Maharaja Ranjit Singh Punjab Technical University
Bathinda-151001

FACULTY OF PHARMACY

SYLLABUS

FOR

BACHELOR OF PHYSIOTHERAPY

(4.5 YEARS PROGRAMME)

2023 BATCH ONWARDS

SCHEME

1st 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**

2nd 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**

3rd Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext**	**Total**	
BPHTS1-301	Pathology	3	0	0	40	60	100	3
BPHTS1-302	Microbiology	3	0	0	40	60	100	3
BPHTS1-303	Pharmacology	3	0	0	40	60	100	3
BPHTS1-304	Biomechanics and kinesiology	4	1	0	40	60	100	5
BPHTS1-305	Foundation of Exercise Therapy and therapeutic massage	3	0	0	40	60	100	3
BPHTS1-306	Pathology- Practical	0	0	2	30	20	50	1
BPHTS1-307	Microbiology- Practical	0	0	4	30	20	50	2
BPHTS1-308	Biomechanics and kinesiology - Practical	0	0	6	60	40	100	3
BPHTS1-309	Foundation of Exercise Therapy and therapeutic massage- Practical	0	0	4	60	40	100	2
Foundation Course - Internal Examination								
BPHTS1-310	Introduction to quality and patient safety (Including Emergency care, BLS, Biomedical waste management, Infection prevention and control, etc.)	1	0	0	50	-	50	1
BPHTS1-311	Introduction to quality and patient safety (Including Emergency care, BLS, Biomedical waste management, Infection prevention and control, etc.)- Practical	0	0	2	50	-	50	1
BPHTS1-312	Clinical observation	0	0	6	-	100	100	3
Total		**17**	**1**	**24**	**480**	**520**	**1000**	**30**

4th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext**	**Total**	
BPHTS1-401	Exercise Therapy	4	1	0	40	60	100	5
BPHTS1-402	Bio physics	1	0	0	40	60	100	1
BPHTS1-403	Electrotherapy (LMHF & Equipment care)	4	1	0	40	60	100	5
BPHTS1-404	Exercise Therapy -Practical	0	0	8	60	40	100	4
BPHTS1-405	Bio physics -Practical	0	0	2	60	40	100	1
BPHTS1-406	Electrotherapy (LMHF & Equipment care) -Practical	0	0	8	60	40	100	4
Foundation Course - Internal Examination								
BPHTS1-407	Medical/ Physiotherapy Law and Ethics	2	0	0	50	-	50	2
BPHTS1-408	Clinical Education	0	0	6	-	100	100	3
Total		**11**	**2**	**24**	**350**	**400**	**750**	**25**

5th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BPHTS1-501	Clinical Orthopedics & Traumatology	3	1	0	40	60	100	4
BPHTS1-502	General Surgery including burns, plastic surgery & Obstetrics and Gynecology	3	1	0	40	60	100	4
BPHTS1-503	General Medicine, Paediatrics & psychiatry	3	1	0	40	60	100	4
BPHTS1-504	Community Medicine	3	1	0	40	60	100	4
BPHTS1-505	General Surgery including burns and plastic surgery & Obstetrics and Gynecology -Practical	0	0	2	60	40	100	1
BPHTS1-506	General Medicine, Paediatrics & psychiatry-Practical	0	0	2	60	40	100	1
Not for University Examination								
BPHTS1-507	Evaluation Methods & Outcome Measures	3	0	0	50	-	50	3
BPHTS1-508	Evaluation Methods & Outcome Measures-Practical	0	0	2	50	-	50	1
BPHTS1-509	Diagnostic imaging for Physiotherapist	1	0	0	50	-	50	1
BPHTS1-510	Clinical education	0	0	14	-	100	100	7
Total		**16**	**0**	**20**	**430**	**420**	**850**	**30**

6th Semester		Contact Hrs.			Marks			Credits
Subject Code	**Subject**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
BPHTS1-601	Physiotherapy in Orthopedics & sports	3	1	0	40	60	100	4
BPHTS1-602	Physiotherapy In General Medicine and General surgery	3	1	0	40	60	100	4
BPHTS1-603	Clinical Neurology & Neurosurgery	3	0	0	40	60	100	3
BPHTS1-604	Physiotherapy in Orthopedics & sports-Practical	0	0	6	60	40	100	3
BPHTS1-605	Physiotherapy In General Medicine and General surgery -Practical	0	0	6	60	40	100	3
BPHTS1-606	Clinical Neurology & Neurosurgery -Practical	0	0	2	60	40	100	1
Not for University Examination								
BPHTS1-607	Professionalism and values	1	0	0	50	-	50	1
BPHTS1-608	Clinical education	0	0	14	-	100	100	7
Total		**10**	**2**	**28**	**350**	**400**	**750**	**26**

FIRST SEMESTER

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:

- **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.

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

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

- 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.

- 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.

- Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Phoechromocytoma.
- Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.
- Calcitrol, Thymus and Pineal gland (very brief).
- Local Hormones. (Briefly).

Recommended Text Books / Reference Books:

- Physiological basis of Medical Practice-Best and Tailor. 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.

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.

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,

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

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

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.

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. Alchoholism
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

INTRODUCTION TO HEALTHCARE DELIVERY SYSTEM IN INDIA

Subject Code: **BPHTS1-107** **L T P C** **Duration: 30 (Hrs.)**
2 0 0 2

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 Heath 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.

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.

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

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.

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

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.

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

INTRODUCTION TO YOGA- BASIC THEORY, SCIENCE AND TECHNIQUES PRACTICAL

Subject Code: **BPHTS1-113** **L T P C** **Duration: 30 (Hrs.)**
0 0 2 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.

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)

- 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

- 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

HUMAN ANATOMY-2 (INCLUDING APPLIED ANATOMY)

Subject Code: **BPHTS1-201** **L T P C** **Duration: 60 (Hrs.)**
3 1 0 4

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, metartarsals 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.

- 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.

HUMAN PHYSIOLOGY-2 (INCLUDING APPLIED PHYSIOLOGY)

Subject Code: **BPHTS1-202** **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:

- 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. Funcions. 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

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 parasymapathetic 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: TmG. Renal threshold for glucose.

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

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.

- 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. Thalassemia 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 Tailor. 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.

HUMAN PHYSIOLOGY-2 (INCLUDING APPLIED PHYSIOLOGY) - PRACTICAL

Subject Code: **BPHTS1-206** **L T P C** **Duration: 60 (Hrs.)**
0 0 4 2

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

GENERAL AND CLINICAL PSYCHOLOGY

Subject Code: **BPHTS1-203** **L T P C** **Duration: 45 (Hrs.)**
2 1 0 3

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.

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.
- Cliford 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.

GENERAL AND CLINICAL PSYCHOLOGY - PRACTICAL

Subject Code: **BPHTS1-207** **L T P C** **Duration: 30 (Hrs.)**
0 0 2 1

Experiment

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

BASIC PRINCIPLES OF BIOMECHANICS

Subject Code: **BPHTS1-204** | **L T P C** | **Duration: 45 (Hrs.)**
2 1 0 3

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.

MEDICAL TERMINOLOGY AND RECORD KEEPING

Subject Code: **BPHTS1-209** | **L T P C** | **Duration: 30 (Hrs.)**
2 0 0 2

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

THIRD SEMESTER

PATHOLOGY

Subject Code: **BPHTS1-301** **L T P C** **Duration: 45 (Hrs.)**
3 0 0 3

Course Objectives:

- Acquire the knowledge of concepts of cell injury & changes produced thereby in different tissues & organs-; capacity of the body in healing process.
- Recall the Etiopathogenesis, the pathological effects & the clinic pathological correlation of common infections & non-infectious diseases.
- Acquire the knowledge of concepts of neoplasia with reference to the Etiology, gross & microscopic features, diagnosis, & prognosis in different tissues, & organs of the body.

Course Outcomes:

- Demonstrate an understanding of essential basic pathological processes including cell death and injury, inflammation, thrombosis and neoplasia
- Acquire the ability to relate these essential basic pathological processes to the pathogenesis of common and important diseases
- Demonstrate an understanding of the predisposing factors, causes, pathogenesis, morphology and potential complications of such diseases

UNIT -1 (15 Hrs.)

- **General Pathology**- Cell injury-causes, mechanism & toxic injuries with special reference to Physical, Chemical, & ionizing radiation
- **Reversible injury (degeneration)-** types, morphology, swelling, hyaline, fatty changes, Intra-cellular accumulation-hyaline mucin,
- **Irreversible cell injury**-types of necrosis, apoptosis, calcification, dystrophic & metastasis,
- **Extra-cellular accumulation-** amylidosis, calcification, Pathogenesis, morphology.
- **Inflammation & Repair**
  a) Acute inflammation – features, causes, vascular & cellular events,
  b) Morphologic variations,
  c) Inflammatory cells & mediators,
  d) Chronic inflammation:- causes, types, non-specific & granulomatous
  e) Wound healing by primary & secondary union factors promoting & delaying healing process.
  f) Healing at various sites including-bones, nerve & muscle.

UNIT -2 (10 Hrs.)

- **Immuno – pathology** – (basic concepts)
  a) Immune system:- organization-cells- antibiodies- regulation of immune responses,
  b) Hyper-sensitivity,
  c) Secondary immuno-deficiency including HIV,
  d) Organ transplantation
- **Circulatory disturbances**
  a) Edema - pathogenesis - types - transudates / exudates
  b) Chronic venous congestion- lung, lever, spleen,

c) Thrombosis – formation – fate – effects,
d) Embolism – types- clinical effects,
e) Infarction – types – common sites
f) Gangrenes – types – actiopathogenesis
g) Shock – Pathogenesis, types, morphologic changes
h) Deficiency disorders – Vitamins A, B, C, D,

UNIT -3 (10 Hrs.)

- **Growth Disturbance**
  a)Atrophy-malformation, agenesis, dysplasia,
  b) Neoplasia classification, histogenesis, biologic behavious, difference between benign & malignant tumour
  c) Malignant neoplasms- grades-stages-local & distal spread,
  d) Carcinogenesis – environmental carcinogens,
  e) Chemical, Occupational, heredity, viral, f) precancerous lesions & ca in situ g) Tumor & host interactions – systemic effects-metastatic or direct spread of tumors affecting bones, spinal cord, leading to paraplegia, etc.

UNIT -4 (10 Hrs.)

- **Neuro Pathology**
  a)-Reaction of nervous tissue to injury – infection & ischaemia
  b)- Pyogenic meningitis, TBM, Viral,
  c)- Cerebro – vascular diseases – atherosclerosis – Thrombosis, embolism, aneurysm, hypoxia, infarction & hemorrhage.
  d)- effects of Hypotension on CNS e)- Coma f)- Polio myelitis- Leprosy- Demyelinating diseases – Parkinsonism – Cerebral palsy- metachromatic leucodystrophy – Dementia – Hemiplegia / paraplegia – Pathogenesis & pathology of Wilson's disease g

Recommended books:-

- **Rapid Review Pathology by Edward F. Goljan**
- Robbins and Cotran Review of Pathology by Klatt and Kumar
- Underwood's Pathology: A Clinical Approach by Simon Cross
- Pathology Illustrated by Fiona Roberts & Elaine MacDuff
- Robbins Basic Pathology by Kumar, Abbas & Aster

MICROBIOLOGY

Subject Code: **BPHTS1-302** **L T P C** **Duration: 45 (Hrs.)**
3 0 0 3

Course Objectives:

- To introduce to the students regarding various kinds of microbes in terms of their structure, growth etc. & collection of clinical samples their processing and identification.

Course Outcomes:

- Describe/explain the processes used by microorganisms for their replication, survival,and interaction with their environment, hosts, and host population.

Unit-1 (10 Hours)

- **Introduction and History of Microbiology**

a. Classification-Prokaryotes, Eukaryotes, Viruses, Fungi.
b. Morphology-size, shape, arrangement
c. Special characteristics–spores, capsules, enzymes, mortality, reproduction
d. Gram staining, ZN staining
e. Different types of microscopes

Unit-2 (15 Hours)

- **Sterilization:** Definition and different methods of sterilization including – Gaseous sterilizationPlasma sterilization, Advantage and disadvantage of various methods and their controls, Sterilization of different instruments used in patients, Preparation of materials for Autoclaving: packing, loading, holding time, unloading
- **Disinfection:** Definition and different type of methods including High level disinfectants, Disinfection of patient care unit and rooms (O.T., Wards, ICUs & Laboratories), Central supply department Areas and floor plan for instrument cleaning high leveldisinfection & sterilizing area.
- **Asepsis:** Universal Precautions, Use of aseptic precautions to prevent infection, Safety mechanisms including vaccination in prevention of blood borne infections

Unit-3 (10 Hours)

- **Culture media**- Liquid and Solid, Collection & transport of specimens for Micro-biological Investigations.
- **Infection** - Source - Portals of entry - Spread of infection. Antimicrobial agents - Fundamental aspects - Antibiotic sensitivity testing.
- **Immunity** – Non-specific - Natural & Acquired - Allergy and Anaphylaxis Outline of common infections, diseases, etiology, treatment and prevention. - Skin and soft tissue infections - Respiratory tract infections - Meningitis - Enteric infections - Urinary tract infections - Ocular infections - Wound infections - PUO Hospital acquired infections - Catheter associated urinary tract infections (CAUTI) - Ventilator associated pneumonia (VAP) - Catheter related blood stream infections (CRBSI) - Surgical Site Infection Pathogenic yeasts and fungi.

