CENTURION UNIVERSITY OF TECHNOLOGY AND MANAGEMENT, ODISHA

SCHOOL OF PARAMEDICS AND ALLIED HEALTH SCIENCES

BACHELOR OF PHYSIOTHERAPY

(Four and Half years Program)

2024

SYLLABUS

Bachelor of Physiotherapy is an undergraduate academic Course in a field of Medical Scienceknown as Physiotherapy. The duration of BPT course is 4½ years including 6 months internship. Physical Therapy Programs provide core skills like manual therapy, therapeutic exercise and the application of electro physical modalities, to the prospective students. The course focuses on the use of physical movements and exercise to improve and cure injuries, deformities and diseases. Physiotherapy doesn't rely extensively on the use of drugs and medicine. Instead, it relies on the use of physical treatment to improve the situation.

Program: Bachelor of Physiotherapy

Duration: Four years (Eight semesters) full-time program with 6 months internship.

Eligibility: +2 Science with Physics, Chemistry & Biology or equivalent degree

Examination: Examination rules will be as per guideline of CUTM Examination hand book. **Internship:** A candidate will have to undergo internship for a period of six calendar months in a hospital which fulfills the norms decided by the University.

Dissertation will be compulsory to all students. Students will carry out dissertation work individually or in the group of not more than three students. The format for dissertation/Internship report will be similar to the research thesis style; incorporating chapters on: Introduction, Materials and Methods, Results and Discussion and References / Bibliography. The dissertation will be submitted in a typewritten and bound form.

Degree: On successful completion of four years program, the candidate will be awardedwith **"Bachelor of Physiotherapy (B.P.T)** from Centurion University.

PROGRAMME OUTCOMES (POs):

PO	STATEMENT
PO1	Possess a strong foundation of knowledge in the core concepts, theories, and principles of allied health.
PO2	Demonstrate competence in performing a range of clinical procedures and techniques.
PO3	Collaborate with professionals from different healthcare disciplines, demonstrating teamwork.
PO4	Exhibit professionalism, integrity, and ethical conduct in their interactions with patients, colleagues.
PO5	Apply critical thinking skills to analyze complex healthcare scenarios and solve problems.
PO6	Demonstrate leadership qualities and possess basic knowledge of healthcare management principles.
PO7	Provide compassionate and comprehensive patient care.
PO8	Embrace a commitment to lifelong learning and professional development.
PO9	Demonstrate effective verbal and written communication skills.
PO10	Promote health and wellness by educating individuals and communities about healthy lifestyles, disease prevention strategies, and the importance of early intervention.
PO11	Respect and appreciate the cultural diversity of patients and communities.
PO12	Understand the importance of research in advancing allied health practice.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO	STATEMENT
PSO1	The objective of this course is to outline the cognitive, emotional, and psychomotor abilities that are necessary for examining, diagnosing physiotherapy treatment.
PSO2	To operate and maintain physiotherapy equipment used in patient treatment.
PSO3	To enhance the ability to assess patients for impairments and functional limitations and perform routine physiotherapeutic procedures based on the findings.

PROGRAMME STRUCTURE

Bachelor of Physiotherapy

CHOICE BASED CREDUT SYSTEM (CBCS) STRUCTURE

Category	Minimum Credits to be completed	Minimum Credits to be completed
School (Core)	20	**216**
Discipline (Core)	140	
Skill Basket#	16	
Value Added**	8	
AECC	6	
Summer Internship##	6	
Project	10	
Internship	10	

#Skill course is to be registered by the student during 1st ,2nd ,3rd and 4th semester
**Value added course to be registered by the student one time in each year
##Summer Internship during summer vacation post 2nd , 4th and 6th semester

BASKET-I				
SCHOOL CORE COURSES				
S.NO	**CODE**	**SUBJECT**	**SUBJECT** (T+P+Pj)	**CREDITS**
SC-1	CUTM4274	General Anatomy I	2+1+0	3
SC-2	CUTM4275	General Anatomy II	2+1+0	3
SC-3	CUTM1758	General Physiology	3+2+0	5
SC-4	CUTM4327	Clinical Pathology	2+1+0	3
SC-5	CUTM4286	Biochemistry	2+1+0	3
SC-6	CUTM1721	Research Methodology	2+0+1	3
BASKET-II				
DISCIPLINE CORE COURSES				
S.NO	**CODE**	**SUBJECT**	**SUBJECT** (T+P+Pj)	**CREDITS**
DC-1	CUTM4290	Microbiology	2+1+0	3
DC-2	CUTM4285	Cell Biology	2+0+1	3
DC-3	CUTM1734	Medical Law and Ethics	2+0+1	3
DC-4	CUTM1742	Basic Computer and Information Science	0+2+0	2
DC-5	CUTM2954	Psychology and Sociology	3+0+1	4
DC-6	CUTM4319	Pharmacology	3+0+1	4
DC-7	CUTM1976	Electrotherapy-I	3+3+0	6
DC-8	CUTM1979	Electrotherapy-II	3+3+0	6
DC-9	CUTM4304	Exercise Therapy-I	3+3+0	6
DC-10	CUTM4305	Exercise Therapy-II	3+3+0	6
DC-11	CUTM4306	Biomechanics and Kinesiology-I	5+0+1	6
DC-12	CUTM2955	Biomechanics and Kinesiology-II	5+0+1	6
DC-13	CUTM4302	Community Medicine	3+0+1	4
DC-14	CUTM4311	Principle of Rehabilitation	5+0+1	6
DC-15	CUTM2959	Paediatrics and Geriatrics	2+0+1	3
DC-16	CUTM4299	General Surgery	3+0+1	4
DC-17	CUTM2957	Medicine I (General Medicine)	3+0+1	4
DC-18	CUTM1987	Medicine II (Cardiology and Work Physiology)	3+1+0	4
DC-19	CUTM1988	Medicine III (Neurology)	3+1+2	6
DC-20	CUTM2964	General Orthopaedics –I	3+0+1	4
DC-21	CUTM2965	General Orthopaedics –II	2+0+1	3
DC-22	CUTM2963	Medicine IV (Psychiatry)	3+0+1	4
DC-23	CUTM4310	Physical Diagnosis and Physical Fitness	5+0+1	6
DC-24	CUTM1993	Yoga and Naturopathy	3+0+1	4
DC-25	CUTM4303	Physiotherapy in Medical and Surgical Condition	3+2+1	6
DC-27	CUTM4307	Physiotherapy in Cardio- Pulmonary Condition	3+2+1	6
DC-28	CUTM4308	Physiotherapy in Orthopaedics Conditions	3+2+1	6
DC-29	CUTM4309	Physiotherapy in Neurological Conditions	3+2+1	6
DC-30	CUTM4300	Advance Physiotherapeutics - I	3+2+0	5
DC-31	CUTM4301	Advance Physiotherapeutics - II	2+2+0	4

GENERAL ANATOMY-I

Subject Name	Code	Type of course	T-P-Pj	Credit
General Anatomy-I	CUTM4274	Theory + Practical	2-1-0	3

Course Objective:

- To familiarize the student with the different anatomical terminology related to Musculoskeletal, Integumentary, Reproductive and Nervous system.
- To develop the students skill in identify the anatomical landmarks and features of bones, muscles, joints, and organs
- To explain the functional relevance of different anatomical structures in maintaining physiological processes.
- To analyse the interrelationships between organs and systems in the human body to comprehend their integrated functioning.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	Cos with POs & PSOs Mapping
CO1	Identify the basic structures and anatomical terminology of the human body systems.	PO1, PO5, PO7
CO2	Describe the anatomical features of Skeletal system and joints of the bones.	PO1, PO5
CO3	Understand the structure, origin and insertion of the muscles of the human body.	PO1, PO2, PO5
CO4	Understand the anatomical features and relationship of the Integumentary and Reproductive system of the human body.	PO1, PO5, PO7,
CO5	Understand the complex anatomical features and relationship of the Nervous system and circulatory system of the human body.	PO1, PO5, PO8, POS3

Course Outline:

Module I Introduction to Anatomy, Cell and Tissues:

1. Introduction to Anatomy and its Division.
2. Cell: Definition, Parts, and Types.
3. Tissues: Definition, types and location.
4. Introduction to organ systems and their types.
5. Anatomical nomenclature, Body Planes, Positions, Body Membranes, Body cavities and movements.

Module II Skeletal System & Arthrology

1. Introduction to the skeletal system and its parts.
2. Bone, ossification of bone, classification of bone based on structure, size,shape, and location.
3. Cartilage: Types of cartilage, their characteristics, features, and location inthe body.
4. Introduction to axial & appendicle skeleton with bone features.
5. Introduction to Arthrology: Definition and classifications of joints withexamples in detail.
6. Brief about Joints of superior extremity like shoulder joint, elbow joint, wrist joint and radioulnar joint.
7. Brief about Joints: Hip and Knee joint, subtalar, tibiofibular joints.

Module III Muscular System

1. Introduction to Muscular system and Muscles, Classification of muscles andtheir characteristics, features and action of muscles.
2. Introduction to surface landmarks of superior extremity. Brief about Muscles and fascia of Pectoral region: Pectoral muscles, Scapular region and Back, Muscles of Arm, Forearm, and Hand, their action and nerve supply.
3. Introduction to surface landmarks of the lower extremity. Brief about Muscles and fascia of Thigh region, Gluteal region, Compartment of the leg,name of the muscles of leg, their action and nerve supply.

Module IV Integumentary System & Reproductive System:

1. Integumentary system- Skin (Introduction, Structure, Function), hair,nails, exocrine glands.
2. Reproductive System: Introduction and classification.

3. Male reproductive System- Testes, Scrotum, penis, and glands.
4. Female reproductive System-External genitalia, & internal organs –Vagina, Cervix, Uterus, Fallopian tubes and Ovaries.
5. Breast structure with blood and nerve supply.

Module V Nervous System & Cardiovascular System:

1. **Nervous System:** Introduction and subdivision of nervous system.
2. CNS: Structure and Characteristic features of Neurons, Brain, and Spinalcord.
3. PNS: Introduction to PNS, Classification of PNS and spinal nerves& cranialnerves.
4. **Cardiovascular System:** Introduction to CVS, structure of Blood vessels, Arteries &Veins with their major and minor branches in detail, Structure ofheart along with blood and nerve supply, types of circulation.

Practice: -

1. Identification and description of all anatomical structures.
2. Learning of Anatomy by demonstration only through dissected parts, slides,models, charts, etc.

Suggested Readings: -

1. B D Chaurasia's Human Anatomy 9th ed
2. Textbook of Anatomy by Vishram Singh, 4th ed.
3. Principles of Anatomy and Physiology,16thed by G.J. Tortora
4. Ross and Wilson- Anatomy and Physiology in health and illness
5. Fattana, Human Anatomy, (Description and Applied), Saunder's & C P Prism Publishers, Bangalore

GENERAL ANATOMY-II

Subject Name	Code	Type of course	T-P-Pj	Credit
General Anatomy-II	CUTM4275	Theory + Practical	2-1-0	3

Course Objective:

- To familiarize the student with the different anatomical terminology related to Cardiorespiratory, Digestive, Endocrine and Lymphatic system.
- To develop the students skill in identify the anatomical landmarks and features of bones, muscles, joints, and organs
- To explain the functional relevance of different anatomical structures in maintaining physiological processes.
- To analyse the interrelationships between organs and systems in the human body to comprehend their integrated functioning.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	Identify the basic structures and anatomical relations of the Respiratory system.	PO1, PO5, PO7,
CO2	Describe the spatial relationships among different anatomical structures of the digestive system.	PO1, PO5, PSO3
CO3	Use anatomical knowledge in Interpretation of the urinary or excretory system.	PO1, PO5, PO9, PSO3
CO4	Break down complex anatomical systems into their component parts of the Endocrine system to the human body.	PO1, PO5, PO7, PO8
CO5	Understand the anatomical features and relationship of the Lymphatic system with other structures of the body.	PO1, PO5, PO7, PO10, POS3

Course Outline:

Module I Respiratory System:

1. Introduction to the system and organs, Orientation of Thoracic cage- boundaries, inlet, outlet & walls.
2. Nose, pharynx, Larynx extent, walls with associated cartilages & muscles with blood and nerve supply.
3. Trachea- extent & brief structure, Bronchi, Bronchioles and alveoli along with blood and nerve supply.
4. Lungs- Surfaces, borders, lobes, fissures, pleural cavity and fluid.
5. Intercostal muscles - origin, insertion, nerve supply
6. Diaphragm - origin, insertion, nerve supply.

Module II Digestive System:

1. Introduction and parts of the system, Blood vessel and layers of GIT.
2. Oral cavities (boundaries), teeth, tongue, enumerate muscles & papillae, and salivary glands.
3. Pharynx (extent, parts & boundaries) and Esophagus (parts, extent, constrictions, sphincters).
4. Stomach - location, parts, surfaces, curvatures, nerve supply.
5. Small Intestine parts, the difference between duodenum, jejunum & ileum, nerve supply.
6. Large intestine - parts & their features with blood and nerve supply.
7. Liver- location, surfaces, border, lobes, Gall bladder-location, parts & function, Pancreas - location, parts, surfaces, borders & its ducts.

Module III Urinary/Excretory System:

1. Introduction and Parts of Urinary system.
2. Kidney- Structure (surfaces, poles, borders, hilum) & function.
3. Structure of nephron, Ureter (length, parts, constrictions), Urinary bladder (location, capacity, surfaces, borders, parts, openings) and Urethra (parts).

Module IV Endocrine System:

- Introduction of Gland and their types.
- Pituitary gland locations, parts, enumerate types of cells & hormones secreted.
- Thyroid gland- location, parts, features & blood supply.

- Parathyroid S - location, enumerate types of cells & hormones secreted.
- Adrenal gland locations, shape, enumerate its components & hormones.

Module V Lymphatic System:

1. Introduction to Lymphatic System, Lymph, lymphatic capillaries and vessels.
2. Lymph nodes- structure and functions.
3. Spleen - location, surfaces, borders, poles, hilum.
4. Thymus - location, structure & functions.
5. Tonsil – types according to location, palatine tonsil in brief.

Practice:-

1. Identification and description of all anatomical structures.
2. Learning of Anatomy by demonstration only through dissected parts, slides,models, charts, etc.

Suggested Readings: -

1. B D Chaurasia's Human Anatomy 9th ed
2. Textbook of Anatomy by Vishram Singh, 4th ed.
3. Principles of Anatomy and Physiology,16thed by G.J. Tortora
4. Ross and Wilson- Anatomy and Physiology in health and illness
5. Fattana, Human Anatomy, (Description and Applied), Saunder's& C P Prism Publishers, Bangalore

GENERAL PHYSIOLOGY

Subject Name	Code	Type of course	T-P-Pj	Credit
General Physiology	CUTM1758	Theory+ Practical	3-2-0	**5**

Course Objective:

- To learn and understand the fundamental scientific concepts relating to a broad range of topics in human physiology.
- To obtain Knowledge about the general physiological systems and physiological terminology.
- To develop investigative skills and to become familiar with standard techniques of measurement.
- To help the students to gain practice and confidence in applying this knowledge, in a quantitative manner where appropriate, to actual experiment

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	Understand the mechanism of human body function.	PO1, PO5
CO2	Interpret the functionality of different physiological systems.	PO1, PO5, PSO3
CO3	Break down complex physiological processes, such as metabolic pathways and hormonal regulation, to understand the interactions between different organ systems.	PO1, PO5, PO7
CO4	Analyze the interrelationships between different organ systems and their roles in maintaining overall body function and homeostasis.	PO1, PO5, PO7,PSO3
CO5	Assess and interpret physiological data from laboratory experiments or clinical case studies to evaluate body function	PO1, PO5, PO6, PSO2

Course Outline:

Module I

Structure and properties of cardiac muscle, Cardiac cycle, Conductive system, ECG, Heart sounds, Heart rate and regulation, Cardiac output and regulation, Blood pressure and regulation, Coronary Circulation, Effect of exercise in Cardio vascular system.

Module II

Structure and function of respiratory system. Mechanics of respiration – Muscles of respiration, Lung & Chest wall compliance, V/Q Ratio, Surfactant. Transport of gases- O2 & CO2. Nervous and Chemical regulation of respiration. Hypoxia, Cyanosis, Dyspnea. Acid Base Balance. Principles of Lung Function Test – Spiro meter, Lung volumes and capacities. Effect of exercise on respiratory system. Defense mechanism of lungs

Module III

- Structure and function of GI system. Mastication and Deglutition. Saliva – composition, function, regulation. Gastric secretion – composition, phases of secretion, function. Pancreatic secretion – composition, function, regulation. Bile – composition and function. Movements of small and large intestine. Digestion in mouth, stomach, intestine and Defecation
- Structure and function of kidney and Nephron.
- Formation of urine – Filtration, Reabsorption, Secretion and Micturation

Module IV

- General organization of endocrine glands. General metabolism – Carbohydrate, Fat, Protein. Physiological action, regulation, disorder of hormones –Adrenal, Pancreatic, Parathyroid, Thyroid. Menstrual cycle and its different phases.
- Structure of muscle – Macroscopic & Microscopic (Myofibril, Myoneural junction) Properties of skeletal muscle Sliding filament theory. Effect of exercise on muscular system

Module V

General organization of nervous system. Structure, type and function of neuron. Properties of neurons. Synapse and synaptic transmission. Neurotransmitters. Reflex – Properties and types. Sensory – Receptors, sensory pathway, pain pathway, referred pain, modulation of pain. Motor – Basal ganglia, Cerebellum, Cortex –Function & Effect of lesion. Ascending and Descending pathway. Posture and Equilibrium. Muscle tone. ANS – organization, function of SNS & PSNS. CSF – composition, formation, circulation, function

Practice:

1. Identification of different organs and systems from charts
2. Identification of different blood cell, their normal and abnormal morphology fromslides.
3. Examination of pulse, B.P., Respiratory rate.
4. Reflexes
5. Spirometry to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC,
6. ERV, EC, residual volume on Spirometry.

Suggested Readings: -

1. Text book of medical physiology – Guyton Arthur
2. Textbook of Physiology – A.K.Jain.
3. Principles of Anatomy and Physiology,16thed by G.J. Tortora
4. Essential of Medical Physiology- K. Sembulingam

CLINICAL PATHOLOGY

Subject Name	Code	Type	T + P + Pj	Credits
Clinical Pathology	CUTM4327	Theory+ Practice	2+1+0	3

Course Objective:

- To develop a comprehensive understanding of the pathophysiological mechanisms underlying common diseases and disorders affecting different body systems.
- To acquire knowledge of various laboratory techniques and diagnostic tests used in clinical pathology, including hematological, biochemical, microbiological, and histopathological tests.
- To understand the principles of specimen collection, handling, processing, and the importance of quality control in clinical pathology.
- To apply theoretical knowledge to the identification of pathological changes in tissues and organs through microscopic and other diagnostic techniques.

Course Outcome:

After completion of the course, the students will be able to,

CO	Statements	CO with POs & PSOs Mapping
CO1	Execute the technique of collection of pathological specimens.	PO1, PO2, PO9, PSO1, PSO3
CO2	Understand preservation and processing of pathological samples.	PO1, PO2, PO5, PO6, PO9, PSO1, PSO2
CO3	Identify the causative agents of infectious diseases.	PO1, PO2, PO9, PO10, PSO1
CO4	Interpret Gram staining and ZN staining results to diagnose respiratory infections, differentiate between amoebic and bacillary dysentery, and assess the presence of pathogens in various body fluids.	PO1, PO2, PO5, PO9, PSO1, PSO3
CO5	Evaluate human abnormalities through clinical investigations.	PO1, PO2, PO5, PO7, PO9, PSO1, PSO3

Course Outline:

Module-I

Physical & Chemical Examination of Urine: Sugar, ketone bodies, diabetes, nephritis, UTI, etc. Microscopical Examination of Urine: Including operation of the urine analyzer.

Special Tests: Pregnancy test, multistep reagent strip, jaundice, albumin, phosphate, BJP, bile salt and pigment.

Lab & Practice: Benedict test, Roth era's test, Faucet's test, urine analyzer operation, and other urine tests.

Module-II

Respiratory Tract Infection: Gram staining, ZN staining, and DOT centers. Sputum Analysis: For diagnosis of Mycobacterium tuberculosis. Clinical Significance & Report Writing: Sputum and respiratory infections.

Throat Swab Analysis: Bacteriological examination and clinical significance.

Lab & Practice: Gram staining, ZN staining, sputum analysis. Throat swab examination.

Module-III

Physical, Chemical, and Microscopical Examination of Stool: Including differences between amoebic and bacillary dysentery. Clinical Significance of Stool Examination: For parasitic and bacterial infections.

Lab & Practice: Stool analysis, occult test, protozoa and helminth identification.

Module-IV

Pleural, Pericardial, and Synovial Fluids: Composition, collection, and routine laboratory investigation. Cerebrospinal Fluid (CSF): Related to meningitis, brain tumors, and other disorders.

Lab & Practice: Collection and examination of pleural, pericardial, synovial fluids, and CSF.

Module-V

Semen Examination: Composition, and analysis for male infertility disorders. Lab & Practice: Semen analysis, chemical and microscopical examination

Suggested Readings: -

1. Textbook of Clinical laboratory methods and diagnosis by Gradwohls, PublisherMosby

2. Medical laboratory technology Vol.1 by K. L. Mukherjee, 2007, Publisher Tata McGrawHill Textbook of medical laboratory technology by Praful B Godkar, Publisher Bhalan
3. Medical laboratory science theory and practice by J Ochei and Kolhatkar, 2002, TataMcGraw- Hill, Publisher TBS

BIOCHEMISTRY

Subject Name	Code	Type of course	T-P-Pj	Credit
Biochemistry	CUTM4286	Theory+ Practice	2-1-0	3

Course Objective:

- To explore the processes and pathways involved in the metabolism of carbohydrates and their significance in energy production.
- To comprehend the structure, function, and importance of amino acids and proteins in biological systems.
- To analyze the function and mechanisms of enzymes in facilitating and regulating metabolic reactions.
- To understand the roles of carbohydrates, proteins, and lipids in maintaining metabolic balance and overall physiological functions.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	List out the biochemical pathways leading to metabolism in the human body.	PO1, PO5 PSO1
CO2	Understand the significance of biomolecules in metabolic activities.	PO1, PO5, PSO1
CO3	Implement the knowledge of transformation of energy by the cells.	PO1, PO2, PO5, PSO1
CO4	Detects abnormal range of these molecules from patient samples.	PO5, PO5, PO7, PSO2

CO5	Evaluate the biochemical analysis of the patient samples.	PO1, PO2, PO4, PO5, PO7, PO9, PSO1, POS3

Course Outline

Module- I

Structure of enzyme: Apoenzyme and cofactors, prosthetic group-TPP, coenzyme NAD, metal cofactors, Classification of enzymes. **Mechanism of action of enzymes:** active site, transition state complex and activation energy. Lock and key hypothesis, and Induced Fit hypothesis.

Enzyme inhibition, enzyme kinetics.**Diagnostic value of serum enzymes:** Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.

Practice: Study of effect of temperature on enzyme activity Study of effect of pH on enzyme activity

Module- II

Carbohydrates: Biomedical importance & properties of Carbohydrates, Classification. **Families of monosaccharides:** aldoses and ketoses, trioses, tetroses, pentoses, and hexoses. Stereo isomerism of monosaccharides, epimers, Haworth projection formulae for glucose; chair and boat forms of glucose. **Practice:** Estimation of Glucose in urine

Module- III

Metabolism: Glycogenesis & glycogenolysis, Glycolysis, citric acid cycle & its significance, Components of respiratory chain, energy relationships during cell respiration, types of respiration. HMP shunt & Gluconeogenesis, regulation of blood glucose level. **Practice:** Estimation of Glucose in blood

Module- IV

Amino acids: Classification, essential & non-essential amino acids. Chemistry of Proteins & their related metabolism, Classification, biomedical importance.

