Four-Year Undergraduate Programme

Bachelor of Physiotherapy

Faculty of Physiotherapy Parul University

Vadodara, Gujarat, India

ANNEXURE-I

Faculty of Pharmacy

1. **Vision of the Department**

   To make successful academic quests through entrepreneurship. Research, modernization and partnerships, thus making PU the finest educational destination.

2. **Mission of the Department**

   - Bridging the gap between academia and career, by laying emphasis on development programs for both students and staff.
   - Promoting healthy relationships between existing students, alumni, teachers and staff
   - Forming associations with other universities and corporate firms of the nation and the world
   - Presenting state of the art infrastructure with high quality and work ethics.

3. **Program Educational Objectives**

   The statements below indicate the career and professional achievements that the BPT curriculum enables graduates to attain.

PEO 1	To create a competent physiotherapist who will understand and practice professional principles of physiotherapy in private practice, hospitals, government and non-government organizations, academia, research institutes and entrepreneurial pursuit.
PEO 2	Sustain continued professional development through lifelong learning activities and work for development of the field.
PEO 3	An ability to function professionally with ethical responsibility as an individual as well as multidisciplinary team with positive attitude.

4. **Program Learning Outcomes**

   Program Learning outcomes are statements conveying the intent of a program of study.

PLO 1	**Physiotherapy Knowledge:**	Apply the knowledge of anatomy, physiology and kinesiology in professional Physiotherapy Practice and select various exercise therapies and Electrotherapeutic techniques for prevention and cure 0f various conditions
PLO 2	**Problem analysis**	An ability to assess, critically analyze and manage patients with various diseases and disorders in the field of Physiotherapy and Rehabilitation sciences.
PLO 3	**Design/ development of Treatment Protocol**	Design and implement treatment protocol for various disease and disorders according to the n99d 0f the patients with appropriate consideration of functional and environmental needs.
PLO 4	**Use of Modem Technology/ Recent Advances**	Apply scientific research and other forms of best evidences in the practice of physiotherapy.

PLO 5	**Community Needs/ Services:**	An ability to address prevention, wellness and health promotion needs of individuals, groups and communities
PLO 6	**Ethics**	Practice in an ethical and legal manner.
PLO 7	**Individual and team work**	Function effectively as an individual as a member or leader in diverse teams, and in multidisciplinary settings.
PLO 8	**Communication:**	Communicate effectively on different diseases and disorders treated by physiotherapists, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions to the patients.
PLO 9	**Case studies and clinical Trial**	An ability to design and conduct clinical trial, analyze data and provide well informed conclusions on a given study.
PLO 10	**Life-long learning**	Sustain lifelong learning activities and work for the development of professional as well as personal growth.
PLO 11	**Professional Physiotherapists**	Able to work professionally in the field of physiotherapy and maintain good intrapersonal and interpersonal skills.
PLO 12	**Contemporary Issues**	Able to work on contemporary issues related to the field of physiotherapy.

5. **Program Specific Learning Outcomes**

PSO 1	To create a competent physiotherapist who will understand and practice professional principles of physiotherapy in private practice, hospitals, government and non-government organizations, academia, research institutes and entrepreneurial pursuit
PSO 2	Sustain continued professional development through lifelong learning activities and work for development of field.
PSO 3	An ability to function professionally with ethical responsibility as an individual as well as in multidisciplinary team with positive attitude.

6. **Program Curriculum**

Year 1

Sr. No.	Subject Code	Subject Name	Credit	Lecture	Lab
1	07101101	Human Anatomy	-	150	150
2	07101102	Human Physiology	-	150	100
3	07101103	Biochemistry	-	50	-
4	07101104	Psychology & Sociology	-	120	-
5	07101105	Exercise therapy-I & Massage Manipulations	-	150	150
6	07101106	Biomedical Physics	-	50	-
7	-	Computer Application*	-	60	40
8	-	English*	-	50	-
9	-	Nursing and First Aid*	-	30	-
10	-	Introduction to Physiotherapy	-	10	-
Total				**820**	**440**

Year 2

Sr. No.	Subject Code	Subject Name	Credit	Lecture	Lab
1	07101201	Exercise Therapy – II	-	100	150
2	07101207	Electrotherapy	-	150	200
3	07101203	Pathology +Microbiology	-	120	-
4	07101204	Pharmacology	-	60	-
5	07101208	Kinesiology	-	150	-
6	-	Clinics	-	-	550
Total				**580**	**900**

Year 3

Sr. No.	Subject Code	Subject Name	Credit	Lecture	Lab
1	07101301	General Medicine	-	70	-
2	07101301	ENT + Ophthalmology	-	10+5	-
3	07101301	Radiology	-	20	-
4	07101301	Pediatrics	-	20	-
5	07101301	Dermatology	-	10	-
6	07101302	Neuro Medicine & Neuro Surgery	-	60	-
7	07101302	Gynec & Obs	-	30	-
8	07101303	Gen. Surgery + Plastic Surgery	-	60+15	-
9	07101303	C.T. Surgery	-	60	-

10	07101304	Ortho – Traumatic	-	60	-
11	07101304	Ortho Non-Traumatic	-	60	-
12	07101305	Physical & Functional Diagnosis	-	100	100
13	-	Clinics	-	-	650
Total				**580**	-

Year 4

Sr. No.	Subject Code	Subject Name	Credit	Lecture	Lab
1	07101401	Physiotherapy in Musculoskeletal and Sports Science.	-	60	60
2	07101402	Physiotherapy in Neuroscience and Psychosomatic Disorders.	-	60	60
3	07101407	Physiotherapy in Cardio-Pulmonary, Medical and Surgical Science	-	70	80
4	07101405	Physiotherapy in Community Health.	-	50	70
5	07101406	Biostatistics And Research Methodology	-	50	-
6	-	Clinics	-	-	960
Total				**290**	**1230**

7. **Detailed Syllabus**

ANNEXURE-II

1ST YEAR

a. Course Name: Human Anatomy

b. **Course Code:** 070101101

c. Prerequisite: To study Human Anatomy candidate must have passed 12th science or equivalent course. They should have basic knowledge regarding human body and human biology.

d. **Rationale:** This course provides an in-depth understanding of human anatomy, histology, embryology, and physiology, focusing on the structural and functional relationships within the body systems. It aims to equip students with foundational knowledge critical for advanced studies in health sciences, medicine, and related fields. By integrating theoretical concepts with practical insights, students will gain a comprehensive view of the human body, enhancing their analytical skills and preparing them for clinical applications.

e. Course Learning Objective:

CLOBJ 1	Describe the structure, classification, and function of bones in the axial and appendicular skeleton, as well as identify and detail the types of muscle tissues, major muscle groups, their origin, insertion, nerve supply, and action.
CLOBJ 2	Explain the organization and functions of the central and peripheral nervous systems, including cranial and spinal nerves, explain role of special sensory organs.
CLOBJ 3	Understand the major endocrine glands, their hormonal products, and the physiological effects of hormones on various body systems.
CLOBJ 4	Outline the anatomy of the heart, blood vessels, and lymphatic structures, and explain their roles in circulation and fluid balance.
CLOBJ 5	Discuss the anatomy and functions of the digestive, urinary, and reproductive organs, focusing on their structural adaptations for specific functions.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Identify and describe the major bones and landmarks of the axial and appendicular skeleton, demonstrating an understanding of bone function, composition and growth, classification of joints and types of muscles and detail the action of major muscles in various regions.
CLO 2	Describe the structure and function of the central and peripheral nervous systems, including the role of major neural pathways and special sensory organs.
CLO 3	Explain the roles of major endocrine glands and their hormones, discussing how these hormones regulate physiological processes and maintain homeostasis.
CLO 4	Explain the anatomical features of the heart and blood vessels, describing how these structures support efficient blood circulation and lymphatic drainage.
CLO 5	Describe the anatomy of the digestive, urinary, and reproductive systems, demonstrating knowledge of how their structures facilitate essential physiological processes.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
5	**4**	**9**	**-**	**30**	**-**	**30**	**70**	**70**	**200**

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. **Course Content:**

Sr.	Topics	W	T	P	CO
1	**General Introduction:** 1. Definitions and subdivisions 2. Plan of human body 3. System of the body 4. The unit of structure and function of the cell	3	4	2	CLO1
2	**Histology: (Not For University Examination)** 1. Cell 2. Tissues of the body 3. Epithelium 4. Connective tissue 5. Cartilage 6. Bone 7. Lymphoid tissue 8. Muscles 9. Nerves	0	8	-	-
3	**Embryology: (Not for University Examination)** 1. Ovum, spermatozoa, fertilization and formation of germ layers and their derivations. 2. Development of skin, fascia, blood vessels and lymphatics. 3. Neural tube, brain vessels, spinal cord. 4. Development of brain and brainstem structures, developmental anomalies. 5. Development of bones, axial and appendicular skeleton and muscles.	0	6	-	-
4	**Osteology** Anatomical positions of the body, axis, planes, common anatomical terminologies (grooves, tuberosity, trochanters etc). Connective tissue classification. Bones: - Composition and functions, classification of types according to morphology and development, growth and repair, structure of long bone, vertebral column, types of vertebrae, bones of extremities and bony landmarks.	15	10	10	CLO1
	Arthrology				

5	Definitions.	14	12	10	CLO1
	Classification of joints. Construction of joints. Motions of joints.				
	Structure of fibrous, cartilaginous joints. Blood supply and nerve supply of joints.				
	Articulations – articular surfaces, types of joints, motions of upper and lower extremities, trunk, head.				
6	**Myology**	8	10	5	CLO1
	Types of muscle tissue.				
	Muscles of upper extremity, lower extremity, trunk, eye, face etc. origin, insertion, nerve supply and action (in detail).				
7	**Myology of other systems**	3	10	5	CLO1
	Cardiovascular system.				
	Blood lymph, tissue fluid-characteristics, composition and function The heart-main arteries, veins, capillaries.				
	Lymph circulation.				
8	**Neuro-anatomy**	8	10	15	CLO2
	Division and function of the nervous system. Brain, spinal cord-their structures, division.				
	Nerve tissue-neuron, nerve, fiber, synapse, end-organs etc.				
	Organization of Central Nervous System-spinal nerves and autonomic nervous system-mainly pertaining to cardiovascular, respiratory and urogenital system Cranial nerves. Peripheral nervous system-Peripheral nerves, sensory and organs, neuromuscular junction, spinal segments and areas.				
	Nerve supply to voluntary muscles and segmental distribution.				
	Hypothalamus, Corpus striatum, Cerebral hemispheres – white and gray matter, lateral ventricles, blood supply of brain, meninges, pyramidal system, extrapyramidal systems, anatomic integration.				
	Cerebro-spinal fluid.				
	Sensory end-organs and sensations.				
	Autonomic nervous system-sympathetic, parasympathetic.				
9	**Lymphatic System – brief outline.**	1	3	3	CLO4
10	**Cardiovascular System**	3	8	8	CLO4
	Heart (gross anatomy and functions). Arteries.				
	Veins.				
	Collateral Circulation.				
11		2	5	5	CLO5
	Digestive System				
	Anatomy of digestive organs – Esophagus, stomach, intestine, rectum etc. Digestive glands.				
12	**Urinary System**	2	5	3	CLO5
	Anatomy of urinary organs, kidneys, ureters, urinary bladder urethra in males and females etc.				
	Types of bladder especially in paraplegics.				
13	**Reproductive System**	2	5	3	CLO5
	Brief outline of genital organs.				
	Outline of male and female reproductive system				
14	**Endocrine System**	1	3	3	CLO3
	Glands – classification, sites and section. Enzymes.				
	Hormones.				

15	**Special sensory organs and sensations** Emphasis on skin, ear and eyes. Less detail on smell and taste.	2	5	3	CLO2
16	**Regional Anatomy:** **1) Upper Extremity:** **I. Osteology:** Clavicle, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges in articulated hand. **II. Soft parts:** Breast, pectoral region, axilla, front of arm, cubital fossa, front of forearm, back of forearm, palm, dorsum of hand, muscles, fascia, nerves, blood vessels and lymphatic drainage of upper extremity. **III. Joints:** shoulder girdle, shoulder joint, elbow joint, radioulnar joint, wrist joint and joints of hand. **IV.** Arches of hand, skin of the palm and dorsum of hand. **2) Lower Extremity:** **I. Osteology:** Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals, phalanges. **II. Soft parts:** Gluteal region, front and back of thing (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 the foot, skin of foot. **3) Trunk:** **I. Osteology:** Cervical, thoracic, lumbar, sacral and coccygeal vertebra and ribs. **II. Soft tissue:** Pre and Para vertebral muscles, anterior abdominal wall muscles, intervertebral disc. **III. Joints:** Hip joint, knee joint, ankle joint, joints of the foot. **4) 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, Extraocular muscles, salient points about the eye ball and internal ear.	36	46	75	CLO1
TOTAL		**100**	**150**	**150**	

i. **Textbook and Reference Book:**

1. Gray's Anatomy
2. Extremities by Quinning Wasb
3. Atlas of Histology by Mariano e Fiore
4. Anatomy and Physiology by Smout and McDowell
5. Kinesiology by Katherine Walls
6. Neuroanatomy by Snell
8. Neuroanatomy by Vishram Singh

a. **Course Name: Human Physiology**

b. **Course Code:** 07101102

c. **Prerequisite:** To study human physiology candidate must have passed 12th science or equivalent program. Candidate should have some basic knowledge of human body and human biology.

d. **Rationale:** This course on General Physiology provides a comprehensive overview of the essential physiological principles governing human body function. By integrating topics such as cellular structure, body systems, and the physiological responses to exercise and nutrition, students will gain a holistic understanding of how various systems interact to maintain homeostasis. This foundational knowledge is critical for future studies in health sciences, medicine, and related fields, enabling students to apply physiological concepts in clinical and practical settings.

e. **Course Learning Objective:**

CLOBJ 1	Understand the structure and function of cells and organelles, as well as the principles governing body fluid compartments.
CLOBJ 2	Describe the composition, function, and formation of blood components, along with the anatomy and physiology of the cardiovascular system, including cardiac output and blood pressure regulation.
CLOBJ 3	Explain the mechanisms of respiration and the physiological effects of acute and chronic exercise on respiratory function and overall fitness.
CLOBJ 4	Explain the structure and function of muscle types, the mechanics of muscle contraction, and the physiological principles of the nervous system, including sensory receptors, synaptic transmission, and motor control pathways.
CLOBJ 5	Understand the processes of digestion, absorption, and metabolism of macronutrients and micronutrients, emphasizing their roles in maintaining health across different life stages.
CLOBJ 6	Examine the functions of the endocrine system, reproductive health, and the physiological mechanisms underlying renal function and urine formation.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Describe the structure of cells and their organelles, and explain the distribution and composition of body fluid compartments.
CLO 2	Demonstrate knowledge of blood composition and function, describe the cardiac cycle, and analyze factors affecting blood pressure and cardiac output.
CLO 3	Articulate the mechanisms of gas exchange in the lungs and tissues, and evaluate the physiological adaptations to various types of exercise.
CLO 4	Explain the mechanisms of muscle contraction and the properties of motor units, as well as describe the roles of various components of the nervous system in coordinating movement and sensory processing, applying this knowledge to assess muscle function and neurological conditions.
CLO 5	Outline the digestive processes and assess the nutritional needs for different age groups, as well as the metabolic pathways of carbohydrates, proteins, and fats.
CLO 6	Explain the regulatory functions of hormones from major endocrine glands, the physiological aspects of reproduction, and the mechanisms involved in kidney function and urine formation.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
5	**4**	**9**	**-**	**30**	**-**	**30**	**70**	**70**	**200**

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/ Seminars/ Presentations/ MCQ Tests, etc.)

h. Course Content:

Sr. No.	Contents	W	T	CO
1	**General Physiology** Cell Structure and organelle. General Principles of Biophysics. Body Fluid compartments.	3	7	CLO1
2	**Blood:** **I.** Composition of Blood, Plasma, Protein Formation and their Function. **II.** Structure, formation and functions of R.B.C. **III.** Structure, formation and functions of W.B.Cs. and platelets. **IV.** Coagulation and its defects of bleeding and clotting time. **V.** Blood Groups and their significance, Rh. Factor. **VI.** Reticuloendothelial system, Jaundice, Structure and functions of spleen. **VII.** Haemoglobin and E.S.R.	10	26	CLO2
3	**Cardiovascular System:** **I.** Structure, properties of heart muscle and nerve supply of heart structure and function of arteries, arterioles, capillaries and veins. **II.** Cardiac cycle and heart sounds. **III.** Cardiac output measurement, factors affecting. **IV.** Heart rate and its regulation, Cardiovascular reflexes. **V.** Blood pressure, its regulations and physiological variations. **VI.** Peripheral resistance, factors controlling and its role in B.P. **VII.** Haemorrhage. **VIII.** Changes in muscular exercise.	12	30	CLO2
4	**Respiratory System:** **I.** Mechanism of respiration, intra-pleural and intrapulmonary pressure. **II.** Lung volumes and capacities. **III.** O2 and CO2 carriage and their exchange in tissues and lungs. **IV.** Nervous chemical regulation of respiration – Respiratory Centres. **V.** Respiratory states – Anoxia, Asphyxia, Cyanosis, and Acclimatization.	12	30	CLO 3

5	**Exercise Physiology:** **I.** Effects of acute & chronic exercises. **II.** Oxygen / CO2 transport-O2 debt. **III.** Effects of exercise on muscle strength, power, endurance, B.M.R., R.Q.-hormonal & metabolic effects-respiratory & cardiac conditioning. **IV.** Aging. **V.** Training-fatigue- & recovery. **VI.** Fitness-related to age, gender, & body type.	7	17	CLO 3
6	**Digestive System:** **I.** General outline and salivary digestion. **II.** Gastric secretion and its mechanism of section and functions. **III.** Digestion, Absorption and Metabolism of Proteins. **IV.** Structure, Secretions and Function of Liver.	5	12	CLO 5
7	**Nutrition:** **I.** Digestion, Absorption and Metabolism of Carbohydrates. **II.** Digestion, Absorption and Metabolism of Fats. **III.** Digestion, Absorption and Metabolism of Proteins. **IV.** Vitamins, its sources, functions and resources. **V.** Balanced diet in different age groups and occupation	4	10	CLO 5
7	**Endocrines:** **I.** Anterior Pituitary. **II.** Posterior Pituitary and Parathyroid. **III.** Thyroid. **IV.** Adrenal Cortex. **V.** Adrenal Medulla, Thymus. **VI.** Pancreas and Blood sugar regulation.	8	20	CLO 6
8	**Reproductive System:** **I.** Sex determination and development, Puberty. **II.** Male sex hormones and their functions, spermatogenesis. **III.** 3Female sex hormones and functions, menstrual cycle, ovulation and contraceptives. **IV.** Pregnancy, functions of placenta and lactation.	4	11	CLO 6
9	**Excretory System:** **I.** Gross and minute structure of Kidney and features of renal circulation. **II.** Mechanism of formation of Urine, GFR and Tubular function. **III.** Renal function. **IV.** Physiology of Micturition.	4	9	CLO 6
10	**Muscle and Nerve:** **I.** Structure of Neurons, membrane potential and generation of action potential. **II.** Nerve impulse conduction, Salutatory conduction. **III.** Neuromuscular junction and drugs acting on it – Myasthenia. **IV.** Degeneration and regeneration in peripheral nerves - Wallerian degeneration of electro tonus and Pflagers Law.	6	14	CLO 4

