



# VELS



INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)

(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)

PALLAVARAM - CHENNAI

ACCREDITED BY NAAC WITH 'A' GRADE

*Marching Beyond 25 Years Successfully*

## **B.P.T** **Bachelor of Physiotherapy**

**Curriculum and Syllabus**  
**(Based on Choice Based Credit System)**  
**Effective from the Academic year**  
**2019-2020**

**School of Physiotherapy**

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

- PEO1: To enable BPT graduates to pursue higher education, to do research activity and to have a successful Clinical career in Hospitals associated with Physiotherapy, or as entrepreneurs.
- PEO2: To ensure that BPT graduates will have the ability, attitude, skill & knowledge to adapt to emerging changes in the field of Physiotherapy.

## **PROGRAM OUTCOME (PO)**

- PO1: During this BPT degree, one can gain a comprehensive knowledge of physiotherapy, including areas such as Orthopedics, neurology, cardiac & Respiratory conditions, OBG and preventative health care.
- PO2: The Bachelor of Physiotherapy incorporates significant clinical and professional training opportunities, providing hands-on experience with real patients in a supervised environment.
- PO3: Students will have the ability to effectively work with patients and other Clients with respect to the care of individuals, specific groups, communities or populations
- PO4: Students will have the Demonstrated skills that support lifelong learning in personal and professional development
- PO5: One can apply a distinct body of knowledge, skills and attitudes, incorporating ethical action, to improve the health and well-being of patients & other Clients.

## **PROGRAM SPECIFIC OBJECTIVES (PSOs)**

- PSO1: To structure the assessment chart, to develop short term and long term goals of treatment and design the protocol for Physiotherapy treatment by applying basic concepts of Physiotherapy Practice.
- PSO2: To apply Advance Physiotherapy techniques to treat challenging conditions.
- PSO3: To adapt to emerging changes in the field of Physiotherapy.

## BOARD OF STUDIES

S. No	NAME	AFFILIATION	ROLE
1	Dr. P. Senthil Selvam, PhD	Head of the Department, School of Physiotherapy, VISTAS	Chairperson
2	Dr. M.S. Sundaram, PhD	Professor School of Physiotherapy, VISTAS	Internal Member
3	Dr. M. Sandhiya, MPT (Phd)	Professor School of Physiotherapy, VISTAS	Internal Member
4	Dr. Priyakumari, MPT (Phd)	Professor School of Physiotherapy, VISTAS	Internal Member
5	Dr. Jibe George Varghese, MPT (Phd)	Professor & Principal Menakshi College of Physiotherapy, MAHER, Chennai	External Member
6	Dr. C.V. Senthil Kumar, MPT (Phd)	Principal Dr. M.G.R Educational and Research Institute University, Chennai	External Member
7	Dr. R. Sakthivel, MPT	Clinical Therapist Perungudi	Alumni

**B. P.T - Bachelor of Physiotherapy  
CURRICULUM**

**Total No. of Credits: 200**

**I Semester**

Category	Code	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
Core	19BPT001	Psychology & Sociology – Theory	6	0	0	4
Core	19BPT002	Anatomy- I Theory & Viva	8	0	2	6
Core	19BPT003	Physiology - I- Theory & Viva	8	0	2	6
Elective	19BPT__	DSE Elective-I- Theory	2	0	0	2
Elective	19BPT__	DSE Elective-II- Theory	2	0	0	2
<b>Total</b>			<b>26</b>	<b>0</b>	<b>4</b>	<b>20</b>

**II Semester**

Core	19BPT004	Orientation in PT & First Aid- Theory	6	0	0	4
Core	19BPT005	Anatomy- II Theory & Viva	8	0	2	6
Core	19BPT006	Physiology- II – Theory & Viva	8	0	2	6
Elective	19BPT__	GE Elective-I- Theory	2	0	0	2
Elective	19BPT__	AEC Elective-I- Theory	2	0	0	2
<b>Total</b>			<b>26</b>	<b>0</b>	<b>4</b>	<b>20</b>

**III Semester**

Core	19BPT007	Clinical Medicine & Pharmacology - Theory	5	0	0	4
Core	19BPT008	Exercise Therapy - I - Theory & Practical	7	0	2	6
Core	19BPT009	Electrotherapy – I – Theory & Practical	7	0	2	6
Core	19BPT010	Biomechanics I - Theory	5	0	0	4
Elective	19BPT__	GE Elective-II- Theory	2	0	0	2
<b>Total</b>			<b>26</b>	<b>0</b>	<b>4</b>	<b>22</b>

#### IV Semester

Core	19BPT011	Microbiology / Pathology – Theory	5	0	0	4
Core	19BPT012	Exercise Therapy II - Theory & Practical	7	0	2	6
Core	19BPT013	Electrotherapy – II- Theory & Practical	7	0	2	6
Core	19BPT014	Biomechanics II- Theory	5	0	0	4
Elective	19BPT__	AEC Elective-II– Theory	2	0	0	2
<b>Total</b>			<b>26</b>	<b>0</b>	<b>4</b>	<b>20</b>

#### V Semester

Core	19BPT015	General Surgery , Plastic Surgery & burns - Theory	5	0	0	4
Core	19BPT016	Professional Ethics /Administration/Marketing - Theory	5	0	0	4
Core	19BPT017	Evidence Based practice - Theory	5	0	0	4
Core	19BPT018	Principles of Bio Engineering – Theory & Practical	8	0	2	6
Elective	19BPT__	DSE Elective-III– Theory	5	0	0	4
<b>Total</b>			<b>28</b>	<b>0</b>	<b>2</b>	<b>22</b>

#### VI Semester

Core	19BPT019	Clinical Cardio – pulmonary diseases – Theory & Viva Voce	5	0	0	4
Core	19BPT020	Physiotherapy in Cardio pulmonary diseases – Theory & Practical	7	0	2	6
Core	19BPT021	Physiotherapy in OBG & Women health – Theory & Practical	7	0	2	6
Core	19BPT022	Community Medicine – Theory	5	0	0	4
Elective	19BPT__	DSE Elective-IV– Theory	2	0	0	2
<b>Total</b>			<b>26</b>	<b>0</b>	<b>4</b>	<b>22</b>

### VII Semester

Core	19BPT023	Clinical Neurology & Psychiatry–Theory & Viva Voce	5	0	0	4
Core	19BPT024	Physiotherapy in Neurology –Theory & Practical	7	0	2	6
Core	19BPT025	Clinical orthopaedics & Traumatology - Theory & Viva Voce	5	0	0	4
Core	19BPT026	Physiotherapy in Orthopaedics – Theory & Practical	7	0	2	6
Elective	19BPT___	SEC Elective-I– Theory	2	0	0	2
<b>Total</b>			<b>26</b>	<b>0</b>	<b>4</b>	<b>22</b>

### VIII Semester

Core	19BPT027	Community Based Rehab/ Disability Evaluation – Theory & Viva Voce	6	0	0	4
Practical	19BPT028	Clinical Reasoning in Physiotherapy management - Practical	0	0	6	4
Project	19BPT029	Project - Viva voce	0	0	10	10
Elective	19BPT___	DSE Elective-V– Theory	4	0	0	2
Elective	19BPT___	SEC Elective-II– Theory	4	0	0	2
<b>Total</b>			<b>14</b>	<b>0</b>	<b>16</b>	<b>22</b>

### CREDITS

Total Hours of Instruction (Lectures, Tutorial, Practicals)      170 Credits

Clinical Supervision & Hands on skill (VI to VIII Sem)      10 Credits

Internship Training Programme (6 Months)      20 Credits

**Grand Total      200 Credits**

### List of Discipline Specific Elective Courses

19BPT101	English for communication
19BPT102	Computer & its application in PT
19BPT103	Biostatistics / Research Methodology
19BPT104	Ergonomics
19BPT105	Clinical testing
19BPT 106	Applied Physics
19BPT107	Applied Chemistry

### List of Generic Elective Courses

19BPT151	Medical Electronics & Biophysics
19BPT152	Cardiopulmonary resuscitation
19BPT153	PT Evaluation
19BPT154	Clinical Diagnosis

### List of Ability Enhancement Compulsory Courses

19BPT201	Food and Nutrition
19BPT202	Hospital Management
19BPT203	Acupuncture
19BPT204	Medical Transcription
19BPT205	Basic statistics

### List of Skill Enhancement Elective Courses

19BPT251	Fitness
19BPT252	Yoga
19BPT253	Computer Languages
19BPT254	Effective English

**Syllabus**  
**Core Courses**



**Course Objectives:**

The objective of this course is that after 100 hours of lectures, demonstrations, practical and clinics the student will be able to recognize and help with the psychological factors involved in disability, pain, disfigurement, unconscious patients, chronic illness, death, bereavement and medical – surgical patients/conditions. They should also understand the elementary principles of behavior for applying in the therapeutic environment.