Metabolism: Ammonia formation & transport, Transamination, Decarboxylation, Urea cycle, metabolic disorders in urea cycle, catabolism of amino acids. **Practice:** Estimation of Protein in urine Estimation of Protein in blood

Module- V

Chemistry of Lipids & their related metabolism: Classification, biomedical importance, essential fatty acids. Brief outline of metabolism: Beta oxidation of fatty acids, fatty liver, Ketogenesis, Cholesterol & its clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis. **Diabetes mellitus:** its types, features, gestation diabetes mellitus, glucose tolerance test, glycosuria, Hypoglycemia & its causes. **Practice:** Estimation of Bile pigment in urine Estimation of Bile salts in urine

Suggested Readings:

1. Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil(2018) Harper's Illustrated Biochemistry. Mc Graw Hill.

(e-Book link: https://www.pdfdrive.com/harpers-illustrated-biochemistry-d176838999.html)

2. Nelson DL and Cox MM. (2008). Lehninger Principles of Biochemistry, 5th Ed., W.H. Freeman and Company.

e-Booklink: https://www.pdfdrive.com/lehninger-principles-of-biochemistry-5th-edition- d164892141.html)

3. Donald Voet, Judith G. Voet (2011) Biochemistry 4th Edition. Wiley Publishers.

(e-Book link: https://www.pdfdrive.com/biochemistry-4th-edition-e165192126.html)

4. Jeremy M. Berg, John L. Tymoczko, LubertStryer. Biochemistry 7th Edition. W.H. Freemanand Company, New York.

(e-Book link: https://www.pdfdrive.com/biochemistry-seventh-edition-e167675390.html)

MICROBIOLOGY

Subject Name	Code	Type of course	T-P-Pj	Credit
Microbiology	CUTM4290	Theory+ Practice	2-1-0	3

Course Objective:

- To learn about various types of culture media, their preparation, and applications in microbiology
- To acquire knowledge of microbial techniques for the isolation and identification of pure cultures of bacteria, fungi, and viruses.
- To gain expertise in performing aseptic techniques to handle microbial cultures safely and effectively during routine laboratory tasks.
- To implement appropriate sterilization methods and culture-handling procedures.

Course Outcome:

After completion of the course, the students will be able to:

CO	Statements	CO with POs & PSOs Mapping
CO1	Understand the significance of microbial cell organelles.	PO1, PO5, PSO1
CO2	Apply the concept of pathogenicity in disease diagnosis.	PO5, PO7, PO10, PSO1, PSO2
CO3	Perform staining techniques to distinguish between microorganisms.	PO2, PO3, PSO1, PSO2
CO4	Justify the use of different culture media for the growth of various pathogenic microbiota.	PO5, PO6, PSO1, PSO2
CO5	Apply the concept of pathogenicity in disease diagnosis	PO5, PO7, PO10, PSO1, PSO2

Course Outline:

Module –I: Introduction to Microbiology and Bacterial Anatomy

Microbiology: Definition, history, and host-microbe relationship. Safety measures in a microbiology laboratory. Bacterial anatomy: Bacterial cell structure including spores, flagella, pili, and capsules Sporulation

Practice: Handling of the microscope

Module-II: Growth and Nutrition of Microbes

General nutritional requirements of bacteria. Bacterial growth curve

Practice: Inoculation techniques for bacteria on culture media

Module-III: Sterilization Techniques and Equipment

Sterilization: Definition, sterilization by dry heat, moist heat (at, above and below 100°C)

Use of Autoclave and Hot air oven. Radiation, Filtration, preventive measures, controls, and sterilization indicators

Practice: Preparation and use of sterilization equipment

Module-IV: Staining Techniques

Simple staining: Methylene blue. Gram staining

Practice: Demonstration of Gram stain and special stains (spore, capsule)

Module-V: Culture Media and Antibiotic Susceptibility Testing

Types of culture media: Liquid, solid, routine laboratory media (basal, enriched, selective)

Preparation of culture media for microbial growth

Practice: Preparation of different types of culture media

Suggested Reading:

5. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill, New Delhi
6. Microbiology by Prescott
7. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth – Heinemann;Oxford
8. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
9. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesbrough;Cambridge University Press; UK
10. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing
11. Text book of Medical Microbiology by Gruckshian

YOGA AND NATUROPATHY

Subject Name	Code	Type of course	T-P-Pj	Credit
Yoga and Naturopathy	CUTM1993	Theory+ Project	3-0-1	**4**

Course Objective:

- To Develop a comprehensive understanding of the history, principles, and philosophy of yoga and naturopathy
- To Understand the role of natural therapies such as diet, hydrotherapy, mud therapy, fasting, and lifestyle modifications in preventing and managing diseases.
- To Explore the therapeutic applications of yoga and naturopathy for stress management, chronic disease management, and overall health improvement.
- Integrate yoga and naturopathic principles to advocate for holistic approaches to health and encourage sustainable and natural living practices.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Know different paths of yoga, and its relevance in modern-day life.	PO1, PO10, PSO1
CO2	Understand the principles of naturopathy, including the healing power of nature.	PO1, PO5, PSO1
CO3	Demonstrate the importance of a balanced diet and nutrition in maintaining health and preventing diseases.	PO10, PO11, PSO3
CO4	Describe effects of asana on various systems of the body.	PO1, PO7, PSO3
CO5	Relate yoga and naturopathic techniques with therapeutic settings to support patients.	PO4, PO7, PO10, PSO2, PSO3

Course Outline:

Module I

Yoga: Introduction, Historical background and Origin of Yoga, Meaning and Concept of Yoga and its relationship with healthcare. Yoga in Global Scenario: Yoga as a Science; and

recent advances in Yoga. Naturopathy: definition, history, principle and concept and effect. Acupuncture and acupressure, mechanism of acupuncture Forbidden points

Module II

Asanas: Asanas- meaning, types, principles, Techniques of asanas and effects of asanas on various systems of the body - circulatory, respiratory and digestive system. Yoga and Treatment: Therapeutic and Corrective Values of Yoga Practices special reference to disease like: Diabetes, Asthma, Constipation, Obesity, Cervical, Gastric and Acidity.

Suggested Readings

1. Debnath, Monica "Basic Core Fitness through Yoga and Naturopathy" (2006-07) Sports
2. Sarawati, S Satyananda " Asana, Pranayam, Mudra and Bandhas".
3. Iyengar, B.K.S "The Illustrated Light of Yoga" (1982) Great Britain, George Allenand’

Suggested Project Works:

1. The Impact of Yoga on Stress Reduction and Mental Well-Being
2. Yoga as a Complementary Therapy for Managing Chronic Pain
3. Effects of Pranayama on Respiratory Health: A Study on Lung Capacity
4. Role of Yoga in Enhancing Flexibility and Postural Alignment
5. Effectiveness of Yoga in Improving Sleep Quality
6. Exploring the Benefits of Yoga in Workplace Stress Management
7. Yoga for Obesity Management: A Holistic Approach to Weight Loss
8. Yoga for Athletes: Enhancing Performance and Recovery
9. The Role of Diet in Naturopathy: A Study on Detoxification Diets
10. Naturopathic Approaches to Managing Migraine: A Case Study
11. Herbal Remedies in Naturopathy: Their Efficacy and Safety
12. Naturopathy for Skin Disorders: Exploring the Role of Herbal Therapies
13. A Study on the Role of Fasting in Detoxification and Weight Management
14. Comparative Analysis of Naturopathic and Conventional Treatments for Arthritis
15. Naturopathic Interventions for Gut Health: Probiotics and Dietary Approaches
16. Effectiveness of Mud Therapy in Reducing Inflammation and Pain
17. The Use of Essential Oils in Naturopathy for Stress and Anxiety Relief

CELL BIOLOGY

Subject Name	Code	Type of course	T-P-Pj	Credit
Cell Biology	CUTM4285	Theory+ Project	2-0-1	**3**

Course Objective:

- Determine the parts of the cell membrane and the cell wall
- Distinguish the types and mechanism of mutation
- Compare and contrast the events of cell cycle and its regulation
- Understand the dynamic character of cellular organelles

Course Outcome:

After completion of the course the students will be able to:

CO	Statements	CO with POs & PSOs Mapping
CO1	Describe the fundamental principles of cellular biology.	PO1, PSO1, PSO2
CO2	Understand the cells growth, division and death.	PO1, PO2, PO5, PSO1, PSO3
CO3	Utilize the skill in mechanism of cell signaling and how it regulates cellular functions.	PO5, PO6, PSO2
CO4	Relate the knowledge with how cellular dysregulation can lead to disease condition.	PO4, PO10, PO12, PSO1, PSO3
CO5	Identify cellular dysregulation.	PO5, PO12, PSO3

Course Outline:

Module –I Fundamentals of Cell Structure and Function:

Overview of Cells: History and Cell Theory: Key historical developments and basic principles. Structure and Function of Cell and its Organelles: Biological Membranes: Structure and function. Nucleus: Nuclear envelope, nucleolus. Mitochondria: Structure, function, and marker enzymes. Chloroplasts: Structure and function. Lysosomes, Glyoxysomes, and Peroxisomes: Structure, function, and marker enzymes.

Endoplasmic Reticulum: Rough and smooth ER, functions. Ribosomes: Structure and function. Golgi Complex: Structural organization, function, and marker enzymes.Cell

Types:Prokaryotes vs. Eukaryotes: Key differences and characteristics.From Single Cell to Multicellular Organisms: Overview of cellular evolution. Different Molecules of the Cell: Water, Salt, and Mineral Ions: Importance and roles.

Project topics:

1. Comparative Study of Organelles: Structure and Function in Prokaryotic and Eukaryotic Cells
2. The Role of Mitochondria and Chloroplasts in Cellular Metabolism
3. Cell Membranes: Structure, Function, and Transport Mechanisms
4. The Role of the Endoplasmic Reticulum and Golgi Complex in Protein Synthesis and Modification

Module II: Cell Cycle and Cellular Communication

Cell Cycle and Its Regulation: Phases of the Cell Cycle: G0/G1, S, G2, and M phases.Cell Division: Mitosis, meiosis, and cytokinesis. Regulation of the Cell Cycle: Key regulatory mechanisms. Cellular Communication and Mobility:

Cell Adhesion: Roles of different adhesion molecules. Gap Junctions: Function and importance. Extracellular Matrix (ECM): Structure and function.

Cell-Cell Interaction and Cell-ECM Interaction: Mechanisms and significance.

The Cytoskeleton: Components and functions. Microtubule-Based Movement and Microfilament-Based Movement: Mechanisms and roles.

Project Topics:

1. Regulation of the Cell Cycle: Key Checkpoints and Their Role in Cell Division
2. The Role of the Cytoskeleton in Cell Movement and Division
3. Extracellular Matrix (ECM) and Cell Adhesion: Mechanisms of Cell Communication
4. Mechanisms of Gap Junction Communication in Multicellular Organisms

Module III: Cell Signaling

Cell Signaling: Hormones and Their Receptors: Types and functions. Cell Surface Receptors: Overview and types. Signaling Through G-Protein Coupled Receptors (GPCR): Mechanisms and pathways. Tyrosine Kinase Receptors: Structure and function. Signal Transduction Pathways: Key pathways and their roles. Second Messengers: Types and functions. Regulation of Signaling Pathways: Mechanisms and importance. Bacterial and Plant Two-

Component Systems: Overview and examples. Bacterial Chemotaxis: Mechanisms and significance.

Project topics:

1. Signaling Pathways: The Role of G-Protein Coupled Receptors in Cell Communication
2. Tyrosine Kinase Receptors in Cellular Signal Transduction
3. The Role of Second Messengers in Regulating Cellular Responses

Module IV: Programmed Cell Death (Apoptosis)

Programmed Cell Death (Apoptosis): Intrinsic Pathway: Mechanisms and key components. Extrinsic Pathway: Mechanisms and key components. Caspase Enzymes: Roles and functions. Regulation of Apoptosis: Importance in health and disease.

Project topics:

1. Mechanisms of Apoptosis: Intrinsic vs. Extrinsic Pathways
2. The Role of Caspase Enzymes in Programmed Cell Death
3. Apoptosis and Disease: The Connection Between Programmed Cell Death and Cancer
4. Regulation of Apoptosis in Development and Immune System Function

Module V: Cancer Biology

Cancer Biology: Development and Causes of Cancer: Overview and basic concepts.Tumor Viruses: Types and mechanisms. Oncogenes: Functions and roles in cancer.Tumor Suppressor Genes: Functions and roles in cancer.

Project topics:

1. The Role of Oncogenes in Cancer Development: Mechanisms and Pathways
2. Tumor Suppressor Genes: Their Functions and Implications in Cancer
3. The Impact of Tumor Viruses on Cellular Transformation and Cancer Development
4. The Relationship Between Apoptosis Dysregulation and Cancer Progression

Suggested Readings:

1. The Cell a Molecular Approach (4^{th} Edition) by Cooper & Hausman https://www.thebiomics.com/books/cell-biology/cell-molecular-approach- cooper-and-hausmn-4th-ed.html

2. Molecular Biology by Friefelder David, Publisher Narosawww.alibris.com/Molecular-Biology-David.
3. Introduction to Cell biology by John K Young, World Scientific publishing company. www.overdrive.com/.../introduction-to-cell-biology.
4. Introduction to biology,3rd tropic edition by D G Maackean www.amazon.com/Introduction-Biology-D-G-Mackean/

MEDICAL LAW AND ETHICS

Subject Name	Code	Type of course	T-P-Pj	Credit
Medical Law and Ethics	CUTM1734	Theory+ Project	2-0-1	**3**

Course Objective:

- To provide students with a foundational understanding of ethics, with a particular focus on medical ethics, and to explore key ethical principles such as autonomy, which significantly influence medical law.
- To examine the general principles of medical law that govern the legal relationship between medical practitioners and their patients, ensuring that students grasp the legal dynamics in healthcare settings.
- To analyze the legal implications of providing medical advice, diagnosis, and treatment, enabling students to understand the legal responsibilities and potential liabilities in medical practice.
- To investigate selected medico-legal issues over the course of human life, including reproductive technologies, fetal rights, research on human subjects, organ donation, rights of the dying, and the legal definition of death.

Course Outcomes:

After completion of the course, the students will be able to:

CO	Statements	CO with POs & PSOs Mapping
CO1	Understand the Legal Framework Governing Medical Practice.	PO4, PO5, PSO1
CO2	Recognize Professional Responsibilities and Legal Obligations of Medical Practitioners.	PO4, PO9, PSO1
CO3	Analyze different types of medical negligence.	PO4, PO5, PSO3
CO4	Evaluate Legal Processes in Medical Malpractice Litigation.	PO4, PO5, PO9, PSO3
CO5	Assess the Medico legal risks in Healthcare Practice	PO4, PO5, PO10, PSO1

Course Outline:

Module-I

1. The Indian medical council act, 2. Medical council of India (functions), 3. Functions of state medical councils, 4. The declaration of Geneva, 5. Association of Healthcare Providers (AHPI) India

Module-II

1. Duties of medical practioners 2. Regarding Red Cross emblem 3. Professional secrecy 4. Privileged communication.

Module-III

1. Professional negligence 2. Medical mal occurrence 3. Contributory negligence 4. Criminal negligence 4. Corporate negligence 5. Ethical negligence 6. Precautions against negligence 7. difference between professional negligence and infamous conduct.

Module-IV

1. Malpractice litigation involving various specialties 2. Prevention of medical negligence 3. supremecourt of India guidelines on medical negligence 3. The therapeutic misadventure 4. Vicarious liability

Module-V

1. Products liability 2. Medical indemnity insurance 3. Medical records 4. Consent in medical practice, 4. Euthenesia 5. Deaths due to medical care 6. Malingering

Suggested Readings:

1. Medical Law and Ethics by Shaun D Pattinson, 5 th edition, 2017.
2. Medical Law and Ethics in India" by KK Singh, 1st Edition (2018).
3. Medical Ethics Manual for Students" by Dr. Vijayaprasad Gopichandran and Dr. S.S. Lal, 1st Edition (2016).

Suggested Project Works:

1. Legal Responsibilities of Medical Professionals in Clinical Practice
2. Informed Consent: Legal and Ethical Implications in Treatment Process
3. Confidentiality and Data Protection in Hospitals: Legal Perspectives
4. The Role of Professional Codes of Conduct in Clinical Practice
5. Ethics: Balancing Patient Autonomy and Beneficence
6. Duty of Care and Negligence in Hospitals: Understanding Legal Accountability
7. Legal and Ethical Implications of Tele-Medicine Practice
8. The Impact of Medical Malpractice Laws on Clinical Practice
9. Regulatory Frameworks for Medical Practice in India
10. The Importance of Ethical Documentation in Clinical Practice
11. Patient Rights and Responsibilities: A Legal Perspective

BASIC COMPUTER AND INFORMATION SCIENCE

Subject Name	Code	Type of course	T-P-Pj	Credit
Basic Computer and Information Science	CUTM 1742	Practice	0-2-0	**2**

Course Objective:

- To gain knowledge about the roles and operations of various computer hardware components.
- To identify the key considerations for individuals and organizations when selecting and acquiring computer hardware based on specific needs and budgets.
- To learn methods for maintaining computer equipment and resolving common hardware issues to ensure optimal functionality and longevity.
- To understand how hardware and software collaborate to perform computing tasks, alongside the principles of software development, categorization, and upgrading.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	Understand the fundamental hardware components.	PO1, PO5, PSO3
CO2	Apply the concept in preparing documents.	PO8, PO9, PSO1,PSO3
CO3	Organize data's available digitally.	PO5, PO9, PSO3
CO4	Create presentations, formatting and enhancing texts	PO5, PO9, PSO3
CO5	Utilize the concepts and software skills in data handling.	PO5, PO8, PSO1, PSO2

Course Outline:

Module- I

Introduction to computer: introduction, characteristics of computer, block diagram of computer, generations of computer. Types of Input output devices. Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices.

Module- II

Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Module- III

Introduction to MS-DOS: History of DOS, features of MS-DOS, MS-DOS Commands (internal and external). Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.). Computer networks: introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid). Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

Suggested readings: -

1. Objective Computer Awareness
2. Computer Networking (Global Edition)

RESEARCH METHODOLOGY

Subject Name	Code	Type	T + P + Pj	Credits
Research Methodology	CUTM1721	Theory+ Project	2+0+1	3

Course Objective:

- To gain a solid understanding of the fundamental concepts, types, and importance of research in scientific inquiry and academic fields.
- To learn how to formulate research problems, hypotheses, and objectives, as well as how to design and structure research projects.
- To understand and apply various methods of data collection, including surveys, experiments, interviews, and observation, while ensuring accuracy and reliability.
- To become proficient in using statistical tools and techniques for analyzing and interpreting data.

Course Outcome:

After completion of the course, the students will be able to,

CO	Statements	CO with POs & PSOs Mapping
CO1	Identify the key components of research, including its definition, scope, limitations, types, and objectives	PO1, PO6, PO12, PSO3
CO2	Understand the steps involved in developing a health research proposal.	PO2, PO3, PO4, PO9, PSO3
CO3	Implement the methods of data collection.	PO1, PO2, PO10, PO11, PSO2
CO4	Interpret the concepts of sampling designs, the theory of estimation and hypothesis testing, and the significance tests based on t, F, Z, and Chi-Square tests	PO2, PO5, PO13, PSO2, PSO3
CO5	Evaluate the importance of tabulation, coding, editing, interpretation, and report writing in the research process.	PO7, PO9, PO12, PSO3

Course Outline:

Module- I

Introduction to Research**:** Definition, scope, limitations, and types of research. Objectives of Research**:** Types and importance. Research Process**:** Basic steps involved in the health research proposal development process. Literature Review**:** Importance, sources, strategies for accessing information, library and computer search techniques.

Project Topics:

1. Impact of Digital Library Systems on Literature Review Effectiveness in Health Research
2. Evaluating the Scope and Limitations of Research in Rural Healthcare Development
3. Comparative Study of Traditional vs. Modern Research Methods in Public Health

Module- II

Research Title and Objectives**:** Criteria for selecting a research title. Formulation of Research Objectives**:** Types and qualities of research objectives. Research Designs**:** Different types of research designs and their applicability to various research contexts.

Project Topics:

1. Exploring Factors Influencing Research Title Selection in Epidemiological Studies
2. Formulating Research Objectives for Preventing Lifestyle Diseases Among Urban Youth
3. Analyzing the Applicability of Experimental vs. Observational Research Designs in Community Health Projects

Module- III

Data Collection Methods**:** Secondary and primary data collection techniques. Scaling Techniques**:** Concept, types, rating scales, ranking scales, scale construction techniques, and multi-dimensional scaling. Sampling Designs**:** Concepts, types, techniques, and sample size determination.

Project Topics:

1. Effectiveness of Primary Data Collection Techniques in Monitoring Pandemic Outbreaks
2. Assessing Multi-Dimensional Scaling in Consumer Preferences for Health Products
3. Sampling Techniques in Determining Prevalence Rates of Non-Communicable Diseases

Module- IV

Research Hypothesis**:** Definition, qualities, importance, and types of hypotheses. Theory of Estimation**:** Testing of hypothesis, small and large sample tests. Statistical Tests**:** Tests of significance based on t, F, Z, and Chi-Square tests.

Project Topics:

1. Hypothesis Testing for the Impact of Yoga on Mental Health in Adolescents
2. Statistical Analysis of Health Outcomes in Smokers vs. Non-Smokers Using Chi-Square Tests
3. Small and Large Sample Testing to Study Vaccination Rates in Urban vs. Rural Areas

Module- V

Designing Questionnaire & Interviewing**:** Techniques for effective data collection. Tabulation, Coding, Editing**:** Organizing and processing research data. Interpretation and Report Writing**:** How to analyze results and prepare research reports.