11	**Muscle** **I.** Type of muscles and their gross structure, stimulus chronaxie, strength duration curve. **II.** Structure of sarcomere – Basis of muscle contraction, Starling's Law and changes during muscle contraction. **III.** Electrical – Biphasic and monophasic action potentials. **IV.** Chemical, Thermal and Physical changes, isometric and isotonic contraction. **V.** Motor units and its properties, Clonus, Tetanus, All or None Law, Beneficial Effect. **VI.** Nature of Voluntary contraction, Fatigue.	4	10	CLO 4
12	**Nervous System** **I.** Types and properties of Receptors, types of sensations. **II.** Structure of Synapses, Reflex and its properties, occlusion summation, sub minimal fringe, etc. **III.** Tracts of Spinal Cord. **IV.** Descending, Pyramidal and Extra pyramidal Tracts. **V.** Hemi section and complete section of spinal cord, upper and lower motor neuron paralysis. **VI.** Cerebral cortex – areas and functions, E.E.G. **VII.** Structure, connections and functions of Cerebellum. **VIII.** Connections and functions of Basal Ganglia and Thalamus. **IX.** Reticular formation, tone, posture and equilibrium. **X.** Autonomic nervous system.	14	35	CLO 4
13	**Special Senses** **I.** Broad features of Eye, errors of refraction, lesions of visual pathways. **II.** Speech and its disorders. **III.** Ear and vestibular apparatus.	3	8	CLO 6
14	**A.N.S** Sympathetic / parasympathetic system-adrenal medulla-functions-Neuro Transmitters.	3	8	CLO 6
15	**Temperature Regulation** Circulation of the skin, body fluid, electrolyte balance floor-(micturition, defecation labour).	1	3	CLO 6
16	**Practical and Demonstrations** **1) Blood:** **i.** Haemoglobin meter and total R.B.C. count. **ii.** Total W.B.C. count. **iii.** Preparation and staining of blood smears, determination of differential W.B.C. count. **iv.** Blood grouping. **v.** Erythrocyte sedimentation rate. **vi.** Bleeding and clotting time. **2) Respiratory System:** **i.** Artificial respiration. **ii.** Pulmonary function test. **3) Cardiovascular System:** **i.** Heart Sounds.		100	

	ii. Arterial Blood Pressure in Man. **iii.** Cardiac efficiency tests. **iv.** Recording and study of E.C.G. **4) Central Nervous System:** **i.** Testing of peripheral sensations and cranial nerves. **ii.** Superficial and deep reflexes. **iii.** Tests for Cerebral and Cerebellar functions. **5) Neuromuscular System:** **i.** Varieties of stimuli. **ii.** Electrical Apparatus for physiological experiments.			
TOTAL		**100**	**250**	

i. Text Book and Reference Book:

1. A K Jain for Physiotherapist
2. Anatomy and Physiology by Indeber singh
3. Text book of medical Physiology by G.K. Pal
4. Guyton and hall Text book of medical Physiology

a. **Course Name: Biochemistry**
b. **Course Code:** 07101103
c. **Prerequisite:** To study biochemistry candidate must have passed 12th science or equivalent program. Candidate must have some basic knowledge of biology and chemistry**.**
d. **Rationale:** This syllabus provides a comprehensive overview of cell biology, integrating the biochemical and molecular principles of membrane structure, carbohydrate, protein, lipid, and nucleic acid metabolism, along with clinical applications, to equip students with essential knowledge for understanding health and disease.

e. **Course Learning Objective:**

CLOBJ1	Understand membrane structure and the functions of key intracellular organelles.
CLOBJ2	Acquire knowledge about the chemistry, classification, and metabolic functions of different food components focusing on their roles in health and disease.
CLOBJ3	Describe the structure and function of nucleic acids, the role of enzymes, biochemistry of connective tissue and muscles and different clinical biochemistry tests.
CLOBJ4	Understand the essential aspects of nutrition, including basal metabolic rate (BMR), energy requirements, and elements of a balanced diet.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO1	Explain membrane dynamics and the roles of organelles in cellular function.
CLO2	Describe the metabolism and regulation of different food components focusing on key pathways and their clinical significance in disorders like diabetes and obesity.
CLO3	Explain the key concepts of nucleic acids, enzymes, connective tissue and muscle components, and explain the significance of clinical biochemistry results for liver, renal, and lipid functions.
CLO4	Determine the composition of foods and dietary recommendations, and identify the nutritional value of carbohydrates, proteins, fats, and fibers.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Theory Hour Hrs./Week	**Lab Hour Hrs./Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
2	0	2	-	15	-	-	35	-	50

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	Topics	W	T	CO
1	Cell Biology Membrane structure and function. Function of intracellular organs in brief.	4	2	CLO1
2	Carbohydrates Chemistry, definition, classification with examples.Function of mucopolysaccharide (in detail). Reducing properties of sugars of clinical and diagnostic importance (e.g. Benedict's test, Barfoed's test, etc). Metabolism, digestion and absorption of carbohydrates, glycosis – aerobic and anaerobic, energetics and regulation. Krebs's cycle, its energetics regulation and role of TCA cycle. Glycogenesis, Glycogenolysis, their regulation and the role of liver and muscle glycogen. Significance of HMP shunt and gluconeogenesis. Hormonal regulation of blood sugar level, important metabolic disorders of glycogen, lactose intolerance, diabetes mellitus.	10	5	CLO2
3	Proteins Chemistry, definition, classification of amino – acids, protein structure, effect of temperature on proteins, denaturation, coagulation, isoelectric pH and its importance. Metabolism, digestion and absorption, decarboxylation, deamination, trans methylation, transamination and their importance and detoxification of ammonia including urea cycle. Special products of amino acids, example: phenylalanine, glycine, and methionine. Neurotransmitters Plasma proteins including immunoglobulins. Hemoglobin, Myoglobin, their functions, haemoglobinopathies, thalassemia. Structural proteins: Collagen, Elastin.	10	5	CLO2
4	Lipids Chemistry, definition, classification and function. Metabolism, digestion and absorption of lipids, beta oxidation of fatty acids and its energetics, regulation of fat metabolism in adipose tissue, ketone bodies formation and its utilization, cholesterol and importance of lipoproteins, lipoproteinemia with atherosclerosis – causes and prevention, fatty acid synthesis, fatty liver and obesity.	10	5	CLO2
5	Nucleic Acids DNA, RNA – definition, structure and function, types, genetic code, catabolism of purines – gout	8	4	CLO3
6	Enzymes Definition, classification, factors. Coenzymes. Inhibition and type of inhibitors Isoenzymes. Clinical and therapeutic uses of enzymes.	10	5	CLO3
7	Vitamins Definition, classification, functions. Deficiency symptoms, RDA.	14	7	CLO4
8	Biological Oxidation Oxidative phosphorylation, ETC.	6	3	CLO3
9	Minerals Phosphate, calcium and iron (in details). Magnesium fluoride, Zinc, Copper, Selenium, Molybdenum. RDA, iodine sources, absorption, transport, excretion, function and disorders. Acid – base balance, water and electrolyte balance.	6	3	CLO4
10	Connective tissue Biochemistry of connective tissue – Collagen, Glycoprotein, Proteoglycans.	6	3	CLO3

11	Muscle Contraction Mechanism & Biochemical, events. Connective Tissue- Biochemistry of connective tissue-collagen Glyco protein-proteoglycans.	4	2	CLO3
12	Clinical Biochemistry Liver function test, Renal function test, Lipid profile in serum.	4	2	CLO3
13	Nutrition and BMR, PEM, Balance diet	8	4	CLO4
TOTAL		**100**	**50**	

i. Text Book and Reference Book:

a. Satyanarayana, U. Biochemistry
b. Chatterjee, M. N. & Shinde T. B. of medical biochemistry
c. Siftman, Davidson, Biochemistry A K Jain for Physiotherapist

a. **Course Name: Psychology and Sociology**
b. **Course Code: 07101104**
c. **Prerequisite:** To study psychology and sociology candidate must have passed 12th science or equivalent course. They should have some basic idea about English language.
d. **Rationale:** This sociology syllabus explores the interplay between social factors and health, emphasizing the importance of understanding socialization, family dynamics, community health issues, and social change for healthcare professionals to enhance patient care and address broader social problems related to disability and health.

e. **Course Learning Objective:**

CLOBJ 1	Identify and define sociology, its scope, and its relation to anthropology, psychology, and social psychology, highlighting its importance in healthcare and the application of various sociological methods.
CLOBJ 2	Describe socialization and its impact on health and illness, analysing how social factors from different groups influence individual behaviour in rural and urban communities.
CLOBJ 3	Define family and its types, explaining how family dynamics affect health and contribute to disorders, while discussing social change factors and the role of medical social workers in supporting disabled individuals in healthcare.
CLOBJ 4	Comprehend the biological and environmental influences on behaviour and child development, and differentiate between learned and innate behaviours, focusing on conditioning and social learning.
CLOBJ 5	Understand sensory processes and attention mechanisms in perception, analyse memory processes—including storage, forgetting, and aging effects—and explore the development of motivation and emotion, considering early experiences and social factors.
CLOBJ 6	Know the scope of social psychology, including socialization and the impact of social control mechanisms, while evaluating key psychological tests for assessing intelligence, personality, and anxiety in various contexts, including healthcare settings.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Identify and define sociology, its scope, and its connections to anthropology, psychology, and social psychology in healthcare.
CLO 2	Explain the meaning, nature of socialization, the impact of social factors by different groups and its role on health and illness in rural and urban communities.
CLO 3	Describe the different types of family and the influence of it on different behavioral individual, which affecting the health and increasing health disorders.
CLO 4	Illustrate biological and environmental influences on behavior and child development, differentiating learned and innate behaviors.
CLO 5	Define sensory processes and attention mechanisms in perception, and analyze memory processes, including aging effects
CLO 6	Outline the scope of social psychology, including socialization and social control mechanisms, while evaluating psychological tests for intelligence and personality.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
4	-	4	-	30	-	-	70	-	100

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	Topics	W	T	CO
1	**SOCIOLOGY** Introduction: Meaning – definition and scope of Sociology. Its relation with anthropology, psychology, social psychology and ethics. Methods of Sociology – case study, social survey, questionary interview and opinion poll methods. Importance of its study with special reference to health care professionals. Social Factors in health and disease: The meaning and nature of socialization. The role of social factors in health and illness. Socialization: Meaning and nature of socialization. Primary, secondary and anticipatory socialization. Agencies of socialization. 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 settings. Family: The family. Meaning and definition. Function. Types. Changing family patterns. Influence of family on individual health, family and nutrition, the effects of sickness on family and psychosomatic disease and their importance to physiotherapy. Community: Rural community – meaning and features – health hazards of ruralities. Urban community – meaning and features – health hazards of urbanities. Cultural and Health: Concept of culture. Culture and behavior. Cultural meaning of sickness. Cultural and Health Disorders. Social Change: Meaning of social changes. Factors of social changes.	50	60	CLO1,2,3

	Human adaptation and social change. Social change and stress. Social change and deviance.			
	Social change and health programme.			
	The role of social planning in the improvement of rehabilitation.			
	Social Problems of disabled: Consequence of the following social problems in relation to sickness and disability, remedies to prevent this problem.			
	Population explosion. Poverty and unemployment. Beggary.			
	Juvenile delinquency. Prostitution.			
	Alcoholism			
	Problems of women in employment.			
	Social Security: Social security and social legislation in relation to disabled. Social Worker: Meaning of Social work, role of a medical social worker.			
2	**PSYCHOLOGY**	50	60	CLO4,5,6
	Biological foundation of behavior, hereditary and environment and logical basis for development, developmental psychology (child).			
	Learned and unlearned behavior: Simple learning and conditioning, social learning.			
	Thinking and intelligence: Learning and problem solving development of conceptual thinking in children. Communication, language and thinking.			
	Measurement of intelligence influences on intelligence, extent and consequence			
	of individual differenced.			
	Perception: Sensory basis of perception, attention and perception, observer error. Memory: Phases of memory, short term storage, memory and perception thinking etc. Forgetting testimony and recall of events, memory and ageing.			
	Motivation and emotion: Approaches to motivations, emotion, development, influence of early experience. Family and social influences on motivation and behavior.			
	Personality: Nature of personality structure and dynamics, dimensional, psychoanalytical and constitutional theories of personality, measurement of personality, culture and personality patterns.			
	Attitude: Nature of attitude and beliefs including prejudice, group influences on attitudes, attitude change, doctor – patient expectations and attitude, prejudice formation and education.			
	Interpersonal behavior: Experimental analysis on social interaction, studies of the interview situation, behavior in formal and informal groups, group norms and rules. Leadership in formal and informal groups, group morale.			
	Social psychology: Nature and scope of social psychology, social interaction, psychological groups and their classification, socialization of the individual, social control (social hierarchy) – moves, customs, fashion, propaganda and its techniques.			

	Tests: Wescher scales, Stanford-Binet intelligence scale, Bender and Gestalt- other projective test, anxiety scale.			
TOTAL		**100**	**120**	

i. **Text Book and Reference Book:**

a. A K Jain for Physiotherapist
b. Anatomy and Physiology by Inderber singh
c. Text book of medical Physiology by G.K. Pal
d. Guyton and hall Text book of medical Physiology

a. **Course Name: Biomedical Physics**

b. **Course Code: 07101107**

c. **Prerequisite:** To study biomedical physics candidate should have the basic knowledge about human biology and principles of physics

d. **Rationale:** This syllabus on low and high-frequency currents provides a foundational understanding of electrical principles, bio-physics, and therapeutic applications, equipping students with essential knowledge for safely utilizing electrical modalities in clinical settings while considering the impact of electromagnetic fields on health.

e. **Course Learning Objective:**

CLOBJ 1	Understand the fundamentals low-frequency currents, high-frequency currents and its relevance to physiotherapy.
CLOBJ 2	Describe the E.M Spectrum, the Cellular Bio-physics of E.M.F signals and the risk factors to prolong exposure to E.M fields
CLOBJ 3	Enumerate the characteristics of therapeutic direct currents, its waveforms and A.C. current.
CLOBJ 4	Understand the principles of stability and motions in relevance to physiotherapy

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Explain the fundamentals low-frequency currents, high-frequency currents its relevance to physiotherapy.
CLO 2	Explain the E.M Spectrum, the Cellular Bio-physics of E.M.F signals and the risk factors to prolong exposure to E.M fields
CLO 3	Describe the characteristics of therapeutic direct currents, its waveforms and A.C. current.
CLO 4	Explain the principles of stability and motions in relevance to physiotherapy

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
4	-	4	-	15	-	-	35	-	50

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	Topics	W	T	CO
1	**Fundamentals of Low frequency currents:** 1. Production of electricity, mains supply, 2. A.C. currents & Faradic type current 3. D.C. currents – Types, Fundamentals of electrical charges, static electricity, physics of direct currents Ohm's law, Conductors, Capacitors, Rheostats, Potentiometers, Ammeters & Oscilloscopes, 4. Types of electrodes, galvanic skin resistance, electrode, gels, types & significance.	18	9	CLO1
2	**Fundamentals of High frequency currents:** E.M.F. Conduction, Lenz's Law, transformers, types. Magnetism Thermionic valves. Semi–conductors: types, transistors. Electronic circuits– oscillators, pulse generators	20	10	CLO1
3	**E.M. spectrum:** Laws of transmission- reflection, refraction, absorption, attenuation.	12	6	CLO2
4	**Cellular Bio-physics:** Reception & emission of E.M.F. signals.	10	5	CLO2
5	**Environmental currents & fields risk factors on prolonged exposure to E.M. Field.**	10	5	CLO2
6	**Therapeutic continuous / interrupted direct currents & their various wave forms, A.C. current.**	4	2	CLO3
7	**Principles of stability:** BOS, Height, COG, LOG, Mass of body, the impact of forces, Friction, Segmentation, Visual factors, Psychological and Physiological factors.	14	7	CLO4
8	**Principles of motion:** Causes of motion, Kinds, Motions experienced by the body, Laws of motion, Centripetal and Centrifugal force.	12	6	CLO4
TOTAL		**100**	**50**	

i. Text Book and Reference Book:

a. Fundamentals of Electrotherapy & Biomedical Physics 2nd Edition 2022, Ashish Kakkad
b. Physical Agents in Physiotherapy Principles and Practice: Biophysics and Therapeutic Electricity, Solomen, Subin
c. Introduction to medical biophysics, Parkash, Parveen

a. **Course Name: EXERCISE THERAPY - I AND MASSAGE MANIPULATIONS**

b. **Course Code: 07101105**

c. **Prerequisite:** To study exercise therapy-I and massage manipulation candidate should have passed 12th science or equivalent program. They should have basic idea of human body, human anatomy, and human physiology.

d. **Rationale:** This syllabus provides a comprehensive framework for understanding the mechanical principles and therapeutic practices integral to physiotherapy, emphasizing the interplay between anatomy, biomechanics, and exercise techniques to enhance patient rehabilitation and overall physical health.

e. **Course Learning Objective:**

CLOBJ 1	Understand mechanical principles (force, momentum, torque) and the mechanics of muscle action and posture, gait assessment, starting and derived positions in physiotherapy
CLOBJ 2	Outline concepts of equilibrium, stability, centre of gravity, and joint movements, including angles and axes, planes.
CLOBJ 3	Describe various exercise therapy techniques, including active, passive, resisted, various exercise regimens, suspension therapy, and group exercises
CLOBJ 4	Identify the causes of restrictions in range of motion, including skin, muscle, and capsular contractures, method of assessment with goniometry of all joints.
CLOBJ 5	Explain relaxation methods, including breathing exercises and their physiological effects
CLOBJ 6	Describe soft tissue manipulation techniques, mat exercises, pelvic tilt.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Identify Mechanical principles such as force, momentum, and torque in relation to muscle action, posture, and gait assessment in physiotherapy.
CLO 2	Enlist equilibrium, stability, center of gravity, and joint movements by accurately assessing angles, axes, and planes in therapeutic settings.
CLO 3	Describe various exercise therapy techniques, including active, passive, resisted exercises, suspension therapy, and group exercises.
CLO 4	Identify the causes of restrictions in range of motion, such as skin, muscle, and capsular contractures, and utilize goniometry to assess all joints effectively.
CLO 5	Explain relaxation methods, including breathing exercises and analyse their physiological effects to enhance patient recovery.
CLO 6	Discuss soft tissue manipulation techniques, mat exercises, and pelvic tilt, explaining their therapeutic applications and benefits in rehabilitation.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
5	3	8	-	30	-	30	70	70	200

