

**CHARUTAR VIDYA MANDAL UNIVERSITY**  
**FACULTY OF PHYSIOTHERAPY**  
**RITA A. PATEL INSTITUTE OF PHYSIOTHERAPY**

**BPT - Semester III**

**Course Code: BPT – 116**

**Course Title: Pathology**

**Course Credit Hours:**

Hrs. / Wk			Credits			Marks		Total Marks
L	P	T	L	P	T	Theory	Practical	
4	-	4	4	-	4	100	-	100

**Course Outline:** This subject follows the basic subjects of Anatomy, Physiology and Biochemistry and it forms a vital link between preclinical subjects and clinical subjects. Pathology involves the study of causes and mechanisms of diseases. The knowledge and understanding regarding Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

Sr No	Title of the Unit	Minimum number of Hours
1.	Introduction to Pathology	02
2.	Cell injuries	04
3.	Inflammation and Repair	04
4.	Immunopathology	04
5.	Infectious diseases	04
6.	Circulatory Disturbances	04
7.	Growth Disturbances and Neoplasia	06
8.	Nutritional Disorders	02
9.	Genetic Disorders	02
10.	Hematology	08
11.	Respiratory System	03

12.	Cardiovascular Pathology	06
13.	Alimentary tract	04
14.	Hepato – biliary pathology	04
15.	Lymphatic System	04
16.	Musculoskeletal System	04
17.	Endocrine pathology	04
18.	Neuropathology	04
19.	Dermatopathology	03

**Total hours (Theory): 76 Hrs**

**Total hours (Practical): 00 Hrs**

**Total hours: 76 Hrs**

<b>Unit Sr No</b>	<b>Course Content</b>	<b>Hours of Teaching</b>
<b>1</b>	<b>Introduction to Pathology</b>	<b>2 Hours</b>
<b>2</b>	<b>Cell injuries</b>	<b>4 Hours</b>
<b>2.1</b>	Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure. Reversible cell injury: Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoid changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations	
<b>2.2</b>	Pigments - Melanin / Hemosiderin	
<b>2.3</b>	Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains	
<b>3</b>	<b>Inflammation and Repair</b>	<b>4 Hours</b>
<b>3.1</b>	Acute inflammation: features, causes, vascular and cellular events	
<b>3.2</b>	Inflammatory cells and Mediators. Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples	
<b>3.3</b>	Repair, Wound healing by primary and secondary union, factors promoting and delaying the process	
<b>3.4</b>	Healing in specific site including bone healing	
<b>4</b>	<b>Immunopathology</b>	<b>4 Hours</b>
<b>4.1</b>	Immune system: General concepts	
<b>4.2</b>	Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification, SLE	
<b>4.3</b>	AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education	
<b>5</b>	<b>Infectious diseases</b>	<b>4 Hours</b>
<b>5.1</b>	Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis	
<b>5.2</b>	Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery	
<b>5.3</b>	Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Ricketts, Chlamydial infection, HIV infection	

<b>5.4</b>	Fungal disease and opportunistic infections	
<b>5.5</b>	Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst	
<b>6</b>	<b>Circulatory Disturbances</b>	<b>4 Hours</b>
<b>6.1</b>	Hyperemia/Ischemia and Haemorrhage Edema: Pathogenesis and types. Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology Thrombosis and Embolism: Formation, Fate and Effects	
<b>6.2</b>	Infarction: Types, Common sites	
<b>6.3</b>	Shock: Pathogenesis, types, morphologic changes	
<b>7</b>	<b>Growth Disturbances and Neoplasia</b>	<b>6 Hours</b>
<b>7.1</b>	Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia	
<b>7.2</b>	Precancerous lesions	
<b>7.3</b>	Neoplasia: Definition, classification, biological behaviour: Benign and Malignant, Carcinoma and Sarcoma	
<b>7.4</b>	Malignant Neoplasia: Grades and Stages, Local & Distant spread	
<b>7.5</b>	Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer	
<b>7.6</b>	Benign & Malignant epithelial tumors E.g. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumors E.g.: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma	
<b>8</b>	<b>Nutritional Disorders</b>	<b>2 Hours</b>
<b>8.1</b>	Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples	
<b>9</b>	<b>Genetic Disorders</b>	<b>2 Hours</b>
<b>9.1</b>	Basic concepts of genetic disorders and some common examples and congenital malformation	
<b>10</b>	<b>Hematology</b>	<b>8 Hours</b>
<b>10.1</b>	Constituents of blood and bone marrow, Regulation of hematopoiesis. Anemia: Classification, clinical features & lab diagnosis	
<b>10.2</b>	Nutritional anemias: Iron deficiency anemia, Folic acid, Vit. B 12 deficiency anemia	