Project Topics:

1. Designing Questionnaires to Assess Public Awareness of Reproductive Health
2. Developing an Interview Framework to Study Health-Seeking Behavior in Low-Income Communities
3. Tabulation and Statistical Interpretation of Survey Data on Patient Satisfaction in Hospitals

Suggested Readings:

1. Research Methodology by C.R. Kothari (3rd Ed)

2. Research Methodology In the Medical & Biological Sciences by Petter Laake et al.

3. Essentials of Research Design and Methodology by Geoffrey Marczyk et al.

4. WHO, Health Research Methodology: A guide for training in research Methods, 2nd Edition, WHO

PSYCHOLOGY AND SOCIOLOGY

Subject Name	Code	Type of course	T-P-Pj	Credit
Psychology and Sociology	CUTM2954	Theory+ Project	3+0+1	**4**

Course Objective:

- To recognize and help with the psychological factors involved in disability, pain, disfigurement, unconscious patients, chronic illness, death, bereavement and medical-surgical patients/conditions.
- To understand the elementary principles of behaviour for applying in the therapeutic environment.
- To understand the role of family and community in the development of behaviours.
- To develop a holistic outlook towards the structure of society and community resources.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	To describe the principle and philosophy behind the Sociology and Psychology	PO1, PO9, PSO1
CO2	To understand the specific psychological factors and effects in physical illness.	PO7, PO10, PSO1
CO3	Demonstrate the social and economic aspects of a community that influence the health of the people.	PO3, PO10, PO11, PSO1
CO4	Identification of social institutions and resources.	PO3, PO11, PSO3
CO5	To execute a holistic approach in their dealing with patients during admission, treatment, rehabilitation and discharge.	PO4, PO7, PO9, PSO1

Course Outline:

Module I

General Psychology: -Definition of Psychology: Definition of Psychology, information in relation to following schools' methods and branches, a) Schools: Structuralism, functionalism, behaviorism psychoanalysis, gestalt Psychology, b) Methods: Introspection,

observation, inventory and experimental method, c) Branches: General, child, social, abnormal industrial. Heredity and Environment: Twins, Relative importance of heredity and environment, their role in relation to physical characteristics, intelligence and personality, nature- nature controversy. Intelligence: Definitions, IQ, Mental Age, List of various intelligence tests- WAIS, WISC, Bhatia's performance test, Raven's Progressive Matrices test. Motivation Definitions: Motive, drive, incentive and reinforcement activity, air, avoidance of pain, attitude to sex. Psychological needs: Information, security, self-esteem, competence, love and hope Emotions Definitions: Differentiate from feelings, psychological changes of emotion. Personality: Definitions: List of components, Physical characteristics: character, abilities families and culture of personality characteristics, Personality assessment: Interview, standardized, non-standardized, Exhaustive and stress interviews, list and define inventories BAP, CPI and MMPI projective test Rorschach, TAT and sentence completion test.

Learning Definition: List the laws of learning as proposed by Thorndike. Types of learning: Briefly describe, Classical conditions, Operant conditioning, insigne observation and Trial and Error type list the effective ways to learn. Massed Vs spaced. Whole Vs. Part, Recitation Vs. Reading, Serial Vs. Free Recall. Knowledge of results. Association Organization, Mnerroic methods, incidental Vs Intentional learning, role of language Sensation, Attention and Perception: a) List of senses, Vision, Hearing, Olfactory, Gustatory and outdances sensation, movement, equilibrium and visceral sense. Define attention and list factors that determine attention, nature of stimulus intensity, colour, change, extensity, repetition, movement size, curiosity, primary motives, b)Define perception and list the principles of perception, figure fround, constancy, similarity, proximity, closure, continuity, values and interests, past experience context, needs, moods, religion and age, perceived susceptibility perceived seriousness perceived benefits and socio- economic status, c)Define illusion and hallucination, d)List visual, auditory, cutaneous, gustatory and olfactory mechanism. Defence Mechanisms of the ego, rationalization, projection, reaction, formation, identification, repression, emotional insulations undoing, interjection, acting out.

Module II

Health Psychology: Psychological Reaction of a patient: Psychological reaction of a patient during admission and treatment anxiety, shock, denial, suspicious, questioning, loneliness, regression, shame, guilt, rejection, fear, withdrawl, depression, egocentricity, concern about small matters narrowed interests, emotional, anger reactions, Perpetual changes, confusion,

disorientation, hallucinations, depression, illusions, anger, hostility, loss of hope. Reactions to Loss: Reactions to loss, death and bereavement shock and disbelief, development of awareness, restitution, resolution. Stages of acceptance as proposed by Kubler-Ross. Stress: Physiological and Psychological relation to health and sickness psychosomatic, professional stress burnout.

Module III

Introduction: Definitions of sociology, sociology as a science of society, uses of the study of sociology, application of knowledge of sociology in physiotherapy and occupational therapy. Sociology & Health: Social factors affecting health status, social consciousness and perception of illness, social consciousness and meaning of illness, decision making in taking treatment. Institutions of health, their role in the improvement of the health of the people. Socialization: Meaning of Socialization, influence of social factor on personality, Socialization in hospitals, Socialization in the rehabilitation of patients. Social groups: Concept of social groups, influence of formal and informal groups on health and sickness, the role of primary groups and secondary groups in hospitals and rehabilitation setting.

Module IV

Family: Influence of family on human personality, discussion of changes in functions of a family, influence of family on individual's health, family and nutrition, the effects of sickness on family and psychosomatic disease. Culture: Components of culture. Impace of culture on human behavior, cultural meaning of sickness, response & choice of treatment (role of culture as social consciousness in molding the perception of reality), culture induced symptoms and disease, sub- culture of medical workers. Caste system: Features of modern caste system and its trends. Social change: Meaning of social change, factors of social change, human adaption and social change, social change and stress, social change and deviation, social change and health programmes, the role of social planning in improvement of health and in rehabilitation.

Module V

Social Control: Meaning of social control, Role of norms, folkways, customs, morals, religion, law and other means of social control in the regulation of human behavior, social deviation and disease. Social Problems of the Disabled: Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems: a)

Population explosion b)Poverty and unemployment, c) Beggary, d) Juvenile delinquency, e) Prostitution, f) Alcoholism, g) Problems of women in employment. Social Security: Social security and social legislation in relation to the disabled. Social Worker: The role of medical social worker.

Suggested readings: -

1. Psychology and Sociology- Apllied to Medicine- Porter & Alder- W.B Saunders.
2. Behaviorial Sciences for Medical Undergraduates- Manju Mehta–Jaypee Brothers.
3. Parter & Alder – Psychology & Sociology applied to medicine – W.B Saunders.

Suggested Project Works:

1. Impact of Stress on Rehabilitation Outcomes in Physiotherapy Patients
2. The Role of Motivation in Recovery Among Patients Undergoing Physiotherapy
3. Psychological Factors Influencing Chronic Pain Management
4. The Relationship Between Anxiety and Functional Recovery Post-Injury
5. The Influence of Depression on Recovery in Stroke Patients Undergoing Physiotherapy
6. Psychological Preparedness and Its Impact on Outcomes in Rehabilitation
7. The Influence of Social Support Systems on Physiotherapy Outcomes
8. Socioeconomic Status and Access to Physiotherapy Services
9. The Role of Family Dynamics in Rehabilitation of Elderly Patients
10. Barriers to Seeking Physiotherapy Among Marginalized Communities

PHARMACOLOGY

Subject Name	Code	Type of course	T-P-Pj	Credit
Pharmacology	CUTM4319	Theory+ Project	3-0-1	**4**

Course Objective:

- To make the students learn about various drugs acting on different body systems.
- To develop a foundational understanding of pharmacology.
- To understand the pharmacology of antiviral, antibacterial, antifungal, antiprotozoan, anthelmintic, and anticancer drugs
- To gain comprehensive knowledge of drugs affecting various organ systems.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	Gain knowledge regarding the Pharmacokinetics and pharmacodynamics of drugs.	PO1,PSO1
CO2	Interpret drugs and its inter-actions on different body systems.	PO1, PO5, PSO1
CO3	Analyse different drug concepts	PO5, PO12, PSO1
CO4	Create different types of treatment procedures.	PO2, PO5, PSO3
CO5	Memories different drugs with respective to conditions.	PO1, PO2, PSO3

Course Outline:

Module I

Fundamentals of Pharmacology

Introduction to Pharmacology Definition and scope Drug nomenclature (chemical, generic, and brand names).

Pharmacokinetics Absorption, Distribution, Metabolism, Excretion

Adverse Drug Reactions: Types of adverse effects, Mechanisms of drug toxicity, Reporting and management

Module II

- Gastrointestinal (GI) System: Anti-ulcer drugs, Laxatives and antidiarrheals, Anti-emetics
- Respiratory System: Bronchodilators, Anti-inflammatory agents, Cough suppressants and expectorants
- Cardiovascular System: Antihypertensives, Diuretics, Antiarrhythmics, Drugs for heart failure
- Blood and Blood Coagulation: Hematopoietic agents, Anticoagulants (special emphasis on types and mechanisms), Antiplatelet drugs, Thrombolytics
- Renal Function and Excretion: Diuretics and their mechanisms, Drugs affecting urine pH, Excretion of drugs in stool, bile, and other body fluids

Module III

- Central Nervous System (CNS): Analgesics and anesthetics, Antiepileptics, Antipsychotics and antidepressants
- Autonomic Nervous System: Sympathomimetics and sympatholytics, Parasympathomimetics and parasympatholytics
- Endocrine System: Hormones and hormone antagonists, Drugs for thyroid disorders, Drugs for diabetes management
- Autacoids: Histamines, Prostaglandins, Leukotrienes

Module IV

- Antiviral Drugs: For HIV/AIDS, For Hepatitis, Other viral infections
- Antibacterial Drugs: Classes of antibiotics and their mechanisms, Resistance and stewardship
- Antifungal Drugs: Azoles, polyenes, and other classes
- Antiprotozoan Drugs: Drugs for malaria, amoebiasis, and other protozoal infections
- Anthelmintics: Drugs for helminth infections
- Anticancer Drugs: Chemotherapy agents, Targeted therapy, Hormonal treatments

Module V

- Antiseptics and Disinfectants: Classification and uses, Mechanisms of action
- Drugs Interfering in Pathological Tests: Common drug interactions affecting lab results, Implications for test interpretation
- Measurement of Drug Levels: Techniques for measuring drug levels in body fluids, Clinical significance of drug monitoring

Suggested readings: -

1. Essentials of Medical Pharmacology: K.D. Tripathi, 6th edition, Jaypee Publishers.

Suggested Project Works:

1. Role of Analgesics in Pain Management for Physiotherapy Patients
2. Pharmacological Interventions in Muscle Spasticity: Implications for Physiotherapy
3. Effects of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) on Rehabilitation Outcomes
4. Pharmacokinetics and Physiotherapy: A Comprehensive Overview
5. Steroid Therapy and Its Implications in Physiotherapeutic Practice
6. Use of Muscle Relaxants in Acute and Chronic Conditions Requiring Physiotherapy
7. Cardiovascular Medications and Their Influence on Physiotherapy Treatment Plans
8. Understanding Bronchodilators in Pulmonary Rehabilitation Physiotherapy
9. Impact of Diabetes Medications on Exercise Tolerance in Physiotherapy
10. Pharmacological Approaches to Osteoporosis and Their Physiotherapeutic Implications

ELECTROTHERAPY-I

Subject Name	Subject Code	Type of course	T-P-Pj	Credit
Electrotherapy-I	CUTM1976	Theory+ Practice	3-3-0	**6**

Course Objective:

- Understand the basic physical principles related to matter (solids, liquids, gases), electricity (conductors, insulators, potential difference), and the effects of current electricity on biological tissues.
- Explain the physiological and therapeutic effects of direct and modified direct currents, including the clinical application of iontophoresis and galvanism in treating nerve and muscle tissue disorders.
- Demonstrate knowledge of pain management techniques**,** including the mechanisms of pain pathways, the gate control theory, and the clinical use of Transcutaneous Electrical Nerve Stimulation (TENS) for various types of pain.
- Analyze the therapeutic benefits of medium-frequency currents, such as Interferential Therapy (IFT), including the production, biophysical effects, and clinical application for conditions like degenerative spinal pain and pelvic floor strengthening.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Outline the principles and precautions of Electricity and Electrical Equipment	PO1, PO2, PSO2
CO2	Understand the indications and contraindications of various types of electrotherapeutic currents.	PO5, PO7, PSO1, PSO3
CO3	Operate application of electrotherapy on nerve lesions, facilitation of muscle contraction and pain relief by low frequency currents.	PO2, PO5, PO7, PSO3
CO4	Apply electrical stimulation on excitable tissue principles, techniques and effects of electrotherapy.	PO5, PO7, PO12, PSO1, PSO3
CO5	Create a therapeutic approach in the restoration of physical function	PO4, PO7, PO9, PO12, PSO3

Course Outline:

Module I

Physical Principles: Structure and properties of matter – solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity. Structure of atom, molecules, elements and compounds. Static and current electricity. Conductors, Insulators, Potential Difference, Resistance & Intensity Ohm's Law – Its application to AC & DC currents:

- Rectifying Devices– Thermionic valves, Semiconductors, Transistors, Amplifiers, Transducers Oscillator circuits.
- Capacitance, condensers in DC and AC circuit, Display devices & indicators – analogue & digital.

Principals and Effects of Current Electricity: Chemical effects- Ions and electrolytes, Ionization, Production of a E.M.F by chemical action. Electromagnetic spectrum – biophysical application Electrical supply: - Brief outline of main supply of electric current, Dangers –short circuits, electric shocks,Precautions – safety devices, earthing, fuses etc and First aid & initial management of electric shock.

Module II

1. Low Frequency Currents: Introduction to direct, alternating &modified currents
2. Production of direct current –Physiological and therapeutic effects of constant current anodal and cathodal- Galvanism, Ionization and their application in various conditions.
3. Iontophoresis – Principles of clinical application, indication, contraindication, precaution, operational skills of equipment & patient preparation.
4. Modified direct current – various pulses, duration and frequency and their effect on Nerve and Muscle tissue. Production of interrupted and surged current and their effects.
5. Modified direct current- Physiological and therapeutic effects, principles of clinical application, indications, contra indications, precautions, operational skills of equipment& patient preparation.

Practice:

i. Application of stimulation in Facial Palsy, patient preparation, motor point stimulation, documentation.

ii. Application of stimulation in Median Nerve, patient preparation, motor point stimulation, documentation.

iii. Application of stimulation in Radial Nerve, patient preparation, motor point stimulation, documentation.

iv. Application of stimulation in Ulnar Nerve, patient preparation, motor point stimulation, documentation.

v. Application of stimulation in Femoral Nerve, patient preparation, motor point stimulation, documentation.

vi. Application of stimulation in Sciatic Nerve, patient preparation, motor point stimulation, documentation.

vii. Therapeutic application of different low frequency currents, Faradic foot bath, Faradism under pressure, Iontophoresis.

Module III

1. Introduction to Pain, types and classification of Pain.
2. Pain pathway, Pain Gate theory, Central and Peripheral inhibition of Pain
3. Transcutaneous Electrical Nerve Stimulations (TENS): - a) Types of Low Frequency pulse widths, frequency & intensities used as TENS applications. b) Theories of pain relief by TENS, c) Principle of clinical application, effects & users, indicators, contraindications, precautions, operational skills of equipment and patient preparation.

Practice:

i. Application of TENS for Cervical Pain patient preparation, treatment dosage, documentation.

ii. Application of TENS for Radiating Pain patient preparation, treatment dosage,, documentation.

iii. Application of TENS for Lymphatic clearance and its patient preparation, treatment dosage, documentation.

iv. Application of TENS for improving muscle bulk, patient preparation, treatment dosage, documentation.

v. Application of TENS for Chronic and Acute Pain, patient preparation, treatment dosage, documentation.

Module IV

Medium frequency currents (Interferential Therapy)– conceptual framework of medium frequency current therapy, production, biophysical effects, types therapeutics effects. Techniques of application, indications, Contraindications, Precautions, operational skills and patient preparation.

Practice:

- Application of IFT for Degenerative Cervical induced pain patient preparation, treatment dosage,, documentation.
- Application of IFT for Pelvic floor strengthening, patient preparation, treatment dosage, documentation.
- Application of IFT for Degenerative Lumbar spine induced pain patient preparation, treatment dosage, and documentation.
- Application of IFT for localized chronic pain patient preparation, treatment dosage, and documentation.

Module V

Electro-Diagnosis: Electrical Stimuli and normal behavior of Nerve and muscle tissues. FG Test, SD Curve and its application Chronaxie, Rheobase. Instrumentation, definition & basic techniques of E.M.G and NCV. Bio-Feedback – Instrumentation, principles, Therapeutic effects, indications,

Therapeutic mechanical pressure (Intermittent compression therapy) – Principal, biophysical effects, types, production, therapeutic effects. Techniques of application, indications, contraindications, precautions, operational skills and patient preparation.

Practice:

1. To study the operation of electric supply to the equipment & safety devices.
2. To perform diagnostic test – SD curve, FG test

Suggested readings: -

1. Electrotherapy Explained: Principles &Practice – Low & Reed – Butterworth Heinemann.
2. Clayton's Electrotherapy, (9*t*h edi.) Forster & Palastanga Bailliere Tindall.
3. Therapeutic Heat and cold – Lehman- Williams & Wilkins.
4. Principles and Practice of Electrotherapy- Kahn – Churchill Livingstone

ELECTROTHERAPY-II

Subject Name	Code	Type of course	T-P-Pj	Credit
Electrotherapy-II	CUTM1979	Theory+ Practice	3-3-0	**6**

Course Objective:

- Understand the fundamental anatomy of skin and muscles and how they interact with physical and electromagnetic modalities.
- Learn the principles of electromagnetic induction, magnetism, and their applications in physiotherapeutic devices.
- Explore the physiological and therapeutic effects of heat, cold, and electromagnetic modalities on tissues and their applications in treatment.
- Gain practical knowledge of operating and applying high-frequency currents, therapeutic ultrasound, and traction techniques for rehabilitation purposes

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Outline the principles and precautions of Electricity and Electrical Equipment's	PO1, PO2, PSO2
CO2	Understand the indications and contraindications of various types of electrotherapeutic currents.	PO5, PO7, PSO1, PSO3
CO3	Operate application of electrotherapy on tissue healing and pain relief by High frequency currents.	PO2, PO5, PO7, PSO3
CO4	Apply electrical stimulation on excitable tissue principles, techniques and effects of electrotherapy.	PO5, PO7, PO12, PSO1, PSO3
CO5	Create a therapeutic approach in the restoration of physical function.	PO4, PO7, PO9, PO12, PSO3

Course Outline:

Module I

Brief Anatomy of Skin, Muscle. Magnetic effects, Molecular theory of magnetism, Magnetic fields, Electromagnetic Induction. Milli ammeter and Voltmeter, Transformers and choke coil Thermal Effects – Joule's Law and Heat production. Transformers and its working principles Electromagnetic spectrum – biophysical application. Electrical supply: - Brief outline of main supply of electric current. Dangers –short circuits, electric shocks. Precautions – safety devices, earthing, fuses etc. First aid & initial management of electric shock. Physiological responses to heat gain or loss on various tissues of the body. Therapeutic effects of heat, cold.

Module II

Superficial heat: Paraffin wax bath, moist heat, electrical heating pads. Mechanism of production and mode of heat transfer with its physiological & therapeutic effects. Indications, contraindications, precautions, operational skills of equipment & patient preparation.

Therapeutic cold (Cryotherapy): Principles and types, mode of heat transfer with its physiological & therapeutic effects.Techniques of application, indications, contraindications, precautions, operational skills and patient preparation

Module III

High frequency currents (S.W.D) – Production, biophysical effects, types, Therapeutic effects, techniques of application, indications, contraindications, precautions, operational skills and patient preparation.

High frequency sound waves (Ultrasound) – Production, biophysical effects, types, therapeutic effects, Techniques of application, indications, contraindications, precautions, operational skills and patient preparation.

Module IV

Therapeutic light in Physiotherapy (LASER) – Definition, historical background, physical principles, biophysical effects, types, production, therapeutic effects, Techniques of application, indications, contraindications, precautions, operational skills and patient preparation.

Infra-red rays: Wavelength, frequency, types & sources of IRR generation, techniques of irradiation, physiological & therapeutic effects, indications, contraindications, precautions, operational skills of equipment & patient preparation.

Ultra- violet rays (UVR): a) Wavelength, frequency, types & sources of UVR generation, techniques of irradiation, physiological & therapeutic effects, indications, contraindications, precautions, operational skills of equipment & patient preparation. b) Dosimetry of UVR.

Module V

Principle of Traction (Distraction) on the joints and its physiological effects on Axial and appendicular skeleton.

Cervical Traction – Principle, method of application, indication and contraindication.

Lumbar Traction – Principle, method of application, indication and contraindication.

Practice:

1. To study a short-wave diathermy unit, its operation and different methods of application – region wise.
2. To perform deep heating treatment for lower back and upper back using SWD
3. To induce localized heating using Ultrasound for tissue healing
4. To study an Ultrasound unit, its operation, its operation and different methods of application – region wise.
5. To study a laser unit, its operation and different methods of application – region wise.
6. To perform Lumbar and cervical traction with respective to different position.
7. To study various forms of therapeutic cold application region wise including-ice, cold packs, vapour coolant sprays in reducing acute pain

Suggested readings: -

1. Electrotherapy Explained: Principles & Practice Low & Reed – Butterworth Heinmann.
2. Clayton's Electrotherapy (10*th* Saunders. edition) – Kitchen & Bazin – W.B
3. Therapeutic Heat and Cold Lehmann –Williams & Wilkins
4. Principles and Practice of Electrotherapy –Kahn- Churchill Livingstone
5. Electrotherapy: Clinical in Physical Therapy–Wolf- Churchill Livingstone

EXERCISE THERAPY-I

Subject Name	Code	Type of course	T-P-Pj	Credit
Exercise Therapy	CUTM4304	Theory+ Practice	3-3-0	**6**

Course Objective:

- Introduce the fundamental principles and techniques of exercise therapy and explore its general areas of application, including the importance of assessment.
- Explain the fundamental and derived starting positions in exercise therapy, detailing joint positions, muscle work, and the effects and uses of different movements.
- Describe and classify various types of movements (active, passive, assisted, and resisted), including their techniques of application, indications, contraindications, effects, and uses.
- Familiarize students with the principles and techniques of manual muscle testing and goniometry, including testing positions, procedures, and measurement of range of motion (ROM) for different joints.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Know the principles and safety precautions of different forces and exercises	PO1, PO2, PO7, PSO1, PSO2
CO2	Understand the indications and contraindications of various types of therapeutic Exercises.	PO7, PO9, PSO3
CO3	Demonstrate the knowledge on application of exercise therapy in improving function	PO2, PO7, PSO3
CO4	Interpret the application of exercises on human body	PO5, PO7, PSO1, SPO3
CO5	Create patient centric therapeutic approach in the restoration of physical function.	PO4, PO7, PO9, PO12, PSO3

Course Outline:

Module I

Introduction to Exercise therapy, Principles, techniques and general areas of its application, Assessment & its importance. Description of Fundamental starting positions and derived position including joint positions, muscle work, stability, effects and uses. Introduction to Movements including analysis of joint motion, muscle work and Neuro muscular co-ordination. Classification of movements – Describe the types, technique of application, indications, contraindication, effects and uses of the following: a) Active movement, b) Passive movement, c) Active assisted movement,d) Resisted movement, e) To study the principles, techniques of application indication, Contraindication, precaution, effects and uses of Suspension Therapy.

Module II

Principles and application techniques of Manual muscle testing. Testing position, procedure and grading of muscles of the upper limb, lower limb and trunk etc. Goniometer: Principles, techniques and application of Goniometer. Testing position, procedure and measurement of R.O.M of the joints of upper limbs, lower limbs and trunk.

Module III

Soft Tissue Manipulation (Therapeutic Massage): History, various types of soft tissue manipulation techniques. Physiological effects of soft tissue manipulation on the following systems of the body, Circulatory, Nervous, Musculoskeletal, Excretory, Respiratory, Integumentary system and Metabolism. Classify define and describe – effleurage, stroking, kneading, p, deep friction, vibration and shaking etc. Preparation of patient: Effects, uses, indications and contraindications of the above manipulation.

Module IV

Motor Learning: - i) Introduction to motor learning: a) Classification of motor skills, b) Measurement of motor performance; ii) Introduction to motor control: a) Theories of motor control, b) Applications; iii) Learning Environment: a) Learning of Skill, b) Instruction& augmented feedback.

Module V

Physiological Properties of a muscle. Principles of Strengthening Exercise, Repetitive

Maximum, Progressive resisted exercises and its different types. Strengthening Exercises of Upper limb, Lower Limb muscles.