SEE - Semester End Examination, **CIA -** Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	Topics	W	T	P	CO
1	**General Mechanical Principles** Mechanical principles applied in Physiotherapy like force, momentum, torque etc. Momentum action and reaction, friction, rotation about a pivot, angle of pull of muscle.Gravity: Definition, line of gravity, center of gravity. Equilibrium: supporting base, stability and uses.Work, energy and power. Lever: Definition, orders of lever, examples in human body, levers at home and work; levers in Physiotherapy. Springs: Properties of springs, springs in series and parallel. Mechanics of muscle: Group action of muscles, types of contraction, muscle work.	7	10	10	CLO1
2	**Introduction to Physical Therapy**	1	2	-	CLO1
3	**Basic of exercise** Physiological effects and Therapeutic uses of exercises, psychogenic aspects of exercises, Pharmacological effects ofexercises.	1	2	-	CLO1
4	**Use of apparatus in Exercise Therapy**	1	3	1	CLO1
5	**Joint movements** Terminology, angle of motion, axis and planes of movement, levers.	2	5	-	CLO2
6	**Fundamental starting positions, derived positions** effects and uses and muscle work	5	10	5	CLO2
7	**Pelvic tilt**	1	2	-	CLO6
8	**Muscle work for all positions**	1	3	-	CLO3
9	**Measurement of joint movements/ Goniometry** Principles of goniometry, types (Bubble and gravity goniometers), method for measuring each movement.	15	15	30	CLO4
10	**Relaxation** 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.	4	8	4	CLO5

11	**Passive Movements** 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. CPM Unit	8	10	15	CLO3
12	**Active Movements** Definition of strength, power & work, endurance, muscle actions. Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fiber type, motor unit, force gradation. Causes of decreased muscle performance physiologic adaptation to training: Strength, Power, & Endurance. Types of active movements **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. Specific exercise regimens Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle Isometrics, Isokinetic regimens.	13	15	25	CLO3
13	**Causes for restriction of range of motion** Distinguish between skin, muscle, capsular contractures.	1	2	-	CLO4
14	**Group work** Criteria for selection of patients, advantages and disadvantages of group therapy / class exercise.	1	2	1	CLO3
15	**Suspension therapy** Definition and concepts of suspension, points of suspension, Weight & pulleys and application of pulleys for suspension, Application of suspension therapy either to increase the joint range or muscle power.	8	10	15	CLO3
16	**Mat Exercises** Principles Equilibrium / balancing exercises, Transfer activities, Indications and contraindications.	5	10	5	CLO6
17	**Evaluation methods** Principles – techniques – merits/demerits, Individual and group muscles, Limb length and girth, Posture and gait.	3	6	2	CLO5
18	**Breathing exercises** Mechanism of breathing, muscles of respiration, Principles and techniques, Therapeutic effects, Exercises for bronchial hygiene, coughing and huffing, home programme.	4	7	5	CLO5
19	**Assessment of sensation, reflex testing, blood pressure, pulse rate, chest expansion and respiratory rate.**	2	4	2	CLO5
20	**Maintenance of record – range of motion, resistance.**	1	2	-	CLO4

21	**Soft Tissue Manipulation – Massage Mobilization** Introduction – brief history, definition, classification. Physiological effects and therapeutic uses.	16	22	30	CLO6
	Indications – contraindications.				
	Preparation of patient, basic points to be considered during the treatment. Specific techniques, effects and uses of each manipulation.				
	Massage techniques for upper and lower limbs, neck and back.Massage for edema, scar, tendonitis, fibrosis (tight fascias).				
	Practice of soft tissue manipulation in subjects. Mobilization of soft tissues, joints and fluid collection.				
TOTAL		**100**	**150**	**150**	

i. Text Book and Reference Book:

1. Fundamentals of Electrotherapy & Biomedical Physics 2nd Edition 2022, Ashish Kakkad
2. Physical Agents in Physiotherapy Principles and Practice: Biophysics and Therapeutic Electricity, Solomen, Subin
3. Introduction to medical biophysics, Parkash, Parveen

Year 2

a. **Course Name: Exercise Therapy II**
b. **Course Code: 07101201**
c. **Prerequisite:** To study exercise therapy – II, candidate must have the knowledge about human body, joints and mechanism as well as they should have studied exercise therapy-I.
d. **Rationale**: The syllabus is designed to equip students with a comprehensive understanding of therapeutic techniques, assessment methods, and functional re-education strategies essential for effective physical rehabilitation, promoting improved patient outcomes across diverse populations.

e. **Course Learning Objective:**

CLOBJ 1	Understand the principles, types, and physiological effects of stretching and traction, and demonstrate appropriate manual and mechanical techniques for treating soft tissue and spinal conditions.
CLOBJ 2	Discuss the principles, techniques, and biomechanical basis of joint mobilization, different schools of manual therapy and the effects and uses of mobilization for the upper and lower limbs, while recognizing indications, contraindications, and precautions.
CLOBJ 3	Explain the fundamental principles and applications of manual muscle testing (MMT), including the Oxford scale of muscle gradation, as well as the types, influencing factors, and treatment of postural deviations.
CLOBJ 4	Describe the physiological effects of aerobic exercises, conduct fitness and stress tests, and apply postural drainage techniques for various respiratory conditions also describe understanding about trick movements and hydrotherapy
CLOBJ 5	Explain neurophysiological principles of PNF, demonstrate movement patterns and facilitation techniques, and describe the effects of crawling exercises like Clapp's crawl and Frankel's exercises on motor skills and coordination.
CLOBJ 6	Explain the principles of normal gait and effectively implement gait training using supportive aids, including the selection, pre-crutch training, and techniques for crutch walking, slope navigation, and staircase climbing also describe functional reeducation in neurological and orthopedics conditions.

f. Course Learning Outcomes:

At the end of the course the student will be able to

CLO 1	Explain the principles, types, and physiological effects of stretching and traction, and differentiate between manual and mechanical techniques used for treating soft tissue and spinal conditions.
CLO 2	Explain schools of manual therapy, its biomechanical basis of joint mobilization, and mobilization techniques for the upper and lower limbs while adhering to principles, indications, and contraindications.
CLO 3	Perform manual muscle testing and assess postural alignment, applying the Oxford scale and identifying appropriate treatment strategies for postural deviations.
CLO 4	Evaluate the effectiveness of aerobic exercises through fitness and stress testing, and implement postural drainage techniques while considering positioning, indications, and contraindications for specific patients. Explain Trick movements and Hydrotherapy in detail.

CLO 5	Discuss diagonal movement patterns in PNF and apply facilitation techniques to enhance mobility, strength, and stability in patients; implement crawling exercise programs like Clapp's crawl and neuromuscular coordination exercises, including Frankel's exercises.
CLO 6	Define abnormal gait patterns, design gait re-education programs with comprehensive gait training sessions, addressing functional re-educational activities for neurological and orthopedic conditions.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
4	10	14	-	**30**	**-**	**30**	**70**	**70**	**200**

Lect - Theory Hour, **Tut** - Tutorial, **Lab** - Lab Hour, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

h. Course Content:

Sr. No.	**Topic**	**W**	**T**	**P**	**CO**
1	**Stretching**: Definitions related to stretching, types of contracture and differentiation properties of soft tissues affecting elongation and aims of stretching, manual and mechanical stretching, cycle mechanical stretching, indications and aims of stretching, principles and contraindications, MFR (Myofascial Release).	16	12	20	CLO 1
2	**Traction:** Types, effects, principles of application for cervical and lumbar spine, traction to soft tissues of joints – gliding movements.	4	4	5	CLO 1
3	**Manual Therapy & Peripheral Joint Mobilization**: Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan Biomechanical basis for mobilization, Effects of joint mobilization, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.	15	12	24	CLO 2
4	**M.M.T.**: Need of M.M.T., uses, fundamental principles, anatomical and physiological basis, Oxford scale of muscle gradation, principles of isolation, substitution, stabilization, grading procedure for muscles of extremities, neck and trunk.	15	12	25	CLO 3
5	**Posture**:	3	5	4	

	Types, factors influencing posture, regulation of posture and posture mechanism, pelvic tilt and postural deviations of spine and its treatment.				CLO 3
6	**Trick movements**:	2	2	2	CLO 4
7	**Crawling exercises**: Principles, types, effects and uses of Clapp' crawl.	2	2	3	CLO 5
8	**Proprioceptive Neuromuscular Facilitation**: Definitions & goals Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb Procedure: components of PNF Techniques of facilitation, Mobility: Contract relax, Hold relax, Rhythmic initiation, 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. 	13	10	24	CLO 5
9	**Neuro Muscular coordination**: Factors governing coordination, principles of reeducation, Frankel's exercises and its techniques	5	5	8	CLO 5
10	**Functional Reeducation**: Mat activities for reeducation of hemiplegics, paraplegics and cerebral palsy, walking reeducation in neurological and orthopedic conditions	6	6	12	CLO 6
11	**Aerobic exercises**: Physiological effects and therapeutic uses, fitness testing, stress testing for healthy and convalescent individuals	2	5	0	CLO 4
12	**Postural drainage**: Definition, Guidelines, Assistive measures, indications and contraindications and positioning.	7	10	10	CLO 4
13	**Hydrotherapy**: Physiological properties of water and hydrodynamics, physiological and applications of Bad Ragas Technique, indications and contraindications.	3	5	5	CLO 4
14	**Locomotion**: Normal gait, gait training Training with supportive aids: principles, selection of aid, pre-crutch training, Crutch walking, progression. Walking on slopes, staircase climbing, transport with walking aids. 	7	10	8	CLO 6
TOTAL		**100**	**100**	**150**	

j. Text Book and Reference Book:

1. Therapeutic Exercise: Foundations and Techniques, Carolyn Kisner and Lynn Allen Colby.
2. The Principles of Exercise Therapy, M. Dena Gardiner.
3. Practical Exercise Therapy, Margaret Hollis
4. Orthopaedic Manual Therapy: An Evidence-Based Approach by Chad Cook (Reference Book)
5. Hydrotherapy: An Essential Guide by Angela S. Carr (Reference Book)

a. **Course Name: Pathology and Microbiology**
b. **Course Code: 07101203**
c. **Prerequisite:** To study pathology and microbiology candidate should have knowledge regarding human biology and physiology.
d. **Rationale**: The syllabus provides a comprehensive framework for understanding the principles of pathology and microbiology, encompassing the causes, mechanisms, and effects of diseases across various body systems, thereby equipping students with essential knowledge and skills for diagnosing and managing health conditions effectively.

e. Course Learning Objective:

CLOBJ 1	Identify health, disease, and the causes of diseases, and describe fundamental concepts of pathology, including mechanisms of cellular injury and inflammation
CLOBJ 2	Describe the types and processes of acute inflammation and wound healing in various tissues, and explain the role of inflammation in both acute and chronic conditions.
CLOBJ 3	Understand cell injury mechanisms, pathological processes (such as edema, thrombosis, infarction, and embolism), and the pathology of diseases affecting major body systems, while recognizing and interpreting common laboratory tests and biopsy findings.
CLOBJ 4	Explain the classification, morphology, and structure of bacteria, viruses, fungi, and parasites, including their staining, sterilization, and cultivation techniques..
CLOBJ 5	Identify and differentiate key Gram-positive and Gram-negative bacteria, viral infections (such as polio and rabies), and common parasitic and fungal infections, along with their roles in diseases like tuberculosis, malaria, and candidiasis.
CLOBJ 6	Understand the immune system, including antigen-antibody reactions and hypersensitivity, and apply microbiological knowledge to recognize clinical features of infectious diseases, interpret laboratory findings, and enhance diagnostic and clinical decision-making skills.

f. Course Learning Outcomes:

At the end of the course the student will be able to

CLO 1	Define and describe the fundamental concepts of pathology, including the causes of cellular injury and the relationship between health and disease.
CLO 2	Explain the processes of healing and tissue repair following injury and the role of inflammation in various acute and chronic conditions.
CLO 3	Discuss the pathology of systemic diseases and recognize common laboratory investigations, interpreting their results in a clinical context.
CLO 4	Explain the classification and morphology of various pathogens, alongside the techniques used in their staining and cultivation.
CLO 5	Describe the clinical features of major infectious diseases caused by bacteria, viruses, parasites, and fungi, along with their causative organisms.
CLO 6	Explain principles of immunity and microbiology to interpret laboratory findings and make informed clinical decisions regarding infections affecting different body systems.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
4	-	4	-	**30**	**-**	**-**	**70**	**-**	100

Lect - Theory Hour, **Tut** - Tutorial, **Lab** - Lab Hour, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

h. Course Content:

Sr.	Topic	W	T	CO
1	1. **Pathology**:	50	60	CLO 1, 2, 3
	2. Introduction: Aims and objectives of study of pathology, definitions of health, disease, causes of disease, methods of study of disease.			
	3. Inflammation: General morphology, types, phenomenon of acute inflammation.			
	4. Tissue repair: Wound healing, fracture, skin, nerves, muscles.			
	5. Cell Injury: Degeneration, physical and chemical irritants, ionizing radiations, cellulites.			
	6. Disturbance of circulation: Edema, thrombosis, infarction, embolism.			
	7. Necrosis, Gangrene			
	8. 5 Growth and its disorders: Atrophy and hypertrophy (pseudo).			
	9. Cellular ageing			
	10. Tumors: Definitions, classification, characteristics of benign and malignant tumors, etiology and spread of tumors, systemic effects.			
	11. Infection: Acute, chronic, including AIDS.			
	12. Blood-Anemia: Definition, classification, etiology, lab investigations, blood picture; Hemorrhagic disorders – cause and classification (hemophilia).			
	13. Immunity and Hypersensitivity			
	Systemic Pathology:			
	(Each condition in this section is to be taught under the specific headings of Causes, Development, Gross and Microscopic only).			
	1. Respiratory System: Pneumonia, Bronchitis, Bronchiectasis, Asthma, Emphysema, Tuberculosis and Carcinoma of Lungs Occupational Lung Diseases.			

	2. Cardiovascular System: Rheumatic Heart diseases, Myocardial infarction, Atherosclerosis and other disease of blood vessels – TAO, Burger's diseases, Thrombophlebitis, Congenital Heart diseases.			
	3. Alimentary System: Peptic Ulcer, Ulcerative lesions of intestine.			
	4. Liver: Hepatitis, Cirrhosis.			
	5. CNS**:** Meningitis, Encephalitis, Cerebral Hemorrhage, CVA, Brief outline of CNS Tumors.			
	6. Peripheral Nerves: Neuritis, Neuralgia, GBS, Neuropathies.			
	7. Bones and Joints: Osteomyelitis, Osteoarthritis, Septic Arthritis, Gout, Osteomalacia, Bone Tumors briefly- Giant Cell tumor, Osteosarcoma, Ewing's Sarcoma, Hem arthrosis.			
	8. Muscles: Disorder of muscles including Poliomyelitis and Myopathies, Volkmann's Ischemic contracture.			
	9. Skin: Scleroderma, Psoriasis, Autoimmune disorders.			
	10. Urinary System: Nephritis, Glomerular Nephritis, Nephrotic Syndrome.			
	11. Endocrine System: Thyroid - Thyroiditis and Thyroid tumors, Diabetes.			
	Clinical Pathology – (including Demonstrations)			
	1. Anemia – (deficiency) – T.C. /D.C. / Eosinophilia, E.S.R., C.P.K.			
	2. Muscle / skin / nerve biopsy.			
	3. Microscopic appearance of muscle necrosis –fatty infiltration.			
	4. Lab investigation in liver & renal failure.			
2	**Microbiology**:	50	60	CLO 4,5,6
	1. General Bacteriology:			
	i. Introduction, historical background, classification of micro– Organisms.			
	ii. Morphology of bacteria.			
	iii. Staining of bacteria.			
	iv. Sterilization.			
	v. Cultivation and culture media.			
	2. Systemic Bacteriology:			
	i. Gram-Positive cocci – Streptococci, Pneumococci, Staphylococci.			
	ii. Gram-Negative Cocci – Gono and Meningo cocci.			
	iii. Gram-Positive Bacilli.			
	iv. Gram-Negative Bacilli-Typhoid, Cholera, Dysentery.			
	v. Aerobic-Diphtheria, T.B., Leprosy.			
	vi. Anaerobic-Tetanus, Gas Gangrene, Botulism.			
	3. Immunology:			
	i. Immunity, Antigens.			
	ii. Antibodies, Ag-Ab Reaction.			
	iii. Agglutination, precipitation.			
	iv. Hypersensitivity reactions.			