	including pernicious anemia. Hemolytic Anaemias: Classification and Investigations. Hereditary hemolytic anaemias: Thalassemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies	
<b>10.3</b>	Acquired hemolytic anaemias i. Alloimmune, Autoimmune ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia	
<b>10.4</b>	Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis Coagulopathies – i. Inherited ii. Acquired with lab diagnosis	
<b>10.5</b>	Leukocytic disorders: Leukocytosis, Leukopenia, Leukemoid reaction	
<b>10.6</b>	Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Multiple myeloma and dysproteinemias	
<b>10.7</b>	Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis	
<b>11</b>	<b>Respiratory System</b>	<b>3 Hours</b>
<b>11.1</b>	Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases	
<b>12</b>	<b>Cardiovascular Pathology</b>	<b>6 Hours</b>
<b>12.1</b>	Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus	
<b>12.2</b>	Endocarditis. Rheumatic Heart disease	
<b>12.3</b>	Vascular diseases: Atherosclerosis, monckeberg's medial calcification, Aneurysm and Arteritis and tumors of Blood vessels	
<b>12.4</b>	Ischemic heart Disease: Myocardial infarction. Hypertension and hypertensive heart disease	
<b>13</b>	<b>Alimentary tract</b>	<b>4 Hours</b>
<b>13.1</b>	Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumor of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumors	
<b>13.2</b>	Stomach: Gastritis, Ulcer & Tumors	
<b>13.3</b>	Tumors and tumor like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma	
<b>13.4</b>	Pancreatitis and pancreatic tumors: i) Exocrine, ii) Endocrine Salivary gland tumors:	

	Mixed, Warthin's	
<b>14</b>	<b>Hepato – biliary pathology</b>	<b>4 Hours</b>
<b>14.1</b>	Jaundice: Types, aetio-pathogenesis and diagnosis. Hepatitis: Acute, Chronic, neonatal	
<b>14.2</b>	Alcoholic liver disease	
<b>14.3</b>	Cirrhosis: Post necrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumors of Liver	
<b>15</b>	<b>Lymphatic System</b>	<b>4 Hours</b>
<b>15.1</b>	Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma. Lymphadenitis - Nonspecific and granulomatous. Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumors - Hodgkin's and Non-Hodgkin's Lymphomas, Metastatic Tumors	
<b>15.2</b>	Causes of Splenic Enlargements	
<b>16</b>	<b>Musculoskeletal System</b>	<b>4 Hours</b>
<b>16.1</b>	Osteomyelitis, acute, chronic, tuberculous, mycetoma	
<b>16.2</b>	Metabolic diseases: Rickets/Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease	
<b>16.3</b>	Tumors Classification: Benign, Malignant, Metastatic and synovial sarcoma. Arthritis: Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous	
<b>17</b>	<b>Endocrine pathology</b>	<b>4 Hours</b>
<b>17.1</b>	Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis	
<b>17.2</b>	Tumors of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumors of cortex and medulla	
<b>18</b>	<b>Neuropathology</b>	<b>4 Hours</b>
<b>18.1</b>	Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess	
<b>18.2</b>	Tuberculosis, Cysticercosis	
<b>18.3</b>	CNS Tumors, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma	
<b>19</b>	<b>Dermatopathology</b>	<b>3 Hours</b>
<b>19.1</b>	Skin tumors: Squamous cell carcinoma, Basal cell carcinoma, Melanoma	



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**BPT - Semester III**

**Course Code: BPT – 117**

**Course Title: Microbiology**

**Course Credit Hours:**

Hrs. / Wk			Credits			Marks		Total Marks
L	P	T	L	P	T	Theory	Practical	
4	-	4	4	-	4	100	-	100

**Course Outline:** This subject follows the basic subjects of Anatomy, Physiology and Biochemistry and it forms a vital link between preclinical subjects and clinical subjects. Microbiology involves the study of common organisms causing diseases including nosocomial infections and precautionary measures to protect one from acquiring infections. The knowledge and understanding regarding Microbiology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