**Course Outcomes:**

The Course outcome is to know about the

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

**UNIT I****PSYCHOLOGY****20****1. DEFINITION OF PSYCHOLOGY**

Basic information in relation to following school, Methods, and Branches.

- (A) Schools : Structuralism , Functionalism, Behaviorism gestalt psychology and psychoanalysis.
- (B) Methods : Introspection, Survey, Observation and experimental method.
- (C) Branches : Abnormal, Industrial, Educational, Child, Social , Clinical, Counseling Evolution of the Definition – Psychology Application of psychology in physiotherapy.

**2. HEREDITY AND ENVIRONMENT**

Nature – Nurture controversy.

- Relative Importance of Heredity and Environment
- Twins – Identical and Fraternal twins
- Internal and External environment.

**3. DEVELOPMENT AND GROWTH BEHAVIOUR**

Infancy to old age – 36developments (Physical, Cognitive, Socio – emotional )

- (A) Baby hood
- (B) Early, Middle, Late Childhood
- (C) Adolescence
- (D) Adulthood
- (E) Middle Adulthood
- (F) Oldage

#### **4. INTELLIGENCE**

Definitions, IQ

3 types of Intelligence – Social, Mechanical and Abstract Intelligence

Various Intelligence tests – verbal & Nonverbal test, performance test.

#### **5. MOTIVATION**

The “Why” of Behavior, motives, Incentives and Reinforcement , motivation cycle.

Physiological and psychological Needs.

Primary needs – Hunger, Twist, Air, Sleep, Sex Elimination Activity, Avoidance of pain, Safety & Security.

Secondary needs – Love and Affection, Self-esteem, Self – Actualization.

Abrahams Maslow’s Need hierarchy theory.

### **UNIT II**

**20**

#### **1. EMOTIONS**

Definition, Importance of Emotion, Differentiate from feelings. Emotion and nervous system.

Types of Emotion – Primary and Mixed Emotions.

Theories of Emotion ( James- Lange theory and cannon – Bard theory)

Role of RAS, Hypothalamus, cerebral cortex, sympathetic Nervous system, Adrenal gland.

Emotion and Disease: Skin rashes, Migraine, Ulcer, etc.

Nature and control of anger, fear and anxiety.

#### **2. PERSONALITY**

Definition, list the components, Physical characteristics character abilities, temperament, Interest and attitudes.

Role of heredity, Nervous system, family and culture on personality development

Basic concepts of freud. Dynamics of personality

Id, Ego, Super Ego.

Psychosexual developmental stages of Sigmund Friend stages oral, anal,

Phallic, latency and genital stages.

Psychosocial developmental stages of Erickson (8) stages

Personality Assessment:

(a) Paper- pencil tests, questionnaires & Inventories( BAI, CPI,MMPI)

(b) Interview – Standardised, unstandardised and stress Interviews.

(c) Projective Techniques: 1) TAT – Thematic Apperception test.

2) Sentence Completion Test.

3) Rorschach’s Ink blot Test.

### **3. LEARNING**

Definition, Laws of learning by Thorndike

Theories of Learning:

- 1) Conditioning theories - Classical conditioning Operant conditioning
- 2) Insight Learning.
- 3) Trial and Error learning.

Effective ways to learn:

Massed Vs Spaced, Whole Vs part, Recitation Vs Reading, Serial Vs Free Recall Incidental Vs Intentional Learning, Role of Language, Knowledge of Results, Association, Organization and Mnemonic methods.

### **4. THINKING**

Definition, Concepts – 5 types of concepts

Creatively – steps in creative thinking.

Delusions – faculty thinking types (Reference, Influence, Sin guilt, Persecution, Grandeur and Hypochondria and Nihilistic delusions).

### **5. FRUSTRATION**

Sources and solutions of frustration (Internal & External) Reactions of Frustration

Conflicts and its 4 types

1. Approach Conflict
2. Avoidance – Avoidance Conflict
3. Approach – Avoidance Conflict
4. Double Approach - Avoidance Conflict

Stress – How to cope up with stress.

## **UNIT III**

**20**

### **1. SENSATION, ATTENTION AND PERCEPTION**

List the senses, sensation and sensory experiences–vision, auditory, Gustatory, Cutaneous, olfactory, Equilibrium, Kinesthetic and visceral sense.

Types of attention – voluntary, Involuntary & Habitual

- Division of attention, Internal (Subjective) & External (objective) factors which influences Attention.
- Span of Attention.
- Nature of stimulus, Intensity, color, Repetition, movement, size.

Perception and perceptual organization.

- Disorders of perception (Hallucination & its types – visual, auditory cutaneous, gustatory, olfactory hallucination.
- Errors of perception (Illusion –“Muller – Lyer” illusion – Horizontal vertical illusion.
- Principles of perception – figure ground principle
- principle of closure

- Grouping principles.
  - a. Similarity
  - b. Proximity
  - c. Continuity
- Other factors influencing perception – Interest, Motives, Values, Needs, Moods, Sex, Religion and past experience.

## **2. LEADERSHIP**

3 styles of leadership

- Autocratic Leadership
- Democratic Leadership
- Laissez –faire Leadership ( free – rein)
- Traits of a leader.
- Leadership can be cultivated or not?

## **3. DEFENSE MECHANISM OF THE EGO**

Successful and un successful Defense mechanisms

Importance of Defense Mechanisms.

- Compensation, Repression, Regression, Denial, Rationalization (Sour grapes & Sweet lemon), projection, Identification, Introjections, Acting out, Depersonalization.

## **4. MEMORY AND FORGETTING**

Forgetting – Decay through disuse

Interference effects

Memory – How to improve memory, Attention and Concentration.

How to face exam and overcome exam stresses.

## **5. THERAPY**

Neurotic and psychotic disorders

Psychosomatic and somato-psychotic diseases

Childhood disorder – Autism

- Mental Retardation

### **General out time:**

Therapy for mild mental disorders (for – psychotic problems)

Counseling and guidance

Psychotherapy, coping strategies for stress anger and Anxiety.

Psychological Relaxation Techniques.

**1. INTRODUCTION**

Definitions of sociology, Sociology as a science of society, uses of the study of sociology, application of knowledge of sociology in physiotherapy.

**2. SOCIALIZATION**

Meaning of socialization, influence of social factor on personality, socialization in hospitals, socialization in the rehabilitation of patients.

**3. 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 the hospital and rehabilitation settings.

**4. FAMILY**

Influence of family on human personality, discussion of changes in the functions of a family. Influence of the family on the individual's health, family and nutrition, the effects of sickness on family, and psychosomatic disease.

**5. SOCIAL PROBLEMS OF THE DISABLED**

Consequences of the following social problems in relation to sickness and disability; remedies to prevent these problems.

Population explosion

Poverty and unemployment

Beggary

Juvenile delinquency

Prostitution

Alcoholism

Problems of women in employment

**6. SOCIAL CONTROL**

Meaning of social control, role of norms, folkways, customs, morals, religion law and other means of social control in the regulation on human behavior, Social deviance and disease.

**7. SOCIAL SECURITY**

Social security and social legislation in relation to the disabled.

**1. SOCIOLOGY AND 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.

**2. CULTURE**

Components of culture, impact of culture on human behavior, Cultural meaning of sickness, Response of sickness & choice of treatment (role of culture as social consciousness to molding the perception of reality), Culture induced symptoms and disease, Sub – culture of medical workers.

**3. COMMUNITY**

Concept of community, role of rural and urban communities in public health, role of community in determining beliefs, practices and home remedies in treatment.

**4. CASTE SYSTEM**

Features of the modern caste system and its trends.

**5. SOCIAL WORKER**

Medical social worker

**6. SOCIAL CHANGE**

Meaning of social change, Factors of social change, human adoption and social change, social change and stress. Social change and deviance. Social change and health programmes, the role of social planning in the improvement of health and in rehabilitation.