	4. General Virology:			
	i. Poliomyelitis.			
	ii. Rabies.			
	iii. Demonstration of test in: diagnosis of AIDS, Hepatitis and Syphilis.			
	5. Parasitology:			
	i. Malaria.			
	ii. Amoebiosis.			
	iii. Round worm and loop worm.			
	6. Mycology:			
	i. Candidiasis.			
	ii. Ring worm.			
	iii. Scabies.			
	7. Applied Microbiology: Relevant to diseases involving Bones, Joints – Nerves – Muscles-Skin - brain-cardiopulmonary system, & burns.			
	8. Laboratory Diagnosis of Infection			
	TOTAL	**100**	**120**	

i. Text Book and Reference Book:

1. Text book of Pathology - by Harsh Mohan
2. Pathology of Disease by Naik. 1st edition. Jaypee publications Boissonnault - W.B. Saunders
3. Pathology: Implications for Physical Therapists - Goodmann and B Boissonnault - W.B. Saunders
4. Text books of Microbiology – by R. Ananthnarayan & C.K. Jayram Panikar.
5. Text Book of Microbiology by Chakrovorthy. 2nd edition.New central books.
6. Medical Microbiology by Irving. 1st edition. Taylor and Francis.
7. Textbook of Microbiology by Arora. 2nd edition. CBS publications.

a. **Course Name: Pharmacology**
b. **Course Code: 07101204**
c. **Prerequisite:** To study pharmacology candidate should have the basic knowledge about human body, human physiology and bio-chemistry.
d. **Rationale**: Comprehend drug interactions, side effects, and their impact on rehabilitation, enhancing the safe and effective management of patients undergoing medication.
e. **Course Learning Objective:**

CLOBJ 1	Understand the chemical characteristics, principles of drug administration, and the processes of drug distribution, metabolism, and excretion, along with the factors influencing drug reactions, dosages, and potential toxicities.
CLOBJ 2	Explain the effects of drugs acting on the PNS (e.g., cholinergic, anticholinergic, muscle relaxants) and CNS their therapeutic uses and impact on rehabilitation.
CLOBJ 3	Understand the mechanisms of drugs acting on the cardiovascular system (e.g., antihypertensive, diuretics) and respiratory system (e.g., bronchodilators), and evaluate their influence on exercise capacity and rehabilitation outcomes.
CLOBJ 4	Comprehend the actions of endocrine drugs (e.g., insulin, steroids), gastrointestinal agents (e.g., antiemetic, antidiarrheal), and dermatological treatments, recognizing their role in managing common conditions in clinical physiotherapy.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Explain comprehensively the chemical properties, pharmacokinetics, and pharmacodynamics of drugs, including their administration, distribution, metabolism, excretion, and the factors affecting drug reactions and dosages.
CLO 2	Discuss the pharmacological effects of drugs acting on the peripheral and central nervous systems along with the immune system and evaluate their therapeutic applications and implications for physiotherapy practice.
CLO 3	Describe the effects of drugs on the cardiovascular and respiratory systems, and assess their impact on physical activity, exercise tolerance, and rehabilitation outcomes in clinical settings.
CLO 4	Integrate knowledge of endocrine, gastrointestinal, and dermatological pharmacological agents into clinical practice, understanding their therapeutic roles and applications in managing conditions commonly encountered in physiotherapy.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
2	-	2	-	15	-	-	35	-	50

Lect. - Theory Hour, **Tut** - Tutorial, **Lab** - Lab Hour, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

h. Course Content:

Sr. No.	Contents	W	T	CO
1	**General Pharmacology:** Chemical character and general action of drugs Principles of drug administration and routes of administration, distribution, metabolism, excretion of drugs, factors influencing drug reaction, dosage and factors modifying it. Drug toxicity including allergy and idiosyncrasy	13	7	CLO1
2	**Drugs acting as PNS:** stimulating and inhibiting, cholinergic and anticholinergic. Drugs acting at NM junction. Muscle relaxants, alcohol.	13	7	CLO2
3	**Drugs acting on CVS:** antihypertensive, vasoconstrictors, vasodilators, diuretics, mucolytic agents. Drugs that influence myocardial contractility and heart rate.	13	7	CLO3
4	**Drugs acting on CNS:** Analgesics, antipyretics, narcotics, anti-inflammatory, anti-epileptic, sedatives, hypnotics, tranquilizers, anticonvulsants, stimulants, psychotherapeutics.	13	7	CLO2
5	**Vitamins**	4	2	CLO 2
6	**Immunological agents and vaccines**	3	3	CLO 2
7	**Endocrine Pharmacology:** thyroxin, glucocorticoids, anabolic steroids, calcitonin, insulin and hypoglycemic agents.	10	6	CLO 2
8	**Drugs acting on Respiratory system:** bronchodilators, drugs used in inhalation therapy, Drugs acting on CNS and cardio respiratory system which influence the physical exercise. Pulmonary effects of general and local anesthetic agents	15	9	CLO3
9	**Chemotherapeutic agents**	4	2	CLO4
10	Irritants-counter irritants	3	1	CLO4
11	Diagnostics drugs in Parkinsonism	3	2	CLO2
12	Drugs in G.I. tract: Peptic ulcer, antiemetic, Diarrhea& constipation	3	2	CLO4
13	Dermatological: Scabies – Psoriasis – Local antifungal	3	2	CLO4
	TOTAL	**100**	**57**	

i. Text Book and Reference Book:

1. Textbook of Pharmacology for Physiotherapy,1st Edition, Padmaja Udaykumar,
2. Jaypee Publication.
3. Essentials of Medical Pharmacology, 6th Edition, KD Tripathi, Jaypee Publications.
4. Pharmacology &Pharmaco therapeutics, 12th Edition, RS Satoshkar, SD Bhandarkar, Nirmala N Rege, Popular Publications.
5. Handbook of Pharmacology, 1st Edition, Dr UN Panda, AITBS Publication

a. **Course Name: Electrotherapy**
b. **Course Code: 07101207**
c. **Prerequisite:** A basic understanding of anatomy, physiology, and physics, as well as clinical assessment skills and knowledge of therapeutic modalities.
d. **Rationale**: Emphasizes the importance of integrating electrotherapy into patient care for improved outcomes, ensuring practitioners are equipped with evidence-based skills and ethical considerations for safe practice
e. **Course Learning Objective:**

CLOBJ 1	Explain the principles and physical properties of electromagnetic waves, including Grothus' Law, Cosine Law, and Inverse Square Law, along with the fundamental concepts of low-frequency currents, nerve muscle physiology, and characteristics of Faradic, Galvanic, and Interrupted Direct Currents, focusing on their therapeutic applications.
CLOBJ 2	Detail the production, application techniques, and physiological effects of infrared and ultraviolet rays, as well as superficial heating modalities like paraffin wax baths and moist heat therapy, including their therapeutic uses, safety considerations, and contraindications.
CLOBJ 3	Discuss the physiological effects, therapeutic benefits, and methods of application for cryotherapy and hydrotherapy, covering safety precautions and various techniques and modalities. Explain medium frequency current in detail.
CLOBJ 4	Outline the characteristics and therapeutic applications of high-frequency modalities, such as shortwave diathermy, microwave diathermy, and lasers, as well as advanced electrotherapy techniques like NMES, FES, and Shock Wave Therapy, including their clinical uses and practical applications.
CLOBJ 5	Describe the principles and techniques of electrodiagnosis, including FG tests and SD curve examinations, alongside pain modulation using TENS and the associated clinical indications, contraindications, and treatment techniques.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Define and explain the principles of electromagnetic waves and low-frequency currents, focusing on their therapeutic applications.
CLO 2	Describe the production, techniques, and effects of infrared, ultraviolet, and superficial heating modalities, including their therapeutic uses and safety precautions.
CLO 3	Explain the applications and effects of cryotherapy and hydrotherapy, along with pain modulation mechanisms, particularly TENS, also elplain the medium frequency currents in detail.
CLO 4	Evaluate the characteristics and therapeutic uses of high-frequency modalities and addressing their safety and application methods.
CLO 5	Discuss advanced electrotherapy methods and electrodiagnostic techniques, assessing their therapeutic benefits and clinical relevance.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
4	08	12	-	30	-	30	70	70	200

Lect - Theory Hour, **Tut** - Tutorial, **Lab** - Lab Hour, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

h. **Course Content:**

Sr.	Topic	W	T	P	CO
1	**Electromagnetic Waves**: Electromagnetic spectrum, physical properties of electromagnetic radiations – reflection, refraction, absorption, penetration, Grothus' law, Cosine law, Inverse square law and its practical application.	2	7	-	CLO1
2	**Cellular biophysics**: Reception and emission of EM signals. Environmental currents and fields-risk factors on prolonged exposure to EM field.	1	3	-	CLO1
3	**Infra-Red Rays**: Production of IR rays, luminous and non-luminous generators, penetration, technique of application, physiological effects and therapeutic uses, duration and frequency of treatment, indications and contraindications, dangers and precautions.	4	6	10	CLO2
4	**Ultra Violet Rays**: Production of UVR – mercury vapor lamps (Kromayer lamp), fluorescent tubes (Alpine sun lamp), Theraktin tunnel and PUVA apparatus; physiological effects of UVR-chemical reactions with skin structure of skin, penetration and absorption of UVR Erythema-different degree of erythema, test dose, technique to find out the test dose and its importance, Technique of application of UVR, local and general irradiation, specific conditions like psoriasis, acne, alopecia and indolent wounds, Technique of application using accessories, Filters, sensitizers, Dangers and contraindications	7	10	12	CLO2
5	**Cryotherapy**: Physiological effects and therapeutic uses, techniques of application and contraindications.	3	6	4	CLO3
6	**Hydrotherapy**: Properties of water buoyancy, effects of buoyancy on movements, Hubbard tank, contrast bath and whirlpool bath.	3	6	4	CLO3

7	**Superficial Heat Modalities**: Paraffin Wax Bath: Structure of the bath, composition of wax and mineral oils, physiological effects and therapeutic uses other heating modalities: heating pad, moist heat and fluid therapy.	4	6	15	CLO2
8	**High Frequency Current**: 1. **Short Wave Diathermy:** 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. 2. **Capacitive energy transfer** (Long Wave Diathermy): Introduction and characteristics, physiological effects and therapeutic uses, technique of application and principles of treatment and dangers. 3. **Micro Wave Diathermy:** Introduction and characteristics, physiological effects and therapeutic uses, technique of application and principles of treatment and dangers. 4. **Lasers:** Introduction and characteristics, therapeutic effects, principles of application, indication, contraindication and dangers. 5. **Ultrasonic therapy:** 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, Nonthermal 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. 6. **Phonophoresis:** Define Phonophoresis, Methods of application, commonly used drugs, Uses. Dosages of US. 7. **Care of the Wound:** UVR, LASER, US.	28	40	55	CLO4
9	**Low Frequency Currents**: 1. **Review of physics:** Current electricity, Ohm's law, resistance, rheostats, potentiometers, EM induction, capacitors, valves, semiconductors and transistors. 2. **Nerve Muscle Physiology:** Resting potential, action potential, propagation of action potential, motor unit, synapse and synaptic transmission of impulses, effects of positive and negative electrodes on nerves and accommodation. 3. **Electric shock:** Causes, severity, treatment and precaution, earth shock and its precautions. 4. **Faradic Current:** Definition, characteristic and modification faradic current, sinusoidal current, parameters of simulation, physiological and therapeutic effects, indications and contraindications and precautions, techniques of stimulation, group muscle stimulation, faradic foot bath, Faradism under pressure and Pelvic floor muscle reeducation.	28	40	55	CLO5

	5. **Interrupted Direct current:** Introduction and characteristics, parameters of stimulation, physiological and therapeutic uses of stimulation, precautions.				
	6. **Galvanic Current:** Introduction and characteristics, parameters of stimulation, physiological and therapeutic uses of stimulation, precautions.				
	7. **Iontophoresis:** Definition, principles, physiological and therapeutic uses, indication, techniques of iontophoresis, and principles of treatment, contraindications and dangers.				
	8. **TENS**: Definition, theories of pain modulation, pain gate theory, principle and techniques of treatment, indication and contraindication				
10	**Medium frequency Current**:	16	20	30	CLO3
	1. Interferential Current: Definition, characteristics, physiological and therapeutic effects, indications and contraindications, techniques of application, precautions.				
	2. Russian Currents				
	3. Rebox currents				
	Advanced Electrotherapy:	4	6	15	CLO4
	1. Computerization in electrotherapy, programming of parameters of treatment, appropriate selection of parameters and combination therapy, combined therapy-principles, therapeutic uses and indications like US with stimulation or TENS etc.				
	2. Introduction to Diadynamic currents, HVPGS and micro currents				
11	3. Electrical currents for the Care of Wounds.				
TOTAL		**100**	**150**	200	

i. **Text Book and Reference Book:**

- Clayton's Electro Therapy
- Electro therapy Explained – by Low & Read
- Electro Therapy – by Kahn,
- Therapeutic Electricity – by Sydney Litch

REFERENCE BOOKS:

1. Electrotherapy: Evidence Based Practice by Kitchen Shield, 11th Ed.
2. Physical Agents in Rehabilitation: From Research to Practice by Cameron.
3. Clinical Electro Therapy – by Nelson & Currier

a. **Course Name: Kinesiology**
b. **Course Code: 07101208**
c. **Prerequisite:** To study Kinesiology candidate should have basic idea of Human body, joints and movements. Apart from this candidate should have basic knowledge of physics.
d. **Rationale**: The subject provides critical insights into human movement, injury prevention, and performance enhancement, which are essential for effective physiotherapy practice. A solid understanding of these concepts enables students to assess and design targeted rehabilitation strategies, ultimately improving patient outcomes and promoting holistic care.

e. Course Learning Objective:

CLOBJ 1	Define arthrokinematics and osteokinematics, and comprehend the concepts of force, torque, and moment in relation to joint and muscle function.
CLOBJ 2	Explain the design and functions of joints and muscles, along with the biomechanical principles of giving and receiving impetus.
CLOBJ 3	Describe the kinetics and kinematics of gait, including its characteristics and types of abnormal gait.
CLOBJ 4	Explain optimal posture, its analysis across various positions, and the biomechanics of skilled movements and activities of daily living.
CLOBJ 5	Describe and demonstrate the biomechanics of the cervical spine, thorax, temporomandibular joint, shoulders, elbows, and wrists.
CLOBJ 6	Describe and demonstrate the biomechanics of the lumbar spine, pelvic complex, hips, knees, and ankles.

f. Course Learning Outcomes:

At the end of the course the student will be able to

CLO 1	Define and apply arthrokinematics, osteokinematics, force, torque, and moment to analyze joint and muscle functions.
CLO 2	Explain the mechanics of joints and muscles, including the principles of impetus in movement.
CLO 3	Describe the characteristics and kinematic features of normal and abnormal gait patterns.
CLO 4	Discuss optimal posture and its implications for skilled movements and daily living activities.
CLO 5	Describe and demonstrate the biomechanics of specified upper body joints and regions, integrating knowledge of movement principles.
CLO 6	Describe and demonstrate the biomechanics of specified lower body joints and regions, applying principles of biomechanics to functional movements.

f. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
4	-	4	-	30	-	-	70	-	100

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. Course Content:

Sr.	Topics	W	T	CO
1	**Basic Concepts in Biomechanics: Kinematics and Kinetics:** **1. Kinetics:** i. Principles of Stability: BOS,COG, LOG, Mass of Body, Impact of Forces, Friction, Segmentation, Visual factors, Psychological and Physiological factors. ii. Motion: Types, causes, Location, Direction, Magnitude, Laws of Motion. iii. Forces: Force Convention, Composition, Magnitude, Direction, Resolution of forces, Parallel force system iv. Torque v. Lever: Types, Anatomical lever, Mechanical Advantage, Angle of Pull. **2. Kinematics:** i. Osteokinematics: Planes, Axis, End feel. ii. Rotatory and translatory motion iii. Arthrokinematics: Accessory motion	10	15	CLO1
2	**Joint structure and Function:** 1. Joint design 2. Materials used in human joints 3. General properties of connective tissues 4. Human joint design 5. Joint function 6. Joint motion 7. General effects of disease, injury and immobilization	5	8	CLO2
3	**Muscle structure and function:** 1. Mobility and stability functions of muscles 2. Elements of muscle structure 3. Muscle function 4. Effects of immobilization, injury and aging.	5	7	CLO2

4	**Biomechanics of the peripheral joints:** 1. **The shoulder complex**: Structure and components of the shoulder complex and their integrated function. 2. **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. 3. **The wrist and hand complex:** Structural components and functions of the wrist complex structure of the hand complex,prehension,functional position of the the wrist and hand. 4. **The hip complex**: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur. 5. **The knee complex:** structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease. 6. **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.	40	60	CL05,6
5	**Skilled Movements:** Rope climbing, cycling, running, ballistic and volitional movements.	4	6	CLO4
6	**Impetus:** Impetus to external objects and receiving impetus	3	4	CLO2
7	**Locomotion:** Normal gait analysis: Definition of gait, phases of normal gait, normal gait with kinetic and kinematics, abnormal pathological gaits, gait training.	8	12	CLO3
8	**Biomechanics of spinal column:** Spinal curves, articulations, non-contractile soft tissue of column, IV disc, ligaments, intrinsic equilibrium, movements of spinal column and muscle mechanics.	8	12	CLO5
9	**Mechanics of pelvic complex:** Pelvis at rest, in standing body and in motion, patho-mechanics of pelvis	3	5	CL06
10	**Mechanics of thorax:** Movements between ribs and vertebrae, sternum and ribs, patho- mechanics of respiration.	3	5	CLO5
11	**Postural strain and occupational hazards:** Correct use of body mechanics at home, at school and work, recreation, particular application for patients, Physiotherapists and other staff.	4	4	CLO4
12	**Kinetics and kinematics of ADL:** Supine to sitting, Sitting to standing, Squatting, Climbing up and down, pushing, pulling, overhead activities, walking, running, jogging.	7	9	CLO4
Total		**100**	**150**	

h. Text Book and Reference Book:

a. Kinesiology by Cynthia Norkins
b. Kinesiology by K Wells, 6th Edition; Saunders Publication
c. Joint structure and function- Cynthia Norkins, 4th Edition, Jaypee Publication
d. Clinical kinesiology – Brunnstrom, 5th Edition, Jaypee Publication

REFERENCE BOOKS:

1. Biomechanical basis of human movement, Joseph Hamill & Kathleen M.Knutzen, 3rd Edition, LWW Publications
2. Bio-mechanics of Musculoskeletal System by Nigg, 2nd Edition, John Wiley Publication
3. Basic Bio-mechanics of musculoskeletal system by Frenkle, 3rd edition, Lippincott Williams & Wilkins

Year 3

a. **Course Name: Medicine – I (General Medicine, Pediatrics and Dermatology)**
b. **Course Code: 07101301**
c. **Prerequisite:** To study Medicine-I candidate should have knowledge about human anatomy, human physiology, human systems, pathology and basic pharmacology.
d. **Rationale**: This syllabus covers a comprehensive range of topics in general medicine, cardiothoracic medicine, pediatrics, and dermatology, equipping students with the essential knowledge and skills to diagnose, manage, and treat various medical conditions across different systems, while emphasizing the integration of clinical practice and patient care.

e. **Course Learning Objective:**

CLOBJ 1	Explain aetiology, clinical feature, diagnosis, complications and medical treatment of endocrine, Gastro-intestine, infectious, Nutritional, Urological, blood, cardio- respiratory and vascular disorders.
CLOBJ 2	Use the principle of management at medical intensive care Unit.
CLOBJ 3	Implement the knowledge of basic structure of skin and its disorder in medical management.
CLOBJ 4	Explain paediatric disorders and its medical management.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Describe aetiology, clinical feature, diagnosis, complications and Medical treatment of endocrine, Gastro-intestine, infectious, Nutritional, Urological, blood, cardio-respiratory and vascular disorders accurately.
CLO 2	Interprete special procedure in intensive care Unit and emergency care accurately.
CLO 3	Describe structure and function of skin and its disorders correctly.
CLO 4	Describe normal growth and development of a child and aetiopathogenesis, clinical feature, diagnosis and medical treatment of paediatric disorders correctly.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
6	-	6		30	-	70	-	-	100