Sr No	Title of the Unit	Minimum number of Hours
1.	General Microbiology	16
2.	Immunology	10
3.	Bacteriology	15
4.	General Virology	10
5.	Mycology	10
6.	Clinical/Applied Microbiology	15

**Total hours (Theory): 76 Hrs**

**Total hours (Practical): 00 Hrs**

**Total hours: 76 Hrs**

<b>Unit Sr No</b>	<b>Course Content</b>	<b>Hours of Teaching</b>
<b>1</b>	<b>General Microbiology</b>	<b>16 Hours</b>
<b>1.1</b>	Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate	
<b>1.2</b>	Normal flora of the human body	
<b>1.3</b>	Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections	
<b>1.4</b>	Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence associated	
<b>1.5</b>	Physiology: Essentials of bacterial growth requirements	
<b>1.6</b>	Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection	
<b>1.7</b>	Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity	
<b>2</b>	<b>Immunology</b>	<b>10 Hours</b>
<b>2.1</b>	Basic principles of immunity immunobiology: lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis	
<b>2.2</b>	Humoral immunity and its role in immunity Cell mediated immunity and its role in immunity, Immunology of hypersensitivity, Measuring immune functions	
<b>3</b>	<b>Bacteriology</b>	<b>15 Hours</b>
<b>3.1</b>	Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports i. Staphylococci, Streptococci and Pneumococci	
<b>3.2</b>	Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports i. Mycobacteria: Tuberculosis, M. leprae, atypical mycobacteria, Enterobacteriaceae	

<b>3.3</b>	Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports i. Vibrios: <i>V. cholerae</i> and other medically important vibrios, <i>Campylobacters</i> and <i>Helicobacters</i> , <i>Pseudomonas</i>	
<b>3.4</b>	Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports i. <i>Bacillus anthracis</i> , Sporing and non-sporing anaerobes: <i>Clostridia</i> , <i>Bacteroides</i> and <i>Fusobacteria</i>	
<b>4</b>	<b>General Virology</b>	<b>10 Hours</b>
<b>4.1</b>	General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections. Immunity and prophylaxis of viral diseases. Principles of laboratory diagnosis of viral diseases. List of commonly used antiviral agents	
<b>5</b>	<b>Mycology</b>	<b>10 Hours</b>
<b>5.1</b>	General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mucosal opportunistic infections including Mycotoxins, systemic mycoses. General principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples. Antifungal agents	
<b>6</b>	<b>Clinical/Applied Microbiology</b>	<b>15 Hours</b>
<b>6.1</b>	Streptococcal infections: Rheumatic fever and Rheumatic heart disease, Meningitis	
<b>6.2</b>	Tuberculosis	
<b>6.3</b>	Pyrexia of unknown origin, leprosy	
<b>6.4</b>	Sexually transmitted diseases, Poliomyelitis	
<b>6.5</b>	Hepatitis	
<b>6.6</b>	Acute-respiratory infections, Central nervous System infections, Urinary tract infections	
<b>6.7</b>	Pelvic inflammatory disease, Wound infection, Opportunistic infections, HIV infection	
<b>6.8</b>	Malaria, Filariasis, Zoonotic diseases	



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**BPT - Semester III**

**Course Code: BPT – 118**

**Course Title: Pharmacology**

**Course Credit Hours:**

Hrs. / Wk.			Credits			Marks		Total Marks
L	P	T	L	P	T	Theory	Practical	
3	-	3	3	-	3	100	-	100

**Course Outline:** This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body. The student will be aware of the contribution of both drug and physiotherapy factors in the outcome of treatment.

Sr No	Title of the Unit	Minimum number of Hours
1.	General Pharmacology	06
2.	Autonomic Nervous system	06
3.	Cardiovascular Pharmacology	09
4.	Neuropharmacology	08
5.	Disorders of Movement	06
6.	Inflammatory/Immune Diseases	12
7.	Digestion and Metabolism	05
8.	Geriatrics	05