**HEALTH PSYCHOLOGY (APPLIED) – Not for exams****A. PSYCHOLOGICAL REACTIONS OF A PATIENT**

Psychological reactions of a patient during admission and treatment: anxiety, shock, denial, suspicion, questioning, loneliness, regression, Shame, guilt, rejection, fear, withdrawal, depression, egocentricity, concern about small matters, narrowed interests, emotional over reactions, perpetual changes, confusion, disorientation, hallucinations, delusions, illusions, anger, hostility loss of hope.

## **B. 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.

## **C. STRESS**

Physiological and psychological changes, Relation to health and sickness: Psychosomatics, Professional stress, burnout.

## **D. COMMUNICATIONS**

Types – verbal, non – verbal, elements in communication, barriers to good communication, developing effective communication, specific communication techniques of counselors.

## **E. COMPLIANCE**

Nature, factors, contributing to non compliance, improving compliance.

## **F. EMOTIONAL NEEDS**

Emotional needs and psychological factors in relation to unconscious patients, handicapped patients, bed –ridden patients, chronic pain, spinal cord injury, paralysis, cerebral palsy, burns, amputations, disfigurement, head injury, degenerative disorders, parkinsonism, leprosy incontinence and mental illness.

## **G. GERIATRIC PSYCHOLOGY**

Specific psychological reactions and needs of geriatric patients.

## **H. PAEDIATRIC PSYCHOLOGY**

Specific psychological reactions and needs of pediatrics patients.

## **I. BEHAVIOUR MODIFICATION**

Application of various conditioning and learning principles to modify patient behavior.

## **J. SUBSTANCE ABUSE**

Psychological aspects of substance abuse: smoking, alcoholism and drug addiction.

## **K. PERSONALITY STYLES**

Different personality styles of patients.

**Evaluation****Total Hours: 100****Text books:**

1. Morgan & King, Introduction to Psychology, 3rd Ed, 1994
2. Sachdeva D.R. & Bhushan. V, An introduction to Sociology, Kitab Mahal Limited, 1974.

**References:**

1. Clifford T. Morgan – Introduction to Psychology, ELBS, 2 Ed, 1990
2. Hilgard & Atkinson - Introduction to Psychology, CBS, 3 Ed, 1994
3. Madan. G.R. Indian Social Problems, Vol.1, Chennai Applied Publications, 1973.



**Course Objectives:**

The objective of this course is that after 180 hours of lectures, demonstrations and practicals the student will be able to demonstrate knowledge in human anatomy as in necessary for the study and practice of physiotherapy.

**Course Outcomes:**

On completion of the paper, students are expected to

1. Understand the structural and functional importance of cell and different types of tissues.
2. Detail anatomical knowledge of Digestive, cardiovascular system & Genito- Urinary and outline of Endocrine system.
3. Understanding the different type of classification and general features of bone, joints and muscular tissues.
4. The structural and functional importance of muscles, joints, long and short nerves and different spaces in upper limb including applied aspect.
5. Knowledge of greater vessels, muscles and structural and functional importance of different viscera in head and neck region outline of visual, auditory and taste pathways, including applied aspect.

**UNIT I****INTRODUCTION****36****a. Introduction**

1. Define Anatomy and mention its subdivisions.
2. Name regions, cavities and system of the body.
3. Define anatomical position and anatomical terms.

**b. Cell**

1. Define a cell.
2. Mention the shape, size and parts of a cell.
3. Name and mention the functions of organelles. Name the inclusion bodies.
4. Define chromosomes and genes.
5. Review mitosis and meiosis. Mention the main events, but stages not necessary.

**c. Tissues**

1. Classify tissues.
2. Classify and mention the microscopic structure of types of tissues such as epithelial, connective, muscular and nervous tissues. Give examples for each type of tissue.

**a. Introduction to Bones (Osteology)**

1.
  - a. Define skeleton.
  - b. Mention the subdivisions of skeleton. Name the bones in each subdivision. Know the number of bones in each subdivision and total number of bones.
  - c. Classify the bones and give examples.
  - d. Enumerate the common surface features of the bones.
  - e. Define ossification. Explain the types of ossification and give examples. Define ossification centre. Explain the growth of a long bone in length and width.
  - f. Indicate blood supply and nerve supply of a bone.
2. When regional anatomy is taught:
  - a. Identify the name and correctly orientate the bone.
  - b. Identify surfaces, borders and all other surface features.
  - c. Mark and indicate the muscle and ligaments attachments on the bone.

**b. Introduction to Joints (Syndesmology / Arthology)**

1.
  - a. Define a joint or articulation.
  - b. Classify the joints and give examples for each type. Define each type of joint.
  - c. Mention the basic features of a synovial joint.
  - d. Define the axis and movements possible in a synovial joint.
  - e. Define range of movement and limiting factors.
  - f. Indicate the blood supply and nerve supply in general.
  - g. Define stability of a joint.
  - h. Demonstrate common movements.
2. When regional anatomy is taught:
  - a. Mention the type, the articular surfaces, ligaments, and movements, axis of the movements, chief muscles producing the movements, limiting factors, nerve supply and blood supply of all individual joints.
  - b. Mention the factors for stability.
  - c. Articulate the factors for stability.
  - d. Indicate applied anatomy for all joints.

**c. Introduction to Muscles (Skeletal Muscle) (Myology)**

1.
  - a. Define a skeletal muscle.
  - b. Define fasciae, tendon, and aponeurosis.
  - c. Classify the skeletal muscles by shape etc., and give examples.
  - d. Define origin, insertion, muscle work (contractions), type of muscle work, range of muscle work; group actions - protagonists, antagonists, synergists and fixators: shunt and spurt muscles; types of levers with examples.

2. When the regional anatomy is taught:
  - a. Mention the position, origin, insertion, nerve supply and actions of the skeletal muscles. (for the skeletal muscles of soft Palate, Pharynx and larynx, position, action and nerve supply may be sufficient)
  - b. Indicate the groups of muscles by position and action, group action and nerve supply of group of muscles.
  - c. Indicate segmental innervations of muscles.
  - d. Predict the result of paralysis of individual and group of muscles.

### **UNIT III**

### **UPPER EXTREMITY**

**36**

1. Pectoral regions:
  - a. Outline the features of pectoral region.
  - b. Name, identify and correctly orientate the sternum, Clavicle, scapula and humerus.
  - c. Outline the main features of the bones of shoulder girdle.
  - d. Identify the parts, borders and surfaces of sternum. Mention its other features.
  - e. Identify the ends, surfaces curvatures and other features of clavicle.
  - f. Identify the borders, angles, surfaces, processes, fossae and other features of scapula.
  - g. Identify the ends, head, greater and lesser tubercles, anatomical and surgical necks, capitulum, trochlea, radial, coronoid and olecranon fossae and epicondyles of humerus.
  - h. Locate and identify the muscles of pectoral region. Mention their origin, insertion, nerve supply and action.
2. Scapular region:
  - a. Comprehend the main features of the muscles in the scapular region.
  - b. State the layered arrangements of the muscles of the back.
  - c. Name and identify the muscles of scapular region. Mention their origin, insertion, nerve supply and actions.
  - d. Demonstrate the bony landmarks of scapula, humerus and clavicle.
3. Axilla:
  - a. Mention and identify the boundaries and contents of axilla.  
Name the branches of axillary artery. Name and identify the cords and branches of brachial plexus and mention their root value.
  - b. Illustrate the formation of brachial plexus.
4. Shoulder Girdle:
  - a. Comprehend the main features of the joints of the shoulder girdle and state their functions.
  - b. Name the joints of shoulder girdle. Identify the articular surfaces and name the