Practice:

1. To practice all the soft tissue manipulative techniques region wise - upper limb, lower limb, neck, back and face.
2. To practice the measurement of ROM of joints – upper limb, lower limb & trunk.
3. To practice the grading of muscle strength region wise –upper limb, lower limb and trunk.
4. To study the position of joints, muscle work, and stability of various fundamental and derived positions.
5. To study the different types of muscle contraction, muscle work, group action of muscles and coordinated movements.
6. To practice the various types of suspension therapy and its application on various parts of body-region wise
7. To study and practice each muscle of Upper and Lower limb strengthening exercises.
8. To study & practice local & general relaxation techniques

Suggested readings: -

1. Practical Exercise Therapy Hollis- Blacwell Scientific Publications.
2. Therapeutic Exercises Foundation and Techniques – Kisner and Colby-F.A Davis
3. Principle of Exercise Therapy- Gardiner – C.B.S Delhi.
4. Beard’s Massage- Wood- W.B Saunders.
5. Muscle testing and functions – Kendall – Williams & Wilkins.

EXERCISE THERAPY-II

Subject Name	Code	Type of course	T-P-Pj	Credit
Exercise Therapy-II	CUTM4305	Theory+ Practice	3-3-0	**6**

Course Objective:

- Define key terms related to mobility and stretching, including flexibility, contracture, hypermobility, and selective stretching.
- Explain the mechanical and physiological properties of soft tissues, including muscle tissue and noncontractile tissue, in response to immobilization and stretching.
- Demonstrate proficiency in various stretching techniques, including proprioceptive neuromuscular facilitation (PNF) and manual stretching techniques for the upper and lower extremities.
- Apply knowledge of gait training by identifying gait deviations and managing them through therapeutic exercises and the use of walking aids, such as crutches, canes, walkers, and wheelchairs.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Know the principles and safety precautions of different forces and exercises	PO1, PO2, PO7, PSO1, PSO2
CO2	Understand the indications and contraindications of various types of therapeutic Exercises.	PO7, PO9, PSO3
CO3	Demonstrate the knowledge on application of exercise therapy in improving function	PO2, PO7, PSO3
CO4	Interpret the application of techniques to improve patient functional status	PO5, PO7, PSO1, SPO3
CO5	Create patient centric therapeutic approach in the restoration of physical function.	PO4, PO7, PO9, PO12, PSO3

Course Outline:

Module I

Stretching's: Definition of Terms Associated with Mobility and Stretching: Flexibility, Hypo mobility, Contracture, Selective Stretching, Overstretching and Hypermobility, Overview of Interventions to Increase mobility of Soft Tissues, Indications, Contraindications, and Potential Outcomes of Stretching Exercises. Properties of Soft Tissue: Response to Immobilization and Stretch , Mechanical Properties of Non-contractile Soft Tissue, Mechanical and Physiological Properties of Muscle Tissue, Neurophysiological Properties of Skeletal Muscle. Determinants and Types of Stretching Exercises :Alignment and Stabilization, Intensity of Stretch, Duration of Stretch , Speed of Stretch, Frequency of Stretch, Mode of Stretch.

Proprioceptive Neuromuscular Facilitation Stretching principles, theories, techniques, Integration of Function into Stretching. Procedural Guidelines for Application of Stretching Interventions: Examination and Evaluation of the Patient, Preparation for Stretching, Application of Manual Stretching, Procedures , After Stretching Precautions for Stretching: General Precautions , Special Precautions for Mass-Market, Flexibility Programs. Adjuncts to Stretching Interventions: Complementary Approaches ,Heat , Cold, Biofeedback , Joint Traction or Oscillation. Manual Stretching Techniques in Anatomical Planes of Motion : Upper Extremity Stretching , Lower Extremity Stretching , Neck and Trunk Self-Stretching Techniques

Module II

Peripheral Joint Mobilization: JOINT MOBILIZATION 1. Introduction 2. Definition 3. Joint range-Outer range, Middle range, Inner range 4. Causes of joint range limitation 5. Effect of prolonged immobilization 6. Indication & Contraindication 7. Principle Position of patient, Position of therapist. Relaxation, Fixation, Support or Stabilization, Direction of movement. Force & Range/Distraction or Traction, Intensit &Duration. Oscillatory technique, Sustained translator joint play techniques

Module III

Co-ordination Exercises: Co-ordination & Balance Principles, Technique, Neural control, Methods of co -ordination exercises, Frenkel's exercises Differentiate types of co -ordination loss & balance loss. Physiology of inco -ordination, Balance loss & training.

Balance Training: MAT ACTIVITIES & FUNCTIONAL RE-EDUCATION 1. Introduction 2. Demonstrate common mat activities Rolling-Prone on elbows-Prone on hands-Hook lying-Bridging-Quadruped position-Long sitting-Short sitting-Kneeling-Half kneeling-Standing-Walking

Module IV

Gait Training: Overview of normal gait & its components, Gait deviations Assessment,Types, etiogenesis, management, including therapeutic exercises.

Pathological gaits: Trendelenburg gait, Circumductory gait, Hip hiking gait, Foot drop gait, Calcaneal gait, Flexed knee gait, Scissoring gait, Parkinson gait, Antalgic gait, Wide base gait, Lordotic gait, Anterior trunk bending, Posterior trunk bending.

Module V

WALKING AIDS: Types of walking aids: Crutches, Canes, Walkers, Wheel chair. Crutches: Types-Axillary, Elbow or Forearm, Gutter Measurement for crutches-Axillary & Elbow Parts of crutch-Axillary & Elbow Crutch muscles and preparatory exercise Gait pattern-Four point gait, two point gait, three point gait, PWB, NWB Swing to & Swing through, stair climbing Canes: Purpose, Types of cane-Standard cane, Standard adjustable canes, Tripod, Quadripod Gait pattern-Three point gait, two point gait.Walkers: Purpose, Parts, Types-Rigid walking frame, Foldable walker, Rollator, Reciprocal walker, Gutter Walker Wheel Chair: Introduction, Purpose, Parts of wheel chair, Wheels, tyres, wheel locks, casters, hand rim, foot rest, tilt bar, seat and back rest. Measurement Seat width, Seat height, Seat depth, Back rest height, Arm rest height. Types of wheel chair Rigid, Foldable, One arm driven wheel chair, Powered wheel chair. Pre Gait Training-on bed, parallel Bar, off Bed, crutch hold / balance, Training for different conditions (Paraplegia, Hemiparesis, Amputation, etc.)

Suggested readings: -

1. Therapeutic Exercises Foundation and Techniques – Kisner and Colby-F.A Davis
2. Proprioceptive Neuromuscular Faciliation- Vos et al-Williams and wilkins.

BIOMECHANICS AND KINESIOLOGY- I

Subject Name	Code	Type of course	T-P-Pj	Credit
Biomechanics and Kinesiology I	CUTM4306	Theory+ Project	5-0-1	**6**

Course Objective:

- Understand the basic principles of mechanics and their application to human motion, forces, and equilibrium.
- Explore the kinematic and dynamic aspects of lower extremity joints, including the hip, knee, ankle, and foot, and their role in movement and weight-bearing.
- Analyze posture from an anatomical and biomechanical perspective, identifying factors that contribute to postural balance and imbalance.
- Investigate normal and pathological gait patterns, including the biomechanics of walking aids and the role of the pelvis in locomotion.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	To recall the basics physics principles in relation to human body	PO1, PSO1
CO2	Understand the principles of biomechanics and kinesiology and their application in health and disease	PO1, PO5, PSO1, PSO3
CO3	To analysis of normal human movement from a global perspective, integrating biomechanics, muscle mechanics and motor control theory	PO5, PO9, PSO1, PSO3
CO4	To evaluate design effective rehabilitation programs	PO5, PO7, PSO3
CO5	To create evidence-based approaches for problem solving in the field	PO5, PO7, PO12, PSO3

Course Outline:

Module I

Mechanics: Introduction to mechanics including motion, forces, parallel forces system, Newton's law of motion, concurrent force systems – composition forces, muscle action line.

Centre of Gravity, line of gravity, stability and equilibrium, d) Introduction to Bio-Mechanics and terminology.

Module II

Muscle Structure and function: a) Mobility and stability functions of muscle, b) Elements of muscle structure and its properties, c) Types of muscle contractions and muscle work, d) classification of muscles and their functions, e) Group action of muscles, Co-ordinated movement.

Module III

Joint Structure and Function: Lower extremity- Hip Joint anatomy, kinetics and Kinematics-of Hip Joint with relation to two leg stance and one leg stance. Applied Biomechanics of Hip Joint. Joint Structure and Function: Lower extremity- Knee Joint anatomy, kinetics and Kinematics-of Knee Joint with Applied Biomechanics

Module IV

Joint Structure and Function: Lower extremity- Ankle Joint anatomy, kinetics and Kinematics-of Knee Joint with relation to Arches of foot.

Module V

Posture & Gait: Posture- Definition, Anatomical aspects of posture, factors responsible for posture. Postural imbalance – factors responsible for imbalance in Static and dynamic positions including ergonomics. Description of Normal gait, determinants of gait, and biomechanics of walking aids. Gait deviations – Types, Causative factors and analysis. Pelvis biomechanics and its relations to normal gait.

Suggested readings: -

1. Joint Structure and Function- A Comprehensive Analysis – Norkins & Levengie – F.A Davis
2. Brunstrom’s Clinical Kinesiology –Smith et al –F.A Davis
3. Basic Biomechanics explained – Low & Reed –Butterworth Heinmann
4. Kinesiology Applied to Pathological Motion –Soderberg Lippineou.

Suggested Project Works:

1. Analysis of Muscle Activation Patterns During Common Lower Limb Exercises
2. Effect of Footwear on Lower Limb Joint Kinematics During Running
3. The Role of Quadriceps Strength in Knee Joint Stability
4. Biomechanical Analysis of the Impact of Flat Feet on Lower Limb Alignment
5. Hip Joint Range of Motion and Its Influence on Lower Limb Kinetics
6. Biomechanics of Single-Leg Balance Exercises in Improving Ankle Stability
7. Analysis of Gait Parameters in Individuals with Knee Osteoarthritis
8. Effects of Fatigue on Gait Patterns in Young Adults
9. Comparison of Gait Biomechanics Between Barefoot and Shod Walking
10. Changes in Gait Dynamics Following Total Hip Replacement
11. Impact of Aging on Spatiotemporal Gait Parameters
12. Biomechanical Analysis of Gait in Athletes Post-Lower Limb Injury
13. Comparison of Gait Mechanics in Patients Using Different Walking Aids

BIOMECHANICS AND KINESIOLOGY- II

Subject Name	Code	Type of course	T-P-Pj	Credit
Biomechanics and Kinesiology II	CUTM2955	Theory+ Project	5-0-1	6

Course Objective:

- Understand the structural components and functional dynamics of the shoulder complex, including its articulations, ligaments, and musculature, with a focus on injury prevention and rehabilitation.
- Analyze the biomechanical structure and function of the elbow joint, including the humero-ulnar, humeroradial, and radioulnar joints, and their role in upper limb mobility and stability.
- Explore the complex anatomy and function of the wrist and hand joints, focusing on finger musculature, thumb mechanics, grip types, and the impact of injuries on hand functionality.
- Examine the vertebral column's structure, function, and regional biomechanics, considering the roles of the cervical, thoracic, and lumbar regions in maintaining posture, stability, and movement.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	To recall the basics physics principles in relation to human body	PO1, PSO1
CO2	Understand the principles of biomechanics and kinesiology and their application in health and disease	PO1, PO5, PSO1, PSO3
CO3	To analysis of normal human movement from a global perspective, integrating biomechanics, muscle mechanics and motor control theory	PO5, PO9, PSO1, PSO3
CO4	To evaluate design effective rehabilitation programs	PO5, PO7, PSO3
CO5	To create evidence-based approaches for problem solving in the field	PO5, PO7, PO12, PSO3

Course Outline:

Module I: Shoulder Complex

Describe the structural components of the shoulder complex including the articulating surfaces, capsular attachments and ligaments and movements of the following joints. i) Sterno-clavicular ii) Acromio-clavicular iii) Scapulo-thoracic iv) Gleno-humeral.

Describe the function of the shoulder complex including dynamic stability of the glenohumeral joint, musculotendinous cuff, Stabilisation of the dependent arm, Scapulohumeral Rhythm, Scapulothoracic and glenohumeral contributions.

Describe the muscles(Deltoid, Supraspinatus, Infraspinatus, Teresminor, Subscapularis, Upper Trapezius, Lower Trapezius, Serratus anterior, Middle Trapezius & Rhomboids) 4. Describe the muscles of depression (Latissmus dorsi, Pectoralis, Teres major, Rhomboids). 5. Muscles functioning around shoulder. 6. Effect of injury & aging. 7. PA, dislocation, ligament instability.

Module II: The Elbow joint:

Describe the structure of the Humero-ulnar and Humeroradial joints including articulating surfaces, Joint capsule Ligaments & Muscles. Describe the function of the Humero-ulnar and Humeroradial joints including the Axis of motion, Range of motion, Muscle action.Describe the structure of the superior and inferior radioulnar joints. Describe the function of the superior and inferior radioulnar joints. Describe the mobility and stability of the Elbow complex and its relationship to Hand and Wrist. Describe the effects of injury & aging.Dislocation, Bursitis Dislocation , Ligamental instability, Cubitus varus, Cubitus valgus.

Module III: The Wrist and Hand complex

Describe the wrist complex including Radiocarpal joint, Midcarpal joint and the Ligaments of the wrist complex. Describe the function of the radiocarpal and midcarpal joints including the movements and muscles involved. Describe the Hand complex including : Structure of fingers (Carpometacarpal, Metacarphalangeal and interphalangeal joints of fingers, ligaments & range of motion). Describe the finger musculature including Extrinsic & Intrinsic finger flexors and the Extensor mechanism on the MCP, PIP and DIP joint function and intrinsic finger muscles. Describe the structure of the Carpometacarpal, MCP and IP joints of thumb. Describe the Thumb musculature including the Extrinsic and Intrinsic thumb muscles. Describe Precision, Power, Cylindrical, Spherical & Hook grips. Describe Precision handling,

Pad to pad, Tip to tip and Pad to side prehension and Functional position of wrist and hand.Effect of injury & aging, dislocation, deformities of hand paralysis of hand muscles.

Module IV:

The Vertebral column: Describe the general structure and function of the vertebral column including: Primary and secondary curves, Articulations, Ligaments and muscles, typical vertebra, intervertebral disc. Describe factors affecting stability and mobility. Regional structure and function of cervical, dorsal, lumbar and sacral vertebrae. Describe the muscle of the vertebral column – Flexors, Extensors, Rotators and Lateral Flexors. Describe the effects of injury and developmental deficits. Scoliosis, Kyphosis, Lordosis, Spondylosis, Spondylolisthesis, Spondylitis, IVDP. Biomechanics of Cervical Vertebrae and its implication with upper limb. Biomechanics of Thoracic Vertebrae and its implication with Thoracic ribs and Breathing. Biomechanics of Lumbar Vertebrae and its importance with Lower Limb

Module V:

Biomechanics of temporomandibular joints: Anatomy of Temporomandibular joint, ligaments, capsule & muscles that act at Temporomandibular Joint. Movement of Temporomandibular joint.Role of temporomandibular joint in equilibrium

Suggested readings: -

1. Joint Structure and Function- A Comprehensive Analysis Norkins & Levengie F.A Davis
2. Brunstrom's Clinical Kinesiology –Smith et al –F.A Davis
3. Basic Biomechanics explained – Low & Reed –Butterworth Heinmann
4. Kinesiology Applied to Pathological Motion –Soderberg Lippineou.

Suggested Project Works:

1. Analysis of Shoulder Joint Biomechanics During Overhead Activities
2. Kinematic Study of Wrist Motion During Functional Activities
3. Impact of Hand Grip Strength on Upper Limb Function
4. Effect of Different Ergonomic Positions on Wrist and Hand Biomechanics
5. Comparative Study of Shoulder Biomechanics in Healthy vs. Frozen Shoulder Patients
6. Biomechanical Analysis of Lumbar Spine Loading During Lifting Tasks
7. Role of Core Stability Exercises in Reducing Low Back Pain
8. Kinematic Study of Thoracic Spine Motion in Different Postures

9. Effects of Poor Posture on Cervical Spine Biomechanics
10. Biomechanical Assessment of Scoliosis
11. Spinal Alignment Changes with Different Gait Patterns
12. Effect of Pilates on Lumbar Spine Biomechanics in Patients with Chronic Back Pain
13. Impact of Ergonomic Chair Design on Spine Biomechanics
14. Electromyographic Study of Paraspinal Muscles During Flexion-Extension Movements
15. Evaluation of Spinal Biomechanics in Patients with Degenerative Disc Disease

COMMUNITY MEDICINE

Subject Name	Code	Type of course	T-P-Pj	Credit
Community Medicine	4302	Theory+ Practice	3-0-1	4

Course Objective:

- To learn and Understand Indian Health care system
- To know the various Health Programs and its need and implication on population
- To learn the general concepts about health, disease and physical fitness.
- To understand social security measures & the strategies to access prevalence and incidence of various conditions

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	Remember the fundamental concepts related to health, diseases, occupational health, demography, health education.	PO1, PO9, PSO1
CO2	Explain the principles and practices in public health, including epidemiology, disease prevention, occupational health, and health education.	PO1, PO5, PO7, PSO1, PSO3
CO3	Apply public health strategies and interventions to improve health outcomes, prevent diseases, and promote health and safety in various populations and workplaces.	PO7, PO10, PSO1
CO4	Analyze the impact of public health policies, demographic trends, and health education programs on community and population health (Analyzing).	PO5, PO10, PSO1
CO5	Evaluate the effectiveness of public health initiatives, occupational health programs, and family planning strategies in achieving health goals and improving health outcomes (Evaluating).	PO5, PO10, PO12, PSO3

Course Outline:

Module I

Health and Disease: Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, and the role of socio-economic and cultural environment in health and disease.

Module II

Define occupational health and prevention of occupational disease and hazards. Outline the employee's state insurance scheme and its various benefits. Social security measures for protection from occupational hazards, accidents, and the Workman's Compensation Act.

Epidemiology of communicable disease: Respiratory infections, Intestinal infections, Arthropod borne infections, Zoonoses, Surface infections, Hospital-acquired infections.

Epidemiology of chronic non-communicable diseases and conditions: Cardio vascular diseases: Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, Obesity, Blindness, Accidents and Injuries. National mental health programme, National diabetes control programme.

Module III

Demography and Family Planning: Demographic cycle, Fertility, Family planning-objectives of national family planning programme and family planning methods, A general idea of advantage and disadvantages of the methods.

Preventive Medicine in Obstetrics, Pediatrics and Geriatrics: MCH problems, Antenatal, and post-natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare programmes for women and children, preventive medicine and geriatrics.Reproductive and child health programme and National family welfare programme,

Module IV

Public health administration: An overview of the health administration set up at Central and state levels. The national health programme-highlighting the role of social, economic and cultural factors in the implementation of the national programmes. Health problems of vulnerable groups pregnant and lactating women, infants and pre-school children, occupational groups.

HEALTH PROGRAMS: Outline selected national health programmes. Outline the objectives and strategies of the National Family Welfare Programme. Health programmes in India:

i. Vector-borne disease control programme
ii. National leprosy eradication programme
iii. National tuberculosis programme,
iv. National AIDS control programme,
v. National programme for control of blindness
vi. Iodine deficiency disorders (IDD) programme
vii. Universal Immunisation programme,
viii. National cancer control programme,
ix. National sanitation and water supply programme,
x. Minimum needs programme.

Module V

HEALTH EDUCATION: List the principles of health education, aims and objectives, methods of communication, and role of health education in rehabilitation services. Models of Health education. Define the role of community leaders and health professionals in health education. Outline the role of international health agencies in the rehabilitation of the disabled

Suggested readings: -

i. Community Medicine with Recent Advances by Suryakantha Ah
ii. Community Medicine: Prep Manual for Undergraduates by Rajvir Bhalwar
iii. Text book of Preventive and Social Medicine - K. Park

Suggested Project Works:

1. Impact of Physiotherapy Camps on Community Health Outcomes
2. Role of Physiotherapy in Preventing Lifestyle Diseases in Rural Areas
3. Awareness of Ergonomic Practices Among Office Workers in Urban Communities
4. Community-Based Fall Prevention Programs for the Elderly: A Physiotherapy Approach
5. Effectiveness of Physiotherapy Interventions in Managing Chronic Back Pain in Community Settings

6. Role of Physiotherapy in Rehabilitation of Post-Stroke Patients in Community Health Centers
7. Physiotherapy Awareness and Utilization During Postpartum Recovery in Rural Communities
8. Role of Physiotherapy in Managing Pelvic Floor Disorders Among Women in Low-Resource Settings
9. Role of Physiotherapy in Promoting Physical Activity Among School Children
10. Impact of Community-Based Physiotherapy on Children with Cerebral Palsy

PHYSICAL DIAGNOSIS AND PHYSICAL FITNESS

Subject Name	Code	Type of course	T-P-Pj	Credit
Physical Diagnosis and Physical Fitness	CUTM4310	Theory+Practice	5-0-1	**6**

Course Objective:

- To Understand various physiological changes related to conditons
- To learn the different assessment procedures and its principles.
- To interpretation the results of the assessment
- To plan therapeutic interventions and justify the selection.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Know the concept of physical diagnosis of musculoskeletal and neuromuscular systems.	PO1, PO5, PSO1, PSO3
CO2	Understand ethical principles and professional standards in patient care.	PO4, PO7, PSO1
CO3	Able to apply various diagnostic techniques, such as auscultation, palpation and percussion.	PO2, PO7, PSO3
CO4	Summarize occupation related physical fitness.	PO7, PO10, PSO1
CO5	Able to interpret vital signs, such as blood pressure, heart rate, respiratory rate, and temperature.	PO5, PO7, PO12, PSO 3

Course Outline

Module 1

Musculoskeletal System Examination: Inspection and palpation of bones, joints, and muscles, Range of motion (ROM) assessment for major joints (shoulder, knee, hip, spine, etc.), Special tests for diagnosing musculoskeletal disorders (e.g., ligamentous, tendinous, and meniscal injuries).Neurological Examination: Motor strength and tone assessment, Reflex testing (deep tendon reflexes), Sensory examination (light touch, pinprick, vibration), Balance and coordination assessment. Cardiopulmonary Examination: Heart and lung auscultation, Examination of peripheral circulation (pulses, capillary refill), cardiovascular endurance tests (step tests, 6-minute walk test).

Module II

Diagnostic Tools and Techniques: Orthopaedic Diagnostic Tests- Gait analysis, Posture evaluation, Manual muscle testing (MMT), Functional movement screening (FMS). Cardiopulmonary Fitness Testing- Spirometry for pulmonary function assessment, Cardiopulmonary exercise testing (CPET), Submaximal and maximal exercise tests (e.g., Bruce Protocol, Cooper Test).Diagnostic Imaging in Physical Diagnosis- Basics of interpreting X-rays, MRIs, CT scans, and ultrasound for musculoskeletal conditions, Indications for imaging referral. Special Considerations in Physical Diagnosis- Diagnosis in special populations (paediatrics, geriatrics, athletes), Considerations for comorbidities (e.g., diabetes, obesity, hypertension).