**Total hours (Theory): 57 Hrs**

**Total hours (Practical): 00 Hrs**

**Total hours: 57 Hrs**

<b>Unit Sr No</b>	<b>Course Content</b>	<b>Hours of Teaching</b>
<b>1</b>	<b>General Pharmacology</b>	<b>6 Hours</b>
<b>1.1</b>	Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration, Distribution of drugs, Metabolism and Excretion of drugs Pharmacokinetics, Pharmacodynamics, Factors modifying drug response, Adverse effects	
<b>2</b>	<b>Autonomic Nervous system</b>	<b>6 Hours</b>
<b>2.1</b>	General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System	
<b>2.2</b>	Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants	
<b>3</b>	<b>Cardiovascular Pharmacology</b>	<b>9 Hours</b>
<b>3.1</b>	Drugs used in the treatment of heart failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators	
<b>3.2</b>	Antiarrhythmic Drugs	
<b>3.3</b>	Drugs used in the treatment of vascular disease and tissue ischemia: Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotic, Anticoagulants and Thrombolytics Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers, Cerebral Ischemia Peripheral Vascular Disease	
<b>4</b>	<b>Neuropharmacology</b>	<b>8 Hours</b>
<b>4.1</b>	Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines	
<b>4.2</b>	Antianxiety Drugs: Benzodiazepines, Other Anxiolytics	
<b>4.3</b>	Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium	
<b>4.4</b>	Antipsychotic drugs	
<b>5</b>	<b>Disorders of Movement</b>	<b>6 Hours</b>
<b>5.1</b>	Drugs used in Treatment of Parkinson 's disease	
<b>5.2</b>	Antiepileptic Drugs	

<b>5.3</b>	Spasticity and Skeletal Muscle Relaxants	
<b>6</b>	<b>Inflammatory/Immune Diseases</b>	<b>12 Hours</b>
<b>6.1</b>	Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactins with NSAIDs	
<b>6.2</b>	Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids	
<b>6.3</b>	Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout	
<b>6.4</b>	Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematosus, Scleroderma, Demyelinating Disease	
<b>6.5</b>	Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis	
<b>7</b>	<b>Digestion and Metabolism</b>	<b>5 Hours</b>
<b>7.1</b>	Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemic	
<b>8</b>	<b>Geriatrics</b>	<b>5 Hours</b>
<b>8.1</b>	Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension	

### Course Outcomes (COs):

At the end of course, the students will be able to

<b>CO1</b>	Describe the concepts of pharmacology (including pharmacokinetics and pharmacodynamics) of commonly used drugs
<b>CO2</b>	Discuss the effects of commonly used drugs on body function
<b>CO3</b>	Discuss the therapeutic and adverse effects, contraindications, and precautions for commonly used drugs
<b>CO4</b>	Discuss the pharmacological effects of drugs used in the management pain, inflammatory, cardio-vascular, respiratory, neurological and oncological disorders.
<b>CO5</b>	Explain the effect of commonly prescribed on exercise and movement
<b>CO6</b>	Identify the red and yellow flags for physiotherapy prescription based on the pharmacological effect of commonly prescribed drugs

### Recommended Text Books:

1. Udaykumar P. Pharmacology for physiotherapy, Jaypee Bros, Medical Publishers
2. Ramesh KV, Shenoy KA. Pharmacology for Physiotherapist, Jaypee Brothers, Medical Publishers

### Recommended Reference Books:

1. Tripathi KD. Essentials of medical pharmacology, JP Medical
2. The Pharmacological basis of Therapeutics - Goodman and Gilman - MacMillan

### CO-PO-PSO Matrix

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4	PS O5
CO1	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	1
CO2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	1
CO3	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	1
CO4	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	1
CO5	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	1
CO6	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	1

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**BPT - Semester III**

**Course Code: BPT – 119**

**Course Title: Biomechanics and kinesiology**

**Course Credit Hours:**

Hrs. / Wk.			Credits			Marks		Total Marks
L	P	T	L	P	T	Theory	Practical	
4	6	10	4	3	7	100	100	200

**Course Outline:** 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.

Sr No	Title of the Unit	Minimum number of Hours
1.	Biomechanics of the vertebral column	40
2.	Biomechanics of the Upper Limb joints	42
3.	Biomechanics of the Lower Limb joints	42
4.	Analysis of Posture	25
5.	Analysis of Gait	26
6.	Movement Analysis	15