Unit-4 (10 Hours)

- **Virology:** With special reference to hepatitis, poliomyelitis, HIV & Influenza, Viruses relevant in dialysis patients including their modes of transmission, Diseases communicable to healthcare workers in hospital set up and their prevention, Prevention measures to combat spread of these infections by monitoring and control.
- **Microbial surveillance and sampling**: Bacteriology of air, water and food, Hospital infection Control & Influenza, Viruses relevant in dialysis patients including their modes of transmission, Diseases communicable to healthcare workers in hospital set up and their prevention, Prevention measures to combat spread of these infections by monitoring and control. Microbial surveillance and sampling. Bacteriology of air, water and food, Hospital infection Control.

Recommended Text Books / Reference Books:

- M.J. Jr., Pelczar, E.C.S., Chan and R. Krieg, 'Microbiology', McGraw Hill.
- G.J. Tortora, B.R. Funke and C.L. Case, 'Microbiology-An Introduction', Benjamin Cummings.
- B.D. Davis, R. Dulbecco, H.N. Eisen and H.S. Ginsber, 'Microbiology', Harper & Row, Publishers.
- R.Y. Stainer, J.L. Ingraham, M.L. Wheelis and P.R. Palmer, 'General Microbiology', MacMilan Press Ltd.

PHARMACOLOGY

Subject Code: **BPHTS1-303** **L T P C** **Duration: 45 (Hrs.)**
3 0 0 3

Course Objectives:

- The goal of the study of pharmacological sciences is to understand the properties of drugs andthe ways in which these properties react, according to The American Society for Pharmacology and Experimental Therapeutics.

Course Outcomes:

- Pharmacology is the study of how a drug works on the body, its side effects on the body, and the way the body uses the drug.

UNIT-1 (15 HOURS)

- **General Pharmacology:**

a. Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration,
b. Distribution of drugs, Metabolism and Excretion of drugs, Pharmacokinetics, Pharmacodynamics,
c. Factors modifying drug response.
d. Elementary knowledge of drug toxicity, drug allergy, drug resistance, drugpotency, efficacy & drug antagonism.

- **Autonomic Nervous system**

a. General considerations – The Sympathetic and Parasympathetic Systems,Receptors, Somatic Nervous System
b. Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.

UNIT-2 (10 HOURS)

- **Cardiovascular Pharmacology (in brief) :**

a. Drugs Used in the Treatment of Heart Failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors
b. Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators

- **Antiarrhythmic Drugs**

a. Drugs Used in the Treatment of Vascular Disease and Tissue Ischemia: Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics
b. Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers
c. Cerebral Ischemia
d. Peripheral Vascular Disease

UNIT-3 (10 HOURS)

- **Neuropharmacology (in brief) :**

a. Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines
b. Antianxiety Drugs: Benzodiazepines, Other Anxiolytics
c. Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium
d. Antipsychotic drugs

- **Disorders of Movement (in brief) :**

a. Drugs used in Treatment of Parkinson's Disease

b. Antiepileptic Drugs
c. Spasticity and Skeletal Muscle Relaxants

- **Inflammatory/Immune Diseases-**

a. Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs
b. Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids
c. Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout
d. Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythmatosus, Scleroderma, Demyelinating Disease

UNIT-4 (10 HOURS)

- **Respiratory Pharmacology (in brief) :** Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis
- **Digestion and Metabolism (in brief):**
  Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea
  Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemics
- **Geriatrics:**
  Pharmacology and the geriatric Population: Adverse effects of special concernin the Elderly, Dementia, Postural hypotension, urinary incontinence.

Recommended books:-

- Basic & Clinical Pharmacology By Bertram Katzung
- Rang & Dale's Pharmacology (Ninth Edition)
- Pharmacology Review – A Comprehensive Reference Guide for Medical, Nursing, and Paramedic Students

BIOMECHANICS AND KINESIOLOGY

Subject Code: **BPHTS1-304** **L T P C** **Duration: 75 (Hrs.)**
4 1 0 5

Course Objectives:

- Describe the kinematics of projectile motion and factors influencing projectile trajectory.
- Identify, analyze, and solve various biomechanical problems.
- Demonstrate an understanding of kinetic concepts including inertia, force, torque, and impulse.
- Identify the major factors involved in the angular kinematics of human movement
- Define Newton's laws of physics.
- Identify the steps involved in finding the center of gravity.

Course Outcomes:

- 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 (20 Hrs.)

Biomechanics of the vertebral column -

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. General effects of injury and aging

Unit: 1 (20 Hrs.)

Biomechanics of the peripheral joints -

- The shoulder complex: Structure and components of the shoulder complex and their integrated function
- 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; the effects of immobilization and injury.
- The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; functional position of the wrist and hand.

Unit: 3 (15 Hrs.)

- The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur:
- The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease.
- 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, deviations from normal structure and function – Pes Planus and Pes Cavus

Unit: 4 (20 Hrs.)

- **Analysis of Posture and Gait** – Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; 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, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait
- **Movement Analysis :** ADL activities like sitting – to standing, lifting, various grips , pinches

Recommended books:-

- Cynthia Levangie - Joint Structure and Function - 5th Ed
- Daniel & Worthingham's-Manual of muscle testing
- Lynn Lippert - Clinical
- Brunstroms - Clinical Kinesiology
- Kinesiology of the Musculoskeletal System" by Donald A. Neumann
- "Basic Biomechanics" by Susan J. Hall

FOUNDATION OF EXERCISE THERAPY AND THERAPEUTIC MESSAGE

Subject Code: **BPHTS1-305** **L T P C** **Duration: 45 (Hrs.)**
3 0 0 3

COURSE OBJECTIVE:

- The students will learn the principles and effects of exercise as a therapeutic modality and will learn the techniques in the restoration of physical functions.
- **The** students will be able to understand the concepts, different types and application of massage on patients during clinical practice.

COURSE OUTCOME

- Increased functional capacity and independence
- Decreased pain levels
- Improved joint mobility and muscle flexibility
- Enhanced muscle strength and endurance
- Better posture and body awareness
- Reduced inflammation and swelling
- Improved circulation and tissue healing
- Enhanced relaxation and stress reduction
- Improved sleep quality
- Better overall physical and mental well-being

Unit: 1 (15 Hrs.)

- **Introduction to Exercise Therapy** - The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment
- **Methods of Testing**
  a. Functional tests
  b. Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints
  c. Tests for neuromuscular efficiency
     i. Electrical tests
     ii. Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group & individual: Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine.
     iii. Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf
     iv. Static power Test
     v. Dynamic power Test
     vi. Endurance test
     vii. vii. Speed test
  d. Tests for Co-ordination
  e. Tests for sensation

f. Pulmonary Function tests

g. Measurement of Limb Length: true limb length, apparent limb length, segmental limb length

h. Measurement of the angle of Pelvic Inclination

Unit: 2 (20 Hrs.)

- **Relaxation**
  a. Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.
- **Passive Movements**
  a. Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses, Techniques of giving passive movements.
- **Active Movements**
  a. Definition of strength, power & work, endurance, muscle actions.
  b. Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction &relaxation, muscle fiber type, motor unit, force gradation.
  c. Causes of decreased muscle performance
  d. Physiologic adaptation to training: Strength & Power, Endurance.
  e. Types of active movements

Unit: 3 (5 Hrs.)

- **Free exercise:** Classification, principles, techniques, indications, contraindications, effects and uses
- **Active Assisted Exercise:** principles, techniques, indications, contraindications, effects and uses Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses
- **Types of resisted exercises:** Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

Unit: 4 (5 Hrs.)

- **THERAPEUTIC MASSAGE**
  a. History and Classification of Massage Technique
  b. Principles, Indications and Contraindications
  c. Technique of Massage Manipulations
  d. Physiological and Therapeutic Uses of Specific Manipulations

Recommended books:-

- "Therapeutic Exercise: Foundations and Techniques" by Carolyn Kisner and Lynn Allen Colby
- "Massage Therapy: Principles and Practice" by Susan G. Salvo
- "Orthopedic Physical Assessment" by David J. Magee
- "Therapeutic Modalities in Rehabilitation" by William E. Prentice
- "Trail Guide to the Body" by Andrew Biel
- "Clinical Massage Therapy: Understanding, Assessing and Treating over 70 Conditions" by Fiona Rattray and Linda Ludwig
- "Exercise Therapy: Prevention and Treatment of Disease" by John Gormley and Juliette Hussey
- "Foundations of Therapeutic Recreation" by Terry Robertson and Terry Long
- The Principles Of Exericse Therapy By M Dena Gardiner (S)

PATHOLOGY - PRACTICAL

Subject Code: **BPHTS1-306**

L	T	P	C
0	0	2	1

1. Collection of blood and anticoagulants used.
2. Discussion about parts of microscope and different types of microscopes used inpathology.
3. Staining of slide by Leishman method.
4. Study of peripheral blood smear.
5. Estimation of hemaglobin by Sahli's method and discussion of other methods used.
6. ESR
7. Identification of various instruments in pathology lab & their uses (eg. Neubar chamber, RBC, WBC, pipette etc.).
8. Bleeding Time, Clotting Time.

MICROBIOLOGY - PRACTICAL

Subject Code: **BPHTS1-307**

L	T	P	C
0	0	4	2

1. Demonstration of Microscopes and its uses
2. Principles, uses and demonstration of common sterilization equipment
3. Demonstration of common culture media
4. Demonstration of motility by hanging drops method
5. Demonstration of Gram Stain, ZN Stain
6. Demonstration of Serological test: ELISA
7. Demonstration of Fungus

BIOMECHANICS AND KINESIOLOGY - PRACTICAL

Subject Code: **BPHTS1-308**

L	T	P	C
0	0	6	3

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.

FOUNDATION OF EXERCISE THERAPY AND THERAPEUTIC MASSAGE – PRACTICAL

Subject Code: **BPHTS1-309**

L	T	P	C
0	0	4	2

1. Different test methods
2. Demonstrate relaxation techniques.
3. Demonstrate to apply the technique of passive movements
4. Demonstrate various techniques of Active movements
5. Demonstrate massage technique application according to body parts.

INTRODUCTION TO QUALITY AND PATIENT SAFETY

Subject Code: BPHTS1-310 **L T P C** **Duration: 15 (Hrs.)**
1 0 0 1

COURSE OBJECTIVE:

- The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.
- The student is also expected to learn about basic emergency care including first aid and triage.
- The objective will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes.
- The aim will be to help prevent harm to workers, property, the environment and the general public.
- The objective will be to provide knowledge on the principles of on-site disaster management

COURSE OUTCOME

- Ability to assess and improve healthcare quality and patient safety
- Skill in implementing quality improvement initiatives
- Understanding of how to reduce medical errors and adverse events
- Knowledge of best practices in patient safety
- Ability to use data for quality improvement decision-making
- Competence in applying regulatory and accreditation standards
- Skills in fostering teamwork and communication for patient safety
- Understanding of systems thinking in healthcare quality

Unit: 1 (3 HOURS)

- **Quality assurance and management** -
    a. Concepts of Quality of Care
    b. Quality Improvement Approaches
    c. Standards and Norms
    d. Quality Improvement Tools
    e. Introduction to NABH guidelines

Unit: 2 (3 HOURS)

- **Basics of emergency care and life support skills** - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. Topics to be covered under the subject are as follows:
    a. Vital signs and primary assessment
    b. Basic emergency care – first aid and triage

c. Ventilations including use of bag-valve-masks (BVMs)
d. Choking, rescue breathing methods
e. One- and Two-rescuer CPR
f. Using an AED (Automated external defibrillator).
g. Managing an emergency including moving a patient

Unit: 3 (4 HOURS)

- **Bio medical waste management and environment safety-** The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
  a. Definition of Biomedical Waste
  b. Waste minimization
  c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
  d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
  e. BMW Management & methods of disinfection
  f. Modern technology for handling BMW
  g. Use of Personal protective equipment (PPE)
  h. Monitoring & controlling of cross infection (Protective devices)

- **Infection prevention and control -** The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –
  a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
  b. Prevention & control of common healthcare associated infections,
  c. Components of an effective infection control program, and
  d. Guidelines (NABH and JCI) for Hospital Infection Control

Unit: 4 (5 HOURS)

- **Antibiotic Resistance-**
  a. History of Antibiotics
  b. How Resistance Happens and Spreads
  c. Types of resistance- Intrinsic, Acquired, Passive
  d. Trends in Drug Resistance
  e. Actions to Fight Resistance
  f. Bacterial persistence
  g. Antibiotic sensitivity
  h. Consequences of antibiotic resistance
  i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

- **Disaster preparedness and management**. Concepts to be taught should include-
    a. Fundamentals of emergency management,
    b. Psychological impact management,
    c. Resource management,
    d. Preparedness and risk reduction,
    e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

Recommended books:-

- Understanding Patient Safety" by Robert M. Wachter and Kiran Gupta
- "The Healthcare Quality Book: Vision, Strategy, and Tools" by Maulik S. Joshi, Elizabeth R. Ransom, David B. Nash, and Scott B. Ransom
- "Patient Safety: A Case-Based Comprehensive Guide" by Abha Agrawal
- "Fundamentals of Health Care Improvement: A Guide to Improving Your Patients' Care" by Gregory S. Ogrinc and Linda A. Headrick
- "To Err is Human: Building a Safer Health System" by Institute of Medicine (US) Committee on Quality of Health Care in America
- "Crossing the Quality Chasm: A New Health System for the 21st Century" by Institute of Medicine (US) Committee on Quality of Health Care in America
- "Quality and Safety in Nursing: A Competency Approach to Improving Outcomes" by Gwen

INTRODUCTION TO QUALITY AND PATIENT SAFETY - PRACTICAL

Subject Code: **BPHTS1-311**

L	T	P	C
0	0	2	1

- Basic life support (BLS)
- Sudden cardiac arrest (SCA)
- Cardiopulmonary resuscitation (CPR),
- Rapid defibrillation with an automated external defibrillator (AED)
- Biomedical waste
- Infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)

FOURTH SEMESTER

EXERCISE THERAPY

Subject Code: **BPHTS1-401** **L T P C** **Duration: 75 (Hrs.)**
4 1 0 5

Course Objectives:

- This course will include therapeutic exercise involving movement prescribed to correct impairments, restore muscular and skeletal function and/or maintain a state of well-being or prevent injuries and improve functional outcomes.