Module III

A Comprehensive Health Fitness Evaluation: Measurement of Resting Heart Rate and Blood Pressure. Body Composition(Surface Anthropometry) Pre requests, recommended equipment's, , method, performa, Densitometry, Neuromotar fitness (balance, agility, coordination)

Cardiorespiratory Fitness: The Concept of Maximal Oxygen Uptake, Maximal versus Submaximal Exercise Testing.Cardiorespiratory Test Sequence: Static Lung Function and Dynamic Lung Function with conducting procedure, Assessment and Interpretation of respiratory muscle function test. Tests termination Criteria, Modes of Testing and Interpretation of Results- Heart Rate Response, Blood Pressure Response, Rate-Pressure Product, Electrocardiogram, Symptoms, Exercise Capacity, Cardiopulmonary Exercise Testing, Maximal versus Peak Cardiorespiratory Stress.

Module IV

Muscular Fitness: Rationale, Principles of testing. Measurement of Critical Power: Aerobic Capacity and Anaerobic Capacity. Muscular Strength- Criteria for Selection of a Strength testing method. Isometric Measurement of Strength, Free-Weight Testing, Isokinetic Assessment of Strength, Variable-Resistance Measurement of Strength. Muscular Endurance-Lactate Testing to Predict and evaluate endurance performance. Flexibility- Static and Dynamic flexibility, Equipment, procedure, specific measures with upper and lower limb

Module V

Exercise Prescription Guidelines- FITT principle (Frequency, Intensity, Time, Type) for different fitness goals, Exercise prescription for aerobic fitness, strength, flexibility, and functional fitness. Sports and Athletic Performance Enhancement- Sport-specific conditioning programs, Plyometric and agility training, Injury prevention and recovery strategies for athletes. Rehabilitation and Fitness Integration- Designing rehab-to-fitness transition programs, Monitoring progress and adjusting fitness programs for patients recovering from injuries.

Practice:

1. Hands-on practice of musculoskeletal and cardiopulmonary diagnostic tests.
2. Laboratory sessions for fitness testing and exercise prescription.
3. Case studies for designing physical diagnosis and fitness programs for populations.

Suggested readings: -

1. "Clinical Examination: A Systematic Guide to Physical Diagnosis", Nicholas J. Talley and Simon O'Connor, 9th ed.
2. ACSM Guidelines for Exercise Testing and Prescription – ACSM- Williams and Wilkins
3. Exercise Physiology: Theory And Application To Fitness And Performance, Scott K. Powers And Edward T. Howley 10th Ed.
4. Sport And Exercise Physiology Testing Guidel INES- The British Association Of Sport And Exercise Sciences Guide Volume II: Exercise And Clinical Testing By Edward M. Winter,Andrew M. Jones, R.C. Richard

Suggested Project Works:

1. Evaluation of Postural Imbalances in Patients with Chronic Low Back Pain
2. Comparison of Manual Muscle Testing and Isokinetic Testing for Strength Assessment
3. The Impact of Range of Motion Measurement Techniques in Diagnosing Joint Dysfunction
4. Assessment of Gait Abnormalities in Stroke Patients: A Clinical Study
5. Reliability of Visual Observation Versus Instrumented Assessment in Diagnosing Scoliosis
6. The Role of Neurological Examination in Identifying Peripheral Nerve Injuries
7. Evaluation of Pulmonary Function Using Spirometry in COPD Patients

8. A Comparative Study of Palpation Techniques Versus Diagnostic Imaging in Identifying Muscle Injuries
9. Impact of Aerobic Exercise on Cardiovascular Health in Sedentary Individuals
10. The Relationship Between Flexibility Training and Injury Prevention in Sports
11. Assessing the Benefits of High-Intensity Interval Training (HIIT) on Muscular Endurance
12. Effects of Resistance Training on Bone Density in Elderly Populations
13. The Influence of Pilates on Balance and Posture in Older Adults
14. The Impact of Strength Training on Muscle Mass and Function in Chronic Kidney Disease Patients
15. Assessment of Physical Fitness and Its Impact on Recovery in Post-Surgical Physiotherapy

PRINCIPLE OF REHABILITATION

Subject Name	Code	Type of course	T-P-Pj	Credit
Principle of Rehabilitation	CUTM4311	Theory+ Project	4-0-1	5

Course Objective:

- To understand the principles and goals of rehabilitation, including functional recovery and reintegration into daily life.
- To Analyze various physical, psychological, and social factors affecting the rehabilitation process.
- To Demonstrate knowledge of rehabilitation techniques and modalities for different musculoskeletal, neurological, and cardiopulmonary conditions.
- To Develop individualized rehabilitation plans based on patient assessment, diagnosis, and treatment goals.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Learn the concept of different team members and their role in rehabilitation	PO3, PO7, PSO1
CO2	Identify the residual potentials in patients with partial or total disability	PO5, PO7, PSO3
CO3	Apply the principle of rehabilitation for patients having surgical aspects of disabling conditions.	PO7, PO9, PSO3
CO4	Design rehabilitation techniques for a disabled patient.	PO5, PO7, PO12, PSO3
CO5	Help in construction and prescription of Orthotics and Prosthetics manufacturing	PO2, PO7, PSO2, PSO3

Course Outline:

Module I

Conceptual framework of Rehabilitation, roles of Rehabilitation, definitions and various models of Rehabilitation. Epidemiology of disability with emphasis on locomotor disability. Its implications-individual, family, social, economic and the state. Community based

Rehabilitation and out each program to Rehabilitate persons with disabilities living in rural areas. Statutory provisions, Scheme of assistance to persons with disability. Role of N.G.Os in Rehabilitation of the persons with disabilities. Basic principles of administration and finance including personal management and budget preparation and procurement etc.

Module II

Principles of orthotics- types, indications, contra indications, assessment, uses and fitting-region wise, check out procedure of orthosis. Fabrication of simple splints and self-help devices for upper and lower extremity- indications and application. Principles of Prosthetics-types, indications, contra-indications, assessment, uses and fating and lower extremities. check out procedure of prosthesis

Module III

Architectural barriers: Describe architectural barriers and possible modifications with reference to Rheumatoid arthritis, cerebrovascular accident, spinal cord injury and other disabling conditions. Definition, scope and importance of Activities of Daily Living (ADLs) The teaching and training of (a) wheel chair activities (b) bed activities (c) transfer activities (d) Locomotor activities (e) selfcare activities, such as toilet, eating, dressing.

Module IV

Principles and mechanisms of communication including speech and hearing. Common disorders of speech and hearing- ectogenesis, clinical features, assessment and principles of management. Communication for visually impaired- Eye disorders ,visual aids and other managements. Principles in the management of vocational problems, including evaluation and vocational goals for people with disabilities.

Module V

Identification, assessment and classification of mentally subnormal. Rehabilitation of the mentally subnormal, including vocational training and home education programme. Behavioural and learning problem in disabled

Suggested readings: -

1. Physical rehabilitation- assessment & treatment- Sullivan & Schmitz-F.A Davis

2. Occupational Therapy and physical disfunction: Principles, skills & practices- tumor, Doster & Johson- Churchill Livingstone
3. Hand Splitting- Wilson-W.B Saunders
4. Text Book of Rehabilitation – Sundar

Suggested Project Works:

1. Exploring the Principles of Rehabilitation in Physiotherapy: Approaches and Techniques
2. Effectiveness of Physiotherapy Rehabilitation in Post-Surgical Recovery
3. Principles of Rehabilitation in Neurological Physiotherapy: A Review of Techniques and Outcomes
4. Rehabilitation of Musculoskeletal Injuries: Principles and Practices
5. Assessing the Impact of Early Rehabilitation in Post-Fracture Physiotherapy
6. Rehabilitation Strategies for Patients with Spinal Cord Injury: A Physiotherapy Perspective
7. Integrating Physiotherapy into Multidisciplinary Rehabilitation Programs for Chronic Pain Management
8. Principles of Gait Rehabilitation in Physiotherapy: Improving Mobility in Older Adults
9. The Role of Physiotherapy in the Rehabilitation of Cardiopulmonary Patients
10. Psychosocial Aspects of Rehabilitation in Physiotherapy: Enhancing Patient Motivation and Compliance
11. The Impact of Aquatic Therapy on Rehabilitation for Orthopedic Conditions
12. Utilizing Neuromuscular Electrical Stimulation in Rehabilitation of Muscle Atrophy
13. The Role of Physiotherapy in Managing Chronic Conditions like Arthritis
14. Investigating the Benefits of Manual Therapy Techniques in Rehabilitation
15. Development of Personalized Rehabilitation Plans in Physiotherapy: Evidence and Application

MEDICINE I (GENERAL MEDICINE)

Subject Name	Code	Type of course	T-P-Pj	Credit
Medicine I (General Medicine)	CUTM2957	Theory+ Project	3-0-1	4

Course Objective:

- To know the underlying causes, risk factors, and pathophysiological mechanisms of common medical conditions affecting various organ systems.
- To Interpret Clinical Manifestations and Diagnostic Findings of infectious and metabolic conditions.
- To Formulate Patient-Centric Management Plans
- To Promote Preventive and Holistic Healthcare

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	List out different types of health conditions and its effects	PO1, PO5, PSO1
CO2	Understand about the pathogenesis and pathological impact of infectious agents and metabolic conditions on the human body	PO1, PO5, PSO1
CO3	Apply the principles of medication for the management of the conditions	PO5, PO7, PSO3
CO4	Assess the conditions using the serological, radiological tests	PO5, PO7, PSO2, PSO3
CO5	Construct a treatment plan	PO4, PO7, PO12, PSO3

Course Outline

Module I

1. Principles of Infections, modes of transfer of communicable diseases & general preventive measures.
2. Fever/ Pyrexia and different types of fever (Condition with localizing symptoms, Pyrexia of Unknown Origin, Drug Users, Immunocompromised Host, Neutropenic, Post Transplantation, Travel from Tropics) , clinical examination, management and prognosis of each type.

3. Viral Diseases: Epidemiology, Clinical presentation, investigation, management of viral conditions Exanthem- Measels, Rubella, Human Herpes Virus 6 and 7, Varicella, Herpes zoster.Viral Diseases without Exanthem: Mumps, Influenza, Dengue, Yellow fever, Epsten Barr, Cytomegalovirus. Chikungunya virus, Herpes simplex 1 and 2

Module II

Protozoal Diseases: Epidemiology, Clinical presentation, investigation, management of Systemic Protozoal conditions such as Malaria, Babesiosis, sleeping Sickness, Chagas' disease, Toxoplasmosis, leishmaniasis (kala-azar). GIT infections: Amoebiasis, Cryptosporidiosis

Helminths Disease: Epidemiology, Clinical presentation, investigation, management of Intestinal Human nematodes - Hookworm, Roudworm, Threadworm, Whipworm, Strongyloidiasis. Tissue dwelling human nematodes – Lymphatic filariasis,Loiasis, River blindness, Guinea worm. Zoonotic Nematodes and Tape worms.

Module III

Fungal Infections: Epidemiology, Clinical presentation, investigation, management of Candidiasis, Chromoblastomycosis, Mycetoma, Sporotrichosis. Systemic fungals infections like Syndromes of systemic candidiasis, Cryptococcosis, Mucormycosis, Histoplasmosis, Coccidioidmycosis.

Bacterial Diseases: Epidemiology, Clinical presentation, investigation, management of bacterial conditions: Staphylococcal, Streptococcal, Syphillis, YAWS.

Systemic bacterial conditions; Brucellosis, Lyme Disease, Louse-borne and Tick-borne relapsing fever. Leptospirosis, Plague, Typhoid and Paratyphoid.

GIT Infections- Staphylococcal food poisoning, Bacillus food Poisoning, Clostridium perfringers food poisoning, Campylobacter jejuni infection, Salmonella spp., Escherichia coli infection, Bacillary dysentery (shigellosis) and Clostridium difficile infection

Respiratory Infection: Diphtheria, Pneumococcal Infection, Anthrax, Tuberculosis. Leprosy, Rheumatic fever, Tetanus, Typhoid fever, Rickettsial fevers, Q fever, Trachoma

Module IV

Sexual Transmitted Diseases: Suspected Patient approach and Evaluation and presenting complaints due to STD in men and women. Epidemiology, Incidence, Clinical presentations, investigations and management of Bacterial – Syphilis, Gonorrhea, Chlamydia. Viral –

Herpes Simplex, Human Papilloma virus, Hepatitis, Metabolic and Deficiency Diseases: Diabetes, Anemia, Vitamin & Nutritional, Deficiency diseases, diseases of the endocrine glands.

Diseases of Kidney and Urinary System Epidemiology, Incidence, Clinical presentations, investigations and management of Urinary Tract Infection, Loin Pain, Abnormal Micturition, Erectile Dysfunction, Haematuria, Proteinuria, Urinary calculi, Nephritis, Oedema, Hypertension, Acute and Chronic Renal Failure. Importance of Renal Replacement therapy.

Diseases of Liver and Biliary Tract: Applied aspects of Liver anatomy and physiology. Presenting symptom s with liver abnormalities: Jaundice, Acute live failure, Hepatomegaly, Ascites, Hepatic Encephalopathy, Variceal bleeding, Cirrhosis, Portal Hypertension,. Infectious conditions like Viral hepatitis (Hep A,B,C,D) HIV. Non alcoholic fatty liver, Wilsons Disease, Gilbert syndrome. Gall bladder conditions such as Acute and Chronic Cholecystitis, Choledocholithiasis.

Module V

Diseases of Alimentary Tract and associates: Most common presentations Dysphagia, Dyspepsia, Vomiting, GI bleeding, Diarrhea, Malabsorption, Weight Loss, Constipation, Abdominal Pain. Epidemiology, Incidence, Clinical presentations, investigations and management of Gastritis, Peptic Ulcer, Lactose Intolerance, Food allergy, Acute and Chronic Pancreatitis, Anemia.

Diseases of Endocrine Gland: Etiology and Pathogenesis, Clinical presentation, Investigation and Management of Diabetes Mellitus, Diabetes Ketoacidosis, Hypoglycemia, Diabetes in Surgical and Pregnant patients, Diabetic retinopathy, Diabetic Nephropathy, Diabetic Neuropathy, Diabetic Foot,

Suggested readings: -

1. Davidson’s Principles and Practices of Medicine – Edward – Churchill Livingstone
2. Hutchinson’s Clinical Methods – Swash- Bailliere Tindall
3. A short Textbook of Medicine- Krishna Rao- Jaypee Brothers
4. R. Alagappan Manual of Practical Medicine
5. Harrison’s Principles of Internal Medicine

Suggested Project Works:

1. The Role of Lifestyle Modifications in Preventing Type 2 Diabetes

2. An Analysis of Antibiotic Resistance in Common Bacterial Infections
3. Evaluating the Outcomes of Combined Surgical and Medical Treatment in Diabetes Mellitus
4. Comparative Effectiveness of Different Statins in Cholesterol Management
5. Prevalence and Impact of Depression in Patients with Chronic Illnesses
6. Investigating the Link Between Vitamin D Deficiency and Autoimmune Disorders
7. Assessing the Efficacy of Current Vaccines in Preventing Influenza
8. A Survey on the Awareness and Use of Preventive Healthcare Services
9. The Effectiveness of Antiviral Treatments in Managing Chronic Hepatitis C
10. Exploring the Impact of Aging on Immune System Function
11. The Effectiveness of Pharmacogenetics in Personalizing Treatment Plans

MEDICINE II (CARDIOLOGY AND WORK PHYSIOLOGY)

Subject Name	Code	Type of course	T-P-Pj	Credit
Medicine II (Cardiology and Work Physiology)	CUTM1987	Theory+ Practice	3-1-0	4

Course Objective:

- Study Chest X-ray, Blood gas analysis, P.F.T. findings & Hematological studies, for Cardiovascular, Respiratory, and Neurological & Rheumatologically conditions.
- Be able to acquire the skills of Basic Life Support.
- Acquire knowledge of various drugs used for each medical condition to understand its effects and its use during therapy.
- To Interpret Clinical Manifestations and Diagnostic Findings of various cardiopulmonary conditions and Formulate Patient-Centric Management Plans

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	List out different types of Cardio-Pulmonary health conditions and its effects	PO1, PO5, PSO1
CO2	Understand about the pathogenesis and pathological impact of different pathology on Cardiovascular and Pulmonary system	PO1, PO5, PSO1
CO3	Apply the principles of medication for the management of the Cardio-Pulmonary conditions	PO5, PO7, PSO3
CO4	Assess the conditions using the serological, immunological, radiological, organ specific tests	PO5, PO7, PSO2, PSO3
CO5	Construct a treatment plan for the management of the Cardio-Pulmonary conditions	PO4, PO7, PO12, PSO3

Course Outline:

Module I

Clinical Examination of Cardiovascular system: Examination procedure, Cardiovascular Investigation – Auscultation, Electrocardiography, Cardiac Biomarkers, Chest X ray, Echo cardiography, CT, MRI, Cardiac Catheterisation. Presenting problems in Cardiac Conditions: Chest Pain, Breathlessness, Acute Left Heart Failure, Arrhythmia, Angina, Hypertension, Syncope, Palpitation, Cardiac Arrest, Abnormal Heart Sounds and Murmurs. Etiopathology, clinical presentation, investigations and management of Hypertension, Heart Failure, Atherosclerosis, Coronary Heart Disease, Stable Angina, Rheumatic Fever. Disorders of Heart Rate: Clinical presentation, investigation and management of Sinus Rhythms, Atrial and Ventricular tachy arrhythmias, AV bundle block.

Module II

Disorders of Heart Valves: Etiopathology, clinical presentation, investigations and management of Rheumatic Heart Disease, Mitral Valve Disease, Aortic Valve Disease, Tricuspid Valve Disease, Pulmonary Valve Disease, Infective Endocarditis. Vascular Diseases: Etiopathology, clinical presentation, investigations and management of peripheral arterial disease, Raynauds phenomenon, Limb ischaemia. Myocardial Diseases: Etiopathology, clinical presentation, investigations and management of Myocarditis, Cardiac myopathy, Pericarditis, Pericardial effusion

Module III

Clinical Examination of Pulmonary system: Examination procedure, Pulmonary Investigation – Auscultation, Chest X ray, CT, Ultrasound, PET, Ventilation Perfusion Imaging, Endoscopy examination, MRI, Pulmonary Function Test. Presenting problems in Pulmonary Conditions: Cough, Breathlessness, Chest Pain, Hemoptysis, Incidental Pulmonary Nodules on Imaging, Respiratory Failure. Obstructive Pulmonary Disorders: Etiopathology, clinical presentation, investigations and management of Asthma, Bronchiectasis, COPD, Cystic Fibrosis, Emphysema.

Module IV

Infectious Conditions: Etiopathology, clinical presentation, investigations and management of Tuberculosis, Pneumonia, Aspergillosis, Hypersensitive Pneumonitis, Rhinitis, Laryngitis. Restrictive Pulmonary Disorders: Etiopathology, clinical presentation, investigations and management of Pleurisy, Pleural Effusion, Empyema, Thorax Fracture (Haemothorax, Pneumothorax, Haemo-pneumothorax, Flail Chest), Thoracic Kyphoscoliosis, Pectus

Excavatum, Pectus Carinatum. Acute Respiratory Distress syndrome, Sarcoidosis, Pulmonary Fibrosis

Module V

Etiopathology, clinical presentation, investigations and management of Deep Vein Thrombosis, Cor-pulmonale. Physiological Effects of Exercises on the Cardiovascular System, Pulmonary System with respective to Young, Adult, Geriatric Age groups. Physiological Effects of High Altitudes and Low altitudes on the Cardiovascular System, Pulmonary System with respective to Young, Adult, Geriatric Age groups.

Suggested readings: -

1. Davidson's Principles and Practices of Medicine – Edward – Churchill Livingstone
2. Hutchinson's Clinical Methods – Swash- Bailliere Tindall
3. A short Textbook of Medicine- Krishna Rao- Jaypee Brothers
4. R. Alagappan Manual of Practical Medicine
5. Harrison's Principles of Internal Medicine.

Suggested Project Works:

1. The Impact of Lifestyle Modifications on the Management of Coronary Artery Disease
2. Efficacy of Angiotensin-Converting Enzyme Inhibitors in Heart Failure Patients
3. Evaluation of Non-Invasive Diagnostic Methods for Early Detection of Atherosclerosis
4. Role of Biomarkers in Predicting Acute Myocardial Infarction
5. Comparative Study of Invasive vs. Non-Invasive Treatment Approaches in Chronic Heart Failure
6. Effects of Physical Exercise on Cardiovascular Health in Diabetic Patients
7. Study of Risk Factors and Clinical Outcomes in Patients with Myocardial Infarction
8. Evaluation of Spirometric Parameters in Asthmatic Patients
9. The Role of Smoking Cessation Programs in Preventing Chronic Obstructive Pulmonary Disease (COPD)
10. Prevalence of Pulmonary Tuberculosis in Rural vs. Urban Populations
11. Assessment of the Efficacy of Inhaled Corticosteroids in Managing Chronic Asthma
12. Exploring the Relationship Between Obesity and Obstructive Sleep Apnea
13. Comparative Study of Nebulized vs. Oral Medications in Asthma Control
14. Assessment of Lung Function and Quality of Life in Post-Tuberculosis Survivors

MEDICINE III (NEUROLOGY)

Subject Name	Code	Type of course	T-P-Pj	Credit
Medicine III (Neurology)	CUTM1988	Theory+Practice+Project	3-1-2	**6**

Course Objective:

- Be able to describe Aetiology, Pathophysiology, signs & Symptoms & Management ofthe various neurological conditions.
- Acquire skill of history taking and clinical examination of Neurological conditions as a part of clinical teaching.
- Acquire knowledge of various drugs used for each medical condition to understand its effects and its use during therapy.
- To Interpret Clinical Manifestations and Diagnostic Findings of various neurological conditions and Formulating Patient-Centric Management Plans

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Recall basic neuroanatomy and neurophysiology.	PO1, PO5, PSO1
CO2	Understand the radiological and lab investigations of selected neurological disorders	PO5, PO9, PSO1
CO3	Apply the knowledge of the clinical examination for more complex disorders of the neurological system, integrating advanced physical examination procedures.	PO5, PO7, PSO3
CO4	Select measurement and testing procedures commonly used in assessing neurological dysfunction	PO5, PO9, PSO2, PSO3
CO5	Create a conservative and surgical management of selected neurological disorders.	PO4, PO7, PO12, PSO3

Course Outline:

Module I

Neuroanatomy: Review the basic anatomy of the brain and spinal cord including: Blood supply of the brain and spinal cord, anatomy of the visual pathway, connections of the

cerebellum and extrapyramidal system, relationship of the spinal nerves to the spinal cord segments, long tracts of the spinal cords, the brachial and lumbar plexus and cranial nerves. Neurophysiology: Review, in brief, the Neurophysiological basis of tone and disorders of tone and posture, bladder control, muscle contraction movement and pain, assessment and evaluative procedures for the neurological patient. Review of the principles of the management of a neurological patient.

Module II

Briefly outline the etiology, clinical features, and management of the following Neurological disorders Cerebrovascular accidents – General, classification, thrombotic, embolic, hemorrhagic & inflammatory, strokes, gross localization and sequelae. Trauma-localization, first aid, and management of sequelae of head injury

Module III

1. Spinal cord- Craniovertebral junction anomalies, Syringomyelia, spinal Arachnoiditis
2. Spinal Cord Injury: Types, Classification and Medical Management.
3. Tumors: Clinical Manifestation and presentation of Cerebral and Spinal tumors.
4. Demyelinating diseases (central and peripheral)- Guillain- Bane Syndrome. Acute disseminated encephalomyelitis. Transverse myelitis and Multiple sclerosis.
5. Infections- Pyogenic Meningitis sequelae, Tuberculous infection of central nervous system and Poliomyelitis.