**Total hours (Theory): 76 Hrs**

**Total hours (Practical): 114 Hrs**

**Total hours: 190 Hrs**

<b>Unit Sr No</b>	<b>Course Content</b>	<b>Hours of Teaching</b>
<b>1</b>	<b>Biomechanics of the vertebral column</b>	<b>40 Hours</b>
<b>1.1</b>	General structure and function	
<b>1.2</b>	Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region	
<b>1.3</b>	Muscles of the vertebral column	
<b>1.4</b>	General effects of injury and aging	
<b>2</b>	<b>Biomechanics of the Upper Limb joints</b>	<b>42 Hours</b>
<b>2.1</b>	The shoulder complex: Structure and components of the shoulder complex and their integrated function	
<b>2.2</b>	The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury	
<b>2.3</b>	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	
<b>2.4</b>	Explain and demonstrate the movements occurring at the joints, the muscles involved, the movements or muscle action produced, and mention the axis and planes through which the movements occur. The demonstrations may be done on models or skeleton for upper limb joints	
<b>3</b>	<b>Biomechanics of the Lower Limb joints</b>	<b>42 Hours</b>
<b>3.1</b>	The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur	
<b>3.2</b>	The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease	
<b>3.3</b>	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	
<b>3.4</b>	Explain and demonstrate the movements occurring at the joints, the muscles involved,	

	the movements or muscle action produced, and mention the axis and planes through which the movements occur. The demonstrations may be done on models or skeleton for lower limb joints	
<b>4</b>	<b>Analysis of Posture</b>	<b>25 Hours</b>
<b>4.1</b>	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	
<b>4.2</b>	Demonstration of how to analyze posture	
<b>5</b>	<b>Analysis of Gait</b>	<b>26 Hours</b>
<b>5.1</b>	General features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait	
<b>5.2</b>	Demonstration of how to analyze Gait	
<b>6</b>	<b>Movement Analysis</b>	<b>15 Hours</b>
<b>6.1</b>	ADL activities like sitting – to standing, lifting, various grips, pinches	
<b>6.2</b>	Demonstration of analysis for activities of daily living – ADL – (like sitting to standing, throwing, lifting etc.)	

### Course Outcomes (COs):

At the end of course, the students will be able to

<b>CO1</b>	Demonstrate understanding of functional movement (kinetics and kinematics) of human body
<b>CO2</b>	Identify the relationship between structure, function, and mechanical properties of movement system
<b>CO3</b>	Analyse the components of human movement both in normal and pathological conditions
<b>CO4</b>	Apply the principles of movement analysis in understanding normal and abnormal gait and posture
<b>CO5</b>	Perform basic movement analysis to identify gait and postural abnormalities
<b>CO6</b>	Apply the principles of biomechanics in designing physiotherapy protocols
<b>CO7</b>	Interpret data obtained from movement analysis such as gait and postural analysis



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**BPT - Semester III**

**Course Code: BPT – 120**

**Course Title: Foundation of Exercise Therapy and therapeutic massage**

**Course Credit Hours:**

Hrs. / Wk			Credits			Marks		Total
L	P	T	L	P	T	Theory	Practical	Marks
3	6	9	3	3	6	100	100	200

**Course Outline:** In this course, 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. They will be able to understand the concepts, different types and application of massage on patients during clinical practice.

Sr No	Title of the Unit	Minimum number of Hours
1.	Introduction to Exercise Therapy	12
2.	Methods of Testing	50
3.	Relaxation	12
4.	Passive Movements	10
5.	Active Movements	16
6.	Free exercise	14
7.	Active Assisted Exercise	15
8.	Types of resisted exercises	15
9.	Therapeutic Massage	27

**Total hours (Theory): 57 Hrs**

**Total hours (Practical): 114 Hrs**

**Total hours: 171 Hrs**

Unit Sr No	Course Content	Hours of Teaching
1	<b>Introduction to Exercise Therapy</b>	<b>12 Hours</b>
1.1	The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems	
1.2	Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment	
2	<b>Methods of Testing</b>	<b>50 Hours</b>
2.1	<ul style="list-style-type: none"> <li>a. Functional tests</li> <li>b. Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints &amp; spine, Goniometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints</li> <li>c. Tests for neuromuscular efficiency <ul style="list-style-type: none"> <li>i. Electrical tests</li> <li>ii. Manual Muscle Testing: Introduction to MMT, Principles &amp; Aims, Indications &amp; Limitations, Techniques of MMT for group &amp; individual: Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine</li> <li>iii. Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf</li> <li>iv. Static power Test</li> <li>v. Dynamic power Test</li> <li>vi. Endurance test</li> <li>vii. Speed test</li> </ul> </li> <li>d. Tests for Co-ordination</li> <li>e. Tests for sensation</li> <li>f. Pulmonary Function tests</li> <li>g. Measurement of Limb Length: true limb length, apparent limb length, segmental limb length</li> <li>h. Measurement of the angle of Pelvic Inclination</li> </ul>	