- ligaments and movements of sternoclavicular and acromioclavicular joints. Mention the types of joints.
- c. Demonstrate and name the movements of scapula. Mention the chief muscles producing these movements. Correlate movements of scapula.
  - d. Assign functional roles to the articular disc and costo clavicular ligament.
5. Shoulder joint:
- a. Mention the type, articular surfaces and ligaments of the shoulder joint.
  - b. Define and demonstrate the movements of shoulder joint.
  - c. Name and identify the chief muscles producing these movements. Analyse these movements and mention their limiting factors.
  - d. Mention the blood supply and nerve supply of this joint.
  - e. Analyse the association of movements of scapula and movements of shoulder joints.
  - f. Mention the limiting factors and the factors for its stability.
6. Upper arm:
- a. Name and identify the muscles at the front and back of the upper arm.
  - b. Name and identify the ends, borders, surfaces and features of the humerus. Identify the head, anatomical neck, tubercles, surgical neck, bicipital groove, condyle, capitulum, trochlea, epicondyles, radial, coronoid and olecranon fossae.
  - c. Mention the origin, insertion, nerve supply and actions of the muscles present front and back of the upper arm.
  - d. Indicate the course, relations and distribution of radial and musculo-cutaneous nerves.
7. Elbow Joint:
- a. Mention the type, articular surfaces and ligaments of elbow joints.
  - b. Define and demonstrate the movements. Name the chief muscles producing these movements.
  - c. Mention the factors for stability and limiting factors.
  - d. Indicate the applied anatomy.
  - e. Mention the blood supply and nerve supply.
  - f. Explain the carrying angle.
8. Forearm, Wrist and Hand:
- a. Mention the bones of forearm, identify the ends, borders, surfaces and features of radius and ulna.
  - b. Identify the head, neck, tuberosity and styloid process of radius.
  - c. Identify the coronoid process, olecranon process, trochlear notch, tuberosity, head, styloid process of ulna, radial notch of ulna and ulnar notch of radius.
  - d. Name and identify the carpal bones, metacarpal bones and phalanges in an articulated hand.

- e. Mention the position, origin, insertion, nerve supply and action of these muscles.
  - f. Indicate the course, relations and distribution of median, ulnar and radial nerves.
  - g. Mention the type, articular surfaces and ligaments of radioulnar joints. Define the movements of supination and pronation. Mention the axis and muscles producing these movements. Analyse these movements and apply it to the functional role in routine day to day actions.
  - h. Mention the position and distribution of radial and ulnar arteries and ulnar, median and radial nerves.
  - i. Name and locate the carpal bones. Mention the type, articular surface and ligaments of wrist joint. Define and demonstrate the movements and mention the muscle producing them. Mention its blood supply and nerve supply.
  - j. Predict the result of paralysis of muscles of the forearm.
  - k. Mention the functional implications of prehension in the structure of hand.
  - l. Indicate the arrangements of tendons of the digits, retinaculae, fibrous flexor sheaths and synovial sheaths.
  - m. Evaluate the hinge type of interphalangeal joints, ellipsoid type of Metacarpophalangeal joints and saddle type of carpometacarpal joint.
  - n. Name and identify the small muscles of the hand. Mention their position, origin, insertion, nerve supply and action.
  - o. Mention the types of bones formed and ligaments of the joints of the hand. Define the movements and the muscles producing these movements. Predict the result of paralysis of the various types of grip.
  - p. Demonstrate the types of grip.
9. Nerves of Upper limb:
- a. Comprehend and apply the knowledge of the position and distribution of upper limb nerves.
  - b. Mention the root values of the nerves.
  - c. Identify the nerves and mention the position, course, relations and distribution of nerves of upper limb.
  - d. Predict the result of injury to these nerves.
10. Blood Vessels of Upper Limb:
- a. Comprehend and apply the knowledge of the position and distribution of blood vessels and lymph nodes.
  - b. Trace the main arteries and veins.
  - c. Indicate their position name the main branches of tributaries.
  - d. Name and locates the lymph nodes.
11. Cutaneous Nerves of Upper Limb:
- a. Name the cutaneous nerves and illustrates the areas of their distribution.
  - b. Illustrate the dermatomes.

**Head and Neck**

Musculoskeletal and Neurovascular features. Identify the anterior and posterior triangles of neck. Name the subdivisions.

List the contents.

1.
  - a. State the main features of the skull and the facial skeleton.
  - b. Identify the large skull bones and their parts.
  - c. Identify the cranial fossae and hypophyseal fossa.
  - e. Identify and name the main muscle of the face. Mention their nerve supply and action.
  - f. Predict the results of paralysis to the facial muscles and sequel of injury to the facial nerve. (VII Nerve)
  - g. Map the cutaneous distribution of the three divisions of the trigeminal (Vth) nerve on the face.
  
2.
  - a. Identify the general features of a typical cervical vertebra, atlas, axis and seventh cervical vertebra.
  - b. Identify the erector spinae, sternomastoid, scalene muscles and geniohyoid. Mention their attachments, actions and nerve supply.
  - c. Identify the phrenic, accessory and vagus nerves. Mention their distribution.
  - d. Identify and state the position, distribution and root values of the nerves of cervical and brachial plexuses.
  - e. Demonstrate the action of sternocleidomastoid.
  - f. Mention the type, articular surface, ligaments, movements and muscles producing these movements, at the atlanto-occipital and atlanto-axial joints. Demonstrate these movements and the movements of the cervical part of vertebral column.
  
3.
  - a. Identify the subclavian, vertebral and carotid arteries. Mention the position and extent of these arteries.
  - b. Identify the components of the Circle of Wills. Mention the distribution of internal and external carotid and vertebral arteries. Predict the sequelae of occlusion of these arteries.
  - c. Define the modes of distribution of pre and postganglionic efferent neurons in sympathetic and para sympathetic nervous system.
  - d. Name the cranial nerves containing para sympathetic fibers and mention their distribution.
  - e. Distinguish between sympathetic and para sympathetic systems in relation to their functions.

**Temporomandibular joint:**

1. State the type, articular surfaces, ligaments, possible movements, muscles performing the movements and nerve supply of the Temporomandibular joint.
2. Palpate and identify the joint and its articular surfaces.
3. Identify and name the muscles of mastication. Mention their actions and nerve supply.

**Mouth:**

1. State the main features of the mouth cavity, tongue, palate, salivary glands, teeth and gums.
2. Mention the sensory and motor innervations of the tongue.
3. Identify the salivary glands.
4. Demonstrate movements of the tongue and palate.
5. Test and produce the swallowing (gag) reflex.
6. Predict the sequelae of lesions of the VII<sup>th</sup> and XII<sup>th</sup> cranial nerves.

**Pharynx:**

1. State the position and extent of the pharynx.
2. State the three subdivisions and the features of each subdivision.
3. Name the muscles of pharynx and their action.
4. Mention the sensory and motor innervation of the pharynx.

**Larynx and Trachea:**

1. Identify the hyoid and state its parts.
2. Identify the larynx and name its parts.
3. State the boundaries of laryngeal inlet and glottis.
4. Identify the vocal and vestibular folds.
5. State the movements of the laryngeal cartilages. Name the laryngeal muscles.
6. Mention their attachments, actions and nerve supply.
7. Define the position, extent and gross structure of the trachea.
8. State the mechanics of phonation and speech, production of sound voice and speech.

**Cranial nerves:**

1. Enumerate the cranial nerves in serial order.
2. Relate and interpret the number to the names.
3. Indicate the nuclei of origin of termination.
4. Mention the attachments to the brain and the cranial exits.
5. State the sensory and motor distribution.
6. State the position and course of VII<sup>th</sup> nerve.
7. Predict the sequel of lesion.

**Eye:**

1. State the position of the lacrimal apparatus, the functional implications of structure of the eye and the lacrimal apparatus.

2. Name and illustrate the coat, their subdivisions, the refractive media, the chambers of the eye and the optic nerve.
3. Mention the structure of retina and optic pathway.
4. Know the basic understanding of the light and accommodation reflex. (omitting the pathways).
5. Mention the distribution of the three divisions of trigeminal (V) nerve.
6. Name and state the nerve supply and simple actions of the extraocular muscles
7. Predict the results of lesions of III, IV, and VI cranial nerves.

**Nose:**

1. Name the bony components of the nose.
2. Mention the parts and boundaries of the nose.
3. State the main features of the nasal cavity.
4. Name and identify the para nasal air sinuses and locates their openings.

**Ear:**

1. State the basic structural plan of the organs of hearing and equilibrium.
2. Mention the three subdivisions of the ear.
3. Mention the nerve endings for hearing and equilibrium

**UNIT V**

**36**

**SYSTEMS**

**a. Endocrine system**

1. List the endocrine organs and mention their positions.
2. Mention the hormones produced by each endocrine organ.

**b. Digestive System**

1.
  - a. List the parts of the digestive system.
  - b. Mention the boundaries and features of mouth.
  - c. Classify teeth.
  - d. Mention position, extent, subdivisions, communications, internal features and muscles of pharynx.
  - e. Name the tonsils and define fauces.
  - f. Identify the internal features of the mouth and the pharynx on the specimen.
2.
  - a. State the position, course and extent of oesophagus.
  - b. Identify oesophagus on the specimen.
  - c. State its basic nerve supply.
3.
  - a. Mention the position, gross structure of the stomach.
  - b. Identify the stomach, its borders, surfaces and its subdivisions.