Module IV

1. Epilepsy: Definition, Classification and management
2. Myasthenia Gravis: Definition, course and management
3. Motor neuron disease – Definition, classification and medical management
4. Cranial Nerves - Types of disorders and its clinical manifestation
5. Diseases of the muscle – Classification, signs, symptoms, progression and management of Myopathy, Muscular Dystrophy
6. Peripheral nerve disorders – Peripheral nerve injuries, Equipment neuropathies and Peripheral neuropathies

Module V:

Movement disorders: Definition, etiology, risk factors, pathophysiology, classification, clinical signs &symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson's disease, Dystonia, Chorea, Ballism, Athedosis, Tics, Myoclonus and Wilson's disease.

Suggested readings: -

1. Bran's Disease of the Nervous System- Nalton- ELBS
2. Guide to clinical Neurology – Mohn & Gaectier- Churchill Livingstone
3. Principles of Neurology- Victor- McGraw Hill International edition.
4. Davidson's Principles and practices of medicine–Edware-Churchill Livingstone.

Suggestion Project Works:

1. The Role of Neuroplasticity in Stroke Rehabilitation
2. Exploring the Effects of Neuroinflammation in Neurodegenerative Diseases
3. Comparative Study of Pharmacological vs. Non-Pharmacological Interventions in Parkinson's Disease
4. Cognitive Impairment in Multiple Sclerosis: Mechanisms and Management
5. The Impact of Early Intervention in Alzheimer's Disease: A Neurological Perspective
6. Neurophysiological Mechanisms of Chronic Pain in Neurological Disorders
7. Neuroimaging Techniques in the Diagnosis of Brain Tumors
8. Neurodegeneration and the Blood-Brain Barrier: Challenges in Treatment
9. Motor Control Impairments in Huntington's Disease: Clinical Insights
10. The Role of Mitochondrial Dysfunction in Neurological Diseases
11. Exploring the Mechanisms of Brain Plasticity in Traumatic Brain Injury
12. The Role of Neuromodulation in Treatment of Spinal Cord Injury
13. The Relationship Between Neurological Disorders and Mental Health
14. Assessing the Efficacy of Deep Brain Stimulation in Treatment-Resistant Depression
15. Genetic Markers and Their Role in Diagnosing Neurological Disorders

MEDICINE IV (PSYCHIATRY)

Subject Name	Code	Type of course	T-P-Pj	Credit
Medicine IV (Psychiatry)	CUTM2963	Theory+ Project	3-0-1	**4**

Course Objective:

- To comprehend the classification, etiology, clinical features, and management of common psychiatric disorders relevant to physiotherapy practice.
- To identify the psychological and emotional aspects of illness and injury, and integrate psychiatric principles in patient-centered rehabilitation approaches.
- To cultivate effective communication skills for interacting with patients with psychiatric conditions, promoting trust, empathy, and therapeutic alliance.
- To apply a biopsychosocial model in addressing the mental health needs of patients, ensuring comprehensive care alongside physical rehabilitation.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	List out different types of Psychiatric conditions	PO1, PO7, PSO1
CO2	Understand about the Clinical pathophysiology of dysfunctioning of Brain related to Psychiatric conditions	PO5, PO7, PSO1
CO3	Apply the principles of medical and different supportive management to Psychiatric conditions	PO5, PO7, PSO3
CO4	Assess the conditions using the different investigation methods and examinations of different Psychiatric conditions.	PO5, PO7, PSO2, PSO3
CO5	Develop holistic approach in their dealing with patients during admission, treatment, rehabilitation and discharge of Psychiatric clients.	PO4, PO7, PO12, PSO3

Course Outline:

Module I

1. Brief note on the Neuro-Anatomy, Neuro-Physiology of Diencephalon, Sub cortical structures, Cerebral Cortex, Limbic system and Higher cognitive functions, its role and clinical impacts related to Psychiatry and Psychiatric Assessment procedure.
2. Common Classification of Psychiatric disorders with the epidemiological traits, etiology and differential diagnosis, investigation methods.
3. Presenting problems in Psychiatric Conditions: Definition, Classification, Clinical Presentation differential diagnosis of Anxiety, Depressed Mood, Elated Mood, Delusion, Hallucination, Disturbed behavior, Aggressive Behavior, Confusion, Self – Harm, Substance Misuse, Psychological factors effecting medical conditions and Somatic conditions

Module II

1. Psychology and Psychiatric Treatments: Define, compare and contrast between Psychology and Psychiatry treatments. Brief Note on different types of Psychiatric Treatments – Biological Treatments, Psychological Treatment, Social Interventions, electro convulsion therapy, Drug therapy..
2. Cognitive Behavioural Therapy: Brief Background, Theoretical Principal of CBT, Assessing and Formulating patients for CBT, Practical Constructs of CBT with some examples such as CBT in Anxiety, Fear, Anger, Sadness, Emotional dysregulation, Guilt, Shame and Happiness and note on CBT applications in clinical side.

Module III

1. Stress Related Disorders: Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Acute Stress Reaction, Adjustment disorder, Post-Traumatic Stress disorder.
2. Anxiety Related Disorders: Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Phobic Anxiety Disorder, Panic Disorder, Generalised Anxiety Disorder, Obsessive Compulsive Disorder.
3. Mood Related Disorders: Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Depression, Bipolar Disorder, Depression in association with Medical Illness.
4. Brief note on Pathophysiology, Clinical Presentation, Investigation and Management of Neuropsychiatry aspect of Brain tumor, Cerebrovascular disorder, Epilepsy.

Module IV

1. Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Schizophrenia.

2. Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Autism Spectral Disorder.
3. Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Dementia, Alzheimer's.

Module V

Pathophysiology, Clinical Presentation, Investigation and Management with prognosis assessment of Alcohol and Substance Abuse Disorder. Psychiatric Problems in the post war or defense persons. Psychiatry and Law: Code of Ethics for Psychiatrist, NARCOTIC DRUGS AND PSYCHOTROPIC SUBSTANCES ACT (NDPSA), MENTAL HEALTH ACT, INDIAN LUNACY ACT, Criminal Responsibility, Civil Responsibility

Suggested readings: -

1. Davidson's Principles and Practices of Medicine – Edward – Churchill Livingstone
2. Hutchinson's Clinical Methods – Swash- Bailliere Tindall
3. A short textbook of Psychiatry – Ahuja Niraj – Jaypee Brothers
4. Harrison's Neurology in Clinical Medicine.

Suggested Project Works:

1. The Role of Physical Therapy in Managing Anxiety and Depression Symptoms
2. Effectiveness of Exercise Therapy on Sleep Disorders in Psychiatric Patients
3. The Impact of Physical Activity on Cognitive Function in Schizophrenia
4. Rehabilitation Approaches for Patients with Post-Traumatic Stress Disorder (PTSD)
5. Assessment and Treatment of Motor Symptoms in Parkinson's Disease and Schizophrenia
6. The Use of Balance Training in Managing Depression and Anxiety Disorders
7. Physical Therapy Interventions for Enhancing Quality of Life in Bipolar Disorder
8. Exploring the Effectiveness of Aquatic Therapy in Reducing Symptoms of Depression
9. The Role of Neurorehabilitation in Patients with Major Depressive Disorder
10. Effect of Physical Activity on Social Functioning and Mood Regulation in Psychiatric Disorders
11. The Benefits of Breathing Exercises and Relaxation Techniques for Reducing Anxiety
12. Rehabilitation Strategies for Managing Physical Symptoms of Chronic Mental Health Conditions
13. The Relationship Between Physical Exercise and Symptom Reduction in PTSD
14. A Study on the Effects of Aerobic Exercises on Patients with Generalized Anxiety Disorder

GENERAL SURGERY

Subject Name	Code	Type of course	T-P-Pj	Credit
General Surgery	CUTM4299	Theory+ Project	3-0-1	4

Course Objective:

- Recognise and explore the basic principles of surgical management.
- Describe pre-operative evaluation, surgical indications in various surgical approaches, management and post-operative care in above mentioned areas with possible complications.
- knowledge of pregnancy stages, labor, and complications, as well as surgical procedures such as C-sections and the management of obstetric emergencies, including foetal monitoring and shock in obstetrics.
- Classify and assess various types of wounds, understand the principles of tissue repair.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Understand the diseases that therapists would encounter in their practice.	PO1, PO5, PSO1
CO2	Demonstrate skill in providing the treatment for the healing in post operation	PO2, PO5, PO7, PSO3
CO3	Know the conditions of general surgery, indications, contraindications and precautions.	PO5, PO7, PSO1, PSO2
CO4	Outline common clinical features, pathogenesis in Obstetrics & Gynaecology, ENT and Ophthalmological conditions	PO1, PO3, PO5, PSO2
CO5	Prepare a comprehensive treatment plan	PO4, PO7, PO12, PSO3

Course Outline:

Module I

Introduction to principles of surgery and its procedure. Principle of pre and postoperative management of surgical patients. Shock- definition, types, clinical feature, pathology & management. Haemorrhage – common sites, complication, clinical feature & management.
Blood Transfusion- Blood group matching, indication & complication. Anesthesia – Principles of Anesthesia, types of procedure.

Module II

Wounds, Tissue repair, classification- Acute Wounds, Chronic wounds, Scars & their management. Wound infections, Psychology and manifestation, Types of infections & their management

Post-operative examination: PLASTIC SURGERY: Burns: Causes, Classification, Clinical Presentation, Assessment, Complications, and their management. Plastic Surgery: Techniques of plastic surgery, Techniques of Skin Grafting its indication and brief note on procedure Assessment and management of traumatic and leprosy hand.

Module III

Complications of Surgery, Abdominal Surgery – Types of Incisions & common surgical procedures. Indication for the surgery of Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias. Acute appendicitis and what are the Complications and management of following the post operations. Indication for the surgery of Appendectomy Mastectomy, Nephrectomy, Prostectomy, diabetic foot and what are the Complications and management of following the post operations.

Module IV

Obstetrics & Gynecology:

- Define Pregnancy, Trimester with Anatomical and Physiological changes during pregnancy trimesters.
- Labour: Stages of Labour, Mechanism, Normal labour, normal puerperium and Complications and management of labour
- Obstetrics: Definition of Obstetrics, Surgical Procedures – C Section, Grand multipara, bad obstetric history, obesity.
- Assessment of the foetus and new-born, foetal distress, intrapartum foetal monitoring, shock in obstetrics, Pelvic inflammatory disease, Abortions, and ectopic pregnancy, Salpingitis, parametritis, retro-uterus, prolapse of uterus and urinary incontinence.

Module V

Thoracic surgeries –Thoracotomy : Definition, Types of Incisions with emphasis to the site of insision, muscles cut and complications. Lung surgeries: Pnumonectomy, Lobectomy, segmentectomy – Indications, Physiological changes and Complications ; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung.

Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extra cardiac Operations, Closed Heart surgery, Open Heart surgery. Transplant Surgery – Heart, Lung and Kidney – Indications Physiological changes and Complications. Thoracic Trauma situations – Airway obstruction, Pnuemothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions.

Suggested Readings:

1. William N., O'Connell P., McCaskie A. 2018, Bailey & Love-Short Practice of Surgery. 27th Ed. CRC Press.
2. Ak Nan. 2017, Under Graduate Surgery 3rd Ed. CBS Publishers.
3. R.L Gupta. 2003, Text Book of Surgery. 2nd Ed. Jaypee Brothers Medical Publishers.
4. Kochar. 2013. Principle & Practice of Trauma Cases. 2nd Ed. Jaypee Brothers Medical Publishers
5. S.Das. 2017, A Manual on Clinical Surgery. 9th Ed. SD publication, Kolkata.
6. L.Seymoul ,Romney Mary Jane Gray and J.A Merrill 2019, Gynaecology and Obstetrics in Health care of a woman.
7. Padubidri. 2018, Howkins and Bourne Shaw's TextBook Gynaecology. 17th Ed. Elsevier.
8. M.Narendra . 2014. Jeffcoat's Principles of Gynaecology. 8th Ed. Jaypee Brothers

Suggested Project Works:

1. Evaluation of Postoperative Complications in Abdominal Surgery: A Retrospective Study
2. Impact of Early Mobilization on Recovery After Major Abdominal Surgery
3. The Role of Antibiotic Prophylaxis in Preventing Surgical Site Infections in General Surgery
4. The Impact of Obesity on Surgical Outcomes: A Study of Bariatric Surgery Patients
5. Postoperative Pain Management Techniques in General Surgery: A Review of Current Practices

6. A Study on the Impact of Preoperative Screening on Surgical Outcomes in Elderly Patients
7. Analysis of Wound Healing and Infection in Diabetic Patients Post-Surgery
8. The Effects of Smoking on Surgical Outcomes: A Cohort Study
9. Surgical Treatment of Obstructive Jaundice: A Review of Techniques and Outcomes
10. The Role of Nutrition in Preoperative and Postoperative Surgical Care

PAEDIATRICS AND GERIATRICS

Subject Name	Code	Type of course	T-P-Pj	Credit
Paediatrics and Geriatrics	CUTM2959	Theory	2+0+1	3

Course Objective:

- To study about foetal development & child birth.
- To understand the assessment process of paediatric and geriatric patients.
- To know about clinical manifestation congenital, nutritional, cognitive and changes of aging.
- To create a comprehensive treatment for the paediatric and geriatric conditions.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Define the Normal Developmental process and aging with its physiological effects	PO1, PO5, PSO1
CO2	Explain about the Diet & Nutritional requirements of the younger and elderly ones.	PO1, PO7, PSO2
CO3	Illustrate the impact of aging on different system of the human body	PO1, PO5, PO7, PSO3
CO4	Assess the nutritional needs of young and elderly patient with respective to pathophysiology	PO5, PO7, PSO1
CO5	Design and develop treatment plan for pediatric and geriatric patients.	PO4, PO7, PO12, PSO3

Course Outline:

Module I

Review normal fetal development and factors effecting the fetal growth. Define somatic growth and assessment – weight, length, standing height, Circumference measurement of Head, Chest and Mid arm. Growth Chart and its clinical implications. Normal development: Rules and factors effecting the baby development. Developmental Milestones of a normal child- neuromotor, physical growth, cognitive, intellectual, social.

Module II

Normal diet of new born and child: List dietary calories, fat, protein, mineral and vitamin requirement in a normal child and in a child with malnutrition. Classify and outline etiology, findings and treatment of Rickets: Vitamin D deficiency and Vit.D resistant rickets.Still's disease: Classification, pathology in brief, physical findings, course & prognosis. Outline treatment, prevention and correction of deformity.

Module III

Cerebral Palsy – Definition, etiology, pathophysiology, clinical manifestations, complications, treatment. Spina Bifida – Definition, etiology, pathophysiology, clinical manifestations, complications, treatment. Hydrocephalus Definition, etiology, pathophysiology, clinical manifestations, complications, treatment. Arnold-chiari malformation, Basilar impression, Klippel-Feil syndrome, Achondroplacia, Dandy walker syndrome, Down's syndrome- Clinical presentation

Module IV

Theories of Aging and Physiological changes that occur due to aging. Review of clinical presentation and management of Ischemic heart disease, Cerebro vascular accident. Benign prostatic hyperplasia- Definition, etiology, pathophysiology, clinical manifestations, complications, treatment. Cataracts- Definition, etiology, pathophysiology, clinical manifestations, complications, treatment.

Module V

Falls in Elderly- Definition, etiology, pathophysiology, clinical manifestations, complications, treatment. Senile Osteoporosis- Definition, etiology, pathophysiology, clinical manifestations, complications, treatment. Hypostatic Pneumonia- Definition, etiology, pathophysiology, clinical manifestations, complications, treatment.Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare programmes for women and children, Preventive medicine and geriatrics.

Suggested Readings:-

1. Essential Pediatrics- O.P Ghai CBS Publishers& Distributors
2. Guccione's Geriatric Physical Therapy - Mosby
3. Principles of Geriatric Physiotherapy- Nariender Kaur Multani- Jaypee.

Suggested Project Works:

1. The Impact of Early Childhood Nutrition on Cognitive Development
2. Exploring the Role of Physical Activity in Managing Childhood Obesity
3. Assessment of Vaccination Compliance in Children: Challenges and Solutions
4. Early Intervention Strategies for Children with Autism Spectrum Disorder (ASD)
5. Parental Education Programs and Their Effect on Child Health Outcomes
6. Exploring the Relationship Between Sleep Patterns and Academic Performance in School-Aged Children
7. Assessment of Pediatric Pain Management Strategies in Acute Illnesses
8. Improving Mobility and Quality of Life in Older Adults through Physical Therapy
9. Exploring the Relationship Between Nutrition and Cognitive Function in Elderly Populations
10. Prevention and Management of Falls in the Geriatric Population
11. The Role of Social Support in Preventing Depression Among Elderly Individuals
12. Sleep Disorders in the Elderly: Causes, Implications, and Treatment Approaches
13. Evaluating the Effectiveness of Geriatric Care Models in Enhancing Health Outcomes

GENERAL ORTHOPAEDICS I

Subject Name	Code	Type of course	T-P-Pj	Credit
General Orthopaedics- I	CUTM2964	Theory+Project	3-0-1	**4**

Course Objective:

- To develop foundational knowledge of the anatomy, physiology, and pathology relevant to musculoskeletal disorders, including fractures, dislocations, and soft tissue injuries.
- To read & interpret salient features of the X-ray of the Spine & Extremities and correlate the radiological findings with the clinical findings.
- To Analyze clinical symptoms, physical examination findings, and imaging results to accurately diagnose orthopaedic conditions and their underlying causes.
- Design and assess comprehensive post-operative care strategies for fractures and injuries, focusing on functional recovery and prevention of complications.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Outline the definition, etiology, clinical features, pathophysiology of a musculoskeletal condition	PO1, PSO1
CO2	Understand the radiological and lab investigations of selected musculoskeletal disorders	PO1, PO5, PSO1
CO3	Apply the knowledge of the clinical examination for more complex disorders of the musculoskeletal system, integrating advanced physical examination procedures.	PO1, PO2, PO5, PSO1, PSO3
CO4	Select measurement and testing procedures commonly used in assessing musculoskeletal dysfunction	PO2, PO5, PSO1, PSO3
CO5	Create a conservative and surgical management of selected musculoskeletal disorders	PO5, PO7, PSO1, PSO3

Course Outline:

Module I

Introduction to Orthopedics: Introduction to orthopedic terminology, Types of pathology commonly dealt with, clinical examination, common investigations X- rays& imaging techniques and outline of non-operative management.

Principles of operative treatment: List indications, Contraindication and briefly outline principles of Arthrodesis, Arthroplasty, Osteotomy, Bone grafting, Tendon- Transfers and Arthroscopy.

Module II

Fractures and dislocations: General Principles, Outline the following.

i. Types of fractures including patterns, Open and close fractures and fracture- dislocations.
ii. Differences between dislocation and subluxation.
iii. General and Local signs & symptoms of fractures & dislocation and Fracture healing.
iv. Principle of management of fractures & dislocations.
v. Prevention& treatment of complication including: Fracture- disease, Volkmann's ischemic contracture, Sundek's Atrophy Carpal Tunnel Syndrome. Myositis Ossification and shoulder- hand syndrome.
vi. Upper Limb and lower limb Fracture & Dislocations: Enumerate major long bone fractures and joint injuries and briefly describe their clinical features, principles of management and complications

Module III

Lower limb Fracture & Dislocations: Enumerate major long bone fractures and joint injuries and briefly describe their clinical features, principles of management and complications.

Spinal Fractures and Dislocations: Outline the mechanism, clinical features, and principles of management and complications of spinal injuries.

Recurrent Dislocations: Outline the mechanism, clinical features, principles of management and complications of recurrent dislocation of the shoulder and patella.

Module IV

Amputations: Classify amputations, List indication for surgery. Outline pre-operative, operative and prosthetic management. Outline prevention and treatment of complications.

Bone & Joint Infections: Outline the etiology, clinical features, management and complications of septic arthritis osteomyelitis. Tuberculosis (including spinal TB)

Bone Joint Tumors: Classify and outline the clinical feature, management and complications of the following (benign/malignant bone and joint tumors, osteomas, osteosarcomas, osteoclastomas, Ewing's sarcoma, multiple myeloma.

Module V

Sprains and Muscle strains: List common sites of sprains and muscle strains describe the clinical manifestations and treatment Viz. tennis elbow, golfer's elbow, Dequervan's disease, teno vaginitis, trigger finger, carpal tunnel syndrome and plantar fasciitis.

Sports Injuries: Injuries related to common sports their classification and management.

Suggested Readings:-

1. Watson- Zones, Fractures and Joint Injuries-Wilson- Churchill Livingstone.
2. Clinical Orthopaedics Examination- Merae- Churchill Livingstone.
3. Conoise System of Orthopaedics and Fractures- Apley Butterworth Heinmann
4. Outline of Fractures- Adam- Churchill Livingstone.
5. Outline of Orthopaedics- Adam- Churchill Livingstone.
6. Physica examination in Orthopaedics- Apley- Butterworth Heinmann
7. Clinical Orthopaedics Diagnosis- Pandey & Pandey- Jaypee Brother

Suggested Project Works:

1. Outcomes of Early Mobilization in Diaphyseal Fractures: A Clinical Trial
2. The Impact of Bone Density on Fracture Healing in Elderly Patients
3. Evaluation of the Effectiveness of Bone Graft Substitutes in Fracture Healing
4. Fracture Healing in Diabetic Patients: Challenges and Management
5. A Study of Delayed Union and Non-Union in Long Bone Fractures
6. The Effectiveness of Platelet-Rich Plasma (PRP) in Muscle Injury Recovery
7. A Comparison of Surgical and Non-Surgical Approaches to Treating Chronic Muscle Tears
8. The Role of Stretching in Preventing Recurrent Muscle Injuries in Athletes
9. Evaluation of Electromyographic Changes in Patients with Chronic Muscle Injuries
10. Functional Recovery Post-Muscle Injury: A Longitudinal Study on Soft Tissue Healing"
11. Clinical Outcomes of Surgical Resection in Benign vs. Malignant Bone Tumors
12. Assessing the Efficacy of 3D Printing in Bone Tumor Resection and Reconstruction

13. Outcomes of Limb-Salvage Surgery in Patients with Malignant Bone Tumors

14. "The Impact of Post-Surgical Rehabilitation on Recovery after Bone Tumor Surgery

GENERAL ORTHOPAEDICS II

Subject Name	Code	Type of course	T-P-Pj	Credit
General Orthopaedics II	CUTM2965	Theory+Project	2-0-1	**3**

Course Objective:

- To develop foundational knowledge of the anatomy, physiology, and pathology relevant to musculoskeletal disorders related to degeneration and infection.
- To read & interpret salient features of the X-ray of the Spine & Extremities and correlate the radiological findings with the clinical findings.
- To Analyze clinical symptoms, physical examination findings, and imaging results to accurately diagnose orthopaedic conditions and their underlying causes.
- Design and assess comprehensive post-operative care focusing on functional recovery and prevention of complications.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Outline the definition, etiology, clinical features, pathophysiology of a musculoskeletal condition	PO1, PSO1
CO2	Understand the radiological and lab investigations of selected musculoskeletal disorders	PO1, PO5, PSO1
CO3	Apply the knowledge of the clinical examination for more complex disorders of the musculoskeletal system, integrating advanced physical examination procedures.	PO1, PO2, PO5, PSO1, PSO3
CO4	Select measurement and testing procedures commonly used in assessing musculoskeletal dysfunction	PO2, PO5, PSO1, PSO3
CO5	Create a conservative and surgical management of selected musculoskeletal disorders	PO5, PO7, PSO1, PSO3

Course Outline:

Module I

Chronic Arthritis: Outline of pathology: Clinical features, mechanism of deformities, management and complications of Rheumatoid arthritis, Osteoarthritis of major joints and spine, Ankylosing spondylitis. Neck and Back Pain, Painful Arc syndrome, Tendonitis, Fasciitis & Spasmodic Torticollis. Outline the above including clinical features and management. Spinal Deformities: Classify spinal deformities and outline the salient clinical features, management and complications of Scoliosis, Kyphosis and Lordosis.