<b>2.2</b>	Perform different test methods	
<b>2.3</b>	Demonstrate the technique of measuring using goniometry	
<b>2.4</b>	Demonstrate muscle strength using the principles and technique of MMT	
<b>2.5</b>	Demonstrate the techniques for muscle strengthening based on MMT grading	
<b>2.6</b>	Demonstrate techniques for measuring limb length and body circumference	
<b>3</b>	<b>Relaxation</b>	<b>12 Hours</b>
<b>3.1</b>	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	
<b>3.2</b>	Demonstrate relaxation techniques	
<b>4</b>	<b>Passive Movements</b>	<b>10 Hours</b>
<b>4.1</b>	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	
<b>4.2</b>	Demonstrate to apply the technique of passive movements	
<b>5</b>	<b>Active Movements</b>	<b>16 Hours</b>
<b>5.1</b>	Definition of strength, power & work, endurance, muscle actions.	
<b>5.2</b>	Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fiber type, motor unit, force gradation.	
<b>5.3</b>	Causes of decreased muscle performance	
<b>5.4</b>	Physiologic adaptation to training: Strength & Power, Endurance	
<b>5.5</b>	Types of active movements	
<b>5.6</b>	Demonstrate various techniques of Active movements	
<b>6</b>	<b>Free exercise</b>	<b>14 Hours</b>
<b>6.1</b>	Classification, principles, techniques, indications, contraindications, effects and uses	
<b>7</b>	<b>Active Assisted Exercise</b>	<b>15 Hours</b>
<b>7.1</b>	Principles, techniques, indications, contraindications, effects and uses	
<b>7.2</b>	Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects	

	and uses	
<b>7.3</b>	Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses	
<b>8</b>	<b>Types of resisted exercises</b>	<b>15 Hours</b>
<b>8.1</b>	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	
<b>8.2</b>	Demonstrate techniques of strengthening muscles using resisted exercises	
<b>9</b>	<b>Therapeutic Massage</b>	<b>27 Hours</b>
<b>9.1</b>	History and Classification of Massage Technique	
<b>9.2</b>	Principles, Indications and Contraindications	
<b>9.3</b>	Technique of Massage Manipulations	
<b>9.4</b>	Physiological and Therapeutic Uses of Specific Manipulations	
<b>9.5</b>	Demonstrate massage technique application according to body parts and techniques of massage manipulations	

### Course Outcomes (COs):

At the end of the course, the students will be able to

<b>CO1</b>	Explain the physiological effects of endurance, strengthening, balance and coordination effects on various systems
<b>CO2</b>	Demonstrate fundamental and derived positions and muscle actions
<b>CO3</b>	Explain planes and axis of movements
<b>CO4</b>	Discuss the methods of measuring joint movements
<b>CO5</b>	Demonstrate joint movement measurements (Including electronic goniometer)
<b>CO6</b>	Discuss the indications, contraindications and precautions to be taken while performing Passive Range of Motion, Active Range of Motion, Assisted exercises, Endurance exercise, Strengthening exercise, Balance and coordination exercise
<b>CO7</b>	Demonstrate competencies in prescribing Passive Range of Motion, Active Range of Motion, Assisted exercises, Endurance exercise, Strengthening exercise, Balance and coordination exercise
<b>CO8</b>	Differentiate types of exercise based on the therapeutic effects

<b>CO9</b>	Prescribe therapeutic exercise based on the assessment findings
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### Recommended Text Books:

1. Principle of Exercise Therapy -Gardiner - C.B.S. Delhi
2. Practical Exercise Therapy - Hollis - Blackwell Scientific Publications
3. Therapeutic Exercises Foundations and Techniques - Kisner and Colby -F.A. Davis
4. Muscle testing techniques of manual examination and performance by Daniel's and worthingham 1<sup>st</sup> South Asia edition
5. Measurement of Joint Motion – a guide to Goniometry by Cynthia Norkins, 2nd Edition; Jaypee Publication
6. Principles and Practices of Therapeutic Massage, Sinha A G, Jaypee Publication

### Recommended Reference Books:

1. Therapeutic Exercises - Basmajian - Williams and Wilkins
2. Licht SH, editor. Massage, manipulation, and traction. E. Licht
3. Kennedy-Armbruster C, Yoke M. Methods of group exercise instruction Human Kinetics 2014
4. ACSM's Guidelines for Exercise Testing and Prescription

