEDICAL TERMINOLOGY AND RECORD KEEPING

Subject Code: BPHTS1-209

**L T P C
2 0 0 2**

Duration: 30 (Hrs.)

Course Objective:

- This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes.

Course Outcome: Upon completion of this course the student should be able to:

- Students origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study.
- Derivation of medical terms.

Topics

- Define word roots, prefixes, and suffixes.
- Conventions for combined morphemes and the formation of plurals.
- Basic medical terms in health care and physiotherapy.
- Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
- Interpret basic medical abbreviations/symbols.
- Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
- Interpret medical records/reports.

Recommended Text Books / Reference Books:

- Comprehensive medical terminology 3rd edition Bety Davis Jones, RN, MA, CMA