Course Outcomes:

- The goals of therapeutic exercises include the restoration of movement, improvement of function and strength, improvement in gait and balance, and the prevention and promotion of health, wellness, and fitness. Specific exercises are aimed at restoring strength, power and work, or endurance, or a combination.

Unit: 1 (20 Hours)

- Specific exercise regimens
    a. Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training
    b. Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle
    c. Isometrics Isokinetic regimens
- Proprioceptive Neuromuscular Facilitation
    a. Definitions & goals
    b. Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb
    c. Procedure: components of PNF
    d. Techniques of facilitation
    e. Mobility: Contract relax, Hold relax, Rhythmic initiation
    f. Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization Stability: Alternating isometric, rhythmic stabilization

Skill: **timing for emphasis, resisted progression Endurance: slow reversals, agonist reversal**

- Suspension Therapy
    a. Definition, principles, equipments & accessories, Indications & contraindications,
    Benefits of suspension therapy
    b. Types of suspension therapy: axial, vertical, pendular Techniques of suspension therapy for upper limb Techniques of suspension therapy for lower limb
- Functional Re-education
    a. Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lower limb and Upper limb activities.

Unit: 2 (20 Hours)

- Aerobic Exercise
    - Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.
- Stretching
    - Definition of terms related to stretching; Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.
- Manual Therapy & Peripheral Joint Mobilization
    a. Schools of Manual Therapy, Principles, Grades, Indications and Contraindications,
    Effects and Uses – Maitland, Kaltenborn, Mulligan
    b. Biomechanical basis for mobilization, Effects of joint mobilsation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

Unit: 3 (20 Hours)

- Balance - Definition
    a. Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output
    b. Components of balance (sensory, musculoskeletal, biomechanical)
    c. Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types Balance retraining.
- Co-ordination Exercise
    a. Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination,
    Inco-ordination
    b. Causes for Inco-ordination, Test for co-ordination: equilibrium test, non-equilibrium test Principles of co-ordination exercise.
    c. Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.
- Posture
    a. Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.
- Walking Aids
    a. Types: Crutches, Canes, Frames; Principles and training with walking aids

Unit: 4 (15 Hours)

- Basics in Manual Therapy & Applications with Clinical reasoning
    a. Examination of joint integrity
        i. Contractile tissues
        ii. Non contractile tissues
    b. Mobility - assessment of accessory movement & End feel
    c. Assessment of articular & extra-articular soft tissue status
        i. Myofascial assessment
        ii. Acute & Chronic muscle hold
        iii. Tightness
        iv. Pain-original & referred
    d. Basic principles, Indications & Contra-Indications of mobilization skills for joints & soft tissues.
        i. Maitland
        ii. Mulligan
        iii. Mckenzie
        iv. Muscle Energy Technique
        v. Myofascial stretching
        vi. Cyriax
        vii. Neuro Dynamic Testing
- Hydrotherapy
    a. Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipment, techniques, Effects and uses, merits and demerits
- Individual and Group Exercises
    a. Advantages and Disadvantages, Organization of Group exercises, Recreational Activities and Sports

Recommended textbooks/reference books:

- McArdle WD, Katch FI, Katch VL. Essentials of exercise physiology. Lippincott Williams & Wilkins; 2006.
- Hale T. Exercise physiology: a thematic approach. John Wiley & Sons; 2004.
- Clarke D. Exercise physiology. Prentice-Hall.
- Wolinsky I, editor. Nutrition in exercise and sport. CRC press.
- Brooks GA, Fahey TD, White TP. Exercise physiology: human bioenergetics and its applications. Mayfield publishing company.

BIO PHYSICS

Subject Code: **BPHTS1-402** | **L T P C** | **Duration: 15 (Hrs.)**
1 0 0 1

Course Objective:

- Understand fundamental physical principles governing biological systems
- Apply quantitative methods to analyze biological phenomena
- Explore the structure and function of biomolecules from a physical perspective
- Learn about various biophysical techniques and their applications
- Develop critical thinking skills in interpreting biophysical data
- Understand the role of thermodynamics and kinetics in biological processes

Course Outcome:

- After completing this course, students should be able to:
- Apply physical laws and principles to biological systems
- Analyze biological processes using mathematical and physical models
- Interpret data from common biophysical techniques
- Understand the physical basis of biomolecular structure and function
- Critically evaluate biophysical research literature
- Apply biophysical concepts to solve biological problems

Unit 1 (5 Hours)

- Physical principles

  a. Structure and properties of matter -solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity.

  b. Structure of atom, molecules, elements and compound

  c. Electricity: Definition and types. Therapeutic uses. Basic physics of construction. Working

  d. Importance of currents in treatment.

  e. Static Electricity: Production of electric charge. Characteristic of a charged body.

  f. Characteristics of lines of forces. Potential energy and factors on which it depends. Potential difference and EMF.

  g. Current Electricity: Units of Electricity: farad, Volt, Ampere, Coulomb, Watt

  h. Condensers: Definition, principle, Types- construction and working, capacity & uses.

  i. Magnetism: Definition. Properties of magnets. Electromagnetic induction. Transmission by contact. Magnetic field and magnetic forces. Magnetic effects of an electric field.

  j. Conductors, Insulators, Potential difference, Resistance and intensity

  k. Ohm's law and its application to DC and AC currents. Fuse: construction, working and application.

  l. Transmission of electrical energy through solids, liquids, gases and vacuum.

  m. Rectifying Devices-Thermionic valves, Semiconductors, Transistors, Amplifiers, transducer and Oscillator circuits.

  n. Display devices and indicators-analogue and digital.

  o. Transformer: Definition, Types, Principle, Construction, Eddy current, working uses

  p. Chokes: Principle, Construction and working, Uses

Unit 2 (5 Hours)

- Effects of Current Electricity
  a. Chemical effects-lons and electrolytes, lonisation, Production of an EMF by chemical actions.
  b. Ionization: Principles, effects of various technique of medical ionization.
  c. Electromagnetic Induction.
  d. Electromagnetic spectrum.

Unit 3 (2 Hours)

- Electrical Supply
  a. Brief outline of main supply of electric current
  b. Dangers-short circuit, electric shocks: Micro/ Macro shocks
  c. Precaution-safety devices, earthing, fuses etc.
  d. First aid and initial management of electric shock
  e. Burns: electrical & chemical burns, prevention and management

Unit 4 (3 Hours)

- Various agents
  a. Thermal agents: Physical Principles of cold, Superficial and deep heat.
  b. Ultrasound: Physical Principles of Sound
  c. Electro- magnetic Radiation: Physical Principles and their Relevance to Physiotherapy Practice
  d. Electric Currents: Physical Principles and their Relevance to Physiotherapy Practice.
- Section II – Therapeutic Electricity

Recommended textbooks/reference books:

- "Biophysics: Searching for Principles" by William Bialek
- "Physical Biology of the Cell" by Rob Phillips, Jane Kondev, and Julie Theriot
- "Molecular Driving Forces: Statistical Thermodynamics in Biology, Chemistry, Physics, and Nanoscience" by Ken A. Dill and Sarina Bromberg
- "Biophysical Chemistry" by Charles R. Cantor and Paul R. Schimmel
- "Biophysics: An Introduction" by Roland Glaser
- "Principles of Physical Biochemistry" by Kensal E. van Holde, W. Curtis Johnson, and P. Shing Ho
- "Introduction to Biological Physics for the Health and Life Sciences" by Kirsten Franklin, Paul Muir, Terry Scott, and Lara Wilcocks
- "Biophysics: Tools and Techniques" by Betty Karasek

ELECTROTHERAPY (LMHF & EQUIPMENT CARE)

Subject Code: **BPHTS1-403** **L T P C** **Duration: 75 (Hrs.)**
4 1 0 5

COURSE OBJECTIVE –

- The student will learn the Principles, Techniques, Effects, Indication, Contra-Indication and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function.
- The student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

COURSE OUTCOME:

- Understand the principles of low and medium high frequency electrotherapy
- Explain the physiological effects of various electrotherapy modalities
- Identify appropriate electrotherapy treatments for different conditions
- Describe the proper setup and application of electrotherapy equipment
- Understand safety considerations and contraindications for electrotherapy
- Demonstrate knowledge of equipment care, maintenance, and troubleshooting
- Explain the rationale for selecting specific electrotherapy parameters
- Understand the integration of electrotherapy in comprehensive treatment plans
- Critically evaluate research on electrotherapy effectiveness
- Demonstrate awareness of current trends and advances in electrotherapy

UNIT 1 (20 HOURS)

- Low frequency Currents
  1. Basic types of current
  a. Direct Current: types, physiological &therapeutic effects.
  b. Alternating Current
  2. Types of Current used in Therapeutics
  a. Modified D.C
  i. Faradic Current
  ii. Galvanic Current
  b. Modified A.C
  i. Sinusoidal Current ii. Diadynamic Current.
  3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.
  4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.

5. Sinusoidal Current & Diadynamic Current in Brief.
6. HVPGS – Parameters & its uses
7. Ionization / Iontophoresis: Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, would healing.
8. Cathodal / Anodal galvanism.
9. Micro Current & Macro Current
10. Types of Electrical Stimulators

a. NMES- Construction component.

b. Neuro muscular diagnostic stimulator- construction component.

c. Components and working Principles

11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, and Stimulation for Tissue Repair.
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

UNIT 2 (20 HOURS)

Electro-diagnosis

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.
3. Nerve conduction velocity studies 4. EMG: Construction of EMG equipment.
4. Bio-feedback.

UNIT 3 (20 HOURS)

- ***Medium Frequency***

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications.
2. Russian Current

3. Rebox type Current

- **Thermo & Actinotherapy (High Frequency Currents)**

1. Electro Magnetic Spectrum.
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters.
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME.
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD.
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous& Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, commonly used drugs, Uses. Dosages of US.
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp
8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density

UNIT 4 (15 HOURS)

- *Superficial heating Modalities*

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.
2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications.

3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications.
4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications.
5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications.
6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications.
7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication.
8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages.

REFERANCE BOOK

- Electrotherapy: Evidence-Based Practice" by Tim Watson
- "Electrotherapy Explained: Principles and Practice" by Val Robertson, Alex Ward, John Low, and Ann Reed
- "Clayton's Electrotherapy: Theory and Practice" by Sheila Kitchen
- "Therapeutic Modalities in Rehabilitation" by William E. Prentice
- "Physical Agents in Rehabilitation: From Research to Practice" by Michelle H. Cameron

  "Electrophysical Agents: Evidence-Based Practice" by Alain-Yvan Belanger

  "Electrical Stimulation in Clinical Practice" by Charles Jerzak and Mark Harlache
- "Principles and Practice of Electrotherapy" by Joseph Kahn
- "Electrotherapy: Clinical Procedures Manual" by Roger M. Nelson, Dean P. Currier, and Karen W. Hayes
- "Electrotherapy and Electrodiagnosis" by Stanley Licht

EXERCISE THERAPY - PRACTICAL

Subject Code: **BPHTS1-404**

L	T	P	C
0	0	8	4

The students of exercise therapy are to be trained in Practical Laboratory work for all the topics discussed in theory. The student must be able to evaluate and apply judiciously the different methods of exercise therapy techniques on the patients. They must be able to:

1. Demonstrate the technique of measuring using goniometry
2. Demonstrate muscle strength using the principles and technique of MMT
3. Demonstrate the techniques for muscle strengthening based on MMT grading
4. Demonstrate the PNF techniques
5. Demonstrate exercises for training co-ordination – Frenkel's exercise
6. Demonstrate the techniques of massage manipulations
7. Demonstrate techniques for functional re-education
8. Assess and train for using walking aids
9. Demonstrate mobilization of individual joint regions
10. Demonstrate to use the technique of suspension therapy for mobilizing and strengthening joints and muscles
11. Demonstrate the techniques for muscle stretching
12. Assess and evaluate posture and gait
13. Demonstrate techniques of strengthening muscles using resisted exercises
14. Demonstrate techniques for measuring limb length and body circumference.