- c. Enumerate the immediate relations of the stomach.
  - d. State the basic nerve supply of the stomach.
4.
    - a. Name the subdivisions of the intestine and mention their position.
    - b. Mention the differences between small and large intestine.
  5.
    - a. Name the arteries arising from abdominal aorta. Name the organ supplied by these branches.
    - b. Name the positions of the principal autonomic visceral nerve plexuses in the abdomen and pelvis, and state the organs supplied by them.
  6. Mention the position and gross features of the liver and biliary system.
  7. Name the position and subdivisions of the pancreas.
  8.
    - a. Name the major salivary glands.
    - b. Indicate their positions.
    - c. Mention the site of openings of their ducts.

### **c. Genito-Urinary System**

1.
  - a. Comprehend the basic functional implications and the basic structure of the kidney and ureter.
  - b. Mention the position, size and shape of the kidney.
  - c. Name the immediate relations of the kidney.
  - d. Indicate the cortex, medulla, pyramids, sinus, calyces and pelvises of urethra in macro section of kidney.
  - e. Illustrate the structure of a nephron.
  - f. Identify the urethra and indicates the position of the ureter.
2.
  - a. State the anatomy of the bladder and urethra.
  - b. Mention the position, shape, size and surfaces of the bladder.
  - c. Indicate the immediate relations of the bladder.
  - d. Mention the basic innervations of the bladder.
  - e. Name and identify the subdivisions of the male urethra.
  - f. Mention the position, extent and immediate relations of the male urethra.
  - g. Locate and identify the female urethra.
  - h. Mention the position, extent and immediate relations of the female urethra.
  - i. Name the sphincter of the urethra.
3.
  - a. List and locate the parts of the male reproductive system. State the anatomy and functional considerations of the testis, male accessory organs of reproduction and external organs.

- b. Name the constituent structures of the spermatic cord.
  - c. Mention the position of the inguinal canal.
  - d. Name the component structure and parts of the penis.
4.
    - a. List and locate the parts of the female reproductive system. State the anatomy and functional considerations of ovary, uterine tubes, uterus, vagina and female external genitalia.
    - b. Mention the basic features of parts of the female external genitalia.
    - c. Enumerate the factors responsible for the maintenance of the position of the uterus and anatomy of its prolapse.
    - d. Mention the position, extent and gross structure of the female breast.
5. Name the common internal and external iliac arteries.

### **Evaluation**

**Total Hours: 180**

### **Text Book**

1. Chaurasia, Human Anatomy - VOL I, VOL II, VOL III, 7<sup>th</sup> Edition, CBS, 2016.
2. Text Book of Anatomy, Vishram Singh – VOL I, VOL II, VOL III, 3<sup>rd</sup> Edition, CBS, 2018.

### **References:**

1. Nigle Palastanga, Anatomy and human movement, Butterworth Heinmann pub. 4<sup>th</sup> Ed, 2007.
2. Cunningham's Manual of Practical anatomy ( for practical classes only ) Vol. 1, 2 and 3. Romanes, Oxford university press, 3Ed, 2006.
3. Gray's Anatomy, William Bannister, Churchill Living Stone pub, 3 Ed, 2007.

**Course Objective**

The Objective of this course is that after 180 hours of lectures, demonstrations Lab practicals the student will be able to demonstrate an understanding of elementary human physiology dealing with cell, skin, muscle, blood and other important systems of the body.

**Course Outcomes:**

The Course outcome is to know about the

1. Outline of structural and functional importance of cell, muscle and skin.
2. Detail knowledge of different type and function of blood cells.
3. Outline of different parts and functions of excretory, endocrine system.
4. Basic bio chemistry knowledge of different type of digestion.
5. Understanding the carbohydrate, protein and lipid metabolism

**UNIT 1****36****A. CELL INTRODUCTION**

- Outline of basic concept of cell structure and its functions
- Transport through cell membrane
- Homeostasis

**B. SKIN**

- Structure
- Functions
- Blood flow
- Temperature regulation

**C. BLOOD**

- Blood components and its structure
- Plasma proteins
- RBC, Erythropoiesis
- ESR
- Anaemia
- WBC and its functions
- Immunity & its types

- Platelets & its functions
- Coagulation of blood and clotting mechanism
- blood groups

## **UNIT 2**

**36**

### **MUSCLE**

- Classification of muscles
- Structure of a skeletal muscle
- Properties of a skeletal muscle
- Neuromuscular junction & excitation contraction coupling
- Changes during muscle contraction
- Single muscle twitch, quantum & wave summation
- Tetany, myasthenia gravis
- All or none law
- Types of muscle contraction
- Muscle fatigue
- Muscle action potential
- EMG – overview
- Aerobic & anaerobic view
- Endurance & muscle strength
- Age related changes in muscle
- Age related changes in physical work capacity

## **UNIT 3**

**36**

### **A. DIGESTION**

- Mouth & salivary glands
- Mechanism & regulation of gastric juice secretion
- Bile & pancreatic secretion
- Secretions of small and large intestines
- Movements (motility) of the GI tract

### **B. EXCRETION**

- Structure of nephron
- Juxta Glomerular apparatus
- Renal circulation
- Formation of urine
- Micturition
- Renal failure

## UNIT 4

36

### ENDOCRINE SYSTEM

- Hormones
- Pituitary gland-its functions & abnormalities
- Thyroid gland-its functions and abnormalities
- Thyroxin
- Parathyroid glands & physiology of bone

## UNIT 5

36

### BIOCHEMISTRY

- Cell – biochemical morphology of cell
- Carbohydrate chemistry – definition, general
- Classification properties & functions.
- Carbohydrate metabolism, glycolysis, TCA cycle
- Gluconeogenesis, HMP shunt, diabetes.
- Lipid chemistry
- Definition, general classification, properties & functions.
- Lipid metabolism – ketogenesis, ketolysis, functions of lipoproteins, oxidation of fatty acids

### Evaluation

**TOTAL HOURS: 180**

### Text Books:

1. John E.Hall, Arthur C.Guyton, Text Book of Physiology, Saunders, 12<sup>th</sup> Edition, 2010
2. S.S.Randhawa, Medical BioChemistry, PV Books, 1 Ed, 2013
3. Chatterjee, Human Physiology,Central book agency, 4th edition, 1958.

### References:

1. L. Prakasam Reddy,Concise Medical Physiology, JP Brothers, 3<sup>rd</sup> Edi,1999
2. Shetty nandhini, Biochemistry for Physiotherapist and AHS, JP bros, 1 Ed, 2008
3. Sembulingam, Essentials of Physiology, JP Medical Ltd, 6<sup>th</sup> Ed, 2013
4. Sujith Kumar Chaudhri, Concise medical physiology, New Central Book Agency, 6th Ed, 2011
5. U. Sathyanarayana, Essentials of Biochemistry, Book and Allied (P) Ltd, Kolkata,1999
6. Ganong's review of medical physiology kim .E. Barrett 25<sup>th</sup> edition.
7. DM .Vasudevan Textbook of biochemistry for medical students 7<sup>th</sup> edition.

**Course Objective:**

The objective of this course is that after 100 hours of lectures, demonstration, practicals and clinicals, the student shall be able to demonstrate and understand the principles of first aid and demonstrate skill in giving first aid treatment in emergencies that may be met in the community and in his/her practice as therapist.

**Course Outcomes:**

1. Students should have understood the importance of first aid how it can be attempted during various emergency needs, what are the common positions which can be attempted while giving first aid & should know the indications and contraindications while giving first aid for different emergency needs.
2. Students should have understood the common musculoskeletal and respiratory and wounds how to manage those injuries during the golden period of the injury, know the different treatment method for each musculoskeletal and respiratory and wound management.
3. Students should know how the spinal cord or brain injuries will be handled during the emergency situations & will also understand different ways of wound care and hemorrhage management.
4. Students should have understood about the internal structure damage in person encounter during shock & should know how to perform a differential evaluation for diagnosing a shock.
5. Student should have understood how the natural disasters can affect the persons living environment & should know the different ways to be followed during disaster in order to rescue the people from the emergency needs. They should be aware of emergency resources available through which they can save the life of the people.