Module II

Poliomyelitis: Describe the pathology, microbiology, prevention, management and complications of polio. Outline the treatment of residual paralysis including use of orthoses. Principles of muscle transfer and corrective surgery. Leprosy: Outline of clinical features, management and complications of neuritis, muscle paralysis, tropic ulceration and hand & feet deformities. Oral, tibia and fibula deformities.

Module III

Congenital Deformities: Outline the clinical features and management of CTEV, CDH, flat foot, vertical talus, limb deficiency radial club hand and femoral, tibial and fibula deficiencies Meningo myelocele Arthrogryposis multiplex congenital and Osteogenesis imperfect.

Module IV

Peripheral Nerve Injuries: Outline the clinical features and management, including re-constructive surgery of a) Radial, median and ulnar nerve lesions, b) Sciatic and lateral popliteal lesions, c) Brachial Plexus injuries including Erb's, Klumpke's cruch palsy. Hand injuries: Outline of clinical features, management and complications of skin and soft tissue injury, tendon injury, bone and joint injury.

Suggested Readings:-

1. Clinical Orthopaedics Examination- Merae- Churchill Livingstone.
2. Outline of Fractures- Adam- Churchill Livingstone.
3. Physical examination in Orthopaedics- Apley- Butterworth Heinmann
4. Clinical Orthopaedics Diagnosis- Pandey & Pandey- Jaypee Brother

Suggested Project Works:

1. *Orthopaedic Interventions for Congenital Limb Deficiencies: A Retrospective Study*

2. A Comparative Study of Conservative vs. Surgical Management of Clubfoot in Infants
3. Assessment of Early Diagnosis and Management of Rheumatoid Arthritis: A Clinical Approach

4. The Role of Stem Cell Therapy in the Treatment of Osteoarthritis: A Systematic Review
5. Long-Term Outcomes of Total Joint Replacement in Elderly Patients with Arthritis"
6. The Role of Antibiotic Treatment in the Management of Osteomyelitis in Children
7. Surgical Management of Septic Arthritis: A Retrospective Review of Clinical Outcomes
8. Impact of Post-Surgical Infections on Recovery in Orthopaedic Trauma Patients
9. Evaluation of Surgical Techniques in the Treatment of Bone and Joint Infections

PHYSIOTHERAPY IN MEDICINE AND SURGICAL CONDITION

Subject Name	Code	Type of course	T-P-Pj	Credit
Physiotherapy in Medical and Surgical Condition	CUTM4303	Theory+ Practice	3-2-1	**6**

Course Objective:

- To provide an in-depth understanding of the clinical presentation, pathophysiology, and physiotherapeutic management of various skin conditions, ear and throat disorders, and burn injuries, abdominal surgeries.
- To equip students with the knowledge of diabetes mellitus, psychiatric and mental disabilities, focusing on the role of physiotherapy in holistic patient care, and specialized interventions like music therapy and group activities.
- To educate students on the physiotherapeutic management of post-surgical conditions, geriatric care, and women's health issues, emphasizing assessment techniques, outcome measurement, and rehabilitation.
- To evaluate and measure the outcome of physiotherapy intervention

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Understand clinical presentation, physiotherapeutic management of various medical conditions.	PO1, PO7, PO10, PSO1, PSO3
CO2	Assess and evaluate the condition of patients with outcome measurement.	PO2, PO5, PO9, PSO1, PSO3
CO3	Apply physiotherapeutic management techniques to	PO2, PO5, PO7,PSO1,

	medical and geriatric conditions.	PSO3
CO4	Analyze the physiological and psychological changes during women's health and geriatric conditions.	PO1, PO5, PO11, PSO1, PSO3
CO5	Create comprehensive physiotherapy rehabilitation programs to treat Geriatric, Post-surgical and Gynecology conditions.	PO5, PO7, PO10, PSO1, PSO3

Course Outline:

Module I

Clinical presentation and evaluation of different Skin Conditions - Psoriasis, Hyperhidrosis, Acne Vulgaris, Vitiligo, Alopecia, Boil and Carbuncle with Physiotherapeutic management and outcome measurement.

Clinical presentation and evaluation of Ear and Throat conditions with management focusing on ENT pain, inflammation, Vestibular rehabilitation for Virtigo, Meniere Disease, Laryngectomy and Pharyngectomy.

Module II

Diabetes Mellitus: Review on the Physiology of Pancreas, Types of Diabetes, pathophysiology and clinical presentation, diagnostic procedure, physiotherapeutic assessment and management with a brief information regarding the complications.

Psychiatric and Mental Disability: Define and clinical presentation of Schizophrenia, Mood Disorders, Anxiety Disorder, Anorexia nervosa, substance abuse with physiotherapy management with a brief information on Music Therapy, Group activity, Sports intervention programs Horticulture.

Module III

Types of Plastic surgical procedure with a review on skin healing.

Wound: Types and evaluation of wound with a brief on factors to abnormal wound healing.

Assessment – Bed Clinical appearance, 2 and 3 dimensional wound measurement, Wound Edges such as Color, contraction and exudate. Management – Focuses on electrotherapy such as Ultrasound, Infrared rays, Pulsed Electromagnetic Energy, Ultraviolet Ray, LASER and Hyperbaric Oxygen therapy. Scar mobilization, exercises (Active and ADL)

Burns: Assessment – A.B.C.D.E evaluation principle, Fluid resuscitation, Rule of 9, Urine Output. Parkland formula, Pain evaluation by scales such Visual analogues, Numerical pain rating, F.L.A.C.C, Abbey Pain, Facial Rating. Management – Focuses on control and resolve edema by Electrotherapy, Positioning's and Passive Movement; Prevent Scar and Improve ROM by Passive movement, therapeutic massage, Splints, Exercises to Facilitating ADL and Pressure therapy.Pressure Sores – Clinical Presentation, evaluation and management. Types of Plastic surgery, review on skin healing physiology

Module IV

Geriatric Care: Assessment by Tests such as Senior Fitness Test, Arm curl Test, 6 Minute Walk Test, SF-36 and 12 quality of life test, Older people quality of life (OPQOL), Functional Independence Measure, MMSE and test your memory(TYM), Geriatric depression Scale, Pittsburgh Sleep quality Index and Pelvic floor assessment and Physiotherapeutic management.

Abdominal Surgeries: Post-operative assessment focus on complication presentation in Respiratory, Circulatory, Pressure sores, Prolong immobilization. Post-operative management: Pain, DVT, immobility, pressure sore, scar tissue healing, Aerobic training and ADL.

Module V

Brief review of stages of labor with anatomical and physiological changes during pregnancy.

Define Menopause and stages and its implication on females

Detailed evaluation of Women and Pregnant women along with assessment using BMI, Waist- Hip Ratio, PCOS questionnaire, International Consultation on Incontinence questionnaire, Incontinence impact questionnaire, Incontinence severity index.

Define different women conditions: Polycystic ovarian syndrome, Amenorrhea, Dysmenorrhea, Pelvic Inflammatory disease, urinary incontinence, diastasis recti with clinical presentation and physiotherapeutic management.

Suggested Readings:-

1. Cash's Textbook of General Medicine and Surgical Conditions for Physiotherapists.
2. Physiotherapy in General Medicine and Surgical Conditions by Megha Sandeep Sheth.
3. Textbook of Physiotherapy in surgical conditions by Pushpal K. Mitra

4. Principles of Physiotherapy in General Medical and Surgical Conditions by A. Thangamani Ramalingam

Suggested Project Works:

1. The Role of Physiotherapy in Managing Diabetes Mellitus: Effects on Blood Circulation and Mobility
2. Physiotherapy Interventions for Managing Obesity: Impact on Physical Function and Weight Loss
3. The Effectiveness of Physiotherapy in Improving Post-Surgery Recovery in Abdominal Surgeries
4. Impact of Physiotherapy in Managing Chronic Fatigue Syndrome
5. Role of Physiotherapy in the Rehabilitation of Patients with Chronic Kidney Disease
6. Physiotherapy Management for Managing Severe Dehydration and its Effects on Musculoskeletal Health
7. The Role of Physiotherapy in Pre-Operative and Post-Operative Care in General Surgery
8. Impact of Physiotherapy in the Management of Stress-Induced Physical Symptoms
9. The Role of Physiotherapy in Addressing Postpartum Recovery and Rehabilitation
10. Exploring Physiotherapy Techniques for Managing Edema in Non-Orthopedic Patients
11. Physiotherapy in Improving Post-Cancer Treatment Recovery: A Focus on Muscle Strength and Endurance
12. The Effectiveness of Physiotherapy in Managing Lymphedema
13. The Role of Physiotherapy in Managing Functional Impairments in Hepatic Disorders

PHYSIOTHERAPY IN CARDIO PULMONARY CONDITION

Subject Name	Code	Type of course	T-P-Pj	Credit
Physiotherapy in Cardio Pulmonary Condition	CUTM4307	Theory+ Practice	3-2-1	**6**

Course Objective:

- Develop skills in using breathing exercises, chest mobilization techniques, and relaxation positions to improve lung volumes and manage breathlessness.
- Apply respiratory proprioceptive neuromuscular facilitation, incentive spirometry, and pain management strategies to support patient recovery
- Learn various techniques to clear airway secretions, including postural drainage, huffing, coughing, vibrations, and the use of PEP devices and suctioning.
- Understand the pathophysiology, clinical presentation, and physiotherapeutic management of peripheral vascular diseases, obstructive, and restrictive pulmonary disorders.

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Recall the Anatomy and Physiology of Cardio Pulmonary system	PO1, PSO1
CO2	Know and understand role of Physiotherapy in Cardio Pulmonary Conditions	PO1, PO7, PO10, PSO1, PSO3
CO3	Understand and execute physiotherapy assessment for cardiovascular and respiratory conditions.	PO1, PO2, PO5, PSO1, PSO3
CO4	Create a treatment plan for pre- and post-operative cardiac rehabilitation for the surgical condition.	PO2, PO5, PO7, PO10, PSO1, PSO3
CO5	Tailor patient specific physiotherapy rehabilitation program for conditions in the ICU setup and IP setup	PO5, PO7, PO10, PSO1, PSO3

Course Outline

Module I

Cardio-Pulmonary Assessment: Assessment and investigation of patient's problems:

i. Inspection: posture (recumbent, erect orthopenic): breathing pattern (rate, rhythm and pattern, use of accessory muscles), chest movement (symmetry, intercostals and diaphragmatic components), chest deformity (barrel chest, pigeon chest);
ii. spinal deformity (scoliosis, kyphosis, kyphoscoliosis);
iii. sputum (colour, type, volume, consistency);
iv. Cough (types, productive / non-productive, presence of a normal cough reflex).
v. Palpation: Tactile and vocal fremitus, mobility of cervical and thoracic spine, shoulder girdle, rib cage.
vi. Percussion: dullness and hyper resonance.
vii. Auscultation: Normal and abnormal breath sounds.
viii. Measurement: Chest expansion at different levels (axiliary, nipple, xiphoid);
ix. Basics of Cardiopulmonary function testing- Pulmonary Function test, Exercise tolerance (six minute walking test, three minute walking test bicycle ergometer, NHYA scale), Basics of ECG and ABG, Maximal and sub-maximal tests Radiographs.
x. Cardiac dysfunction: evaluation of risk factors, respiratory system evaluation, heart rate rhythm.
xi. Physical assessment in post-operative lung and cardiac conditions: surgery details, date, duration, events, types and extent, incision, vitals, drains, pain, ROM, thoracic cavity, neck, shoulder girdle, thoracic spine, chest excursion, air entry, sputum, posture, neurological complications, exercise tolerance.
xii. Outcome measures in pulmonary rehabilitation and Scales used in pulmonary rehabilitation (becks depression inventory (BDI) and Hamilton Anxiety Scale(HAS), MMSE, SGRQ, SF-36, Activities-specific balance scale and Outcome measures in cardiac rehabilitation

Module II

Physiotherapy Treatment approaches in Cardio pulmonary conditions:

To Improve Lung Volumes:

1. Describe indications, goals and procedure of breathing exercise. Describe diaphragmatic breathing, localized basal expansion, apical expansion, specific

segmental exercise raising the resting respiratory level and note on glossopharyngeal breathing techniques.

2. Describe chest mobilization exercises with indications and contraindications.
3. Describe relaxation positions for the breathless patient: high side, lying, sitting, relaxed sitting, forward lean, standing, relaxed standing.
4. Respiratory Proprioceptive Neuromuscular facilitation exercises.
5. Incentive Spirometer its method of applications, indications and contraindications
6. Pain Management: Soft tissue release, TENS, Mobilization.

AID to respiration:

1. Describe controlled breathing during walking and during functional activity.
2. Describe exercise for the breathless patient: exercise tolerance testing and exercise program.

Module III

Physiotherapy Treatment approaches in Cardio pulmonary conditions:

To Clear Secretions:

1. Describe the technique of huffing and coughing, forced expiratory technique, vibrations, chest shaking and percussion, rib springing, autogenic drainage, active cycle of breathing, inspiratory muscle training and flutter, suctioning, PEP devices.
2. Describe techniques of postural drainage, including indications, general precautions and contra indications, preparation of drainage of individual bronchopulmonary segments, modified postural drainage and continuing postural drainage as a home program.
3. Describe techniques of sterile nasopharyngeal and endotracheal suctioning.

To Ease in Work of Breathing:

1. Outline the history of mechanical respiration. Define the following terms a) respirator b) lung ventilator c) resuscitators d) body ventilator e) electro-simulator f) IPPB g) PEEP h) CPAP i) SIMV j) NEEP. Classify ventilators by their cycling control (volume cycling, pressure cycling, and time cycling and mixed cycling). Describe the principles of operation of commonly used ventilators and outline the use of the following types: I) bear II) Bennett III) Emerson IV) Bird.
2. Outline the principles of humidification therapy and methods of correcting humidity deficits. Describe the principles of operation of pass – over humidifiers and bubble – diffusion aerosol therapy. Outline the principles of aerosol therapy. Describe the physical

properties of aerosols and their deposition in the alveoli. Describe the principles of operation of nebulizers.

Module IV

Angina Pectoris, Pathophysiology, diagnosis, management, exercise tolerance test, Assessment. Recovery Phase and Treatment, Outcome Evaluation and Complications of treatment

Myocardial Infraction, Pathophysiology – Pre and Post OP Management, Exercise tolerance test, Assessment. Recovery Phase and Treatment plan, Outcome Evaluation and Complications of treatment

Cardiopulmonary Transplantation – Assessment and Pre and Post-operative management.

Module V

Peripheral Vascular Disease – DVT, Pathophysiology, clinical Presentation, assessment and management

Obstructive Pulmonary Disorder: Classification, Symptoms, diagnosis and physiotherapeutic management with outcome evaluations.

Restrictive Pulmonary Disorder: Classification, Symptoms, diagnosis and physiotherapeutic management with outcome evaluations.

Practice:

Various physiotherapy modalities and treatment techniques for the above-mentioned conditions to be demonstrated and practiced by the students in clinical setup.

Suggested Readings:-

1. Cash's Textbook of Chest, Heart and Vascular Disorders for Physiotherapists
2. Physiotherapy for Respiratory and Cardiac Problems by Jennifer and Barbara
3. Cardiovascular and Pulmonary Physiotherapy- Joanne Watchie

Suggested Project Works:

1. The Effect of Pulmonary Rehabilitation on Exercise Tolerance in COPD Patients
2. Impact of Inspiratory Muscle Training on Respiratory Function in Cardiac Patients
3. Comparison of Breathing Techniques on Lung Function in Asthma and COPD

4. The Role of Physiotherapy in Improving Quality of Life in Heart Failure Patients
5. Effectiveness of Cardiac Rehabilitation Programs in Post-Myocardial Infarction Recovery
6. The Impact of Aerobic Exercise on Pulmonary Function in Post-Tuberculosis Patients
7. Effects of Physiotherapy Interventions on Pulmonary Function in Post-Surgical Cardiac Patients
8. Assessment of Physical Therapy Interventions for Preventing Post-operative Pulmonary Complications
9. The Role of Physiotherapy in Managing Dyspnea in Patients with Chronic Respiratory Diseases
10. Effect of Chest Physiotherapy Techniques on Mucus Clearance in Cystic Fibrosis Evaluation of the Effectiveness of Mobilization Techniques in Reducing Ventilator-Associated Pneumonia
11. Effectiveness of Interval Training in Improving Cardiopulmonary Endurance in Elderly Hypertensive Patients
12. Impact of Posture Correction and Respiratory Exercises on Breathing Patterns in Cardiopulmonary Dysfunction
13. The Role of Physiotherapy in Reducing Anxiety and Improving Breathing in Pulmonary Rehabilitation
14. Comparison of Traditional vs. Virtual Physiotherapy Programs for Cardiac Patients' Rehabilitation

PHYSIOTHERAPY IN ORTHOPAEDICS

Subject Name	Code	Type of course	T-P-Pj	Credit
Physiotherapy in Orthopaedics	CUTM4308	Theory+ Practice	3-2-1	**6**

Course Objective:

- To Develop skills in using muscle strengthening and range of motion exercises
- Understand the pathophysiology, clinical presentation, and physiotherapeutic management of musculoskeletal conditions and soft tissue dysfunction.
- To create customized treatment plan based on the characteristics of the conditions
- To evaluate the outcome of the treatment

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Outline various orthopaedic disorders and their pathomechanics.	PO1, PO4, PSO1
CO2	Understand the process of clinical examination and surgical interventions for complex disorders of the musculoskeletal system.	PO1, PO2, PO12, PSO1, PSO3
CO3	Demonstrate measurement and testing procedures commonly used in assessing musculoskeletal dysfunction	PO2, PO5, PO7, PSO1, PSO3
CO4	Differentiate the orthopaedic condition based on assessment findings	PO1, PO5, PO9, PSO1, PSO3
CO5	Develop patient-specific treatment plans based on their assessment findings.	PO5, PO7, PO10, PSO1, PSO3

Course Outline:

Module I

- Traumatology: General Physiotherapeutic approach for the following conditions:
- Fractures: Classification, healing of fractures, clinical features, complications, methods of immobilization, Upper limb, Lower limb fractures and their physiotherapeutic management.

- Crush injuries of hand.
- Vertebral fractures of cervical, thoracic and lumbar vertebrae with and without neurological deficits.
- Dislocations of Upperlimb, Lowerlimb and vertebral column

Module II

Injuries: Soft tissue injuries, synovitis, capsulitis, volkman's ischemic contracture etc. tear of semilunar cartilage and cruciate ligaments of knee, meniscectomy, patellectomy, internal derangement of knee.

Deformities: Congenital torticollis and cervical rib, CTEV, Pes cavus, Pes planus and other common deformities.Acquired- Scoliosis, kyphosis, lordosis, Coxa Vara, Genu Valgum, genu varum and recurvatum.

Module III

Amputation: level of amputation of upper limb and lower limb, stump care, stump bandaging, pre and post prosthetic management including check out of prosthesis, training etc.

Surgical procedures; Pre and post-operative management of common corrective procedure like arthroplasty, arthrodesis, osteotomy, tendon transplants, and soft tissue release grafting, including polio residual paralysis and leprosy deformities corrections.

Module IV

Degenerative and infective conditions: osteoarthritis of major joints, spondylosis, spondylitis, spondylolisthesis, PIVD, Periarthritis of shoulder, Tuberculosis of spine, bone and major joint, pertest disease. Rheumatoid arthritis, Ankylosing spondylitis etc. and other miscellaneous orthopaedic conditions treated by physiotherapy.

Module V

Principles of sports physiotherapy – cause of sports injury, management of acute sports injury, common occurred injuries, Role of Physiotherapist in sports, prevention of sports injuries, principle & advanced rehabilitation of the injured athlete.

PRACTICE

1. Develop rehabilitation programs for each condition.
2. Discuss the phases of healing and appropriate physiotherapy interventions at each stage.

3. Create strengthening and conditioning programs for different orthopaedic conditions.
4. Practice gait analysis in patients with orthopaedic conditions like hip and knee osteoarthritis, post-fracture rehabilitation, or post-surgery.
5. Design ergonomics assessments for different work environments.

Suggested Readings:-

1. Essentials of Orthopedics and Applied Physiotherapy, Jayanth Joshi, Prakash Kotwal,
2. Textbook of Orthopaedics, John Ebnezar, 5th ed, Jaypee.
3. Cash Textbook of Orthopaedics and Rheumatology for Physiotherapists- Downie- Jaypee Brothers.
4. Tidy's Physiotherapy- Thomson et al –Butterworth Heimann
5. Orthopaedics Physiotherapy- Donatella & Wooden- W.B Saunders
6. Rheumatological Physiotherapy- David- Mosby
7. Sports Injuries: Diagnosis and Management – Butterworth Livingstone

Suggested Project Works:

1. Effectiveness of Physiotherapy in Post-Surgical Rehabilitation of Knee Replacement
2. The Role of Physiotherapy in Managing Chronic Low Back Pain
3. Impact of Therapeutic Exercises on Joint Mobility in Osteoarthritis of the Hip
4. Comparative Study of Manual Therapy versus Exercise Therapy in the Management of Frozen Shoulder
5. Evaluation of Strengthening Exercises on Muscular Function in Post-Fracture Rehabilitation
6. The Effectiveness of Physiotherapy Interventions in the Treatment of Tendonitis in Athletes
7. Impact of Aquatic Therapy on Range of Motion in Post-Spinal Surgery Patients
8. Effects of Physiotherapy Techniques in the Treatment of Plantar Fasciitis
9. The Role of Kinesiology Taping in Reducing Pain and Improving Function in Shoulder Injuries
10. Physiotherapy Approaches in the Management of Postural Deformities in Adolescents
11. Comparison of Functional Outcomes in Conservative vs Surgical Management of Ankle Sprains
12. Influence of Physiotherapy on Improving Functional Mobility in RA Patients
13. Efficacy of Therapeutic Ultrasound in the Treatment of Soft Tissue Injuries

PHYSIOTHERAPY IN NEUROLOGICAL CONDITIONS

Subject Name	Code	Type of course	T-P-Pj	Credit
Physiotherapy in Neurological Conditions	CUTM4309	Theory+Practice	3-2-1	**6**

Course Objective:

- To equip students with knowledge and skills for performing comprehensive neurological assessments
- Understand the pathophysiology, clinical presentation, and physiotherapeutic management of musculoskeletal conditions and soft tissue dysfunction.
- To create customized treatment plan based on the characteristics of the conditions
- To evaluate the outcome of the treatment

Course Outcome:

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Recall and describe the principles of neurological assessment, including the tools and techniques used in evaluating various neurological conditions.	PO1, PO2, PO4,PSO1
CO2	Understand neurophysiological techniques along with their therapeutic applications in managing neurological disorders.	PO1, PO2, PO5, PO12, PSO1, PSO2
CO3	Apply appropriate assessment scales and treatment modalities in the management of upper and lower motor neuron lesions in clinical settings.	PO2, PO5, PO7,PSO1, PSO3
CO4	Analyze the difference between various neurological disorders such as hemiplegia, cerebral palsy, and peripheral neuropathy by analyzing patient symptoms and assessment data.	PO1, PO5, PO8, PO9, PSO1, PSO3
CO5	Create individualized treatment plans for neurological patients, evaluate the effectiveness of interventions, and modify them based on patient progress.	PO1, PO5, PO7, PO10, PSO1, PSO3

Course Outline:

Module I

Neurological assessment: Required materials for examination, Chief complaints, History taking, Observation, Palpation, Higher mental function – Consciousness, Orientation, Wakefulness, memory, Speech, Reading, Language, Writing, Calculations, Perception, Left right confusion, Reasoning, and Judgment, Motor Examination – Muscle power, Muscle tone, Spasticity, Flaccidity

Reflexes –Developmental reflexes, deep tendon reflexes, Superficial reflexes, Sensory examination –Superficial, Deep and Cortical sensations, Special tests – Romberg's, Kernig's sign, Brudenzki sign, Tinels's sign, Slum test, Lehermitte's sign, Bells Phenomenon, Gower's sign, Sun set sign, Battle's sign, Glabellar tap sign, etc, Balance examination, coordination examination, Gait analysis– Kinetics & Kinematics (Quantitative & Qualitative analysis)

MODULE II:

Assessment tools & Scales – Modified Ashworth scale, Berg balance scale, FIM, Barthel index, Glasgow coma scale, Mini mental state examination, Rancho Los Amigos Scale for Head injury, APGAR score, ASIA scale, Reflex Grading. Differential diagnosis.