BIO PHYSICS - PRACTICAL

Subject Code: **BPHTS1-405**

L	T	P	C
0	0	2	1

- List, describe, draw various electrical components like diodes & triodes, rheostat, capacitor, potentiometer, switches, plugs and pulse generator
- Apply technique of testing of mains supply
- Draw free body diagrams, force vectors during walking and further applications

ELECTROTHERAPY (LHMF & EQUIPMENT CARE) - PRACTICAL

Subject Code: **BPHTS1-406**

L	T	P	C
0	0	8	4

- The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.
    1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.
    2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.
    3. Demonstrate placement of electrodes for various electrotherapy modalities
    4. Electrical stimulation for the muscles supplied by the peripheral nerves
    5. Faradism under Pressure for UL and LL
    6. Plotting of SD curve with chronaxie and rheobase
    7. Demonstrate FG test
    8. Application of Ultrasound for different regions-various methods of application
    9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
    10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
    11. Demonstrate treatment method using IFT for various regions
    12. Calculation of dosage and technique of application of LASER
    13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
    14. Demonstrate the treatment method using whirl pool bath
    15. Winding up procedure after any electrotherapy treatment method.

- ***Equipment care*** **-**
    1. Checking of equipments
    2. Arrangement of exercise therapy and electro therapy equipment.
    3. Calibration of equipment
    4. Purchase, billing, document of equipment.
    5. Safety handling of equipments.
    6. Research lab equipment maintenance.
    7. Stock register, movement register maintenance

MEDICAL/PHYSIOTHERAPY LAW AND ETHICS

Subject Code: **BPHTS1-407** **L T P C** **Duration: 30 (Hrs.)**
2 0 0 2

COURSE OBJECTIVE:

- The students understand the concept and basic principles to know electrotherapy equipment's is given under this topic.
- The student will be learn about physics related to electrotherapy and application on human body tissues

COURSE OUTCOME:

- Understand the moral values and meaning of ethics.
- Develop psychomotor skills for physiotherapist-patient relationship
- Develop bed side behavior, respect & maintain patients" confidentiality

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.
Medical/ Physiotherapy ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

UNIT 1 (5 HOURS)

- Medical ethics versus medical law - Definition - Goal - Scope
- Introduction to Code of conduct
- Basic principles of medical ethics – Confidentiality
- Malpractice and negligence - Rational and irrational drug therapy

UNIT 2 (10 HOURS)

- Autonomy and informed consent - Right of patients
- Care of the terminally ill- Euthanasia
- Organ transplantation
- Medical diagnosis versus physiotherapy diagnosis.

UNIT 3 (10 HOURS)

- Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege

communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.

- Professional Indemnity insurance policy
- Development of standardized protocol to avoid near miss or sentinel events

UNIT 4 (5 HOURS)

- Obtaining an informed consent.
- Biomedical ethical principles
- Code of ethics for physiotherapists
- Ethics documents for physiotherapists
- Laws affecting physiotherapy practice

REFERANCE BOOK

Physical agents in physiotherapy principles & Practice vol-1 Biophysics and therapeutic electricity by subin solomen, pravin aaron

FIFTH SEMESTER

CLINICAL ORTHOPEDICS & TRAUMATOLOGY

Subject Code: BPHTS1-501 **L T P C** **Duration: 60 (Hrs.)**
3 1 0 4

Course Objectives: Orthopedic Physiotherapy primarily focus on orthopedics and treatment conditions affecting the musculoskeletal system, which are composed of joints, muscles, bones, ligaments, and tendons.It diagnoses, manage, and cure the disorders of the musculoskeletal system and recuperate patients after the orthopaedic surgery.

Course Outcome: The student will be able to

- Explain the pathophysiology, clinical signs and symptoms, and both conservative and surgical treatment approaches for various traumatic musculoskeletal conditions.
- Demonstrate the ability to perform and interpret clinical examinations in both pre-operative and post-operative musculoskeletal cases.
- Describe the diagnostic investigations commonly used in the assessment of musculoskeletal disorders.
- Explain the relevance of pathological and biochemical studies related to musculoskeletal conditions.
- Correlate radiological findings with clinical presentations in musculoskeletal cases.

Unit: 1 (15 Hrs.)

- **Introduction:** Introduction to orthopedics, Clinical examination in an orthopedic patient, Common investigative procedures, Radiological and Imaging techniques in Orthopedics, Inflammation and repair, Soft tissue healing
- **Traumatology:** Fracture: definition, types, signs and symptoms, Fracture healing, Complications of fracture, Conservative and surgical approaches, Principles of management – reduction (open/closed, immobilization etc.), Subluxation/dislocations definition, signs and symptoms, management (conservative and operative).
- **Fractures and Dislocations of Upper Limb Fractures of Upper Limb** - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:
  - Fractures of clavicle and scapula.
  - Fractures of greater tuberosity and neck of humerus.
  - Fracture shaft of humerus.
  - Supracondylar fracture of humerus.
  - Fractures of capitulum, radial head, olecranon, coronoid, and epicondyles.
  - Side swipe injury of elbow.
  - Both bone fractures of ulna and radius.
  - Fracture of forearm – monteggia, galaezzi fracture –dislocation.
  - Fracture of the phalanges. (Proximal and middle.)
- **Dislocations of Upper Limb** –Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher's and Hippocrates maneuver), surgical management (putti plat, bankart's) etc. Recurrent dislocation of shoulder. Posterior dislocation of shoulder – mechanism of injury, clinical features and management. Posterior dislocation of elbow – mechanism of injury, clinical feature, complications & management.

Unit: 2 (15 Hrs.)

- **Fracture of Spine:** Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications (quadriplegia); Management- immobilization (collar, cast, brace, traction); Management for stabilization, management of complication (bladder and bowel, quadriplegia). Clay shoveller's fracture, Hangman's fracture, Fracture odontoid, Fracture of atlas. Fracture of Thoracic and Lumbar Regions - Mechanism of injury, clinical features, and management— conservative and surgical of common fractures around thoracic and lumbar regions. Fracture of coccyx, Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum. Fractures and Dislocations of Lower Limb
- **Fracture of Pelvis and Lower Limb** - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:
  - Fracture of pelvis.
  - Fracture neck of femur – classification, clinical features, complications, management - conservative and surgical.
  - Fractures of trochanters.
  - Fracture shaft femur—clinical features, mechanism of injury, complications, management- conservative and surgical.
  - Supracondylar fracture of femur.
  - Fractures of the condyles of femur.
  - Fracture patella.
  - Fractures of tibial condyles.
  - Both bones fracture of tibia and fibula.
  - Pott's fracture – mechanism of injury, management
  - Fracture calcaneum – mechanism of injury, complications and management.
  - Fracture of talus.
  - Fracture of metatarsals—stress fractures jone's fracture.
  - Fracture of phalanges.
  - Dislocations of Lower Limb - mechanism of injury, clinical features, complications, management of the following dislocations of lower limb.
    i. Anterior dislocation of hip.
    ii. Posterior dislocation of hip.
    iii. Central dislocation of hip.
    iv. Dislocation of patella.
    v. Recurrent dislocation of patella.

Unit: 3 (15 Hrs.)

- **Soft Tissue Injuries** - Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis. Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries:
- Hand Injuries - mechanism of injury, clinical features, and management of the following:
  - Crush injuries.
  - Flexor and extensor injuries.
  - Burn injuries of hand.

- Amputations - Definition, levels of amputation of both lower and upper limbs, indications, complications.
- Traumatic Spinal Cord Injuries - Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia.
- Deformities - clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.
  - Congenital Deformities –
    - Hand anomalies- syndactyly, polydactyly and ectrodactly. Arthrogryposis multiplex congenita (amyoplasia congenita).
    - Limb deficiencies- Amelia and Phocomelia. Klippel feil syndrome. Osteogenesis imperfecta(fragile ossium).
    - Cervical rib.
- Acquired Deformities –
  - Acquired Torticollis.
  - Scoliosis.
  - Kyphosis.
  - Lordosis.
  - Genu varum.
  - Genu valgum.
  - Genu recurvatum
  - Coxa vara.
  - Pes cavus.
  - Hallux rigidus.
  - Hallux valgus.
  - Hammer toe.
  - Metatarsalgia.
- Disease of Bones and Joints: Causes, Clinical features, Complications, Management- medical and surgical of the following conditions:
  - Infective conditions: Osteomyelitis (Acute / chronic). Brodie's abscess. TB spine and major joints like shoulder, hip, knee, ankle, elbow etc.
  - Arthritic conditions: Pyogenic arthritis. Septic arthritis. Syphilytic infection of joints.
  - Bone Tumors: classification, clinical features, management - medical and surgical of the following tumors: Osteoma. Osteosarcoma, Osteochondroma. Enchondroma. Ewing's sarcoma. Gaint cell tumor. Multiple myeloma. Metastatic tumors.
  - Perthes disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis.
  - Metabolic Bone Diseases: Rickets. Osteomalacia, Osteopenia. Osteoporosis.
- **Inflammatory and Degenerative Conditions**: causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions:
  - **Osteoarthritis. Rheumatoid arthritis.** Ankylosing spondylitis Gouty arthritis. Psoriatic arthritis. Hemophilic arthritis. Still's disease (juvenile rheumatoid arthritis). Charcot's joints.
    - **Connective Tissue Disorders-** Systemic Lupus Erythematosis, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue Disease (MCTD)

Unit: 4 (15 Hrs.)

- **Syndromes**: Causes, Clinical features, complications, management- conservative and surgical of the following:
  - Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costo clavicular syndrome. Levator scapulae syndrome. Piriformis syndrome
- **Neuromuscular Disorders:** Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions:
  - Cerebral palsy.
  - Poliomyelitis.
  - Spinal Dysraphism.
  - Leprosy.
- Cervical and Lumbar Pathology: Causes, clinical feature, patho-physiology, investigations, management-Medical and surgical for the following:
  - Prolapsed interverbral disc (PID),
  - Spinal Canal Stenosis.
  - Spondylosis (cervical and lumbar)
  - Spondylolysis.
  - Spondylolisthesis.
  - Lumbago/ Lumbosacral strain.
  - Sacralisation.
  - Lumbarisation.
  - Coccydynia.
  - Hemivertebra.
- Orthopedic Surgeries: Indications, Classification, Types, Principles of management of the following Surgeries:
  - Arthrodesis.
  - Arthroplasty (partial and total replacement).
  - Osteotomy,
  - External fixators.
  - Spinal stabilization surgeries (Harrington's, Luque's, Steffi plating) etc.,
  - Limb re attachments.
- Regional Conditions: Definition, Clinical features and management of the following regional conditions
  - Shoulder: Periarthritic shoulder (adhesive capsulitis). Rotator cuff tendinitis. Supraspinatus Tendinitis. Infraspinatus Tendinitis. Bicipital Tendinitis. Subacromial Bursitis.
  - Elbow: Tennis Elbow. Golfer's Elbow. Olecranon Bursitis (student's elbow). Triceps Tendinitis.
  - Wrist and Hand: De Quervain's Tenosynovitis. Ganglion. Trigger Finger/ Thumb. Mallet Finger, Carpal Tunnel Syndrome, Dupuytren's Contracture.
  - Pelvis and Hip: IT Band Syndrome. Piriformis Syndrome. Trochanteric Bursitis.
  - Knee: Osteochondritis Dissecans. Prepatellar and Suprapatellar Bursitis. Popliteal Tendinitis. Patellar Tendinitis. Chondromalacia Patella. Plica Syndrome. Fat Pad Syndrome (Hoffa's syndrome).

- Ankle and Foot: Ankle Sprains. Plantar Fasciitis / Calcaneal Spur. Tarsal Tunnel Syndrome. Achilles Tendinitis. Metatarsalgia. Morton's Neuroma.

Reference Books:

1. Essential of Orthopedics and applied Physiotherapy- Jayanth Joshi, Prakash Kotwal
2. Essential Orthopaedics Including Clinical Methods, by J. Maheshwari, V. A. Mhaskar. Jaypee Brothers Medical Pub; 6 edition
3. Natarajan's Textbook of Orthopaedics and Traumatology, by Natarajan. Wolters Kluwer India Private Limited; Eighth edition
4. Adams's Outline of Orthopaedics, by D. L. Hamblen, H. Simpson. Elsevier Science Ltd; 14 edition
5. Kalava's Textbook of Orthopaedics, S. Kalava. Paras Medical Publisher, 2004
6. Apley & Solomon's System of Orthopaedics, by A. Blom, D. Warwick, M. Whitehouse Productivity Press; 10th New edition.
7. Turek's Orthopaedics Principles and Their Applications, by Anil K. Jain. Wolters Kluwer; Seventh edition
8. Clinical Orthopaedic Examination,, by McRae. Elsevier Health - UK; 6 edition

GENERAL SURGERY INCLUDING BURNS, PLASTIC SURGERY AND OBSTETRICS AND GYNECOLOGY

Subject Code: BPHTS1-502 **L T P C** **Duration: 60 (Hrs.)**
3 1 0 4

Course Objectives:

- This subject follows the basic science subjects to provide the knowledge about relevant aspects of general surgery. The student will have a general understanding of the surgical conditions the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the indications for surgery, etiology, clinical features and surgical methods for various conditions.