**UNIT I****20****1. Introduction**

Definition of first aid, importance of First aid, Golden rules of First aid, scope and Concept of emergency.

**2. First Aid Emergencies**

1. Burns and scalds: Causes, Degree of burns, First aid treatment, General treatment.
2. Poisoning: Classification (irritants, acid, alkali and narcotics), signs and symptoms. First aid treatment, General treatment.
3. Trauma due to foreign body intrusion: Eye, ear, nose, throat, stomach and lungs.
4. Bites: First aid, signs, symptoms and treatment.
  - a. Dog bite: Rabies.
  - b. Snake bite: Neurotoxin, bleeding diathesis.

## **UNIT II**

**20**

### **1. Skeletal injuries**

Introduction to fracture, Types of fractures, mechanism of injury, Signs and symptoms. Rules of treatment, Transportation of patient with fracture, First aid measures in Dislocation of joints, treatment for muscle injuries.

### **2. Respiratory Emergencies**

1. Asphyxia: Etiology, Signs and symptoms, rules of treatment.
2. Drowning: Definition and management.
3. Artificial Respiration: Indications, Types and techniques.

### **3. Wounds and Hemorrhage**

1. Broad outline of Anatomy and Physiology of the circulatory system.
2. Wounds: Classification, management.
3. Hemorrhages: Classification, Signs and symptoms, rules for treatment of hemorrhage.
4. Treatment of hemorrhage from special areas ( Scalp, mouth, nose, ear, palm and various veins)
5. Internal Hemorrhages: Visible and concealed.

## **UNIT III**

**20**

### **1. Shock and Unconsciousness**

Definition; Types of shock, common causes of shock, signs and symptoms of shock (Assessment of established shock). General and special treatment of established Shock.

### **2. Transportation of the injured**

1. Methods of transportation: Single helper, hand seat, stretcher, wheeled transport (ambulance).
2. Precautions taken: Blanket lift, Air and sea travel.

## **UNIT IV**

**20**

### **1. Community Emergencies**

Role of first aider (immediate and late) in fire, explosions, floods and earthquakes.

### **2. Community Resources**

Police assistance, voluntary agencies (local, national, international) and ambulance services (functions)

**Orientation and Introduction to physiotherapy**

1. Acquire the geographical orientation of the various concerned sections of the college & the clinical training areas.
2. Get the overall idea about the graduate program & its scope in the professional
3. Practice
4. Learn the bed – side manners. General ethical code & discipline of the department
5. Acquire the skill of History taking in general.

**Evaluation****Total Hours: 100****Text Books:**

1. Hoon R.S, First aid to the injured, St.John Ambulance Association,10<sup>th</sup> Ed, 2014.
2. Gardner Ward & Peter J. Roylance, New Advanced First Aid, London Butter Worths, 3rd edition, 2001.

**References:**

1. Raine Hardhins and Hunt Vaheirs,Urgencies and emergencies for Nurses, English Universities Press Ltd, 1965.
2. First Aid, American Red Cross, The Balckiston company, Philadephia, 1945.
3. Golqalla Asoi, A handbook of emergencies, Bombay sam and company, 1986.



**Course Objectives:**

The objective of this course is that after 180 hours of lectures, demonstrations and practicals the student will be able to demonstrate knowledge in human anatomy as in necessary for the study and practice of physiotherapy.

**Course Outcomes:**

On completion of the paper, students are expected to know

1. Basic anatomical knowledge of cardiovascular, lymphatic system
2. Detail anatomical knowledge of nervous system.
3. The structural and functional importance of muscles, joints, long and short nerves and different spaces in lower limb, including applied aspect.
4. Basic anatomical knowledge of boundaries and contents of thoracic, abdominal and pelvic cavity.
5. Outline of visual, auditory and taste pathways, including applied aspect.

**UNIT I****36****OSTEOLOGY & MYOLOGY OF LOWER EXTREMITY****Lower Extremity**

1.
  - a. Name, identify and orientate hip bone, femur, tibia, fibula and patella.
  - b. Identify the components and features of hip bones. Identify the ends, borders, surfaces, head, neck, trochanters, condyles and epicondyles of femur and the features of the tibia and fibula.
  - c. Identify and mention the origin, insertion, nerve supply and action of the muscles in the front of thigh.
  - d. Mention the boundaries and contents of femoral triangle and subsartorial canal.
  - e. Indicate the position, course and distribution of femoral nerve.
  - f. Indicate the course and main branches of femoral artery and mention the blood supply of neck of femur.
  - g. Indicate the position of femoral vein.
2. Medial side of Thigh:
  - a. Name and identify the muscles of the medial side of thigh. Mention their origin, insertion, nerve supply and action.
  - b. Indicate the course, relations and distribution of obturator nerve.

3. Back of Thigh:
  - a. Identify and mention the position, origin, insertion, nerve supply and action of the hamstring muscles.
  - b. Indicate the position, course, relation and distribution of sciatic nerve.
4. Gluteal region:
  - a. Identify and mention the position, origin, insertion, nerve supply and action of the muscles.
  - b. Name and mention the position and course of the nerves found there and names of the arteries present in the Gluteal region.
5. Hip Joints:
  - a. Mention the type, articular surface and ligaments.
  - b. Define the movements and name the chief muscles producing the movements.
  - c. Mention the blood supply, nerve supply, factors for stability and limiting factors.
  - d. Indicate applied anatomy.
6. Knee Joints:
  - a. Mention the type, articular surfaces and ligaments.
  - b. Define the movements and name the chief muscles responsible for the movements.
  - c. Analyse the movements.
  - d. Know the blood supply and nerve supply.
  - e. Indicate applied anatomy.
  - f. Define locking and unlocking of the joints.
7. Popliteal fossa:
  - a. Indicate the boundaries and contents.
  - b. Mention the position and branches of tibia and common peroneal nerves.
8. Front of Leg and Dorsum of Foot:
  - a. Name and identify the tarsal bones, metatarsal bones and phalanges in an articulated foot.
  - b. Name and identify the muscles.
  - c. Mention the position, origin, insertion, nerve supply and actions of the muscles.
  - d. Position and distribution of deep peroneal nerve.
  - e. Indicate the position and attachments of extensor retinaculae.
  - f. Mention and identify the features of the tibia and fibula.
9. Lateral Side of Leg:
  - a. Name and identify the muscles.
  - b. Mention the position, origin, insertion, nerve supply and action of the muscles.
  - c. State the position, course and distribution of superficial peroneal nerve.
  - d. State the position and attachment of peroneal retinacula.
10. Back of Leg and Sole of Foot:
  - a. Name and identify the features of the bones of the foot.
  - b. Name and identify the muscles of back of leg.

- c. Mention the position, arrangement, origin, insertion, nerve supply and action of the muscles.
- d. State the position, course and distribution of tibial artery.
- e. State the position and distribution of posterior tibial artery.
- f. Mention the position and attachment of flexor retinaculum.
- g. Mention the arrangement, origin, insertion, nerve supply and action of muscles of foot.
- h. Indicate the types, formation and factors for the maintenance of the arches of foot.
- i. Mention the type, articular surface, ligaments, movement's of chief muscles for the movement, axis of movements and applied anatomy of tibiofibular joints, ankle joints, subtalar joints, M.P.joints and I.P. joints.
- j. Palpate and identify the tendons around the ankle and dorsum of foot.

#### 11. Nerves:

- a. Indicate the position, formation and branches of lumbar and sacral plexuses.
- b. Mention the root values of the nerves.
- c. Mention the position, course, relation and distribution of the nerves.
- d. Predict the result of injury to the nerves.
- e. Illustrate cutaneous innervation of dermatomes.

#### 12. Blood vessels:

- a. Indicate the position of arteries and their main branches.
- b. Indicate the position of veins and their main tributaries.
- c. Indicate the position of lymph nodes.

## UNIT II

36

### TRUNK & THORAX

#### Vertebral Column:

1. State the basic osteology of vertebral column.
2. Identify the parts of a typical vertebra. Identify and state the main features of typical vertebra in each group of vertebrae. Identify a typical vertebra.
3. State the form, structure and movements of joints of vertebral column. Mention the movements and the muscles producing them.
4. Identify the intervertebral disc and mention its parts.
5. State the formation and ligaments of the intervertebral joints.
6. Name and identify the curvatures of the vertebral column and Indicate the deformities.
7. State the contents of vertebral canal.