Neuro physiological Techniques: Concepts, Principles and effects of following Neurophysiological techniques: Roods approach, PNF, Contemporary task oriented approach.

MODULE III:

Brief review of the Upper motor neuron lesions clinical presentation and physiotherapy management:

1. Stroke-ACA, MCA ,PCA, Thalamic stroke
2. Cerebral palsy
3. Multiple sclerosis
4. Parkinson's disease, Ataxia
5. Motor neuron disease
6. Tabes dorsalis
7. Acute CNS infection

Module IV

Brief review of the Upper motor neuron lesions clinical presentation and physiotherapy management: Poliomyelities and Leprosy, Upper SCI and Lower SCI

Module V:

Evaluation and Management of Peripheral Nerve Injuries and Disorders:
History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance& Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Hereditary motor sensory neuropathy, Guillain-Barre syndrome, and peripheral Neuropathies

PRACTICE: Various physiotherapy modalities and treatment techniques for the above-mentioned conditions to be demonstrated and practiced by the students in clinical setup.

Suggested Readings:-

1. Tetraplegia & Paraplegia –Bromley-W.B Sunders.
2. D.A. Umphred - Neurological Rehabilitation .7th Edition. Mosby
3. S.Edwards, Neurological Physiotherapy-Problem solving approach.2 Edition.
4. S. Porter 2016, Tidy's physiotherapy. 15th Edition. Elsevier Publication
5. P.A.Downie 2009, Cash Text Book for Physiotherapists in Neurological Disorders.5th Edition. Jaypee Bros. Publication.
6. M .Hollis 1999, Practical Physical Therapy.3rd Edition .Wiley Publication
7. S.O'Sullivan 2017, Physical Rehabilitation.6th Edition. Jaypee brothers.

Suggested Project Works:

1. The Effectiveness of Therapeutic Exercise in Improving Motor Function in Stroke Patients
2. Impact of Neuroplasticity-Based Physiotherapy on Post-Stroke Rehabilitation
3. A Comparative Study of Conventional Physiotherapy vs. Virtual Reality Therapy in Parkinson's Disease

4. The Role of Functional Electrical Stimulation in Restoring Function in Spinal Cord Injury Patients
5. Effectiveness of Balance Training in Reducing Fall Risk in Elderly Patients with Neurological Disorders
6. Therapeutic Approaches in Managing Spasticity in Multiple Sclerosis: A Physiotherapy Perspective
7. Investigating the Impact of Early Mobilization on Recovery in Traumatic Brain Injury
8. The Role of Aquatic Therapy in Neurological Rehabilitation: A Study of Stroke Patients
9. The Efficacy of Task-Specific Training in Improving Hand Function in Patients with Cerebral Palsy
10. Cognitive and Physical Rehabilitation in Alzheimer's Disease: The Role of Physiotherapy
11. Effects of Joint Mobilization and Soft Tissue Techniques on Range of Motion in Parkinson’s Disease
12. Effects of Low-Frequency Transcutaneous Electrical Nerve Stimulation (TENS) on Pain and Muscle Strength in Patients with Multiple Sclerosis
13. A Study on the Efficacy of Gait Training in Improving Ambulation in Stroke Survivors
14. Impact of Physiotherapy in Managing Fatigue in Multiple Sclerosis
15. Neurophysiological Changes Induced by Physiotherapy in Patients with Parkinson’s Disease
16. Use of Electrical Stimulation for Neuromuscular Reeducation in Spinal Cord Injury Patients
17. Effectiveness of Manual Therapy in Reducing Muscle Stiffness and Improving Mobility in Parkinson’s Disease
18. Post-Stroke Rehabilitation: The Role of Physiotherapy in Enhancing Fine Motor Skills

ADVANCE PHYSIOTHERAPEUTICS - I

Subject Name	Code	Type of course	T-P-Pj	Credit
Advance Physiotherapeutics- I	CUTM4300	Theory+ Practice	3+2+0	5

Course Objectives:

- To Understand the therapeutic principles of various treatment procedures.
- To know the indications and contraindications of each treatment procedure
- To create and apply the treatment parameters.
- To evaluate the treatment outcomes and customisation

Course Outcomes

After completion of the course, the students will be able to

CO	Statements	COs with PO & PSOs Mapping
CO1	Show Proficiency in Manual and Soft Tissue Techniques	PO1, PO2, PO4, PO5, PO7,PSO1, PSO3
CO2	Competence in Movement-Based Therapies	PO1, PO2, PO5, PO9, PSO1, PSO3
CO3	Application of Adjunctive Therapies	PO1, PO5, PO7, PO10,PSO1, PSO3
CO4	Design of Individualized Treatment Plans	PO2, PO5, PO7, PO8,PSO3
CO5	Assessment and Outcome Evaluation	PO3, PO5, PO6, PO11,PSO1, PSO2, PSO3

Course Outline

Module I

Kinesiotaping: Principles of Kinesiotaping- mechanism of action, and physiological effects,Indications and Contraindications,**Taping Materials and Tools-** Types of tape, their properties, and preparation techniques, Fundamental Kinesiotaping Technique- Muscle Facilitation/Inhibition Taping,Correction Techniques, Circulatory and Lymphatic Taping, Advanced Kinesiotaping Techniques- Ligament and Tendon Support, Functional Taping for Sports Performance, Neurological Taping, Case Studies and Clinical Applications

Module II

Dry Cupping: Principles of Cupping Therapy, Types of Cupping, Indications and Contraindications, Anatomy and Physiology of Cupping Therapy- Effect of Cupping on Muscles and Fascia, Circulatory and Lymphatic System, Pain Management and Cupping Therapy, Post-Cupping Care, Advanced Cupping Techniques and Clinical Integration- Dynamic and Functional Cupping, Advanced Applications of Cupping, Combining Cupping with Other Modalities, Ethical and safety considerations

Module III

Pilates: Anatomy basics of core muscles, alignment and role of the pelvic floor, Principles of Pilates, Mat Pilates – Core Foundations, Spinal Alignment and Mobility, Neutral Spine Position, Pilates for Flexibility and Balance- Stretching and Lengthening Techniques, Improving Balance, Pilates and Posture, Using Props in Pilates- Modifications and Progressions, Pilates and Functional Movement, Intermediate Pilates Techniques- Advancing Core Strength, Increasing Flexibility and Range of Motion, Coordination and Precision, Pilates for Rehabilitation and Injury Prevention- Pilates for Lower Back Pain, Rehabilitation Techniques, Postural Re-education.

McKenzie Concept: Principles of the McKenzie Method, McKenzie Treatment for the Lumbar Spine, Directional Preference and Centralization, Patient Self-Treatment, McKenzie Treatment for the Cervical and Thoracic Spine, Self-Management for Neck and Upper Back Pain, McKenzie Treatment for the Extremities- Peripheral Joint Assessment, Mechanical vs. Non-Mechanical Pain in the Extremities, Self-Management of Peripheral Joints, Advanced Concepts and Clinical Application- Advanced Mechanical Diagnosis, Combining McKenzie with Other Therapies.

Module IV

Mulligan Concept: Principles of Mulligan Mobilization, Concepts of Mobilization with Movement (MWM), NAGs (Natural Apophyseal Glides), SNAGs (Sustained Natural Apophyseal Glides), and Pain-Free Movement., Indications and Contraindications, Mobilization with Movement for Upper Extremity, Mobilization with Movement for Lower Extremity and case applications, Spinal Mobilization Techniques- Spinal NAGs and SNAGs, Postural Correction with Mulligan Techniques, Combining Mulligan with Other Manual Therapies like stretching, strengthening and soft tissue release.

Maitland Concept: Principles of Maitland Mobilization, The Grading System, Indications and Contraindications, Maitland techniques for cervical, thoracic and Lumbar spine, Clinical Reasoning and Red Flags, Maitland Mobilizations for the Upper Extremity, Lower Extremity, Advanced Techniques and Clinical Case Studies- Advanced Mobilization Techniques, Combining Maitland with Other Manual Therapy Techniques.

Module V

Myofascial release: Principles of Myofascial Release, Indications and Contraindications, Myofascial Release for the Upper Body- Assessing Fascial Restrictions in the Upper Body, MFR Techniques for the Cervical and Thoracic Regions, Self-Care and Postural Education, Myofascial Release for the Lower Body- Assessing Fascial Restrictions in the Lower Body, MFR Techniques for the Hip, Thigh, and Leg, Clinical Case Applications, Myofascial Release for the Spine and Trunk- Fascial Anatomy of the Spine and Trunk, MFR Techniques for the Lumbar Spine and Abdominal Region, Postural Dysfunction and MFR, Advanced Myofascial Release Techniques and Clinical Integration- Advanced Techniques, Combining MFR with Other Modalities, Clinical Reasoning and Treatment Planning.

Triggerpoint therapy: Physiology of Trigger Points, Trigger Point Referral Patterns, Assessment and Diagnosis of Trigger Points- Assessment and Diagnosis of Trigger Points, Identifying Key Trigger Points, Differentiating Trigger Points from Other Musculoskeletal Conditions

Positional Release Technique: Physiological Mechanisms of PRT, Indications and Contraindications, Types of PRT, Advanced Techniques and Clinical Integration of PRT

Suggested Readings: -

1. K Taping In Pediatrics Basics Techniques Indications 1st Editon 2015
2. A Practical Guide to Kinesiology Taping for Injury Prevention and Common Medical Conditions by John Gibbons
3. Friedman, Brooke Siler. "The Pilates Body: The Ultimate At-Home Guide to Strengthening, Lengthening, and Toning Your Body—Without Machines.
4. Maitland, Geoffrey D. "Maitland's Vertebral Manipulation: Management of Neuromusculoskeletal Disorders."
5. Hengeveld, Erik and Banks, Kevin. "Maitland’s Peripheral Manipulation."
6. McKenzie, Robin. "The Lumbar Spine: Mechanical Diagnosis & Therapy."

7. Simons, David G., Travell, Janet G., and Simons, Lois S. "Myofascial Pain and Dysfunction: The Trigger Point Manual."
8. Chaitow, Leon and DeLany, Judith. "Clinical Application of Neuromuscular Techniques."
9. Choi, Kenneth. "Cupping Therapy for Muscles and Joints: A Practical Guide to Treating Pain and Injury with Cupping."
10. Baker, Bruce. "Cupping Therapy: Beginner's Guide to Healing Pain, Inflammation, and Injury."
11. Chaitow, Leon. "Positional Release Techniques."

ADVANCE PHYSIOTHERAPEUTICS- II

Subject Name	Code	Type of course	T-P-Pj	Credit
Advance Physiotherapeutics- II	CUTM4301	Theory+ Practice	2+2+0	4

Course objectives:

- To Understand the therapeutic principles of various treatment procedures.
- To know the indications and contraindications of each treatment procedure
- To create and apply the treatment parameters.
- To evaluate the treatment outcomes and customisation

Course Outcomes:

After the completion of course, students will be able to

CO	Statements	CO with POs & PSOs Mapping
CO1	Demonstrate Proficiency in Neurorehabilitation Techniques	PO1, PO2, PO4, PO5, PO7,PSO1, PSO3
CO2	Conduct Comprehensive Patient Assessments	PO1, PO2, PO5, PO9,PSO1, PSO3
CO3	Develop Individualized Treatment Plans	PO1, PO5, PO7, PO10,PSO1, PSO3
CO4	Evaluate and Monitor Patient Progress	PO2, PO5, PO7, PO8,PSO3
CO5	Integrate Multidisciplinary Approaches	PO3, PO5, PO6, PO11,PSO1, PSO2, PSO3

Course Outline

Module I

Roods Approach: Principles of Sensory-Motor Control, Facilitation vs. Inhibition, Indications and Contraindications, Sensory Stimulation Techniques for Facilitating Movement- Facilitation Techniques(quick stretch, Tapping, Vibration, Brushing, Resistance training), Application of Facilitation Techniques, Sensory Stimulation Techniques for Inhibiting Excessive Tone- Inhibition Techniques, Clinical Application, Rood's Developmental Sequence and Motor Control- The Rood Developmental Sequence, Facilitation in Different Stages of Development, Integrating Rood's Approach with Functional Activities- Functional Rehabilitation Using Rood's Approach, Task-Oriented Training and Rood Techniques, Combining Rood with Other Neurorehabilitation Methods

- Practice: Hands-on practice of facilitation and inhibition techniques for different body regions (upper and lower limbs, trunk) and it's Case-based application of facilitation techniques in patient scenarios. Application of Rood's developmental sequence to therapeutic exercises. Designing exercises for different motor control stages (stability, controlled mobility, and skill).

Brunnstrom: Neurological Basis of the Brunnstrom Concept, Stages of Motor Recovery, Indications and Contraindications for the Brunnstrom Approach, Stage 1 and 2 – Flaccidity and Spasticity- Stage 1: Flaccidity, Stage 2: Spasticity and Basic Synergies, Treatment Goals and Techniques, Stage 3 – Increased Spasticity and Voluntary Control- Stage 3: Spasticity Peaks, Motor Control and Synergy Patterns, Treatment Strategies for Stage 3, Stages 4 and 5 – Breaking Synergies and Complex Movements- Stage 4: Decline of Spasticity and Breaking Synergies, Stage 5: Complex Movement Patterns, Treatment Goals and Techniques, Stage 6 – Near Normal Coordination and Advanced Techniques - Stage 6: Near Normal Coordination, Advanced Techniques for Motor Control, Functional Rehabilitation and Real-World Application, Clinical Integration and Case Studies- Integrating the Brunnstrom Concept with Other Approaches, Developing a Comprehensive Neurorehabilitation Plan.

- Practice: Hands-on practice of passive range of motion exercises, reflex stimulation, and facilitation techniques. Techniques for encouraging minimal voluntary movement in the arms and legs. Application of motor training techniques within the flexor and extensor synergy patterns.Hands-on practice of exercises to break away from synergy patterns and promote coordinated voluntary movement.

Module II

Sensory Integration therapy- Neurobiology of Sensory Processing, Sensory Processing Disorders (SPD), Indications and Contraindications, Sensory Systems Disorders-Sensory Modulation(SMD), Sensory Discrimination (SDD) and Sensory-Based Motor (SBMD) - Implementing Sensory Integration Therapy- Individualized Treatment Plans, Sensory Diets and Home Programs, Multidisciplinary Approach, Case Studies and Clinical Integration-Case Studies in Sensory Integration Therapy, Clinical Application.

Vojta principles/Reflex Locomotion – The Fundamentals of Vojta Therapy. Difference from Other Physiotherapy Techniques and Methods. Reflex Locomotion and its Relation to Normal Motor Development. Vojta Therapy in Childhood .Vojta Therapy in Adulthood.

Effects of Vojta Therapy on Patient Development and Communication.Frequency and Exercise Intensity in Vojta Therapy

Module- III

NDT- Definition, principles, Overview of key neurodevelopmental disorders, Role of NDT in clinical practice, Neural pathways involved in movement and motor control, Neuroplasticity and its relevance in NDT, Motor Control and Development- Normal Motor Development, Milestones in motor development from infancy to adulthood, Factors influencing normal motor development (sensory, environmental, genetic), Motor Learning and Relearning, Concepts of motor control and motor learning theories, Feedback, practice, and task-based learning in NDT, NDT Techniques and Interventions- Principles of NDT Treatment, Practical Application of NDT Techniques, Adaptive Equipment and Technologies in NDT, Assessment and Goal Setting- Comprehensive Patient Assessment in NDT, Goal Setting and Treatment Planning.

Motor Relearning Programme-Principles of Motor Relearning, Neurophysiological Mechanisms of Motor Recovery, Task-Oriented Approach. Carr and Shepherd principles of stroke rehabilitation

Module- IV

Constrained Induced Movement Therapy- Principles of CIMT, Mechanisms of Neuroplasticity, Indications and Contraindications, Components of the CIMT Protocol- Key Components of CIMT(Forced use of the affected limb, Shaping: Gradual increase in task difficulty, Intensive practice and functional tasks), Protocols of CIMT, Dosage and Duration, Functional Training and Task-Oriented Activities- Task-Specific Training, Functional Tasks for Upper Limb Rehabilitation.

Mirror Therapy-Principles of Mirror Therapy, Neurophysiological Mechanisms, Indications and Contraindications, Mirror Therapy for Motor Recovery- Motor Recovery in Stroke and Hemiparesis, Tasks and Exercises in Mirror Therapy, Stages of Motor Recovery in MT, Patient Selection and Assessment,Mirror Therapy for Pain Management- Mechanisms of Pain Reduction in Mirror Therapy, Application in Phantom Limb Pain and CRPS, Integration with Other Pain Management Techniques, Patient Monitoring and Safety,Integrating Mirror Therapy into Rehabilitation Programs- Comprehensive Rehabilitation Plans, Home-Based Mirror Therapy Programs, Outcome Measures in Mirror Therapy, Challenges and Barriers

Module V

Neurodynamics/Neural Mobilisation: Anatomy Review and Palpation Of Peripheral Nerves, Indication, Contraindication, Precaution Of Neurodynamics. Examination Of Upper Limb & Lower Limb Neural Tension Test. Neural Stretching And Neural Mobilization Of The Following Nerves- Median, Radial, Ulnar, Sciatic, Femoral, Lateral Cutaneous Nerve Of Thigh, Tibial, Peroneal, Sural Nerve.

Vestibular Rehabilitation/Canalith Repositioning Proceedure: Vestibular anatomy and physiology,Understanding sensory integration of equilibrium.Disorders affecting vestibular function, Cortical and Labyrinthine Concussion Differentiation, VRT protocols: adaptation, habituation, and substitution for patient-centered therapy. Pyschogenic factors affecting VRT outcomes. Balance and gait analysis.BPPV exercise treatment protocols.Biomechanics of Positioning.Canalith Repositioning Maneuvers

Suggested Readings:-

1. A motor relearning programme for Stroke by Carr JH and Shepherd RB Butterworth Heinemann.
2. Vestibular Rehabilitation (Contemporary Perspectives in Rehabilitation) by Susan J Herdman and Richard Clendaniel
3. Vestibular Rehabilitation Therapy for the Patient with Dizziness and Balance Disorders: Exercise Protocols by Girardi Marian, Ph.D. and Randolph McKenzie
4. Sensory Integration: Theory and Practice by Anita C. Bundy, Shelly J Lane
5. Mobilisation of the Nervous System by David Butler
6. Brunnstrom, Signe. "Movement Therapy in Hemiplegia.
7. Umphred, Darcy Ann. "Neurological Rehabilitation.
8. Rood, Margaret S. "Neurophysiological Mechanisms Used in Physical Therapy.
9. Ayres, A. Jean. "Sensory Integration and the Child."
10. Ramachandran, V.S., & Rogers-Ramachandran, D. "Phantom Limbs and Neural Plasticity: Insights from Mirror Therapy.
11. Shumway-Cook, A., & Woollacott, M. "Motor Control: Theory and Practical Applications.

INTERNSHIP

Subject Name	Code	Type of course	T-P-Pj	Credit
Internship	CUTM4340	Project	0-0-10	**10**

Course Outcome:

After completion of the course, the students will be able to:

CO	Statements	COs with PO & PSOs Mapping
CO1	Select relevant scientific literature.	PO1, PO8, PO12, PSO3
CO2	Execute appropriate data collection techniques and tools.	PO9, PO10, PO12, PSO3
CO3	Analyse data with appropriate statistical techniques.	PO5, PO9, PO12, PSO3
CO4	Design a research proposal.	PO6, PO8, PO12, PSO3
CO5	Integrate theoretical concepts and practical skills gained from their coursework to design and execute a research project	PO1, PO2, PO5, PO12, PSO1, PSO3

Internship Thesis Guideline

This Guideline is designed to provide students the knowledge and practice of public health research activity, to enable them to carry out researches and solve research related problems and to help them in writing thesis and defend their work. Upon successful completion of the course, the students shall be able to:

1. Search relevant scientific literature
2. Develop a research proposal
3. Employ appropriate data collection techniques and tools
4. Manage collected data
5. Analyze data with appropriate statistical techniques
6. Write thesis
7. Defend the findings

Proposal Development:

At the ending of 4th year (Eighth Semester), students individually consultation with designated faculties and extensive literature survey will develop research proposal during the initial 6 months period.

Data Collection/ Thesis Writing:

Students will carry out data collection, data management, data analysis, and thesis writing during the remaining period (Six Semester).

The Dissertation should have followed format:

1. Title
2. Introduction
3. Materials and Methods
4. Results
5. Discussion
6. Conclusion
7. Recommendation
8. References
9. Appendix

PROJECT

Subject Name	Code	Type of course	T-P-Pj	Credit
Project	CUTM4339	Project	0-0-10	**10**

Course Outcome:

After completion of the course, the students will be able to:

CO	Statements	COs with PO & PSOs Mapping
CO1	Identify health gaps specific to a community.	PO5, PO10, PO11, PSO3
CO2	Demonstrate critical thinking in solving health related issues.	PO5, PO7, PO12, PSO3
CO3	Evaluate case studies.	PO5, PO8, PO12, PSO3
CO4	Design and address a research problem.	PO6, PO8, PO12, PSO3
CO5	Understand the steps involved in data collection and questionnaire design	PO9, PO10, PO12, PSO3

PROJECT WORK:

Suggested Project title

1. Effect of Mobilization in improving ROM followed by metabolic condition
2. Effect of K taping in reducing pain
3. Effect of K taping in Trunk control of spastic conditions
4. Effect of Circuit Training Program on Body Weight and BMI of Young Obese Indian Females
5. Prevalence of bladder dysfunction in office employees
6. Efficacy of Hydrotherapy in reducing the spasticity of lower limbs
7. Efficacy of Burger exercises in DVT
8. Impact of ergonomic education in prevention of musculoskeletal conditions
9. Effect of combined exercises and electrotherapy in improving motor function
10. Effect of Cold vs Contrast Hydrotherapy in OA Knee