Course Outcome: The student will be able to

- Describe the normal and abnormal physiological events during the puberty, labor, puerperium, post – natal stage and menopause.
- Discuss the various complications during pregnancy, labour, puerperium and post – natal stage, pre and post-menopausal stage and various aspects of urogenital dysfunction and their management in brief.
- Acquire the skill of clinical examination of pelvic floor
- Acquire the skill of clinical examination of pregnant women.

Unit: 1 (15 Hrs.)

- Fluid, Electrolyte and Acid-Base disturbances – diagnosis and management; Nutrition in the surgical patient; Wound healing – basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, Scars – types and treatment. Hemostasis – components, hemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion; Surgical Infections; General Post–Operative Complications and their management.
- Reasons for Surgery; Types of anaesthesia and its affects on the patient; Types of Incisons; Clips Ligatures and Sutures; General Thoracic Procedures – Radiologic Diagnostic procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery.
- Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pnuemothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions.
- Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer.
- Disorders of the Chest Wall, Lung and Mediastinum.

Unit: 2 (15 Hrs.)

- Thoracic surgeries – Thoracotomy – Definition, Types of Incisions with emphasis to the site of insision, muscles cut and complications. Lung surgeries: Pnumonectomy, Lobectomy, segmentectomy – Indications, Physiological changes and Complications; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung. Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extracardiac Operations,

Closed Heart surgery, Open Heart surgery. Transplant Surgery – Heart, Lung and Kidney – Indications, Physiological changes and Complications.

- Diseases of the Arteries and Veins : Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases : Arteriosclerosis, Atherosclerosis, Aneurysm, Buerger's disease, Raynaud's Disease, Thrombophlebitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins.
- Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Neprectomy, Prostectomy.
- Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps.
- ENT: Common problems of ear, otitis media, Otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy.
- Ophthalmology: Ophthalmologic surgical conditions, refraction's, conjunctivitis, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra-ocular muscles- surgical management.

Unit: 3 (15 Hrs.)

- Anatomy and physiology of the female reproductive organs. Puberty dynamics
- Physiology of menstrual cycle: ovulation cycle, uterine cycle, Cx cycle, duration, amount, Hormonal regulation of menstruation, Hormonal disorders of females-obesity and female hormones, Pregnancy, Diagnosis of pregnancy, Abortion, Physiological changes during pregnancy, Importance of antenatal care exercise, High risk pregnancy, prenatal common complications – investigation and management, Musculoskeletal disorders during pregnancy, Multiple child birth, Normal labor
- Childbirth complications, investigation and management
- Normal puerperium, lactation and importance of post-natal exercises
- Family planning.
- Medical termination of pregnancy
- Infection of female genital tract including sexually transmitted diseases, low backache
- Prolapse of uterus and vagina

Unit: 4 (15 Hrs.)

- Principle of common gynaecological operations – hysterectomy, D&C, D&E, Pop smear
- Menopause: Its effect on emotions and musculoskeletal system
- Urogenital dysfunction – pre and post-natal condition
- Sterility: Pathophysiology, investigations, management, Malnutrition and deficiencies in females.
- Surgical procedures involving child birth.
- Definition, Indications and Management of the following surgical procedures – pelvic repair, caesarian section, nephrectomy, Hysterosalphyngography, Dilatation and Curettage, Laproscopy, Colposopy, Hysterectomy.
- Carcinoma of female reproductive organs – surgical management in brief Mastectomy – Simple, radical. Hysterectomy.
- Incontinence – Types, Causes, Assessment and Management.

Reference Books:

1. 'Bailey & Love's Short Practice of Surgery'. By N. Williams, P R. O'Connell, A.McCaskie. CRC Press; 27 edition
2. 'Undergraduate Surgery'. By A. K. Nan. CBS (2016)
3. 'Hamilton Bailey s Demonstrations of Physical Signs in Clinical Surgery'. By Lumley. CRC Press; 19th edition
4. 'Howkins & Bourne Shaw's Textbook of Gynaecology'. By Padubidri. Elsevier; Seventeenth edition
5. 'Dc Dutta'S Textbook of Gynecology'. By H. Konar. Jaypee Brothers Medical Publishers; Ninth edition
6. 'DC Dutta's Textbook of Obstetrics'. H. Konar. Jaypee Brothers Medical Publishers; Ninth edition
7. 'Dewhurst′s Textbook of Obstetrics & Gynaecology'. By K. Edmonds, C. Lees, T. Bourne. Wiley-Blackwell; 9th edition
8. 'Logan Turner's Diseases Of The Nose,Throat And Ear Head & Neck Surgery'. By S. M. Hussain. CRC Press/Exclusively distd . By Jaypee; 11th edition.

GENERAL MEDICINE, PAEDIATRICS AND PSYCHIATRICS

Subject Code: BPHTS1-503 **L T P C** **Duration: 60 (Hrs.)**
3 1 0 4

Course Objectives:

- This subject follows the basic science subjects to provide the knowledge about relevant aspects of general medicine. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that the student will be able to list the etiology, pathology, clinical features and treatment methods for various medical conditions.

Course Outcome: The student will be able to

- Explain the causes, underlying mechanisms, clinical features, and management strategies for various cardiovascular, respiratory, gastrointestinal, renal, endocrine, metabolic, geriatric, and nutritional deficiency disorders.
- Discuss the causes, pathophysiology, symptoms, clinical assessment, and treatment approaches for a range of psychiatric conditions.
- Outline the key principles involved in the management of pediatric conditions.

Unit: 1 (15 Hrs.)

- **Infection :** Effects of Infection on the body – Pathology – source and spread of infection – vaccinations – generalized infections – rashes and infection – food poisoning and gastroenteritis – sexually transmitted diseases – HIV infections and Aids.
- **Poisoning:** Clinical features – general management – common agents in poisoning – pharmaceutical agents – drugs of misuse – chemical pesticides – Envenomation.
- **Food and Nutrition: Assessment –** Nutritional and Energy requirements; Deficiency diseases – clinical features and treatment; Protein – Energy Malnutrition: Clinical features and treatment; Obesity and its related disorders: Causes – Complications – benefits of weight loss – management of Obesity – diet, exercise and medications.

Unit: 2 (15 Hrs.)

- **Endocrine diseases:** Common presenting symptoms of Endocrine disease – common classical disease presentations, clinical features and its management; Diabetes Mellitus: Etiology and pathogenesis of diabetes – clinical manifestations of the disease – management of the disease – Complications of diabetes.
- **Diseases of the blood:** Examinations of blood disorders – Clinical manifestations of blood disease; Anemia – signs and symptoms – types and management ; Hemophilia - Cause – clinical features severity of disease – management – complications due to repeated hemorrhages – complications due to therapy.
- **Diseases of the digestive system :** Clinical manifestations of gastrointestinal disease – Etiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achlasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Infections of Alimentary Tract ; Clinical manifestations of liver diseases - Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Viral Hepatitis, Wilson’s Disease, Alpha1-antitrypsin deficiency, Tumors of the Liver, Gall stones, Cholycystitis.

Unit: 3 (15 Hrs.)

- **Diseases of the Skin:** Examination and clinical manifestations of skin diseases; Causes, clinical features and management of the following skin conditions: Leprosy, Psoriasis, Pigmentary Anomalies, Vasomotor disorders, Dermatitis, Coccal and Fungal Parasitic and Viral infections.
- **Pediatrics :** Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ; Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child.

Unit: 4 (15 Hrs.)

- **Psychiatric Disorders:** Classifications, Causes, Clinical manifestations and treatment methods used in Psychiatry. Modalities of psychiatric treatment, Psychiatric illness and physiotherapy, Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illnesses -. Anxiety neurosis, Depression, Obsessive compulsive neurosis, Psychosis, Maniac-depressive psychosis, Post-traumatic stress disorder, Psychosomatic reactions: Stress and Health, theories of Stress – Illness.
- **Etio-pathogenesis, manifestations, and management of psychiatric illness:** Drug dependence and alcoholism; Somatoform and Dissociate Disorders: conversion reactions, Somatization, Dissociate Amnesia, and Dissociate Fugue; Personality disorders; Child psychiatry - manifestations, and management of childhood disorders -attention deficit syndrome and behavioral disorders; Geriatric psychiatry.

REFERENCE BOOKS:

1. Dejong's the Neurologic Examination, by Campbell. Wolters Kluwer India Pvt. Ltd.; Seventh edition
2. Nelson Textbook of Pediatrics: (3 volumes), by Robert M. Kliegman Elsevier India; 1st edition.
3. Ghai Essential Pediatrics, by V. K. Paul, A. Bagga, CBS Publishers & Distributors; 9th edition
4. Davidson's Principles and Practice of Medicine'. By Walker. Elsevier; Twenty-third edition (2018)
5. 'Hutchison's Clinical Methods: An Integrated Approach to Clinical Practice'. Edited by M. Glynn, W. M. Drake. Elsevier Health Sciences; 24th International edition edition
6. 'Golwalla's Medicine for Students (A Reference Book for the Family Physician)'. By A. F. Golwalla, S. A. Golwalla, M.Y. Nadkar. Jaypee Brothers Medical Publishers; Twenty-fifth edition.
7. 'Harrison's Principle of internal Medicine. By Kasper et al. India Medical; 19th edition
8. Introductory Textbook of Psychiatry, by Donald W. Black, Nancy C. Andreasen, 7th Edition
9. The American Psychiatric Association Publishing Textbook Of Psychosomatic Medicine And Consultation-Liaison Psychiatry, by James L. Levenson, 3rd Edition.

COMMUNITY MEDICINE

Subject Code: BPHTS1-504 | **L T P C** | **Duration: 60 (Hrs.)**
3 1 0 4

Course Objectives:

- This subject follows the basic science subjects to provide the knowledge about conditions the therapist would encounter in their practice in the community. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to demonstrate an understanding of various aspects of health and disease list the methods of health administration, health education and disease preventive measures.

Course Outcome: The student will be able to-

- Describe the Health and Disease of the society
- Describe the Epidemiology of the various disease
- Discuss the public health administration of India
- Discuss various Health program in India.
- Discuss about various occupational health hazards

Unit: 1 (15 Hrs.)

- **Health and Disease:** Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, The role of socio-economic and cultural environment in health and disease.
- Epidemiology, definition and scope. Principles of Epidemiology and Epidemiological methods: Components and Aims, Basic measurements, Methods, Uses of Epidemiology, Infectious disease epidemiology, Dynamics and modes of disease transmission, Host defenses and Immunizing agents, Hazards of Immunization, Disease prevention and control, Disinfection. Screening for Disease: Concept of screening, Aims and Objectives, Uses and types of screening.

Unit: 2 (15 Hrs.)

- **Epidemiology of communicable disease:** Respiratory infections, Intestinal infections, Arthropod-borne infections, Zoonoses, Surface infections, Hospital acquired infections Epidemiology of chronic non-communicable diseases and conditions: Cardiovascular diseases: Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, Obesity, Blindness, Accidents and Injuries.
- **Public health administration-** an overview of the health administration set up at Central and state levels. The national health programme-highlighting the role of social, economic and cultural factors in the implementation of the national programmes. Health problems of vulnerable groups- pregnant and lactating women, infants and pre-school children, occupational groups.
- **Health programmes in India:** Vector borne disease control programme, National leprosy eradication programme, National tuberculosis programme, National AIDS control programme, National programme for control of blindness, Iodine deficiency disorders (IDD) programme, Universal Immunisation programme, Reproductive and child health programme, National cancer control programme, National mental health programme.

National diabetes control programme, National family welfare programme, National sanitation and water supply programme, Minimum needs programme.

Unit: 3 (15 Hrs.)

- **Demography and Family Planning:** Demographic cycle, Fertility, Family planning-objectives of national family planning programme and family planning methods, A general idea of advantage and disadvantages of the methods.
- **Preventive Medicine in Obstetrics, Paediatrics and Geriatrics:** MCH problems, Antenatal, Intranatal and post-natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare programmes for women and children, Preventive medicine and geriatrics.
- **Nutrition and Health: C**lassification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition programmes.
- **Environment and Health:** Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, Medical entomology.
- **Hospital waste management:** Sources of hospital waste, Health hazards, Waste management.

Unit: 4 (15 Hrs.)