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr. No.	Content	W	T	CO
1	**General Medicine** 1. Endocrinal Disorders: i. Endocrine diseases, special emphasis to be given to obesity and its related disorders- management, diet, exercise and ii. Medication, Diabetes Mellitus, Thyrotoxicosis, Myxoedema. 2. GI Disorders: i. Clinical manifestations of Gastrointestinal disease –Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achalasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Dysentery, Diarrhea, Inflammatory Bowel Diseases, Infections of Alimentary Tract ii. 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, Cirrhosis of liver, Jaundice. 3. Infectious Diseases: i. Tuberculosis, Malaria, Typhoid, Infective Hepatitis, Tetanus. ii. 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. 4. Nutritious Diseases: i. Vitamins and its deficiencies, Disorders including Rickets and Osteomalacia, Anemia. 5. Urogenital System: i. Structure and function of kidneys including physiology of micturition, Acute and chronic renal failure, Glomerular Nephritis, Pyelonephritis. 6. Rheumatology: Rheumatoid Arthritis, Ankylosing Spondylitis, Gout, Osteoarthritis, Spondyloarthritis, SLE, Polyarteritis Nodosa, Mixed Connective Tissue Disorders, Scleroderma. 7. 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. Poisoning : Clinical features – general management – common agents in poisoning – pharmaceutical agents – drugs of misuse – chemical pesticides – Envenomation 8. Food and Nutrition: Assessment –medications. 9. 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 the therapy. 10. Psychiatric Disorders: Classifications, Causes, Clinical manifestations and Treatment methods used in Psychiatry. Geriatric condition; aging process, CVS& RS complication, osteoporosis	40	40	CLO1

2	**Cardiothoracic Medicine** 1. Brief etiopathogenesis of Cardio respiratory system. 2. Outline, etiopathogenesis of cardio respiratory disorders, investigations, Diagnosis, differential diagnosis and principles of management. 3. **Cardiovascular System**: i. Cardiac Failure-Definition, causes, signs and symptoms and brief management of cardiac failure. ii. Rheumatic fever-Definition, brief description of etiology, clinical features, complications and treatment. iii. Congenital Heart Diseases-Classification, symptoms and complications. iv. Ischemic Heart Disease – Etiopathogenesis, classification, symptoms, diagnosis including stress test, medical and surgical treatment. v. Hypertension -Definition Classification, symptoms, complications and treatment. vi. Infective Endocarditis – brief description of etiology, clinical features, diagnosis and treatment. vii. Brief description of DVT and Pulmonary Embolism. viii. Vascular disease- Atherosclerosis, Berger's Disease, Raynaud's Disease, Phlebitis etc. ix. Cardiac Muscle Disorders – Cardiomyopathies, Myocardiatis. x. Cardiac Tumors. xi. Coronary Valve Disease.	15	15	CLO2
3	**Cardiothoracic Medicine (cont.)** 1. Respiratory System**:** (respiratory disease including the diseases of the chest wall) i. Chronic Bronchitis and Emphysema – Definition, clinical features, diagnosis and treatment. ii. Bronchial Asthma – Definition, etiopathogenesis, clinical features, diagnosis and treatment. iii. Pneumonia – Definition, classification, clinical test of pulmonary tuberculosis, diagnosis, complication and treatment. iv. Tuberculosis – Etiopathogenesis, classification,	15	15	CLO2

	clinical test of pulmonary tuberculosis, diagnosis, complications and treatment. v. Lung Abscess and Bronchiectesis – Definition, clinical features, diagnosis and treatment. vi. Pleural Disorders – Pleural effusion, Emphysema, Pneumothorax. vii. Chest wall deformities – Describe various deformities of the chest wall and effect and pulmonary diseases associated with it. viii. Occupational Lung Diseases – Clinical features, diagnosis and treatment. ix. Respiratory Failure – Classification, causes and treatment. x. Lung Function Test xi. Chest Radiographs xii. Arterial Blood Gas Analysis, xiii. Cystic Fibrosis, xiv. Upper Respiratory Tract Infections, xv. Fungal Diseases, xvi. Interstitial Lung Diseases 2. Intensive and Emergency Care: i. Review of anatomy and physiology related to acute care, cardiovascular, nervous and musculoskeletal system. ii. Common emergencies (surgical and medical)Trauma – Accidents; Explosions, Gun shots, Shock, Hemorrhage, DIC, burns, Septicemia, Acute respiratory failure, Pulmonary edema, Pulmonary embolism, ARO cardiac failure, Myocardial infarction, Cardiac arrhythmias, Unconsciousness, Coma, Cerebral hypoxia, Drug overdose, Poisoning, Tetanus, Respiratory paralysis, Poliomyelitis, GBS, Renal failure, Obstetrical emergencies, Pediatric emergencies. iii. Intensive/ metabolic emergencies iv. Anesthetics: Types, indications, merits, demerits, effects of general anesthesia on cardiopulmonary function. v. Special procedures in ICU: Cardiopulmonary resuscitation, Airway care bronchoscopy, Thoracocentasis, tracheostomy, intubation, chest tubes (nasogastric tubes and tracheal intubation), Skeletal and skin traction. vi. Bioelectric Instrumentation, Interpretation, ECG, Cardiopulmonary monitoring, Radiological evaluation, ABG analysis, fluid and electrolyte balance, hematological studies. vii. Therapeutics, mechanical ventilators, medical gas therapy, IPPB. viii. Psychological aspect of critical care. ix. Infrastructure, instrumentation, mechanical ventilation, assessment, monitoring management of patient in ICU, Basic life support: introduction & demonstration			
4	**Paediatrics** 1. Growth and Development of a child from birth to 12 years, including physical, social, adaptive development. 2. Maternal and neonatal factors contributing to high risk	20	20	CO4

	pregnancy, the neonate, inherited diseases, maternal infections – viral and bacterial, maternal diseases incidental to pregnancy induced hypertension, chronic maternal diseases such as heart diseases, renal failure, TB, Diabetes, epilepsy, bleeding in the mother at any trimester. 3. Community program: international (WHO), national and local for prevention of poliomyelitis, deafness, blindness, mental retardation and hypothyroidism, the immunization schedule for children. 4. Cerebral Palsy: etiology – prenatal and postnatal, pathogenesis, types of cerebral palsy (classification), findings on examination, general examination, examination of CNS, musculoskeletal system, respiratory system, GIT and nutritiional status. 5. Associated defects: Mental retardation, microcephaly, blindness, hearing and speech impairment, squint and convulsions. 6. Prevention: appropriate management of high risk pregnancy, prevention of neonatal and postnatal infections, metabolic problems. 7. Muscular Dystrophy: Various forms, modes of inheritance and clinical manifestations, physical finding in relation to disabilities, progression of various forms and prognosis. 8. Spina Bifida, Meningomyelocele: Development, clinical features-lower limbs, bladder and bowel control, complications – UTI and hydrocephalus, medical and surgical treatment. 9. Still's Disease: Classification, pathology in brief, physical findings, course and prognosis, treatment, prevention and correction of deformity. 10. Acute CNS Infections: classification(bacterial and viral), the acute illness, CNS sequellae leading to Mental retardation blindness, hearing and speech impairment, motor paralysis, bladder and bowel problems, seizures and specific problems like subdural effusion, hydrocephalus, pressure sores, feeding difficulties. 11. Normal diet of new born and child: List dietary, calorie, fat, protein, mineral and vitamin requirement in a normal child and a child with malnutrition, etiology, finding and treatment of Rickets, Vitamin-D deficiency and resistant Rickets. 12. Lung Infections: clinical findings, complications and medical treatment of Bronchiectesis, Lung Abscess and Bronchial Asthma. 13. Problems and management of LBW infants, Prenatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Learning and behavioural problems - Hyperactivity, Autism, Challenging behaviours, Educational delay,The Clumsy child			
5	**Dermatology** 1. Structure and function of normal skin, primary and secondary skin lesions 2. Scabies and Pediculosis 3. Fungal infections of skin: Dermatophytosis, Pityriasis Vesicolor, And Candidiasis, Bacterial infections of skin: Impetigo/boil.	10	10	CLO3

	4. Viral Infections of skin: Herpes Zoster 5. Eczema/ Dermatitis/ Allergies 6. Psoriasis/ Acne/ Alopecia/ Vitiligo and Leukoderma 7. Leprosy/ Lepra reactions 8. Skin Diseases related to Rheumatology and Tropical skin diseases 9. Sexually Transmitted Diseases: Syphilis: Primary and Secondary, Gonorrhea, Chancroid and AIDS 10. Pigmentary abnormalities 11. Vascular disorders			
	Total	**100**	**100**	

i. Text Book and Reference Book:

1. API Textbook of Medicine
2. Golwalla –Medicine for students
3. Principles and practice of Medicine-Davidson
4. Essentials of Paediatrics – by O.P. Ghai – Inter Print publications
5. D.K. series in Paediatrics

a. **Course Name: MEDICINE - II (NEUROLOGY, OBSTETRICS AND GYNECOLOGY)**
b. **Course Code: 07101302**
c. **Prerequisite:** To study Medicine II - candidate should have knowledge about human body, human physiology, human systems, pathology and basic pharmacology.
d. **Rationale:** This syllabus provides a thorough exploration of neurology and obstetrics and gynecology, equipping students with the foundational knowledge of neurophysiology, clinical examination, and management of neurological disorders, alongside a comprehensive understanding of female reproductive health, pregnancy, and related complications, fostering a holistic approach to patient care in these critical medical fields.

e. **Course Learning Objective:**

CLOBJ 1	Describe and apply neurophysiological principles, including motor and sensory systems, autonomic nervous system, and the roles of cranial nerves, plexuses, and peripheral nerves. Differentiate between upper and lower motor neuron lesions to diagnose and manage neurological disorders.
CLOBJ 2	Conduct and interpret clinical neurological examinations, including reflex testing and assessment of bladder and bowel control, to identify features of neurological disorders and formulate differential diagnoses and management plans.
CLOBJ 3	Design and implement physiotherapy interventions for neurological conditions such as stroke, cerebral palsy, and peripheral neuropathies, as well as manage musculoskeletal disorders related to pregnancy, focusing on functional impact and patient-centered care.
CLOBJ 4	Describe the anatomy and physiology of the female reproductive system, understand physiological changes during pregnancy, and manage pregnancy- related and gynecological disorders, including infections, incontinence, and menopause, providing comprehensive care and counseling.
CLOBJ 5	Understand and apply electrophysiology and electromyography for diagnosing and managing neuromuscular disorders, performing and interpreting basic tests to guide treatment planning for muscle and movement disorders.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Apply principles of neurophysiology to describe the functions of motor and sensory systems, autonomic nervous system, cranial nerves, plexuses, and peripheral nerves, and differentiate between upper and lower motor neuron lesions.
CLO 2	Perform and interpret clinical neurological examinations, including reflexes and assessments of bladder and bowel control, to identify neurological disorders and develop appropriate differential diagnoses and management strategies.
CLO 3	Design and implement physiotherapy interventions for managing neurological conditions such as stroke, cerebral palsy, and peripheral neuropathies, and address musculoskeletal disorders related to pregnancy with a focus on functional impact and patient-centred care
CLO 4	Describe the anatomy and physiology of the female reproductive system, understand physiological changes during pregnancy, and manage complications and disorders including infections, incontinence, and menopause.
CLO 5	Perform and interpret basic electrophysiological and electromyography tests to diagnose and manage neuromuscular disorders, using test results to guide treatment planning effectively.

f. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Lecture Hrs./ Week	**Lab Hrs./ Week**	**Hrs./ Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
6	-	6		30	-	70	-	-	100

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

g. Course Content:

Sr. No.	Content	W	T	CO
1	**Neurology** 1. Basis Neurophysiology: i. Motor (pyramidal, extra pyramidal system, spinal cord, upper and lower motor neurons, Cranial nerves, Brachial plexus, Lumbosacral plexus and Peripheral nerves. ii. Sensory iii. ANS: reflexes, bladder and bowel control 2. Principles of clinical examinations, diagnosis, differential diagnosis and management of common neurological disorders. 3. Salient clinical features and management of common neurological conditions: Cerebrovascular accidents: Stroke (hemiplegia), Unconscious patient 4. Diseases of Spinal cord: i. Compressive- Spondylotic, Tumors ii. Noncompressive- Paraplegia, Quadriplegia iii. Foot drop and Wrist drop. 5. Cerebral Palsy with Mental retardation, Spastic child. 6. Disorders of Cerebral circulation 7. Neuroinfections: Meningitis, Encephalitis, Poliomyelitis,Transverse myelitis, Neurosyphilis, Slow viral diseases i. Peripheral Neuropathies:GBS, Diabetic Neuropathy, entrapment neuropathies 8. Muscle Disorders: Myopathy, Polymyositis, Muscular dystrophies, Myasthenia Gravis. 9. Movement Disorders – i. Parkinsonism, Chorea, Dystonia, Tremors and Writer's cramps ii. Cerebellar Ataxia, Friedreich's Ataxia ii. Dementia iii. Costoclavicular Syndrome iv. Demyelinating disorders including Multiple Sclerosis v. Basic concept of electrophysiology and electromyography	**67**	**60**	**CLO1,2,3 ,5**

2	**Obstetrics And Gynaecology** 1. Anatomy and physiology of the female reproductive organs, Puberty dynamics. 2. Physiology of menstrual cycle – Ovulation cycle, uterine cycle, Cx cycle, duration, amount. 3. Hormonal regulation of menstruation. 4. Diagnosis of pregnancy 5. Abortion 6. Physiological changes during pregnancy 7. Importance of antenatal care exercise 8. High risk pregnancy, prenatal common complications – investigation and management. 9. Musculoskeletal disorders during pregnancy 10. Multiple child birth 11. Normal labor 12. Child birth complications, investigation and management 13. Normal puerperium, lactation and importance of post natal exercises 14. Family planning. 15. Medical termination of pregnancy 16. Infection of female genital tract including sexually transmitted diseases 17. Low backache 18. Prolapse of uterus and vagina 19. Principle of common gynecological operations – Hysterectomy, D&C, D&E, Pep smear, Hysterosalphyngography, Laparoscopy, Colposopy 20. Menopause: Its effect on emotions and musculoskeletal system 21. Urogenital dysfunction – pre and post natal condition 22. Sterility: Pathophysiology, investigations, management 23. Carcinoma of female reproductive organs – surgical management in brief 24. Incontinence – Types, Causes, Assessment and Management	**33**	**30**	**CLO3**
Total		**100**	**90**	

h. Text Book and Reference Book:

1. Golwala's Medicine 23rd Edition
2. Neurology for the Physical Therapist, Anne A. H. Phillips, Sandra R. Wainwright.
3. Bradley's Neurology in Clinical Practice Robert B. Daroff, Gerald M. Fenichel, Jeffrey L. Cummings.
4. Textbook of Gynecology by D.C. Dutta
5. Textbook of Obstetrics by D.C. Dutta

a. **Course Name: GENERAL SURGERY AND CARDIOTHORACIC SURGERY**
b. **Course Code: 07101303**
c. **Prerequisite:** To study general surgery and cardiothoracic surgery candidate should have knowledge about human body, human body's landmarks and its complete human physiology.
d. **Rationale**: This comprehensive syllabus in general surgery, plastic surgery, neurosurgery, ENT, cardiothoracic surgery, and ophthalmology provides a detailed foundation in surgical principles and practices, addressing a wide array of conditions from acute infections and trauma to complex surgical interventions, enabling students to effectively diagnose, manage, and treat diverse surgical cases while integrating critical care and rehabilitation strategies.

e. **Course Learning Objective:**

CLOBJ 1	Identify acute and chronic infections such as cellulitis, bacteraemia, septicaemia, and hospital-acquired infections, and develop effective prevention and management strategies to control their spread in clinical settings.
CLOBJ 2	Demonstrate knowledge of common surgical procedures, such as appendectomy and mastectomy, including an understanding of wound healing processes and how to address post-operative complications.
CLOBJ 3	Gain expertise in managing trauma cases, particularly in neurosurgery and cardiothoracic surgery, with a focus on addressing head injuries, spinal cord trauma, and thoracic trauma conditions such as pneumothorax and cardiac tamponade.
CLOBJ 4	Understand the staging, progression, and surgical treatment options for various malignancies, developing skills to assess and manage cancer cases in a surgical oncology context.
CLOBJ 5	Acquire skills to manage complex conditions in plastic surgery, ENT, and ophthalmology, including performing skin grafting for burns, surgical interventions for hearing loss, and treatment of eye disorders like cataract and glaucoma.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Identify and manage various acute and chronic infections, including cellulitis, bacteremia, septicemia, and hospital-acquired infections, with a focus on modes of spread and prevention strategies.
CLO 2	Demonstrate an understanding of different types of surgical procedures (e.g., appendectomy, mastectomy) and the principles of wound repair, including factors affecting healing and management of post-operative complications.
CLO 3	Acquire knowledge of trauma management, particularly in neurosurgery and cardiothoracic surgery, including the handling of head injuries, spinal cord trauma, and thoracic trauma situations like pneumothorax and cardiac tamponade.
CLO 4	Comprehend the staging, behavior, and surgical treatment options for various malignancies, focusing on surgical oncology and cancer management strategies.
CLO 5	Develop the skills to manage specialized conditions in plastic surgery, ENT, and ophthalmology, such as skin grafting, reconstructive procedures for burns, surgical interventions for hearing loss, and treatment of eye disorders like cataract and glaucoma.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme								
Theory Hour	Lab Hour	Hrs/Wk	Credit	Theory Marks		Practical Marks		Total
				External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	
6	-	6	-	70	30	-	-	100