## **Thorax:**

1.
  - a. State the main features of the bones and joints of thoracic cage. Mention the boundaries.
  - b. State the parts and features of sternum.
  - c. Define true, false and floating ribs. Mention the parts and features of typical rib. Know the main features of a typical rib.
  - d. Mention the type and formation of the joints between rib and vertebrae, between costal cartilage and sternum and between costal cartilages.
  - e. Mention the type and formation of the joints between the parts of sternum. Indicate the importance of sternal angle.
  - f. Analyse pump handle and bucket handle movements of ribs.
  - g. Palpate bony landmarks such as jugular notch, sternal angle, xiphisternum and spines of thoracic vertebrae.
2.
  - a. Define inter costal space and list the contents. Mention the course and branches of typical intercostal nerve. Name the muscles of thorax. Mention the origin, insertion, nerve supply and action of intercostal muscles and diaphragm.
  - b. Name the structure passing through the diaphragm and mention the orifices in the diaphragm.
3.
  - a. Define the boundaries and subdivision of the mediastinum and list the contents. Identify the contents.
  - b. State the features of thoracic parts of sympathetic trunk.

## **UNIT III**

**36**

### **ABDOMEN & PELVIS**

#### **Abdomen:**

1.
  - a. Mention the main features of lumbar vertebrae, sacrum and coccyx.
  - b. Mention the formation and subdivisions of the bony pelvis. List the features of the female bony pelvis and their roles.
  - c. Mention the type, articular surfaces, ligaments and movements of the joints of pelvis.
2.
  - a. Define abdominal cavity.
  - b. List the layers of anterior abdominal wall. Name and mention the origin, insertion, nerve supply and action of the muscles and the features of these muscles.
  - c. Explain the formation of rectus sheath and list its contents.
  - d. Define inguinal canal and know its position, extent, formation and contents. Indicate its clinical importance. Define inguinal hernia.
  - e. Name and identify the muscles of posterior abdominal wall. Give their origin, insertion and action. List the organs on the posterior abdominal wall. Name the blood vessels on the posterior wall.
  - f. Mention the position and formation of lumbar plexus. Name its branches.

- g. State the anatomy of lumbar region. Understand the disposition of muscles of the back in layers. Mention the arrangement of lumbar fascia. Identify the muscles in region. Understand the lumbar routes to abdomen. Identify and mention the attachments and actions of the large muscles of back. (at least the ones ending capitis).
- h. Distinguish abdominal cavity and peritoneal cavity.
- i. Mention the features of lumbar part of sympathetic trunk and other sympathetic ganglia.
- j. Mention the branches and distribution of the abdominal aorta and iliac arteries.
- k. State the inferior vena cava and iliac veins and mention their tributaries.

### **Pelvis**

- 1. State the main features of subdivisions, boundaries, walls and floor of pelvis.
- 2. Mention the features of the pubic symphysis and sacroiliac joints.
- 3. Distinguish and mention the major difference between the male and female.
- 4. Identify the muscles of the pelvic floor and mention their attachments, actions and nerve supply.
- 5. Mention the structure of the urogenital diaphragm.

## **UNIT IV**

**36**

### **NEUROANATOMY**

#### **Nervous System**

- 1.
  - a. Define the subdivisions of nervous system. Define central, peripheral and autonomic nervous system and name their subdivisions. Comprehend the position and form of the spinal cord, its structure and functions in terms of neuronal connections.
  - b. Indicate the position and extent of the spinal cord.
  - c. Illustrate the principal features shown in a transverse section of the spinal cord.
  - d. Specify the basic features of a mono and multi synaptic spinal reflex pathway.
  - e. Illustrate the white and grey matter and anterior, lateral and posterior columns of the spinal cord
  - f. Mention the origin, termination and position of important ascending and descending tracts, sites of crossing of fibers of these tracts, and function of each tract.
  - g. State the main consequence of spinal cord transection and hemi section and explain the rationale of cordotomy.
  - h. Indicate the blood supply and meninges of spinal cord.
- 2.
  - a. Name the subdivisions of the brain. Identify and mention the external features of the brain.
  - b. Mention the internal structures and basic features of the brain stem and name the nuclei and fibre tracts with special emphasis on cranial nerve nuclei.
  - c. Identify and mention the parts of the cerebellum.
  - d. Mention the external features and internal structures of the cerebellum and name its

- various afferent and efferent fibers tracts and their origin and termination.
- e. Mention the features of the gross components of the cerebrum.
  - f. Mention and identify the location of gyri, sulci and cortical areas.
  - g. State and identify association, commissural and projection fibers.
  - h. Define and identify components of fore brain, including cerebral cortex, insula, olfactory bulb, olfactory tract, uncus, fornix, basal ganglia, thalamus, hypothalamus, internal capsule, corpus callosum etc.
  - i. Predict the result of damage to internal capsule.
  - j. Outline sensory and motor pathways and trace these pathways.
  - k. Name sensory and motor nerve endings with their functions.
  - l. Define pyramidal motor system and name its tracts.
  - m. Define upper and lower motor neurons.
  - n. Name the parts and tracts of the extra - Pyramidal system and indicate their functions.
3. Outline the basic structures of sensory organs: - Nose, Tongue, Eye, Ear and Skin.
  4. Briefly outline the nature and basics of muscle tone, Mention the anatomical pathways involved in the production and maintenance of muscle tone.
  5.
    - a. State the formation, circulation and drainage of CSF.
    - b. Locate and identify the ventricles.
    - c. Identify and name the meninges and spaces around it and locate the cisterns.
    - d. Define lumbar puncture and cisternal puncture.
    - e. State the feature of the meninges.
    - f. Recognise the difference between extradural, subdural and subarachnoid haemorrhage.
  6.
    - a. Outline the arrangements of major blood vessels around the brain and spinal cord.
    - b. Mention the arteries forming the circle of Willis.
    - c. Name the branches of major arteries supplying the brain and spinal cord and mention the parts they supply.
    - d. Predict the result of blockage or rupture of central deep branches.
    - e. Predict the result of occlusion of cerebral arteries.
    - f. Predict the result of occlusion of vertebral or basilar arteries.
    - g. Identify and mention the connections of dural venous sinuses.
    - h. Name and identify the parts of the limbic system. Mention their function in emotion and behaviour.
  7.
    - a. Mention the position and structure of the autonomic nervous system.
    - b. Mention the sites of origin and termination of the preganglionic and postganglionic sympathetic and parasympathetic fibers.
    - c. Name and locate the sympathetic and parasympathetic ganglia.
    - d. Summarise the functional differences between sympathetic and parasympathetic systems.

8. a. Enumerate the cranial nerves in serial order.
  - b. Mention the nuclei, origin and termination. Indicate the site of attachment to brain/brain stem.
  - c. Explain the general distribution of the cranial nerves and the course of result of VII nerve.
  - d. Predict the result of injury to cranial nerves.
9. a. Anatomy of spinal cord - review.
  - b. Name the groups of spinal nerves.
  - c. Explain the formation and branches of the spinal nerves and distribution of anterior and posterior rami.
  - d. Locate and name the plexuses of nerves.
  - e. Indicate the course and distribution of branches of the plexuses of nerves.

## UNIT V

## SYSTEMS

36

### a. Cardio - Vascular System

1. a. Comprehend the external and internal features of the structure of the heart and their implications.
  - b. Mention the position of the heart.
  - c. Identify and name the chambers, surfaces and borders of the heart.
  - d. Identify the venae cavae, pulmonary trunk and aorta.
  - e. Mention the internal features of the heart chambers.
2. a. State the basic features of blood supply and nerve supply of the heart.
  - b. State the basic arrangement of the pericardium.
  - c. Identify the coronary arteries and coronary sinus.
  - d. Name the parts of the conducting system of the heart.
3. a. Mention the position and general distribution of major arteries and veins. Name their main branches.
  - b. Name the types of arteries and veins. Give examples and indicate the basic microscopic structure of types of blood vessels.

### b. Lymphatic System

1. Comprehend the general and regional arrangements of the lymphatic system.
2. Name the lymphatic organs and mention their location.
3. Illustrate the basic structural features of lymphatic vessel, lymphatic, thymus, spleen and tonsils.
4. Assign functional roles to the lymphatic system.
5. State the position and immediate relation of the spleen.