- **Disaster Management:** Natural and man-made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness.
- **Occupational Health:** Occupational environment, Occupational hazards, Occupational diseases, Prevention of occupational diseases. Social security and other measures for the protection from occupational hazard accidents and diseases. Details of compensation acts.
- **Mental Health:** Characteristics of a mentally healthy person, Types of mental illness, Causes of mental ill health, Prevention, Mental health services, Alcohol and drug dependence. Emphasis on community aspects of mental health. Role of Physiotherapist in mental health problems such as mental retardation.
- **Health Education:** Concepts, aims and objectives, Approaches to health education, Models of health education, Contents of health education, Principles of health education, Practice of health education.

REFERENCE BOOK:

1. Textbook of community medicine & Community Health–by Bhaskar Rao
2. Parks Text Book of Preventive & Social Medicine. K. Park.
3. Foundations of Community Medicine. Dhaar CM.
4. Community Medicine: Practical Manual. RAJKUMAR. PATIL.
5. Research Methods in Community Medicine: Surveys, Epidemiological Research, Programme Evaluation, Clinical Trials. Joseph Abramson, Z. H. Abramson
6. Essential Community Medicine: (including relevant social services). R.J. Donaldson.

GENERAL SURGERY INCLUDING BURNS, PLASTIC SURGERY & OBSTETRICS AND GYNECOLOGY - PRACTICAL

Subject Code: BPHTS1-505 **L T P C** **Duration: 15 (Hrs.)**
0 0 2 1

PRACTICALS:

COURSE OBJECTIVE:

- Understand common surgical conditions and their impact on physical function. Learn basic knowledge about burns, wound care, and reconstructive (plastic) surgery. Gain insight into pregnancy, labor, and postpartum care. Understand the role of physiotherapy in post-surgical and OBG (Obstetrics & Gynecology) conditions. Develop skills to assist and plan physiotherapy interventions safely in surgical and maternity cases.

COURSE OUTCOMES:

- Common surgical problems like hernia, piles, or appendicitis. Describe different types of burns and how physiotherapy helps in healing. Assist in rehabilitation after surgeries like mastectomy or plastic surgery. Support women during pregnancy, labor recovery, and postnatal care using physiotherapy techniques. Apply safe and effective physiotherapy treatment plans for post-operative and OBG cases.

Topic to be covered:

General Surgery

- Observation of post-surgical patients (hernia, appendectomy, mastectomy)
- Breathing exercises for post-operative chest surgery
- Basic wound care handling (under supervision)
- Mobilization techniques after abdominal surgeries

Burns and Plastic Surgery

- Positioning and splinting in burn patients
- Range of motion exercises to prevent contractures
- Scar management (massage techniques)
- Gait training and functional rehab in burn survivors

Obstetrics and Gynecology

- Antenatal exercises: posture, breathing, pelvic floor exercises
- Postnatal care: abdominal strengthening, posture correction
- Education on labor positions and pain relief methods
- Diastasis recti correction techniques
- Observation of C-section and normal delivery recovery physiotherapy

GENERAL MEDICINE, PAEDIATRICS & PSYCHIATRY - PRACTICAL

Subject Code: BPHTS1-506 | **L T P C** | **Duration: 15 (Hrs.)**
0 0 2 1

COURSE OBJECTIVE: Understand common medical conditions affecting different body systems. Learn about diseases in children and their effect on development and function. Understand basic psychiatric disorders and mental health conditions. Know how physiotherapy helps in managing chronic medical, pediatric, and psychiatric cases. Develop skills to assist in rehabilitation and communicate effectively with patients of all age groups.

COURSE OUTCOMES: Identify symptoms and signs of common medical conditions (e.g., asthma, diabetes, stroke). Explain the role of physiotherapy in conditions like Parkinson's, stroke, and COPD. Assist in treatment plans for children with conditions like cerebral palsy or delayed milestones. Recognize basic mental health conditions (depression, anxiety, schizophrenia). Apply communication techniques and basic rehabilitation strategies for patients with mental illness.

PRACTICALS:

Topic to be covered:

General Medicine

- Observation of patients with stroke, Parkinson's, and multiple sclerosis.
- Breathing exercises in COPD/asthma.
- Functional training and mobility in neurological cases.
- Postural drainage and chest physiotherapy techniques.
- Monitoring of vital signs (BP, heart rate, respiratory rate).

Paediatrics

- Developmental assessment (gross and fine motor milestones).
- Observation and handling of cerebral palsy, Down syndrome, or muscular dystrophy cases.
- Neurodevelopmental treatment (NDT) principles.
- Positioning, stretching, and play therapy in pediatric rehab.
- Parental education on home exercise programs.

Psychiatry

- Understanding patient behavior (with depression, anxiety, schizophrenia).
- Relaxation techniques: Deep breathing, Jacobson's relaxation.
- Role of exercise in managing stress and anxiety.
- Communication skills and rapport building with psychiatric patients.
- Observation of psychiatric ward setup and team roles.

EVALUATION METHODS & OUTCOME MEASURES

Subject Code: BPHTS1-507 | **L T P C** | **Duration: 45 (Hrs.)**
3 0 0 3

Course Objectives: Apply appropriate, evidence-based assessment methods to evaluate both individual and group outcomes in patients/clients with musculoskeletal, neuromuscular, cardiopulmonary, and integumentary conditions. These assessments should utilize valid and reliable tools, while considering the healthcare setting, cultural sensitivity, and the influence of societal factors on patient care.

Course Outcomes:

1. Categorize functional diagnoses using the International Classification of Functioning, Disability and Health (ICF) framework, and interpret X-rays of the spine and extremities along with relevant biochemical test results.
2. Analyze electrodiagnostic reports and routinely performed biochemical investigations to support clinical decision-making.
3. Demonstrate appropriate assessment techniques for musculoskeletal, neurological, cardiovascular, hand-related conditions, and postural evaluation.

Note: Implement methods to assess individual and collective outcomes of patients/clients with disorders of the following.
using valid and reliable measures that take into account the setting in which patients/clients receive services, the variables of cultural competence, and the effect of societal factors.

Unit: 1 **10 HOURS**
Musculoskeletal

Unit: 2 **10 HOURS**
Neuromuscular

Unit: 3 **10 HOURS**
Cardiovascular

Unit: 4 **15 HOURS**
Pulmonary integumentary systems

REFERENCE BOOKS:

1. Orthopedic Physical Assessment. David J Magee, Sixth Edition
2. Physical rehabilitation, Susan B O ‘Sullivan, 6th edition
3. Essential Orthopaedics Including Clinical Methods, by J. Maheshwari, V. A. Mhaskar. Jaypee Brothers Medical Pub; 6 edition
4. Natarajan's Textbook of Orthopaedics and Traumatology, by Natarajan. Wolters Kluwer India Private Limited; Eighth edition
5. Adams's Outline of Orthopaedics, by D. L. Hamblen, H. Simpson. Elsevier Science Ltd; 14 edition
6. Wall and Melzack's Textbook of Pain by Stephen McMohan & Martin Koltzenhurg , 2013, 5th Edition
7. Guidelines for Pulmonary Rehabilitation Programs-4th Edition by American Association of Cardiovascular and Pulmonary Rehabilitation, 2010
8. Physical Medicine and Rehabilitation: Expert Consult- Online and Print 4th Edition, 2010 by Randall L. Braddom

EVALUATION METHODS & OUTCOME MEASURES - PRACTICAL

Subject Code: BPHTS1-508 | **L T P C** | **Duration: 45 (Hrs.)**
0 0 2 1

COURSE OBJECTIVES: Implement methods to assess individual and collective outcomes of patients/clients with disorders of the musculoskeletal, neuromuscular, cardiovascular-pulmonary and integumentary systems using valid and reliable measures that take into account the setting in which patients/clients receive services, the variables of cultural competence, and the effect of societal factors

COURSE OUTCOMES: The student will be able to-

- Classify Functional Diagnosis using ICF & Interpretation of X-ray of extremities, spine, biochemical investigations
- Interpretation of Electro-diagnostic findings, routine Biochemical investigations
- Demonstrate assessment techniques of musculoskeletal, neurological cardiovascular and Hand conditions and Posture

PRACTICALS:

- ASSESSMENT OF MUSCULO SKELETAL FUNCTION
- ASSESSMENT OF PAIN
- ASSESSMENT OF NEUROMUSCULAR FUNCTION
- ASSESSMENT OF CARDIO VASCULAR & PULMONARY DYSFUNCTION
- ASSESSMENT OF HAND

DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST

Subject Code: BPHTS1-509 | **L T P C** | **Duration: 15 (Hrs.)**
1 0 0 1

Course Objectives: This course covers the study of common diagnostic and therapeutic imaging tests. At the end of the course students will be aware of the indications and implications of commonly used diagnostic imaging tests as they pertain to patient's management. The course will cover that how X-Ray, CT, MRI, Ultrasound and Other Medical Images are created and how they help the health professionals to save lives.

Course Outcomes: The student will be able to-

- Discuss the result of diagnostic imaging in various conditions
- Recognize the working and principles of imaging techniques
- Identify the various imaging techniques used in musculoskeletal, neuromuscular, cardiovascular conditions

Unit-1 (4 Hrs.)

- **IMAGE INTERPRETATION:** History, A New Kind of Ray, How a Medical Image Helps, What Imaging Studies Reveal, Radiography (x-rays), Fluoroscopy, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound, Endoscopy.
- **RADIOGRAPHY AND MAMMOGRAPHY:** Equipment components, Procedures for Radiography & Mammography, Benefits versus Risks and Costs d. Indications and contraindications.

Unit-2 (4 Hrs.)

- **FLUOROSCOPY:** What is Fluoroscopy? Equipment used for fluoroscopy, Indications and Contra indications, How it helps in diagnosis, The Findings in Fluoroscopy, Benefits versus Risks and Costs.
- **COMPUTED TOMOGRAPHY (CT):** What is Computed Tomography?, Equipment used for Computed Tomography, Indications and Contra indications, How it helps in diagnosis, The Findings in Computed Tomography, Benefits versus Risks and Costs.

Unit-3 (3 Hrs.)

- **MAGNETIC RESONANCE IMAGING (MRI):** What is MRI? Equipment used for MRI, Indications and Contraindications, How it helps in diagnosis, The Findings in MRI, Benefits versus Risks and Costs, Functional MRI.
- **ULTRASOUND:** What is Ultrasound? Equipment used for Ultrasound, Indications and Contra indications, How it helps in diagnosis, The Findings in Ultrasound, Benefits versus Risks and Costs.

Unit-4 (4 Hrs.)

- **ENDOSCOPY:** What is Endoscopy?, Equipment used for Endoscopy, Indications and Contra indications, How it helps in diagnosis, The Findings in Endoscopy, Benefits versus Risks and Costs.
- **NUCLEAR MEDICINE:** What is Nuclear Medicine? Equipment used for Nuclear Medicine, Indications and Contra indications, How it helps in diagnosis, Benefits versus Risks and Costs.

REFERENCE BOOKS:

1. Principles of Radiographic Imaging by Richard Carlton
2. Diagnostic Imaging, Includes Wiley E-Text7 th Edition by Andrea G.Rockall, Andrew Hatrick, Peter Armstrong and Martin Wastie

3. Diagnostic Gynecologic and Obstetric Pathology: An Atlas and Text by Roger A. Reichert, 2011
4. Imaging of Orthopedic Sports Injuries (Medical Radiology Diagnostic Imaging) by Filip M. Vanhoenacker & Mario Maas, 2011
5. Brain Imaging with MRI and CT: An Image Pattern Approach by Zoram Rumboldt, 2012
6. Clinical Ultrasound, 2-Volume Set: Expert Consult: Online and Print, Volume 2, 2011

SIXTH SEMESTER

PHYSIOTHERAPY IN ORTHOPEDICS & SPORTS

Subject Code: BPHTS1-601 | **L T P C** | **Duration: 60 (Hrs.)**
3 1 0 4

Course Objectives: The subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to musculoskeletal dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.

Course Outcome: The students will be able to

- Apply the knowledge gained in clinical musculoskeletal and sports conditions with Physiotherapy techniques
- To identify disabilities due to musculoskeletal and sports dysfunction, plan and set treatment goals
- Implement the physiotherapy treatment protocol for various musculoskeletal disorders and sports injuries
- Prescribe appropriate Orthosis /splints & will be able to fabricate temporary protective & functional splints
- Describe treatment protocol for various musculoskeletal and sports conditions.

Unit: 1 (15 Hrs.)

- **PT assessment for Orthopedic conditions** - SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment- intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental , girth measurement, muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination- dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follow up.
- **Fractures** - types, classification, signs and symptoms, complications. Fracture healing - factors affecting fracture healing. Principles of fracture management - reduction - open and closed, immobilization - sling, cast, brace, slab, traction - manual, mechanical, skin, skeletal, lumbar and Cervical traction, external fixation, functional cast bracing. PT management in complications - early and late - shock, compartment syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short and long term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period.

- **Specific fractures and dislocations:** PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvis. PT assessment and management spinal fractures.

Unit: 2 (15 Hrs.)