SEE - Semester End Examination, **CIA -** Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr. No.	Content	W	T	CO
1	**General Surgery** 1. Acute infections: Inflammatory fever, Bacteremia, Septicemia, Pyaemia, Toxemia. 2. Specific types: Cellulitis-sites, Lymphangitis, Abscess with special reference to hand infection, Carbuncle. 3. Specific Types Condition: Tetanus, Gas gangrene, Hospital acquired infection, Cross infection with modes of spread and prevention 4. General survey of chronic inflammation: syphilis (reference to other venereal diseases), leprosy and actinomycosis. 5. Surgical Tuberculosis 6. General survey of trauma, pathology, clinical features of wound repair-primary, secondary and tertiary wound repair, Clean and contaminated wounds and infectious wound, principles of treatment, factors affecting wound healing, ulcers and gangrene, post-operative complications of abdominal surgery, specifically chest wound infection, edema. 7. Malignancy – spread and its behavior 8. Various abdominal incisions, abdominal drainage tubes, catheters and nasogastric tubes 9. Ward demonstration for an hour, a day, for a period of one week ,Anesthesia and O. T. demonstrations 10. UTI 11. Problems of trauma to the hand and their management 12. Breast surgery 13. Abdominal surgeries: Appendisectomy, Cholecystectomy, Partial Colostomy, Ileostomy, Hernia, Prostatectomy, Nephrectomy 14. Mastectomy & Oncosurgery – Approach, Complication & Management. 15. Amputation – Types, Sites, Complications and Management. 16. Varicose vein and PVD (Peripheral Vascular Disease). 17. Hernia – Surgery, precautions and complications 18. Fluid, Electrolyte and Acid-Base disturbances – diagnosis and	35	60	CLO1,2

	management; Nutrition in the surgical patient, Haemostasis – components, haemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion 19. General Thoracic Procedures – Radiologic Diagnostic procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery. Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer			
2	**Plastic Surgery** 1. Burns as a specific types of severe trauma, classification, early and late complications, management and reconstructive surgery – skin as an example of plastic procedure. 2. Types of skin grafting – take up of a graft – healing of a graft, post operative care of plastic surgery with specific role of physiotherapy. 3. Principles of cineplasty, tendon transplant, cosmetic surgery, types of graft, surgery of hands with emphasis on a management of traumatic and leprosy hand 4. Neck, skin contractures and management 5. Keloid & Hypertrophied scar management, Micro vascular surgery – Reimplantation and Revascularization	15	25	CLO5
3	**Neuro Surgery** 1. Neuro-Physiology**:** Neurophysiologic phases of tone, disorders of tone and posture, bladder control, Muscle contraction movement and pain 2. Outline of surgical disorders of brain – head injuries 3. General survey of diseases of spine and spinal cord, Paraplegia 4. C/F and management of the following**:** i. Congenital and childhood disorders – hydrocephalus and spina bifida. ii. Trauma – Broad localization, First aid and management of sequelae of Head injury and Spinal cord injury iii. Diseases of the spinal cord-craniovertebral junction anomalies, syringomyelia, cervical and lumber disc diseases, tumors iv. Peripheral nerve disorders – Peripheral nerve injuries, localization and management, Entrapment neuropathies v. Intracranial tumors – broad classification, signs and symptoms vi. Preoperative assessment and indications and contraindications for neurosurgery vii. Management of pain, electrical stimulation of brain and spinal cord viii. Miscellaneous ix. Head injury – management, Intracranial Aneurysm and AV malformation, post-operative neurosurgical care.	9	15	CLO3

4	**E.N.T** 1. Anatomy and physiology of hearing and the use of audiometry in assessment of hearing-outline only. 2. General introduction to diseases of E.N.T., emphasis on otitis media, Bell's palsy, Sinusitis and Rhinitis. 3. Mastoid surgery 4. Larynx and associated function paralysis with tracheostomy and care of tracheostomy. 5. Causes of hearing loss, conservative and surgical intervention including types and availability of hearing aids. 6. Surgical procedure in 7th Cranial nerve palsy, Vertigo. 7. Otosclerosis, functional achonia and deafness.	6	10	CL05
5	**Cardiothoracic Surgery** 1. Basic anatomy of chest wall, trachea and bronchial tree, lungs and bronchopulmonary segments, pleura and mediastinum. 2. Physiology, mechanics of breathing and use of mechanical breathing – ventilators (respirators) 3. P.F.T 4. Investigation of lung diseases including endoscopies 5. Chest injury 6. Common supprative diseases of the lung: Bronchioctesis and Lung abscess 7. Bronchogenic Carcinoma 8. Common surgeries of chest: thoracoplasty, pulmonary resection surgery, thoracotomy; Pnemothorax, hydropneumothorax and empyema. 9. Common diseases of esophagus and related conditions causing dysphagia 10. Surgery of portal hypertensions. 11. Surgery of pulmonary T.B. 12. Surgery of heart and great vessels, 13. Basic anatomy of heart and great vessels 14. Investigation of patients undergoing cardiac surgery. 15. Cardiac arrest and its management 16. Basic principles of open-heart surgery: Heart lung by-pass(extracorporeal circulation) 17. Common diseases of heart requiring surgery both congenital and acquired including open heart surgery. 18. Common drugs used in cardiac surgery its uses and side effects. 19. Common vascular surgeries – Embolectomy, vascular deconstructive surgery, (thrombosis, embolism, atherosclerotic and occlusive vascular diseases) including coronary artery by-pass grafting. 20. Surgery for congenital heart disease and Aneurysm, b. Gangrene, Amputation, DVT - Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pnemothorax, Haemothorax, Cardiac Tamponade, Tracheobronchial disruption Aortic disruption, Diaphragmatic disruption, Oesophageal disruption, Cardiac and Pulmonary contusion. 21. Transplant Surgery – Heart, Lung and Kidney – Indications, Physiological changes and complications. 22. Aneurysm, Berger's disease, Raynaud's Disease, Thrombophelbitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins	23	40	CLO3

	Clinical 1. Examination of patients as regards chest and heart disease 2. Demonstration – acquaintances with C.T. surgery, equipments, I.C.C.U./O.T. 3. Radiology:- X-ray studies – in various lung diseases			
	Radiology Introduction, X-rays of fractures of bones, Orthopedic conditions -O.A., P.A., Cervical and lumber spondylosis, common chest conditions, C.T. scan, M.R.I. and angiography etc.	6	10	CLO4
	Ophthalmology 1. Common eye disease including Refractory errors, conjunctivitis and trachoma 2. Cataract and Glaucoma. 3. Squint and Ptosis. 4. Eye Lesions in leprosy, including causes, treatment and complications of lagopthalmos. 5. Causes, clinical features and treatment of disorders of occular movement occurring in diseases such as Myasthenia gravis, Progressive supranuclear palsy and LMN Diseases. 6. Causes, clinical features and treatment and prognosis of inflammatory diseases, Vit-A deficiency, emphasis on preventable causes and prophylactic measures. 7. Definition of blindness and Visual disability evaluation. 8. Investigative procedures used for testing visual failures 9. Ophthalmologic surgical conditions, corneal ulcer, iritis, cataract, retinitis, detachment of retina	6	10	CLO5
	Total	**100**	**170**	

i. Textbook and Reference Book:

1. Undergraduate surgery –Nan
2. Short practice of surgery-Bailey and Love

a. **Course Name: ORTHOPAEDICS TRAUMATIC AND NON - TRAUMATIC**
b. **Course Code: 07101304**
c. **Prerequisite:** To study orthopaedics traumatic and non-traumatic candidate should have knowledge about human anatomy, body landmarks, human physiology and biomechanics & pathology.
d. **Rationale**: The syllabus provides a comprehensive framework for understanding the diagnosis, management, and surgical interventions for a wide range of orthopaedic conditions, encompassing trauma, congenital and acquired deformities, infections, and degenerative diseases, thereby equipping students with essential knowledge and skills for effective clinical practice in orthopaedics.

e. **Course Learning Objective:**

CLOBJ 1	Demonstrate understanding of clinical examination, investigations, and radiological techniques used for diagnosing of different traumatic and non-traumatic orthopaedic conditions.
CLOBJ 2	Describe and understand the etiology, pathology, clinical presentations, relevant investigations and medical management of a wide range of upper limb traumatic and non-traumatic orthopaedic conditions
CLOBJ 3	Describe and understand the aetiology, pathology, clinical presentations, relevant investigations and medical management of a wide range of spine, pelvis and lower limb traumatic and non-traumatic orthopedic conditions.
CLOBJ 4	Describe and understand the mechanisms, classifications, and treatment principles of various congenital and acquired deformities, bone and joint infections, and bone tumors.
CLOBJ 5	Describe etiology, pathology, clinical presentations, relevant investigations and medical management of various neurological and muscular disorders.
CLOBJ 6	List the complications associated with orthopedic surgical procedures and understand the principles and types of orthopedic surgeries, including arthrodesis, arthroplasty, osteotomy, external fixators, and spinal stabilization surgeries.

f. Course Learning Outcomes:

At the end of the course the student will be able to

CLO 1	Demonstrate understanding of clinical examination, investigations, and radiological techniques used for diagnosing of different traumatic and non-traumatic orthopaedic conditions.
CLO 2	Explain the etiology, pathology, clinical presentations, relevant investigations, and medical management of a broad range of upper limb orthopedic conditions, including both traumatic and non-traumatic cases.
CLO 3	Explain the etiology, pathology, clinical presentations, relevant investigations and medical management of a wide range of spine, pelvis and lower limb orthopedic conditions, including both traumatic and non-traumatic cases.
CLO 4	Explain the mechanisms, classifications, and treatment principles of various congenital and acquired deformities, bone and joint infections, and bone tumors.
CLO 5	Explain etiology, pathology, clinical presentations, relevant investigations and medical management of various neurological and muscular disorders.
CLO 6	Enumerate the complications of various orthopedic surgical procedures and understand the principles and types of orthopedic surgeries, including arthrodesis, arthroplasty, osteotomy, external fixators, and spinal stabilization surgeries
CLO 7	Demonstrate effective communication with medical staff and patients concerning the evaluation and management of traumatic and non-traumatic orthopaedic conditions.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme									
Theory Hour Hrs./Week	**Lab Hour Hrs./Week**	**Hrs./Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
3	-	3	-	30	-	-	70	-	100

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	**Topics**	**W**	**T**	**CO**
1	**General Orthopedics:** Clinical examination of an orthopedic patient, investigations, radiological and imaging techniques, salient features Deformities, acquired deformities, causes and principles of management Splinting, Traction procedures – materials Preventive orthopedics Geriatric orthopedics.	3	3	CLO1
2	**Introduction:** General principles and injuries of the upper limb; briefly mention orthopedic surgery, definition and scope, brief history	2	2	CLO1

3	**Sprains, Fractures and Dislocations:** Causes, types, mechanisms, displacements, general symptoms, healing, principles of treatment, complications like malunion, delayed union, nonunion, myositis ossificans, VIC, fat embolism, Sudeck's osteo dystrophy.	3	4	CLO2, 3
4	**Injuries to the hand** Types (open, closed), principles of treatment, injuries to the phalanges, sprains, dislocations of MP and IP joints, fractures of the phalanges, MCPs, Bennett's fracture, Mallet finger tendon injuries (flexor and extensors)	3	4	CLO2
5	**Wrist and forearm injuries** Wrist dislocation, Colles' fracture, displaced epiphysis, Smith's fracture, Barton's fracture, injuries to carpal, scaphoid and sprains; fracture of forearm bones-Greenstick fracture, infraction injury, both bone fracture, Galleazi, montagia fracture	4	5	CLO2
6	**Injuries to the elbow** Traumatic synovitis, sprain, dislocation of the elbow.	3	3	CLO2
7	**Fractures involving the elbow joint** Supracondylar fracture, Intercondylar fracture, fracture of medial epicondyle and lateral epicondyle, myositis ossificans, VIC, fracture of head of radius and olecranon.	3	4	CLO2
8	**Injuries of shoulder and arm** Fracture of proximal end, neck, shaft of humerus, fractures of clavicle, acromioclavicular and sternoclavicular dislocations, fractures of scapula	6	8	CLO2
9	**Injuries of spine and pelvic** Injuries to the cervical spine (upper and lower), atlantoaxial injuries. Dorsolumbar spine: classification, mechanism and types of injuries, stable fracture without paraplegia, fracture dislocation with paraplegia; management of fracture and paraplegia, bedsore and bladder bowel. Pelvic injuries: fractures, its mechanism, classification and management; fractures of acetabulum, sacrum and coccyx.	3	4	CLO3
10	**Injuries of the lower limb** Dislocations of hip joint, intracapsular and trochenteric fractures of femur, fractures of the neck of femur, shaft of femur and fracture femur in children. Fracture of femoral and tibial condyles and patella, injuries to extensor mechanism, contusion, Hemarthrosis, knee joint dislocation and traumatic dislocation of patella Fracture and fracture dislocation of ankle, epiphyseal injury, lower end of tibia.	6	8	CLO3
11	**Foot** Fracture of tallus, calcaneum, MTs and phalanges	3	3	CLO3
12	**Soft tissue injuries** Ligamentous injuries of ankle and injury to muscles	2	2	CLO2, 3
13	**Amputations and Traumatic conditions** Types, ideal stump, complications, general principles of treatment, Upper and lower extremity amputations – Prosthesis, Orthopedic splints and appliances for injuries to muscles and tendons.	5	6	CLO2, 3

14	**Principles of operative management, indications and contraindications for arthroplasty, osteotomy, arthrodesis, spinal stabilization, tendon operations, arthroscopy, total and partial joint replacements, limb reattachments** Anatomy and physiology -Ligaments, bursa, fascia. Dislocations of Upper Limb - Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher's and Hippocrates manoeuvre), 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. Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum. Soft Tissue Injuries - Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, and bursitis. Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries: Meniscal injuries of knee. Cruciate injuries of knee. Medial and lateral collateral injuries of knee. Lateral ligament of ankle. Wrist sprains. Strains- quadriceps, hamstrings, calf, biceps, triceps etc. Contusions- quadriceps, gluteal, calf, deltoid etc. Tendon ruptures-Achilles, rotator cuff muscles, biceps, pectorals etc. Hand Injuries- mechanism of injury, clinical features, and management of the following - Crush injuries. Flexor and extensor injuries. Burn injuries of hand.	5	6	CLO6
15	**Congenital disorders** Congenital deformities, congenital elevation of scapula, torticollis, cleidocranialdystosis, superior radioulnar synostosis, Madelung' deformity, SCM tumor, congenital wry neck, Kyphosis, lordosis, scoliosis – primary and secondary, spina bifida, meningomyelocele, coax vara, CDH, congenital genu recurvatum, CTEV. Congenital Deformities - Vertical talus. Hand anomalies- syndactyly, polydactyly and ectrodactyly. Arthrogryposis multiplex congenital (amyoplasiacongenita). Limb deficiencies- Amelia and Phocomelia. Klippelfeil syndrome. Osteogenesis imperfecta (fragile ossium), Cervical rib Acquired Deformities - Genu varum, Genu valgum, Pescavus, Hallux rigidus, Hallux valgus, Hammer toe, Metatarsalgia.	7	9	CLO5
16	**Infections of bone and joints** Osteomyelitis: acute and chronic, Brody's abscess (as a complication of open fracture), Skeletal T.B., principles of treatment T.B. of shoulder, elbow and wrist, hip, knee, ankle and foot; T.B. Osteomyelitis: Dactylitis, Caries rib	8	10	CLO4
17	**Arthritis:** Acute pyogenic arthritis, septic arthritis of infancy, small pox arthritis, syphilic infection of joint R.A., O.A. Ankylosing spondylitis, Gouty arthritis, Psoriatic arthritis. Haemophilic arthritis. Still's disease (juvenile rheumatoid arthritis). Charcot's joints Connective Tissue Disorders- Systemic Lupus Erythematosis, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue Disease	8	10	CLO4
18	**Bone Tumors** Classification, true bone tumors; osteosarcoma, giant cell tumor, Ewing's sarcoma, Chondroblastoma, chondrosarcoma, fibrosarcoma, lymphoma of bone, plasmacytoma. Bone metastasis: synovial sarcoma, hemangioma of bone, adamanatinoma of long bones and chondroma Tumor like lesions: osteoma, benign osteoblastoma, nonosteogenic fibroma, osteochondroma, osteoid osteoma and enchondroma	5	6	CLO4

19	**Neurological and muscular disorders** Poliomyelitis: recovering and late stages, rehabilitation and recovery phase, tenodesis, tendon transplants, stabilization problems, short limb and equalization and tendon lengthening Cerebral Palsy: types, treatment including orthopedic surgeries Leprosy: classification, multi drug therapy, foot drop, trophic ulcer, deformities in the hand – claw hand and rehabilitation Muscular dystrophy: types and treatment Injuries to plexuses and nerves: brachial and lumbosacral plexus, radial, ulnar, median, sciatic and lateral popliteal. Spinal Dysraphism Syndromes: Causes, Clinical features, complications, management- conservative and surgical of the following: Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costoclavicular syndrome. Levator scapulae syndrome. Piriformis syndrome. Sacralisation. Lumbarisation. Coccydynia. Hemivertebra	3	4	CLO5
20	**Regional conditions of spine and lower limb** Backache:kyphosis,scoliosis,spondylolisthesis,lumbosacral strain, PIVD, fibrositis back, lumber canal sternosis, sacroiliac strain, spondylosis, spondylolysis Hip: coax vara, slipped upper femoral epiphysis, idiopathic chondrolysis of hip Knee: Genu valgum & varum, recurvatum, tibia vara, quadriceps fibrosis, recurrent dislocation of patella, bursa around the knee, loose bodies in the knee, CMP (Chondromalacia Patella), Plica Syndrome, Fat Pad Syndrome (Hoffa's syndrome). Foot: Painful heel, plantar fascitis, posterior heel pain, flat foot, foot strain, pain in forefoot, halus valgus, anterior metatarsalgia, Ankle Sprains. Calcaneal Spur, Tarsal Tunnel syndrome, Achilles Tendinitis, Metatarsalgia, Morton's Neuroma.	6	8	CLO3
21	**Regional conditions of neck and upper limb** Neck: C.S., PIVD, Cervical rib, torticollis, brachialgia Shoulder: supraspinatus tendinitis, calcification, rupture of rotator cuff, adhesive capsulitis, deltoid fibrosis, Subarachnoid bursitis, bicipital tendinitis Elbow: tennis elbow, golfer's elbow, recurrent slipping of ulnar nerve, cubitus varus and valgus Wrist and hand: ganglion, D.Q., trigger finger and thumb, carpal tunnel syndrome, dupuytren's contracture, Mallet Finger	8	10	CLO2
22	**Miscellaneous** Backache, disc lesions, metabolic diseases, rickets, Osteomalacia, osteoporosis, parathyroid osteodystrophy, scurvy etc. tenosynovitis T.B. Spine, Perthes disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis. Metabolic Bone Diseases: Rickets. Osteomalacia, Osteopenia. Osteoporosis. Orthopedic Surgeries: Indications, Classification, Types, And 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.	4	5	CLO7
TOTAL		**100**	**120**	

i. Textbook and Reference Book:

1. Adam's outline of fractures – 8th edn
2. Adams outline of Orthopaedics – 8th edn
3. Apley's textbook of Orthopaedics

a. **Course Name: Physical and Functional Diagnosis**
b. **Course Code: 070101305**
c. **Prerequisite:** To study physical and functional diagnosis candidate should have knowledge about human joint, its mechanics, physiology and basic knowledge of physics.
d. **Rationale:** The syllabus for Physical and Functional Diagnosis, encompasses the physiological principles of action potentials and muscle contraction, detailed methodologies for electro-diagnosis and electromyography, comprehensive evaluation techniques for orthopedic and neuro-muscular dysfunctions, and structured assessments for cardio-pulmonary and pain conditions, ultimately integrating developmental principles and functional diagnosis to enhance therapeutic practices and patient outcomes in physiotherapy.