### CO-PO-PSO Matrix

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4	PS O5
CO1	2	2	2	1	1	1	2	1	1	1	1	1	2	2	2	1	1
CO2	2	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	1
CO3	2	2	1	1	1	1	2	1	1	1	1	1	2	2	2	1	1
CO4	2	2	1	1	1	2	2	1	1	1	1	1	2	2	2	1	1
CO5	3	3	2	1	2	2	1	1	1	1	1	1	3	2	2	2	1
CO6	3	3	2	2	1	1	2	1	1	1	1	2	3	3	2	2	1
CO7	3	3	3	2	2	1	2	1	2	1	1	2	3	3	3	2	1
CO8	2	2	2	1	1	1	2	1	1	1	1	1	2	2	2	1	2
CO9	3	3	3	2	2	1	3	1	2	2	1	2	3	3	3	2	2

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**BPT - Semester III**

**Course Code: BPT – 121**

**Course Title: Introduction to quality and patient safety**

**Course Credit Hours:**

Hrs. / Wk			Credits			Marks		Total
L	P	T	L	P	T	Theory	Practical	Marks
1	2	3	1	1	2	50	50	100

**Course Outline:** This course aims to equip students with the skills needed to save lives as first responders in emergencies. It focuses on Basic Life Support (BLS), which is crucial for responding to sudden cardiac arrest (SCA). Key elements of BLS include recognizing SCA, activating emergency services, performing early CPR, and using an automated external defibrillator (AED) for rapid defibrillation. The course also covers the initial recognition of heart attacks and strokes. In addition, students will learn basic emergency care, including first aid and triage. Training will involve mannequins, dummies, video presentations, role plays, and lecture demonstrations.

Sr No	Title of the Unit	Minimum number of Hours
1.	Quality assurance and management	08
2.	Basics of emergency care and life support skills	15
3.	Bio medical waste management and environment safety	12
4.	Infection prevention and control	06
5.	Antibiotic Resistance	08
6.	Disaster preparedness and management	08

**Total hours (Theory): 19 Hrs**

**Total hours (Practical): 38 Hrs**

**Total hours: 57 Hrs**

<b>Unit Sr No</b>	<b>Course Content</b>	<b>Hours of Teaching</b>
<b>1</b>	<b>Quality assurance and management</b>	<b>8 Hours</b>
<b>1.1</b>	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. a. Concepts of Quality of Care b. Quality Improvement Approaches c. Standards and Norms d. Quality Improvement Tools e. Introduction to NABH guidelines	
<b>2</b>	<b>Basics of emergency care and life support skills</b>	<b>15 Hours</b>
<b>2.1</b>	Vital signs and primary assessment	
<b>2.2</b>	Basic emergency care – first aid and triage	
<b>2.3</b>	Ventilations including use of bag-valve-masks (BVMs)	
<b>2.4</b>	Choking, rescue breathing methods	
<b>2.5</b>	One- and Two-rescuer CPR	
<b>2.6</b>	Using an AED (Automated external defibrillator)	
<b>2.7</b>	Managing an emergency including moving a patient	
<b>3</b>	<b>Bio medical waste management and environment safety</b>	<b>12 Hours</b>
<b>3.1</b>	Definition of Biomedical Waste	
<b>3.2</b>	Waste minimization	
<b>3.3</b>	BMW – Segregation, collection, transportation, treatment and disposal (including color coding)	
<b>3.4</b>	Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste	
<b>3.5</b>	BMW Management & methods of disinfection	
<b>3.6</b>	Modern technology for handling BMW	
<b>3.7</b>	Use of Personal protective equipment (PPE)	