- Selection and application of physiotherapeutic techniques, maneuver's, modalities for preventive, curative and rehabilitative means in all conditions.
- Principles of various schools of thought in manual therapy. (Briefly Maitland and Mc kenzie).
- **Degenerative and inflammatory conditions:** Definition, signs and symptoms, clinical features, path physiology, radiological features, deformities, medical, surgical management. Describe the PT assessment and management and home program for the following conditions – Osteoarthritis - emphasis mainly on knee, hip and hand, Rheumatoid Arthritis, Ankylosing spondylitis, Gout, Perthes disease, Periarthritic shoulder.
- **Infective conditions:** Definition, signs and symptoms, clinical features, pathophysiology, radiological features, medical, surgical management. Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, pyogenic arthritis, TB spine and major joints - knee and hip.
- Define, review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program.
- **Deformities:** Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions: Congenital: CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum.
- **Cerebral palsy:** Definition, etiology, classification, clinical features, complications, deformities, medical and surgical management and home program with special emphasis on carrying techniques. PT management after surgical corrections.
- **Poliomyelitis:** Definition, etiology, types, pathophysiology, clinical features, deformities, medical and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program.

Unit: 3 (15 Hrs.)

Leprosy: Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively.

- **Amputations:** Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management.
- **Spinal conditions:** Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis,

Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta.

- Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction.
- **Osteoporosis-** causes, predisposing factors, investigations and treatment.
- **Orthopedic surgeries:** Pre and post-operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplasty-partial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy.
- **Shoulder joint:** Shoulder instabilities, TOS, RSD, Impingement syndrome - conservative and post-operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears- conservative and surgical repair. Subacromial decompression - Post operative PT management.
- **Elbow and forearm:** Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management.
- **Wrist and Hand:** Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.

Unit: 4 (15 Hrs.)

- **Hip: J**oint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - Management.
- **Knee:** Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome- conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy- rehabilitation.
- **Ankle and foot:** Ankle instability. Ligamentous tears- Post operative management.
- Introduction to Bio-Engineering; Classification of Orthoses and prostheses; Biomechanical principles of orthotic and prosthetic application; Designing of upper extremity, lower extremity and spinal orthosis, indications and check out; Designing of upper extremity and lower extremity prostheses, indications and check out; Psychological aspects of orthotic and prosthetic application; prescription and designing of footwear and modifications; Designing and construction of adaptive devises.
- **Sports Physiotherapy:** Physical fitness. Stages of soft tissue healing. Treatment guidelines for soft tissue injuries- Acute, Sub acute and chronic stages. Repair of soft tissues- rupture of muscle, tendon and Ligamentous tears. Soft tissue injuries- prevention and rehabilitation of, Lateral ligament sprain of ankle. Rotator cuff injuries. Collateral and Cruciate injuries of knee. Meniscal injuries of knee. Supraspinatus and Bicipital tendonitis. Pre patellar and Sub-acromial bursitis. Tennis and Golfer's elbow. Hamstring strains, Quadriceps contusion, TA rupture. Dequervain's tenosynovitis. Trigger and Mallet finger. Plantar fasciitis. Wrist sprains.
- Applied Yoga in orthopedic conditions.

REFERENCE BOOKS:

1. Essential Orthopaedics Including Clinical Methods, by J. Maheshwari, V. A. Mhaskar. Jaypee Brothers Medical Pub; 6 edition
2. Natarajan's Textbook of Orthopaedics and Traumatology, by Natarajan. Wolters Kluwer India Private Limited; Eighth edition
3. Adams's Outline of Orthopaedics, by D. L. Hamblen, H. Simpson. Elsevier Science Ltd; 14 edition
4. Kalava's Textbook of Orthopaedics, S. Kalava. Paras Medical Publisher, 2004
5. Apley & Solomon's System of Orthopaedics , by A. Blom, D. Warwick, M.Whitehouse Productivity Press; 10th New edition edition
6. Turek's Orthopaedics Principles and Their Applications, by Anil K. Jain. Wolters Kluwer; Seventh edition
7. Clinical Orthopaedic Examination,, by McRae. Elsevier Health - UK; 6 edition
8. Cash textbook of orthopaedics and Rheumatology for physiotherapists – Downie –Jaypee brothers.
9. Tidy's physiotherapy- Tomson et. al Butterworth Heinmann
10. Essentials of orthopaedics and applied physiotherapy – Joshi and Kotwal- B.L. Churchill Livingstone.
11. Tetraplegia & Paraplegia- Bromley- W.B. Saunders.
12. Orthopaedics physiotherapy- Donatelli & Wooden- WB. Saunders.
13. Rheumatological Physiotherapy- David – Mosby
14. Orthopaedic Physiotherapy- Tidys and well – Mosby
15. Physiotherapy for amputee- Engstrom & Van de van – Churchill Livingsstone
16. Sports Injuris: Diagnosis and management: Norris Butterworth Heinmann.
17. Brukner and Khan : clinical sports medicine, McGraw Hill
18. Gould: orthopedic Sports Physical Therapy, Mosby kulund: The Injured Athelete, Lippincott.
19. Lars Peterson and Per Renstron: sports Injuries – Their prevention and treatment, Dunitz
20. Fu and Stone: sports injuries : Mechanism , Prevention and Treatment, Williams and Wilkins

PHYSIOTHERAPY IN GENERAL MEDICINE AND GENERAL SURGERY

Subject Code: BPHTS1-602 | **L T P C** | **Duration: 60 (Hrs.)**
3 1 0 4

Course Objectives: Identify discuss and analyze cardiovascular and pulmonary dysfunctions based on pathophysiological principles and arrive at appropriate functional diagnosis. Acquire knowledge of rationals of basic investigative approaches in the medical system and surgical intervention, regimes in general surgeries (special emphasis on abdominal surgeries). Execute effective physiotherapeutic measures (with appropriate clinical reasoning) and exercise, conditioning in general medical and surgical conditions. Acquire knowledge of the overview of patient care in the I.C.U. for bronchial hygiene and continuous monitoring of the patient in the I.C.U. Select strategies for cure, care and prevention, adopt restorative and rehabilitative measures for maximum possible functional independence of a patient at home, work and in the community. Acquire the knowledge of evaluation and physiotherapeutic treatment for obstetric and gynecological conditions. Acquire the knowledge of various conditions where physiotherapy plays a vital role in the rehabilitation (psychiatry, dermatology, geriatric and ENT conditions). Evaluate, grade and treat nonhealing wounds.

Course Outcome:

The student will be able to:

- Recognize, discuss, and assess cardiovascular and pulmonary dysfunctions using pathophysiological concepts to establish an accurate functional diagnosis.
- Understand the rationale behind basic diagnostic procedures and surgical treatments, with particular focus on general and abdominal surgeries.
- Apply appropriate physiotherapy interventions and exercise-based conditioning, supported by clinical reasoning, in managing general medical and surgical cases.
- Gain an overview of patient care in the ICU, including bronchial hygiene techniques and continuous patient monitoring.
- Develop and implement strategies for treatment, prevention, and rehabilitation to promote maximum functional independence at home, the workplace, and within the community.
- Understand the evaluation and physiotherapeutic management of obstetric and gynecological conditions.
- Acquire knowledge of various conditions where physiotherapy is crucial in rehabilitation, including psychiatric, dermatological, geriatric, and ENT disorders.
- Assess, classify, and manage non-healing wounds using appropriate physiotherapy techniques.

Unit: 1 (15 Hrs.)

- Physiotherapy in mother and child care – ante and post-natal management, early intervention and stimulation therapy in child care (movement therapy).
- Applied Yoga in Obstetric and Gynecological conditions.
- Geriatrics – handling of old patients and their problems.
- Complication common to all operations.

Unit: 2 (15 Hrs.)

- Abdominal incisions.
- Physiotherapy in pre and post-operative stages.

- Operations on upper G.I.T.- oesophagus, stomach, duodenum.
- Operations on large and small intestine – Appendisectomy, cholecystectomy, partial colectomy, ileostomy, hernia and herniotomy, hernioraphy, hernioplasty.
- Physiotherapy in dentistry.

Unit: 3 (15 Hrs.)

- Burns and its treatment – physiotherapy in burns, skin grafts, and reconstructive surgeries.
- Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars-U.V.R and other electro therapeutics for healing of wounds, prevention of Hyper-granulated Scars Keloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues.
- Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases.

Unit: 4 (15 Hrs.)

- Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhydrosis. Massage maneuvers for cosmetic purpose of skin; use of specific oil as medium; Care of anesthetic hand and foot; Evaluation, planning and management of leprosy-prescription, fitting and training with prosthetic and orthotic devices.
- ENT – sinusitis, non-suppurative and chronic suppurative otitis media, osteosclerosis, labrynthitis, mastoidectomy, chronic rhinitis, laryngectomy, pharyngeo – laryngectomy, facial palsy.

REFERENCE BOOKS:

1. Physical Rehabilitation O'SULLIVAN SUSAN 6th edition,
2. Therapeutic Modalities in Rehabilitation, William E. Prentice5th edition
3. Cash textbook of general medical and surgical conditions for physiotherapists- Downie Jaypee Brothers.
4. Cash textbook of heart, chest and vascular disorders for physiotherapists- Downie Jaypee Brothers.
5. Principle and practices of cardiopulmonary physical therapy – Frown Felter- Mosby.
6. Chest physiotherapy in intensive care unit- Mackanzie – Wiiliams & Wilkins.
7. Restoration of motor functions in stroke patient: A Physiotherapist approach- Johnstone Churchill Livingstone.

CLINICAL NEUROLOGY & NEUROSURGERY

Subject Code: BPHTS1-603 | **L T P C** | **Duration: 45 (Hrs.)**
3 0 0 3

Course Objectives: This subject follows the basic science subjects to provide the knowledge about relevant aspects of neurology & neurosurgery. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various neurological conditions.

Course Outcome:

1 Explain the causes, underlying mechanisms, clinical features and management of neurological and pediatric conditions.
2 Describe the procedures involved in the clinical examination of the nervous system.
3 Gain a basic understanding of fetal development during the intrauterine period.
4 Describe the normal physical and psychological development and growth of a child.
5 Conduct clinical examinations of neonates and children, focusing on neurological, musculoskeletal, respiratory, and cardiovascular systems.

Unit: 1 (15 Hrs.)

- Disorders of function in the context of Pathophysiology, Anatomy in Neurology and Cortical Mapping.
- Classification of neurological involvement depending on level of lesion.
- Neurological assessment: Principles of clinical diagnosis, higher mental function, assessment of brain & spinal cord function, evaluation of cranial nerves and evaluation of autonomic nervous system.
- Investigations: principles, methods, views, normal/abnormal values/features, types of following investigative procedures- skull x-ray, CT, MRI, evoked potentials, lumbar puncture, CSF examination, EMG, NCV.
- Neuro-ophthalmology: Assessment of visual function – acuity, field, colour vision, Pupillary reflex, accommodation reflex, abnormalities of optic disc, disorders of optic nerve, tract, radiation, occipital pole, disorders of higher visual processing, disorders of pupil, disorders of eye movements, central disorders of eye movement.
- Deafness, vertigo, and imbalance: Physiology of hearing, disorders of hearing, examination & investigations of hearing, tests of vestibular function, vertigo, peripheral vestibular disorders, central vestibular vertigo.
- Lower cranial nerve paralysis – Etiology, clinical features, investigations, and management of following disorders - lesions in trigeminal nerve, trigeminal neuralgia, trigeminal sensory neuropathy, lesions in facial nerve, facial palsy, bell's palsy, hemi facial spasm, Glossopharangial neuralgia, lesions of Vagus nerve, lesions of spinal accessory nerve, lesions of hypoglossal nerve. Dysphagia – swallowing mechanisms, causes of dysphagia, symptoms, examination, and management of dysphagia.
- **Cerebro-vascular diseases:** Define stroke, TIA, RIA, stroke in evolution, multi infarct dementia and Lacunar infarct. Classification of stroke – Ischemic, hemorrhagic, venous infarcts. Risk factors, cause of ischemic stroke, causes of hemorrhagic stroke. Classification

of hemorrhagic stroke, classification of stroke based on symptoms, stroke syndrome, investigations, differential diagnosis, medical and surgical management.

- **Head injury:** Etiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications.
- **Higher cortical, neuro psychological and neurobehavioral disorders:** Causes of blackouts, physiological nature of Epilepsy, classification, clinical features, investigations, medical& surgical management of following disorders – Non-epileptic attacks of childhood, Epilepsy in childhood, Seizers, and Epilepsy syndromes in adult. Classification and clinical features of Dyssomnias, Parasomnias, Dementia, Obsessive-compulsive disorders. Neural basis of consciousness, causes &investigations of Coma, criteria for diagnosis of Brain death. Etiology, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Perceptual disorders and Speech disorders.

Unit: 2 (15 Hrs.)