e. **Course Learning Objective:**

CLOBJ 1	Explain the physiology of action potential generation and propagation, including volume conduction in muscle and nerve tissue.
CLOBJ 2	Utilize and interpret electro-diagnostic tools such as EMG and NCV to assess muscle and nerve function, recognizing normal and abnormal patterns.
CLOBJ 3	Perform detailed orthopaedic assessments focusing on muscle strength, flexibility, and functional analysis according to I.C.I.D.H-II norms.
CLOBJ 4	Evaluate neuro-muscular dysfunction through examinations of cranial nerves, balance, and coordination, including biomechanical and neural factors.
CLOBJ 5	Evaluate cardiopulmonary health using various diagnostic tests and interpret data from functional evaluations and quality of life questionnaires.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Demonstrate competence in utilizing and interpreting EMG, NCV, and biofeedback for evaluating neuromuscular function.
CLO 2	Assess and analyze orthopaedic movement dysfunctions, providing comprehensive evaluations based on standardized protocols.
CLO 3	Perform neuro-muscular assessments, interpreting results to inform rehabilitation strategies for various disorders.
CLO 4	Assess cardiopulmonary function and utilize findings to develop tailored rehabilitation programs.
CLO 5	Describe the principles of human development and maturation, applying this knowledge to assess functional status across different age groups.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme								
Theory Hour	**Lab Hour**	**Hrs/ wk**	**Credit**	**Theory Marks**		**Practical Marks**		**Total**
				External Marks (T)	**Internal Marks (T)**	**External Marks (P)**	**Internal Marks (P)**	
6	-	6	-	70	30	70	30	200

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr. No.	Topics	W	T	CO
1	**Bioelectricity** Physiology of generation & propagation of action potential – Volume conduction.	3	5	CLO1
2	**Electro Physiology of muscle contraction** Therapeutic current – as tool for electro-diagnosis – physiological principles – use of alternating & direct current in electro-diagnosis such as SD curves, use of Biofeedback unit for assessment of muscle function. Principles of Electromyography – Motor unit – Normal characteristics – Activity at rest, Recruitment/frequency pattern at minimal activity, Interference pattern – Abnormal E.M.G. pattern. Principles of nerve conduction. Late responses: F-wave, H-reflex. Electro-physiological principles of assessment of Myoneural junction. E.M.G. instrumentation: Basic components, Panel diagram, Types of electrodes. Biofeedback: Introduction, Principles of biofeedback, Therapeutic effects, Indications, Contraindications and Techniques of treatment. Electrophysiology of muscle & nerve, FG test, Test for sensory & pain threshold/ pain tolerance –technique Normal & abnormal EMG pattern, NCV	10	20	CLO1
3	**Assessment of orthopedic movement dysfunction** General orthopedic examination, Muscle strength, Power, Endurance, Flexibility, Limb-length discrepancy, Limb girth measurement, Pelvic inclination, Goniometry, Trick movements, End-feel, Special Tests, Altered Posture & Gait –Functional analysis as per I.C.I.D.H-II norms. Response to soft tissue to trauma: trigger point, spasm, ligament sprain, muscle strain.	20	40	CLO2
4	**Assessment of articular and extra articular soft tissue – Contractile & Non contractile tissue, Examination of joint integrity – Accessory movement & end feel**	5	10	CLO2
5	**Assessment of neuro-muscular dysfunction** General neurological examination, Higher mental functions, Cranial nerves, Altered muscle strength, Power, Balance, Endurance, Tone, Spasticity, Inco-ordination, Abnormal deep & superficial reflexes, Myotomes, Dermatomes, Voluntary control testing, Abnormal movements, Neural control of bladder, Nerve entrapments, Gait and Functional evaluation as per ICIDH-II norms, Joint mobility, limb length, posture deviation, Posture and alignment: Biomechanical and neural factors	20	45	CLO3
6	**General principles of human development & maturation** Aspects (physical, motor, sensory, cognitive & perceptive, emotional, social), factors influencing human development & growth, principles of maturation, specific development.	3	5	CLO5

7	**Assessment of cardio-pulmonary dysfunction** Chest expansion, Abnormal breath sounds, Quality of life questionnaires, Borg scale, Principles of exercise tolerance test – Assessment of vital parameters in simple functional test, 6 minutes' walk test, 12-minute walk test, Shuttle Walk test, Canadian step test, Treadmill test, Symptom limited test, Breath holding test, Spirometry, Peak- flowmetry, Theoretical basis of Bruce's protocol, Astrand Protocol & Step test.	20	40	CLO4
8	**Functional diagnosis** ICIDH-II, FIM, STREAM, BBS and Barthel Index, ICF for ortho, cardio &neuro.	5	10	CLO3
9	**Interpretation of various investigations** Radiological (X-rays, CT scan, MRI). Routine Biochemical investigations (ABG, blood, CSF, etc). Electro- diagnostic (EMG, NCV, SDC etc) findings. PFT analysis.	5	10	CLO2,3,4
10	**Assessment of pain** Intensity, Quality, Objective assessment, Documentation, Objective measurement: VAS, Numerical Rating scale, Mc Gill's modified questionnaire.	3	5	CLO2,3
11	**Assessment of Hand** Pinches, Grips, Routine sensory motor evaluation, Stereognosis.	3	5	CLO2,3
12	**Fitness testing for Sports.**	3	5	CLO5
TOTAL		**100**	**200**	

i. Text Book and Reference Book:

1. Maitland's book on Manual therapy.
2. Clinical Electrotherapy - Nelson-Currier - Appleton & Lange publication. Clinical
3. Mobilization – Kaltenborn.
4. Electromyography - by Mishra.
5. Orthopaedic Physical examination - by Magee. Mobilization methods – Kaltenborn.
6. Clinical Electromyography – Kimura. Orthopaedic Physical therapy – Donnatelli.
   Exercise & Heart – Wenger.
7. Exercise Physiology - Mc Ardle.
8. Physical Rehabilitation – Susan O'Sullivan.
9. Orthopaedic Physical examination - by Magee. Mobilization methods – Kaltenborn.
10. Clinical Electromyography – Kimura. Orthopaedic Physical therapy – Donnatelli. Exercise & Heart – Wenger.

Year 4

a. **Course Name: Physiotherapy in Musculoskeletal and Sport Sciences**
b. **Course Code: 07101401**
c. **Prerequisite:** To study physiotherapy in musculoskeletal and sport sciences, candidate should have knowledge about the biomechanics of joint, musculoskeletal system, muscle physiology, exercise physiology, general orthopaedic surgeries, basic orthopaedic assessment and basic manual therapy techniques and electrotherapeutic modalities.
d. **Rationale:** The syllabus focuses on comprehensive physiotherapy approaches to managing fractures, dislocations, soft tissue injuries, and postoperative rehabilitation for orthopaedic surgeries, emphasizing assessment and treatment methods; it also covers the management of rheumatological and infectious conditions, degenerative and congenital disorders, and various orthopaedic conditions, along with principles of sports medicine, including injury prevention, assessment, and rehabilitation strategies, to enhance recovery and functional outcomes.

e. **Course Learning Objective:**

CLOBJ 1	**Define and classify** different types of fractures and their associated complications, including understanding the definitions, healing processes, and factors influencing fracture healing. **Apply principles of physiotherapy assessment and management** for fractures of the upper and lower limbs, scapula, ribs, vertebrae, and pelvis, including recognizing and managing fracture complications.
CLOBJ 2	**Conduct a thorough physiotherapeutic assessment and management** for dislocations, focusing on restoring joint function and preventing recurrence.
CLOBJ 3	**Assess and manage** soft tissue injuries, including contusions, sprains, strains, muscle and ligament ruptures, and meniscal injuries.
CLOBJ 4	**DESCRIBE** foundational knowledge and practical skills required for the classification, prevention, assessment, and rehabilitation of sports injuries.
CLOBJ 5	**Develop and implement pre and post-operative management plans** for various orthopaedic surgeries, ORTHOPEDIC CONDITIONS including arthroplasty (total/partial hip and knee replacement), girdle stone arthroplasty, arthrodesis, osteotomy, excision arthroplasty, and tendon transfers.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Demonstrate the ability to assess fracture types and complications accurately and select suitable immobilization methods and rehabilitation strategies.
CLO 2	Perform accurate physiotherapeutic assessments and design effective management plans for dislocations to restore joint function and prevent recurrence.
CLO 3	Equipped to design and implement pre and post-operative physiotherapy management plans for various orthopaedic surgeries, including arthroplasty, arthrodesis, osteotomy, and tendon transfers. They will focus on maximizing recovery, enhancing functional outcomes, and addressing both immediate post-surgical needs and long-term rehabilitation goals.
CLO 4	Effectively classify and assess sports injuries, implement injury prevention strategies, and develop and manage comprehensive rehabilitation programs to support athletes' recovery and return to activity.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme									
Theory Hour Hrs./Week	**Lab Hour Hrs./Week**	**Hrs./Week**	**Credit**	**Internal Marks**			**External Marks**		**Total**
				T	**CE**	**P**	**T**	**P**	
3	3	6	-	30	-	30	70	70	200

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. **Course Content:**

Sr. No.	Topics	W	T	CO
1	**Traumatology** General Physiotherapy approach in traumatology: Fractures and complications- definition, healing, causes, signs and symptoms, methods of reduction, means of immobilization- sling, cast, brace, slab, traction, duration, fractures in children- epiphyseal injury, principles of physiotherapy assessment and management in fractures of injury, Crush principles of physiotherapy assessment and management in fractures of UL and LL bones, scapula, ribs, vertebrae and pelvis and fracture complications General physiotherapy approach in dislocations: Causes, type's principles of treatment, Physiotherapeutic assessment and management (conservative and surgical) or shoulder, elbow, wrist, MP, IP, hip knee ankle dislocations, acromioclavicular and sternoclavicular joints. Physiotherapeutic assessment and management of soft tissue injury: Contusions, sprains, strains, ruptures of muscles and ligaments, meniscal injuries, arthroscopy. Rehabilitation of patient with orthopedic surgery: Pre and post-operative management of arthroplasty of all major joints, girdle stone arthroplasty, arthrodesis, arthroscopy, osteotomy, excision arthroplasty, total/partial hip and knee replacement, Mcmurry's osteotomy, reconstructive surgical mechanical changes (tendon transfer, Peripheral Nerve Injuries) Physiotherapeutic assessment and management of amputations: Classification and levels of UL and LL amputations Physiotherapeutic and prosthetic management/ complete rehabilitation PT assessment and management of reconstructive surgery in CP and polio patients.	50	60	CLO1,3
2	**Rheumatology and Infections:** Pathological changes in inflammation, edema Post incisional inflammation and infection. Pyogenic conditions and Osteomyelitis Physiotherapeutic assessment and management of rheumatology: still's disease, AS, bursitis, capsulitis, synovitis, tendonitis, infective arthritis, Gout, PA PT assessment and management of infective conditions: TB spine and other major joints, Perthes disease, osteomyelitis, pyogenic arthritis PT assessment and management in metabolic and hormonal disorders of the bone tissue-osteoporosis.	15	18	CLO2

3	**Degenerative conditions** Osteoarthritis: All joints Lumber and Cervical Spondylosis Spondylolysis and Spondylolisthes is Prolapsed Intervertebral Discs.	15	18	CLO2
4	**Congenital conditions** PT assessment and management in congenital and acquired conditions: Coxavara, Valga, CDH, Genu vara, Valga, Sprangle Shoulder, Torticollis, Madelung's deformity, Wry neck, Kyphosis, Lordosis, Scoliosis, CV anomalies, CTEV, Pescavus/planus	5	6	CLO2
5	**Miscellaneous** PT assessment and management of miscellaneous orthopedic conditions: Mallet and trigger finger, DQ, Metatarsalgia, Hallux, Valgus, Dupuytrens contracture, Fascitis, Tennis elbow, Ganglion, Tenosynovitis, CMP, Osgood Schlatter's disease and Causalgia Etc.	10	12	CLO2
6	**Sports Medicine** Introduction & classification of sports injury Aetiological factors Prevention of sports injury Frequency and site of injury Investigation and assessment in sports injury Management of sports injuries Pharmacology in sports Rehabilitation in sports	5	6	CLO4
TOTAL		**100**	**120**	

i. **Text Book and Reference Book:**

1. Essentials of Orthopaedics and applied physiotherapy, Prakash kotwal and Kanchan Mittal
2. Essentials of Orthopaedics for physiotherapists, John Ebnezer.
3. Clinical Orthopaedic Rehabilitation, Brotzman S Brent.

a. **Course Name: Physiotherapy in Neuroscience and Psychosomatic Disorders**
b. **Course Code: 07101402**
c. **Prerequisite:** To study physiotherapy in neuroscience and psychosomatic disorders candidate should have knowledge of Neuroanatomy, neurophysiology, Neuromedicine, psychiatry, common Neurosurgeries, basic neurological assessment and different neurological approaches in physiotherapy.
d. **Rationale**: The syllabus encompasses the symptomatology and clinical examination of neurological disorders, the assessment and early detection of developmental disorders in children, and the application of various neurodevelopmental approaches; it further includes assessment and treatment techniques for brain disorders (e.g., stroke, cerebral palsy), spinal cord lesions, and peripheral nerve injuries, alongside pre- and post-surgical management in neurosurgery, emphasizing electro diagnostic methods and the treatment of miscellaneous conditions like myopathies and myasthenia gravis.

e. Course Learning Objective:

CLOBJ 1	Describe the basic structures and functions of the central and peripheral nervous systems, including their roles in neurological disorders and the impact of developmental and acquired brain damage.
CLOBJ 2	Conduct clinical examinations of CNS functions, including the assessment of cranial nerves, and effectively use investigative tools to differentiate between various neurological disorders.
CLOBJ 3	Evaluate and Implement neurodevelopmental approaches such as the Bobath technique, Rood's approach, and Vojta technique, among others, for the treatment of motor impairments and abnormal motor behaviour due to brain damage.
CLOBJ 4	Execute and Develop assessment and treatment plans for neurological conditions, including stroke, cerebral palsy, hydrocephalus, and Parkinsonism, using evidence-based techniques and therapeutic interventions.
CLOBJ 5	Assess and provide rehabilitation for various spinal cord lesions and peripheral nerve injuries, including conditions like multiple sclerosis, Erb's palsy, and carpal tunnel syndrome, utilizing specific techniques and therapeutic strategies.
CLOBJ 6	Perform pre- and post-surgical assessments for neuro-surgical procedures, including laminectomy and spinal fusion, and design effective treatment plans to facilitate recovery and functional improvement.

f. Course Learning Outcomes:

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

CLO 1	Demonstrate a comprehensive understanding of the basic structures and functions of the central and peripheral nervous systems. Describe their roles in neurological disorders and explain how developmental and acquired brain damage impacts these systems.
CLO 2	Conduct thorough clinical examinations of central nervous system (CNS) functions, including the assessment of cranial nerves. Utilize investigative tools effectively to differentiate between various neurological disorders.
CLO 3	Implement and evaluate neurodevelopmental treatment approaches such as the Bobath technique, Rood's approach, and Vojta technique. Apply these methods to address motor impairments and abnormal motor behaviour resulting from brain damage.
CLO 4	Develop and execute evidence-based assessment and treatment plans for neurological conditions, including stroke, cerebral palsy, hydrocephalus, and Parkinsonism. Utilize appropriate therapeutic interventions to optimize patient outcomes.

CLO 5	Assess and provide rehabilitation for spinal cord lesions and peripheral nerve injuries. Apply specific techniques and therapeutic strategies for conditions such as multiple sclerosis, Erb's palsy, and carpal tunnel syndrome to enhance functional recovery.
CLO 6	Perform thorough pre- and post-surgical assessments for neuro-surgical procedures such as laminectomy and spinal fusion. Design and implement effective treatment plans to facilitate recovery and improve functional outcomes.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme								
Theory Hour	**Lab Hour**	**Hrs./Week**	**Credit**	**Theory Marks**		**Practical Marks**		**Total**
				External Marks (T)	**Internal Marks (T)**	**External Marks (P)**	**Internal Marks (P)**	
3	3	6	-	70	30	70	30	200

SEE - Semester End Examination, **CIA -** Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	**Topics**	**W**	**T**	**CLO**
1	**Review of Basic Neuroanatomy and Physiology**	3	3	CLO1
2	**Symptomatology of Neurological disorders, Role of investigation in differential diagnosis**	2	2	CLO1
3	**Clinical examination of CNS functions including Cranial Nerves.**	5	6	CLO2
4	**Development disorders of CNS, Early detection of brain damaged child, High Risk babies, Neuropediatric Examination.**	2	2	CLO2
5	**Development programs and Delayed milestones, Neurodevelopmental Screening Test, Minimum brain damage, Sensory Motor, Functional, Psycho social behaviors of a child, Perception development and training.**	3	3	CLO2
6	**Neurodevelopmental approaches** Neurodevelopmental approaches (Bobath technique, Rood's approach, Vojita technique, Brunnstorm movement therapy, Motor relearning program), Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy and biofeedback), limited patterns and abnormal motor behaviour due to brain damage, its control and training with reference to gait and hand function.	12	14	CLO 3
7	**Assessment and treatment techniques in BRAIN DISORDERS.** Stoke, Cerebral palsy, Hydrocephalus Meningitis Encephalis, Parkinsonism syndrome and Parkinson's diseaseBasal ganglia-Extrapyramidal tract lesions Head injury Brain injury Brain tumors Cerebellar ataxia, friedriech's ataxia Brain tumors Head injury	25	30	CLO 4
8	**Assessment and treatment of SPINAL CORD LESIONS** Motor Neuron Diseases (ALS, SMA, and other types), Quadruplegia, Paraplegia, Monoplegia, Cuada Equina, Potts Spine, Brown Sequard Syndrome S.C.D.C. Multiple sclerosis Tabesdorsalis Disseminated sclerosis Transverse Myelitis Syringomyelia Poliomyelitis, Spina bifida Prolapsed disc.	17	20	CLO 4

9	**Assessment and treatment of PERIPHERAL NERVE LESIONS** Erb's Palsy, Klumke's Palsy, Axillary nerve palsy (BPI)Rectal palsy Carpal tunnel syndrome Thoracic inlet syndrome Bell's palsy, Peripheral neuritis Polyneuropathies Causalgia, Sciatic nerve injury, Nerve trunk and root injuries Cranial nerve injuries (intra-cranial aneurysms and abscess, tumors) Leprosy-operations, transplantations, graphs, sutures and splints.	15	20	CLO 5
10	**Pre- and post-surgical assessment and treatment in Neuro surgeries including** Hydrocephalus Myelomeningocele C.V. junction anomalies, Spinal neoplasms, Infections, T.B., abscess Laminectomy, Discoidectomy Spinalfusion	4	5	CLO6
11	**Electrodiagnosis SDC, FG Test Chronaxie, Rheobase, EMG, NCV**	8	10	CLO 6
12	**Miscellaneous** Myopathies, Myaesthenia Gravis, Herpes Zoster.	4	5	CLO6
TOTAL		**100**	**120**	

i. Text Book and Reference Book:

1. Cash's Textbook for physiotherapist in Neurological disorders-Jay pee bros.
2. Proprioceptive Neuro muscular Facilitation – by Herman Kabat
3. Practical Physical Therapy – Margaret Hollis
4. Therapeutic exercise – by O'Sullivan
5. "Right in the middle" – by Patricia Davis
6. Stroke rehabilitation – by Margaret Johnson
7. Therapeutic exercise – by Basmajiian – 5th edn.
8. Physical Rehabilitation – by Krusen
9. Brain's disorders of Nervous system

a. **Course Name: Physiotherapy in Community Health**
b. **Course Code: 07101405**
c. **Prerequisite:** To study physiotherapy in community health candidate should have the knowledge of Sociology, basic knowledge of Physics and orthopedic, cardiopulmonary as well as neurological conditions
d. **Rationale:** The syllabus covers Community Rehabilitation, focusing on various rehabilitation approaches, definitions of disability, disability surveys, vocational evaluations, social work roles, rural integration, disaster management, occupational health, bioengineering, prosthetics, ethics, and administration in physiotherapy, alongside basic allied therapies.

e. **Course Learning Objective:**

CLOBJ 1	To develop and implement a community-based rehabilitation program that addresses specific local needs and integrates outreach strategies.
CLOBJ 2	To create and assess home exercise programs tailored to various physical therapy conditions, incorporating patient and caregiver education.
CLOBJ 3	To conduct thorough screenings for pediatric disorders, including developmental delays and mental retardation, and develop appropriate intervention strategies..
CLOBJ 4	To prepare and execute a disaster management plan that includes roles and responsibilities for physiotherapists in disaster preparedness, response, and recovery.
CLOBJ 5	To design, prescribe, and evaluate prosthetic and orthotic devices, considering both functional and psychological aspects.
CLOBJ 6	To understand and apply ethical principles and professional conduct guidelines in various physiotherapy settings.
CLOBJ 7	To develop and implement effective management and marketing strategies for physiotherapy services, including budget planning and public relations.

f. Course Learning Outcomes:

At the end of the course the student will be able to

CLO 1	Design and execute a community-based rehabilitation program, demonstrating effective local needs assessment and stakeholder collaboration.
CLO 2	Develop effective home exercise programs for different conditions, achieving improved patient adherence and outcomes through clear patient and caregiver education.
CLO 3	Accurately screen for pediatric disorders and implement intervention strategies that result in measurable improvements in patient development and family support.
CLO 4	Develop and demonstrate a disaster management plan with effective roles for physiotherapists, including successful implementation in disaster scenarios.
CLO 5	Design and prescribe prosthetic and orthotic devices that meet patient needs, demonstrating improved functionality and addressing psychological aspects through effective evaluation.
CLO 6	Create and implement a comprehensive management and marketing strategy for physiotherapy services, resulting in improved service delivery and increased visibility.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme								
Theory Hour	**Lab Hour**	**Hrs./Week**	**Credit**	**Theory Marks**		**Practical Marks**		**Total Marks**
				External Marks (T)	**Internal Marks (T)**	**External Marks (P)**	**Internal Marks (P)**	
3	3	6	-	70	30	70	30	200

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Course Content	**T** - Teaching Hours | **W** - Weightage			
Sr.	**Topics**	**T**	**W**	**CLO**
1	**Introduction to Community Based Rehabilitation, Institute Based Rehabilitation, Outreach Based Rehabilitation, Community Approach to Handicapped Development**	12	10	CLO 1
2	**Definition of impairments, disability, rehabilitation.**	4	3	CLO 1
3	**Disability surveys** Epidemiological aspects, screening for disabilities and developmental disorders, disability evaluation.	7	6	CLO 1
4	**Disability presentation and rehabilitation**	4	3	CLO 1
5	**Present rehabilitation services**	4	3	CLO 2
6	**Home exercise program in various PT conditions and parental education program**	4	3	CLO 2
7	**Pediatric disorders** Screening including mental retardation.	4	3	CLO 3
8	**Vocational evaluation and goals for the disabled**	5	4	CLO 2
9	**Contribution of social worker to the rehabilitation.**	4	3	CLO 2
10	**Rural rehabilitation incorporated with primary health centers.**	4	3	CLO 3
11	**Extension services and mobile units.**	4	3	CLO 3
12	**Community awareness and participation in preventing aspects and demands PT services**	4	3	CLO 1
13	**National district level rehab program**	4	3	CLO 3

14	**Disaster Management** 1. Definition: Disaster preparedness, Disaster response and disaster recovery 2. Types of classification of Disasters 3. Stages of progress of Disasters 4. Role of physiotherapist in Disaster preparedness, response and disaster recovery. 5. National and international agencies providing support during disaster 6. Physiotherapist's role post disaster **7.** Physiotherapist's role of psychological upliftment post disaster.	4	3	CLO 4
15	**Occupational hazards and health promotion. Industrial Health & Ergonomics**	2	2	CLO 4
16	**Bio – Engineering** 1. Introduction and terminology: prosthesis and orthosis 2. Classification of and difference between prosthesis and orthosis 3. Bio medical principles 4. Designing 5. Materials used for fabrications 6. Psychological aspects 7. Prescription and designing 8. Wheel chairs 9. Design and construction of adaptive devices	2	2	CLO 5
17	**Prostheses** 1. Purpose, types and biomedical principles 2. Upper limb prosthesis 3. Lower limb prosthesis in detail: B/K and A/k prosthetic components, check out procedures, gait analysis and deviations 4. Syme's and partial foot prosthesis 5. U.L. prosthetic devices: components, terminal devices, hooks, wrist units 6. Forearm shoulder harness, suspension control system 7. Prosthetic check out procedure	12	14	CLO 5
18	**Orthoses** 1. Purpose, types and biomedical principles 2. Lower limb orthosis in detail: introduction to HKAFO Orthosis 3. Pathological gaits, biomechanics of lower limb orthotics, components, check out procedure and training with orthosis 4. U.L. orthosis: introduction to writ hand orthosis 5. Principles of wrist finger thumb orthosis, opponents splint (short and long), finger splints for correction of contractures, knuckle bender splint, I.P. extension splint with lumbrical bar spring, coil assists 6. Introductory demonstration of methods of construction of temporary orthosis for hand and fingers 7. Spinal orthosis: introduction of lumbosacral (knight), thoracolumbar (Taylor) orthosis Cervical collar, Milwaukee orthosis	12	15	CLO 5
19	**ETHICS** 1. Concepts of Morality, Ethics and Legality. Rules of professional conduct and their medico-legal & moral implications. The need of Council Act for Physiotherapy. 2. Constitution and Functions of the Indian Association of Physiotherapists. 3. Functioning of the World Confederation of Physical therapy (WCPT) & its various branches. 4. Role of WHO & WCPT	8	7	CLO 6

20	**ADMINISTRATION/MANAGEMENT & MARKETING** 1. Management studies related to: -local health care organization management & structure, -planning delivery with quality assurance and funding of service delivery. 2. Information Technology in professional practice. 3. Time Management and Carrier Development in Physiotherapy. 4. Administration: Principles based on the Goals & Functions – at large hospital setup, domiciliary services, private clinic and academic setup. 5. Facility Planning – Academic and Clinical Setup. 6. Methods of maintaining records and documentation. 7. Budget planning for physiotherapy services in various setups. 8. Performance analysis: physical structure, reporting system (man power, status, functions), quantity & quality of services, turn over, cost benefit and revenue contribution. 9. Public Relations and Marketing: reaching media, marketing of physiotherapy practice and strengthening of brand identity with consumers & other health care professionals. 10. Introduction to Evidence Based Practice: Definitions, Evidence Based Practice, Evidence Based Physiotherapy Practice	8	7	CLO 6
21	**ALLIED THERAPEUTICS (Basics only) (Not for university exam)** 1. Accupuncture and accupressure: definition, principles, techniques, physiological and therapeutic effects, contraindications and dangers 2. Introduction to Naturopathy 3. Magneto therapy 4. Yogasana and their scientific study (Suryanamaskar and Shavasan) 5. Basic Occupational Therapy 6. Basic Speech Therapy	8	0	-
TOTAL		**120**	**100**	

i. Textbook and Reference Book:

1) K. Park – Park's Textbook of Preventive & Social Medicine
2) P.K. Mahajan & M.C. Gupta – Textbook of Preventive & Social Medicine

REHABIITATION

1) Physiotherapy in Gynaecological& Obstetrical conditions – by Poldon – Jaypee
2) Astrand P A Rodahe K-Text book of Work Physiology
3) Therapeutic Exercise – By Kisner
4) Text book of Community Medicine & Community Health – by Bhaskar Rao
5) Geriatrics Physiotherapy – By Andrew Guccione
6) Industrial Therapy – by Glenda Key

a. **Course Name: Biostatistics and Research Methodology**
b. **Course Code: 07101406**
c. **Prerequisite:** To study biostatistics and research methodology candidate should have basic knowledge of mathematics.
d. **Rationale:** The syllabus encompasses Biostatistics, covering fundamental concepts like data types, measures of central tendency, sampling methods, variability, statistical tests (including t and Z tests), and correlation, along with Research Methodology focusing on the importance of research, types of epidemiological studies, potential errors in study design, and journal reading skills.

e. **Course Learning Objective:**

CLOBJ 1	Define types, techniques and importance of Biostatistics and research methodology for research work.
CLOBJ 2	Prepare different types and presentation of data and describe normal distribution, techniques, significance and limitations of measuring data such as central tendency, variability and co-efficient correlation.
CLOBJ 3	Classify various sampling methods and concepts of sample size calculation on given data.
CLOBJ 4	Implement appropriate statistical tests on given data.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Understand types, techniques and importance of Biostatistics and research methodology for research work accurately.
CLO 2	Explain different types and presentation of data and describe normal distribution, techniques, significance and limitations of measuring data such as central tendency, variability and co-efficient correlation correctly.
CLO 3	Describe various sampling methods and concepts of sample size calculation on given data accurately.
CLO 4	Practice appropriate statistical tests on given data accurately.

g. **Teaching & Examination Scheme:**

Teaching & Examination Scheme								
Theory Hour	**Lab Hour**	**Hrs./wk.**	**Credit**	**Theory Marks**		**Practical Marks**		**Total Marks**
				External Marks (T)	**Internal Marks (T)**	**External Marks (P)**	**Internal Marks (P)**	
2	-	2	-	35	15	-	-	50

SEE - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

h. Course Content:

Sr.	Topics	W	T	CLO
1	**Biostatistics** 1. Introduction to biostatistics, why statistics? 2. Data: What is data? Quantitative and qualitative data, presentation of data with practical exercises. 3. Measures of central tendency: mean, median, mode, arithmetic and geometric mean. 4. Sampling: Why sampling? Methods of sampling and concepts of sample size 5. Measures of variability 6. Standard deviation, co efficient of variation, normal distribution 7. Measures of variability, standard error and its significance, limitations. 8. Statistical tests, X2 test, standard error of proportions, difference of proportions 9. Mean and difference of mean 10. Concept of and t & Z test 11. Values, co efficient of correlation	70	35	CLO1,2,3, 4
2	**Research Methodology** 1. What is research? Why research? 2. Types of epidemiological studies and measurements of various indications 3. Possible errors that may generate due to study design and how to overcome them 4. How and what to read from journals?	30	15	CLO1
Total		**100**	**50**	

i. Textbook and Reference Book:

1. Research Methodology, Misra R P
2. Research Methods for clinical Therapists, Carolyn Hicks

a. **Course Name: Physiotherapy in Cardiopulmonary, medical and surgical sciences**
b. **Course Code: 07101407**
c. **Prerequisite:** A foundational understanding of human anatomy and physiology, particularly in respiratory and cardiovascular systems, along with basic principles of physiotherapy.
d. **Rationale:** This syllabus equips students with comprehensive knowledge and practical skills necessary for effective assessment and management of diverse cardiorespiratory and related disorders, enhancing their ability to provide targeted physiotherapy interventions in various clinical settings.

e. **Course Learning Objective:**

CLOBJ 1	Apply and interpret assessment techniques for cardiorespiratory disorders, including physiological measurements and clinical evaluations, to guide treatment planning and rehabilitation**.**
CLOBJ 2	Design and implement comprehensive rehabilitation programs for cardiorespiratory conditions, utilizing principles of physiotherapy to address pathophysiology, improve functional outcomes, and enhance quality of life.
CLOBJ 3	Utilize advanced physiotherapy techniques and mechanical aids, such as IPPB, CPAP, BiPAP, and nasopharyngeal suctioning, in the management of complex respiratory and cardiopulmonary conditions.
CLOBJ 4	Conduct thorough clinical examinations for cardiovascular disorders, including heart failure, myocardial infarction, and congenital heart diseases, and apply appropriate physiotherapy interventions based on findings.
CLOBJ 5	Treat pre and post-operative physiotherapy for a range of surgical conditions, including cardiothoracic surgeries and abdominal operations, focusing on optimizing recovery and functional restoration.
CLOBJ 6	Integrate physiotherapy techniques in the management of multisystem conditions, including burns, wounds, and gynecological operations, addressing both physical and functional aspects to support comprehensive patient care.

f. **Course Learning Outcomes:**

At the end of the course the student will be able to

CLO 1	Evaluate cardiovascular and pulmonary dysfunction based on patho-physiological principles and arrive at the appropriate functional diagnosis.
CLO 2	Perform basis investigative approaches in the medical system and surgical intervention, regimes related to cardiovascular and pulmonary impairments.
CLO 3	Execute effective Physiotherapeutic measures (with clinical reasoning) and special emphasis on breathing retraining, nebulization, humidification, bronchial hygiene, general mobilization and exercise conditioning.
CLO 4	Use basic investigative approaches in the medical system and surgical intervention, regimes, in general surgeries (special emphasis on abdominal surgeries).
CLO 5	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 community.

g. Teaching & Examination Scheme:

Teaching & Examination Scheme								
				Theory Marks		Practical Marks		
Theory Hour	Lab Hour	Hrs./wk.	Credit	External Marks (T)	Internal Marks (T)	External Marks (P)	Internal Marks (P)	Total Marks
4	-	4	-	70	30	70	30	200

L- Lectures; **T**- Tutorial; **P**- Practical; **C**- Credit; **MSE**- Mid-Semester Evaluation, **CE**- Continuous Evaluation, **ESE**- End Semester Examination

h. Course Content:

Sr.	Topics	W	T	P	CLO
1	**Cardio-Pulmonary Science Review of:**	53	40	40	CLO1,2,3,4
	Mechanism of normal respiration				
	Cardiorespiratory anatomy and physiology (Anatomical and Physiological differences between the Adult and Paediatric lung)				
	Relaxation and maintenance of bronchial hygiene in respiratory diseases Respiratory and cardiac rehabilitation, fitness programs for cardiorespiratory disorders: Definition, aims and objectives,				
	pathophysiology of diseases, Physiotherapy assessment and principles of rehabilitation				
	Principles and techniques of physiotherapy in diseases of respiratory and cardiopulmonary system: P.D., breathing exercises, PNF techniques of respiration, mechanical aids – IPPB, CPAP, BiPAP, PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning				
	Clinical examination of cardiovascular disorders, principles and techniques of P.T. in cardiovascular diseases:				
	CCF				
	Myocardial infarction				
	Endocarditis, myocarditis, pericarditis, Valvular diseases of heart Congenital heart diseases				
	Clinical examination of respiratory disease, principles and techniques of P.T in:				
	Chronic bronchitis, Emphysema Asthma				
	Cystic fibrosis Bronchiectesis Pulmonary embolism Pulmonary T.B. Pleurisy				
	Empyema Atelectesis				
	Pneumothorax and Bronchopulmonary fistula				

	Evaluation, principles and techniques of physiotherapy management: In traumatic and surgical conditions of chest,				
	lung, pleura and mediastinum				
	Cardiothoracic surgery: Incisions, types, indications and contra indications				
	Pre and post-operative physiotherapy assessment and management in: Lobectomy, pneumonectomy, decortication, thoracoplasty Tracheostomy Mitral valvotomy (mitral stenosis) Mortic incompetence				
	Valve replacement				
	PDA, Coarctation of aorta				
	Pericardiectomy in chronic constrictive pericarditis Septal defects, Fallot's tetrology				
	Bypass surgery				
	Open heart surgery and heart transplant				
	Physiotherapy assessment and management of vascular diseases: Thrombosis, phlebitis and phlebo thrombosis Burger's disease Varicose veins - DVT				
	Venous ulcers Lymphoedema				
	Principles of chest physiotherapy: In I.C.U., I.C.C.U. along with effect of anesthesia on cardiopulmonary system. Knowledge of equipment's in CPU,				
	I.C.U. and I.C.C.U.				
	Neonatal and Pediatric Physiotherapy : Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorder				
2	**Medical and Surgical Science**	47	35	35	CLO2,4,5
	Physiotherapy in mother and child care: Ante and post-natal management, early intervention and stimulation therapy in child care (movement therapy) Electrotherapy and Exercise Therapy measures for the re-education of endo-Urethral sphincters.				
	Geriatrics:				
	Handling of old patients and their problems.				
	Psychiatry:				
	Physiotherapy in psychiatric conditions				
	Complication common to all operations:				
	Abdominal incisions:				
	Physiotherapy in pre and post-operative stages:				
	Operations on upper G.I.T:				
	Esophagus, Stomach, Duodenum				
	Operations on large and small intestine:				
	Appendicectomy, Cholecystectomy, Partial colectomy, Ileostomy, Hernia and Herniotomy, Hernioraphy, Hernioplasty.				
	Gynecological operations:				
	Hysterectomy, prostatectomy, pelvic repair, caesarian section, nephrectomy and other operations.				
	Mastectomy:				

	Simple, Radical.				
	Burns and its treatment: Physiotherapy in burns, Skin grafts, and Reconstructive Surgeries.				
	Wounds, local infections, ulcers, pressure sores:				
	UVR, and other electrotherapeutic modalities for Healing of wound, Hypergranulated scars, Relief of pain and mobilization. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes.				
	Skin conditions:				
	Acne, Psoriasis, Alopecia, Leucoderma, Carbuncles and Boils, STD's: AIDS, Syphilis, Gonorrhoe, Care of anesthetic hand and foot.				
	ENT:				
	Sinusitis, Non suppurative and chronic suppurative otitis media, Osteosclerosis, Labrynthitis, Mastodiectomy, Chronic rhinitis, Laryngectomy, Pharyngeo laryngectomy, Facial palsy.				
TOTAL		**100**	**150**		

1. **Text Book and Reference Book**

2. Cardiovascular and Pulmonary Physical Therapy: Evidence to Practice by Donna Frownfelter
3. Essentials of Cardiopulmonary Physical Therapy" by David L. Brown and Marjorie A. G. McMahon
4. Cash's Textbook of Chest, Heart and Vascular Disorders for Physiotherapists by Joan E. Cash.