<b>3.8</b>	Monitoring & controlling of cross infection (Protective devices)	
<b>4</b>	<b>Infection prevention and control</b>	<b>6 Hours</b>
<b>4.1</b>	Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)]	
<b>4.2</b>	Prevention & control of common healthcare associated infections	
<b>4.3</b>	Components of an effective infection control program	
<b>4.4</b>	Guidelines (NABH and JCI) for Hospital Infection Control	
<b>5</b>	<b>Antibiotic Resistance</b>	<b>8 Hours</b>
<b>5.1</b>	History of Antibiotics	
<b>5.2</b>	How Resistance Happens and Spreads	
<b>5.3</b>	Types of resistance- Intrinsic, Acquired, Passive	
<b>5.4</b>	Trends in Drug Resistance	
<b>5.5</b>	Actions to Fight Resistance	
<b>5.6</b>	Bacterial persistence	
<b>5.7</b>	Antibiotic sensitivity	
<b>5.8</b>	Consequences of antibiotic resistance	
<b>5.9</b>	Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals	
<b>6</b>	<b>Disaster preparedness and management</b>	<b>8 Hours</b>
<b>6.1</b>	Fundamentals of emergency management	
<b>6.2</b>	Psychological impact management	
<b>6.3</b>	Resource management	
<b>6.4</b>	Preparedness and risk reduction	
<b>6.5</b>	Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms	

### **Course Outcomes (COs):**

At the end of the course, the students will be able to

<b>CO1</b>	Perform Opening and maintaining and patent airway: assessment and knowledge of airway maneuvers and adjuncts
<b>CO2</b>	Ventilate patients: Assessment and management of breathing with Mouth to mouth and mouth to mask
<b>CO3</b>	Administer basic life support skills including cardiopulmonary resuscitation
<b>CO4</b>	Provide first aid of simple and multiple system trauma such as Controlling hemorrhage, Managing Burns and wounds, Response to effects of weapons of mass destruction, manually stabilizing injured extremities
<b>CO5</b>	Provide first aid to patients with medical emergencies like heart attack and stroke, Identifying signs of Stroke and heart attack and safe transfer after first aid without delay in transfer, Manage general medical complaints seizures and animal bites (snake /dog bite)
<b>CO6</b>	Manage safe patient transport entailing-Extrication of the victim, helmet removal and spine protection during transport
<b>CO7</b>	Reassure patients and bystanders by working in a confident, efficient manner, Avoid mishandling and undue haste while working expeditiously to accomplish the task
<b>CO8</b>	Explain Roles, responsibilities and limitation of first responder

### **Recommended Text Books:**

1. First aid & emergency nursing by N.N. Yalayyaswamy, CBS Publisher and Distributers.
2. Indian red cross : Indian First Aid Manual 2016 (7th edition) available at <https://www.indianredcross.org/publications/FA-manual.pdf>

### CO-PO-PSO Matrix

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4	PS O5
CO1	2	2	2	2	2	1	1	1	2	1	2	2	2	2	2	2	1
CO2	2	2	2	2	2	1	1	1	2	1	2	2	2	2	2	2	1
CO3	3	3	2	2	2	1	1	1	2	1	2	2	3	2	2	2	1
CO4	3	3	3	2	2	1	1	1	2	2	2	2	3	3	2	2	1
CO5	3	3	3	2	2	1	1	1	2	2	2	2	3	3	3	2	1
CO6	3	3	2	2	2	1	1	1	2	2	2	2	3	2	2	2	1
CO7	2	2	2	3	3	1	1	1	2	2	2	3	2	2	3	2	1
CO8	1	1	2	3	2	1	1	1	1	1	2	3	1	2	2	2	1

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**BPT - Semester III**

**Course Code: BPT – 122**

**Course Title: Clinical Observation**

**Course Credit Hours:**

Hrs. / Wk			Credits			Marks		Total Marks
L	P	T	L	P	T	Theory	Practical	
-	6	6	-	2	2	-	100	100

**Course Outline:** The objective of this 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 forum, role plays, and clinical bed-side demonstrations.

- Students will be posted in rotation in the physiotherapy OPDs and various wards of hospitals attached with the college. The students will observe the process of providing physiotherapy care for the patients. They may assist the clinical staff as well in executing non clinical aspects of service delivery. Each student shall maintain a case portfolio / diary to record the various activities performed during clinical posting. This diary should be presented before the final exam and the grade should be awarded by the college.

**Course Outcomes (COs):**

At the end of the course, the students will be able to

<b>CO1</b>	Take brief history of various clinical conditions affecting human beings
<b>CO2</b>	Communicate with patients and caregivers
<b>CO3</b>	Identify the chief complaints and major problems affecting patients

## CO-PO-PSO Matrix

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4	PS O5
CO1	2	2	1	1	2	1	1	1	1	1	1	2	2	1	2	1	1
CO2	2	1	1	2	3	1	1	1	2	1	1	2	2	2	3	2	1
CO3	2	2	2	1	2	1	1	1	1	1	1	2	2	2	2	1	1