- **Movement disorders:** Definition, etiology, risk factors, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson's disease, Dystonia, Chorea, Ballism, Athedosis, Tics, Myoclonus and Wilson's disease.
- **Cerebellar and coordination disorders:** Etiology, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich's ataxia, Ataxia talengiectasia, Metabolic ataxia, Hereditary cerebellar ataxia, Tabes dorsalis and Syphilis.
- **Spinal cord disorders:** Functions of tracts, definition, etiology, risk factors, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Spinal cord injury, Compression by IVD prolapse, Spinal epidural abscess, Transverse myelitis, Viral myelitis, Syringomyelia, Spina bifida, Sub acute combined degeneration of the cord, Hereditary spastic paraplegia, Radiation myelopathy, Progressive encephalomyelitis, Conus medullaris syndrome, Bladder & bowel dysfunction, and Sarcodosis.
- **Brain tumors and spinal tumors:** Classification, clinical features, investigations, medical and surgical management.
- **Infections of brain and spinal cord:** Etiology, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Meningitis, Encephalitis, Poliomyelitis and Post- polio syndrome. Complications of systemic infections on nervous system – Septic encephalopathy, AIDS, Rheumatic fever, Brucellosis, Tetanus, and Pertussis.
- **Motor neuron diseases:** Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications of following disorders - Amyotrophic lateral sclerosis, Spinal muscular atrophy, Hereditary bulbar palsy, Neuromyotonia and Post-irradiation lumbosacral polyradiculopathy.
- **Multiple sclerosis -** Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications.

- **Disorders of neuromuscular junction –** Etiology, classification, signs & symptoms, investigations, management, of following disorders Myasthenia gravis, Eaton-Lambert syndrome, and Botulism.

Unit: 3 (5 Hrs.)

- **Muscle diseases:** Classification, investigations, imaging methods, Muscle biopsy, management of muscle diseases, genetic counselling. Classification, etiology, signs & symptoms of following disorders – Muscular dystrophy, Myotonic dystrophy, myopathy, Non-dystrophic myotonia.
- Polyneuropathy – Classification of Polyneuropathies, Hereditary motor sensory neuropathy, hereditary sensory and Autonomic neuropathies, Amyloid neuropathy, acute idiopathic Polyneuropathies. Guillain-Barre syndrome – Causes, clinical features, management of GBS, Chronic Idiopathic Polyneuropathies, diagnosis of polyneuropathy, nerve biopsy.
- **Focal peripheral neuropathy:** Clinical diagnosis of focal neuropathy, neurotmesis, Axonotmesis, Neuropraxia. Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – RSD, Nerve tumors, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & Intercostal nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, Sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, Pudental nerve palsy.

UNIT 4 (10 Hrs.)

- **Paediatric neurology:** Neural development, Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders - Cerebral palsy, Hydrocephalus, Arnold-chiari malformation, Basilar impression, Klippel-Feil syndrome, Achondroplacia, Cerebral malformations, Autism, Dandy walker syndrome and Down's syndrome.
- **Toxic, metabolic and environmental disorders:** Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – Encephalopathy, Alcohol toxicity, Recreational drug abuse, Toxic gases & Asphyxia, Therapeutic & diagnostic agent toxicity, Metal toxicity, Pesticide poisoning, Environmental & physical insults, Pant & Fungal poisoning, Animal poisons, & Complications of organ transplantation.
- **Introduction, Indications and Complications of following Neuro surgeries:** Craniotomy, Cranioplasty, Stereotactic surgery, Deep brain stimulation, Burr-hole, Shunting, Laminectomy, Hemilaminectomy, Rhizotomy, Microvascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery - Thalamotomy and Pallidotomy, Coiling of aneurysm, Clipping of aneurysm, and Neural implantation.

REFERENCE BOOKS:

1. Neurology And Neurosurgery Illustrated, International Edition, by Lindsay.Elsevier; 5 edition
2. Brain's Diseases of the Nervous System, Allan Ropper 12th Edition
3. Davidson'sPrinciplesandPracticeofMedicine23rd edition
4. Textbook of Neurology- Victor Adams 10th edition
5. Clinical Neurophysiology: Nerve Conduction, Electromyography, by U.K. Misra, Elsevier India; 3rd edition
6. Brain and Bannister's Clinical Neurology, by Roger Bannister. Oxford University Press; 7th Ed. Edition
7. Lange Clinical Neurology and Neuroanatomy: A Localization, by Aaron Berkowitz. McGraw-Hill Education / Medical; 1 edition
8. Bickerstaff's Neurological Examination in Clinical Practice, by K. Prasad, R. Yadav, J Spillane. Wiley India Pvt Ltd; Seventh Adapted edition.
9. Dejong's the Neurologic Examination, by Campbell. Wolters Kluwer India Pvt. Ltd.; Seventh edition
10. Nelson Textbook of Pediatrics: (3 volumes), by Robert M. Kliegman Elsevier India; 1st edition
11. Ghai Essential Pediatrics, by V. K. Paul, A. Bagga, CBS Publishers & Distributors; 9th edition

PHYSIOTHERAPY IN ORTHOPEDICS & SPORTS - PRACTICAL

Subject Code: BPHTS1-604 **L T P C** **Duration: 90 (Hrs.)**
0 0 6 3

COURSE OBJECTIVES:
The objective of this module is to discuss the Patho-physiology, clinical manifestations and conservative/surgical management of various traumatic cases of the Musculo-skeletal conditions, skill of clinical examination and interpretation of the pre-operative cases and post-operative cases, investigation used in musculoskeletal conditions, Pathological/biochemical studies pertaining to musculoskeletal conditions with radiological findings

Course Outcomes: The student will be able to
- Identify the musculoskeletal dysfunctions
- Describe effective goals and treatment plan
- Demonstrate the special test used to diagnose in various musculoskeletal condition
- Implement and assess progression of treatment plan
- Design the physiotherapy treatment for various musculoskeletal disorders
- Demonstrate the various exercise techniques used in musculoskeletal disorders

MUSCULOSKELETAL CONDITIONS
1. Practical shall be conducted for all relevant topics discussed in theory in the following forms:
2. Physical Therapy Evaluation and clinical reasoning in musculoskeletal conditions.
3. Physical Therapy Examination of various musculoskeletal conditions of the upper extremity: Shoulder, Elbow, Forearm, Wrist and Hand.
4. Physical Therapy Examination of various musculoskeletal conditions of lower extremity: Hip, Knee, Ankle and Foot
5. Examination of the common conditions of spine: Cervical spine, Thoracic Spine, Lumbar Spine
6. Neurological Examination including sensory examination, Dermatomes, Myotomes, Deep tendon reflexes
7. Radiological investigations like X Ray, MRI examination
8. Case presentations and Case discussions
9. Discussion on various musculoskeletal treatment techniques

SPORTS CONDITIONS
1. Practical shall be conducted for all relevant topics discussed in theory part.
2. Practical aspects of –
3. Anthropometric measurement.
4. Isokinetic testing
5. Biofeedback
6. Aerobic and Anaerobic Testing
7. Physical Fitness

PHYSIOTHERAPY IN GENERAL MEDICINE AND GENERAL SURGERY - PRACTICAL

Subject Code: BPHTS1-605 | **L T P C** | **Duration: 90 (Hrs.)**
0 0 6 3

COURSE OBJECTIVES:

- Provide hands-on clinical training in assessing and treating patients with medical and surgical conditions. Develop clinical reasoning and physiotherapeutic decision-making skills in general medicine and pre/post-operative care. Train students to formulate physiotherapy goals and implement treatment protocols in inpatient and outpatient settings. Enable students to understand the role of physiotherapy in preventing complications, improving function, and enhancing quality of life in medical and surgical patients. Instill professional communication, documentation, and patient education skills relevant to general medical and surgical rehabilitation.

COURSE OUTCOMES:

- Conduct physiotherapy assessments including respiratory, neurological, musculoskeletal, and functional evaluations for patients with general medical and surgical conditions.
- Design and implement evidence-based physiotherapy treatment plans for conditions such as pneumonia, COPD, diabetes, hypertension, infectious diseases, and post-operative care following abdominal, thoracic, orthopedic, and oncologic surgeries.
- Apply chest physiotherapy techniques including breathing exercises, postural drainage, percussion, and incentive spirometry in relevant clinical scenarios.
- Provide perioperative and post-operative rehabilitation focusing on early mobilization, pain management, prevention of complications (e.g., DVT, atelectasis), and functional recovery.
- Monitor patient progress, adjust treatment plans based on clinical feedback, and document outcomes effectively in medical and surgical cases.
- Demonstrate proper patient handling techniques, infection control protocols, and inter professional collaboration during ward postings and case discussions.
- Educate patients and caregivers on lifestyle modifications, home exercise programs, and preventive physiotherapy strategies for long-term management.

Topics to be covered:

In General Medicine

- Assessment of neurological patients (stroke, Parkinson's, multiple sclerosis).
- Breathing exercises in respiratory disorders (asthma, COPD).
- Chest physiotherapy: percussion, vibration, postural drainage.
- Functional training in diabetic neuropathy and arthritis.
- Vital signs monitoring (BP, pulse, oxygen saturation, respiratory rate).
- Rehabilitation techniques in chronic conditions like heart failure and TB.

In General Surgery

- Pre-operative physiotherapy education (deep breathing, coughing techniques).
- Post-operative exercises: ankle pumps, breathing exercises, limb mobilization.
- Mobilization techniques: turning, sitting, standing, walking after surgery.

- Pain management strategies (TENS, relaxation techniques).
- Positioning and splinting to prevent complications.
- Observation of surgical patients: hernia, mastectomy, abdominal surgeries.

CLINICAL NEUROLOGY & NEUROSURGERY - PRACTICAL

Subject Code: BPHTS1-606 | **L T P C** | **Duration: 15 (Hrs.)**
0 0 2 1

COURSE OBJECTIVES: The subject follows inheritance of imparting basic as well as advanced information in a wide range of Neurological disorders. The same shall augment and enhance ones abilities in treating and overall smooth and efficient handling in patients suffering with the most widely predominant as well as specific Neurological disorders

COURSE OUTCOMES: The student will be able to

- Demonstrate the neurological dysfunctions in both upper motor neuron and lower motor neuron diseases
- Design the goals and treatment plan
- Implement and assess progression of treatment plan
- To apply theoretical knowledge of neurological physiotherapy in rehabilitation of neurological patients

Topics to be covered:

Neurological Examination Skills

- Level of consciousness (Glasgow Coma Scale)
- Cranial nerve examination
- Motor system examination (tone, power, reflexes)
- Sensory system examination (touch, pain, vibration, proprioception)
- Cerebellar function tests (coordination, balance)
- Gait and posture analysis
- Higher function tests (memory, speech, orientation
- Observation and basic care of patients with: Stroke (CVA), Parkinson's disease, Multiple sclerosis, Guillain-Barré Syndrome, Cerebral palsy, Spinal cord injury

Neurosurgical Conditions & Rehab

- Observation of post-operative neurosurgical cases (tumor, shunt, decompression)
- Positioning and early mobilization post spine/brain surgery
- Use of assistive devices (walker, brace, orthosis)
- Techniques for tone management (stretching, positioning, splinting)
- Functional training: bed mobility, transfers, wheelchair skills
- Education for family and caregivers

PROFESSIONALISM AND VALUES

Subject Code: BPHTS1-607 **L T P C** **Duration: 15 (Hrs.)**
1 0 0 1

Course Objective:

- The module on professionalism will deliver the concept of what it means to be a professional and how physiotherapy profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

Course Outcome:

- Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality. Core values- Accountability, Altruism, Compassion/ caring, excellence, integrity, professional duties, social responsibility.
- Personal values- ethical or moral values
- Attitude and behavior- professional behavior, treating people equally
- Code of conduct , professional accountability and responsibility, misconduct
- Differences between professions and importance of team efforts
- Cultural issues in the healthcare environment
- Entry level health care practitioner, direct access, autonomy in profession, practitioner of practice and evidence based practice.

UNIT 1 (3 Hrs.)

- **The Physiotherapist as Patient/Client manager:** Evaluation and diagnosis, Diagnosis as clinical decision making, Prognosis, Discharge planning and discontinuance of care, Discontinuance of care, Outcomes, Clinical decision making, Referral relationships, Interpersonal relationships, Ethical and legal issues, Informed consent.
- **Managed care and fidelity.**

UNIT 2 (4 Hrs.)

The Physiotherapist as Consultant: Physiotherapy consultation, Building a consulting business, the consulting process, the skills of a good consultant, Trust in the consultant/client relationship, Ethical and legal issues in consultation g. Components of a consulting agreement.

UNIT 3 (4 Hrs.)

- **The Physiotherapist as Critical Inquirer:** History of critical inquiry, Evidence-based practice, Outcomes research, whose responsibility is research? Roles of the staff physiotherapist in critical inquiry, Collaboration in clinical research, Ethical and legal issues in critical inquiry.
- **The Physiotherapist as Administrator:** History of physiotherapy administration, Contemporary physiotherapy administration, Patient/client management d. First-line management, Midlevel managers and chief executive officers, Leadership, Ethical and legal issues.

UNIT 4 (4 Hrs.)

The Physiotherapist as Educator: History of physiotherapy education, Contemporary educational roles of the physiotherapist, Teaching opportunities in continuing education, Academic teaching opportunities, Theories of teaching and learning in professional education, Ethical and legal issues in physiotherapy education.