### **c. Respiratory System**

1.
  - a. List the parts of the respiratory system.
  - b. Comprehend the functional anatomy of the parts of the respiratory system.
  - c. Mention the basic features of innervations of bronchi and lungs.
  
2.
  - a. State the position, extent, gross and microscopic structure of the parietal pleura
  - b. Comprehend the arrangements of pleura. Mention the parts and position of the parietal pleura
  - c. Name the recesses of pleura.
  - d. Identify the trachea and bronchi.
  - e. Identify the right lung and left lung.
  - f. Name the components of the hilum of lung.
  - g. Name the broncho pulmonary segments.
  - h. Illustrate the main features of the microscopic structure of the lung.
  - i. Identify the borders and surfaces of the lung on the specimen.

### **Evaluation**

**Total Hours: 180**

### **Text Book**

1. Chaurasia, Human Anatomy - VOL I, VOL II, VOL III, 7<sup>th</sup> Edition, CBS, 2016.
2. Text Book of Anatomy, Vishram Singh – VOL I, VOL II, VOL III, 3<sup>rd</sup> Edition, CBS, 2018.

### **References:**

1. Nigle Palastanga, Anatomy and human movement, Butterworth Heinmann pub.
2. 4<sup>th</sup> Ed, 2007.
  
3. Cunningham's Manual of Practical anatomy (for practical classes only) Vol. 1, 2 and 3.
4. Romanes, Oxford university press, 3Ed, 2006 .
5. Gray's Anatomy, William Bannister, Churchill Living Stone pub, 3 Ed, 2007



**Course Objective:**

The Objective of this course is that after 200 hours of lectures, demonstrations Lab practicals the student will be able to demonstrate an understanding of elementary human physiology dealing with cell, skin, muscle, blood and other important systems of the body.

**Course Outcomes:**

The Course outcome is to know about the

1. Brief outline of cardiovascular and respiratory system.
2. Outline of different parts and functions of reproductive system.
3. Detail knowledge of central nervous system, peripheral nervous, supporting tissues and autonomic nervous system.
4. Brief knowledge of pathway of vision, auditor and taste.
5. Understanding of the applied aspect of cardiovascular, nervous and respiratory system.

**UNIT 1****36****NERVOUS SYSTEM**

- Structure of a neuron
- Classification of nerve fibres
- Properties of nerve fibres
- Receptors
- Synapse & synaptic transmission
- Reflexes & properties of reflexes
- Spinal cord and its pathway
- Spinal tracts and its functions
- Physiology of pain
- Brainstem, thalamus, basal ganglia
- Cerebrum; cerebral cortex
- Proprioceptors
- Posture & equilibrium
- Vestibular apparatus
- EEG
- CSF
- Autonomic nervous system

**2 a. CARDIOVASCULAR SYSTEM**

- Cardiac muscle – structure & properties
- Cardiac cycle
- Heart sounds
- ECG; arrhythmia
- Cardiac output
- Factors regulating the action of heart
- Heart rate
- Arterial blood pressure & its regulation
- Coronary circulation
- Cerebral circulation
- Haemorrhage
- Circulatory shock
- Cardiovascular adjustments during exercise

**2 b. RESPIRATION****36**

- Overview of respiratory tract
- Defence mechanism in respiratory tree
- Mucociliary transport
- Mechanics of respiration
- Pulmonary circulation
- Lung volumes & pulmonary function tests
- Transport of blood gases
- Acid – base balance
- Artificial ventilation
- Neural & chemical regulation of respiration
- Hypoxia & its types
- Effects of exercise on respiratory system
- Acclimatization
- High altitude and respiration
- Decompression sickness

**UNIT 3****36****SPECIAL SENSES**

- Vision
- Audition
- Olfaction
- Gustation
- Vestibular apparatus

## UNIT 4

### REPRODUCTIVE SYSTEM

36

- Overview of male & female reproductive system
- Menstrual cycle
- Pregnancy & parturition
- Placenta & its functions
- Lactation
- Contraceptive measures
- Physiology of foetus
- Factors affecting foetal growth

## UNIT 5

### BIOCHEMISTRY

36

- Protein chemistry
- Definition , general classification, properties & functions
- Protein metabolism
- Urea cycle
- Enzymes – definition, classification, properties, factors affecting enzyme action & clinical importance
- Electron transport chain
- Vitamins – sources, deficiency manifestations

### Evaluation

**Total Hours: 180**

### Text Books:

1. John E.Hall, Arthur C.Guyton, Text Book of Physiology, Saunders, 12<sup>th</sup> Edition, 2010
2. S.S.Randhawa, Medical BioChemistry, PV Books, 1 Ed, 2013
3. Chatterjee, Human Physiology, Central book agency, 4th edition, 1958.

### References:

1. L. Prakasam Reddy, Concise Medical Physiology,JP Brothers, 3<sup>rd</sup> Edi,1999
2. Shetty nandhini, Biochemistry for Physiotherapist and AHS, JP bros, 1 Ed, 2008
3. Sembulingam,Essentials of Physiology , JP Medical Ltd, 6<sup>th</sup> Ed, 2013
4. Sujith Kumar Chaudhri, Concise medical physiology, New Central Book Agency, 6th Ed, 2011
5. U. Sathyanarayana, Essentials of Biochemistry, Book and Allied (P) Ltd, Kolkata, 1stEd,1999
6. Ganong's review of medical physiology kim .E. Barrett 25<sup>th</sup> edition.
7. DM .Vasudevan Textbook of biochemistry for medical students 7<sup>th</sup> edition.

**Course Objective:**

The objectives of this course is that after 90 hours of lectures & demonstrations, in addition to clinics the student will be able to demonstrate a general understanding of the diseases that therapists would encounter in their practice. They should have a brief idea of the aetiology and pathology, what the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the disease on any therapy that may be prescribed.

Broad outline of goals of pharmacological and surgical therapy should be imparted in those Diseases in which physical will be an important component of overall treatment.

**Course Outcomes:**

1. This helps to study the medicines encountered in the management of physiotherapy
2. This course gives basic idea of different diseases and infections
3. This provides brief knowledge on symptoms and pathology of diseases
4. This gives knowledge on analysing and interpreting imaging findings into the physical therapy diagnostic process
5. This provides information on normal and abnormal developmental disorders in paediatrics

**UNIT I****18****Infections**

Outline the mode of spread and appropriate prevention measures, of the following communicable diseases.

Bacterial – Tetanus

Viral – Herpes Simplex, Zoster, Varicella, Measles, German measles, Hepatitis B, Aids

Protozoal – Filaria

**Haematology**

1. Define and briefly describe clinical aspects of iron deficiency, B12 and folic acid deficiency anaemia.
2. List types of bleeding diathesis.
3. Describe the clinical features of Haemophilia.

**UNIT II****18****Respiratory Tract**

1. Bronchitis - Define, lists etiological factors and describe symptoms.

2. Pneumonia - List types of pneumonia (lobar, broncho, aspiration pneumonia.).
3. List etiologic agents and briefly outline symptoms and complications of pneumonia.
4. Asthma - Define; describe briefly the etiological factors and clinical features of acute exacerbation.
5. Chronic obstructive airway diseases - Define emphysema and chronic bronchitis. Briefly describe the pathology, symptoms of disease and clinical course.
6. Tuberculosis - Describe the aetiology, pathology and clinical features of pulmonary TB.
7. Bronchiectasis - Define and describe briefly the pathology and clinical symptoms of bronchiectasis, bronchopulmonary segments and basis of postural drainage.
8. Emphysema - Define and briefly describe etiological factors.
9. Chest wall deformities - Describe funnel chest, Pigeon chest barrel chest, Kyphoscoliosis of thoracic spine.
10. Briefly outline functional disability of occupational, Lung diseases, List pneumoconiosis.

### **Cardio - Vascular System**

1. Cardiac failure - Define. List causes and symptoms.
2. Rheumatic fever - Define and briefly describe aetiology and gross pathology of rheumatic heart disease.
3. Infective endocarditic. - Define and outline aetiology, symptoms and complications.
4. Ischemic heart disease - Outline pathology of IHD, define angina pectoris and Myocardial infarction, Describe the clinical features and broadly outline medical and surgical therapy.
5. Hypertension - Define and outline the clinical features, complications & goals of therapy.
6. Outline pathogenesis and clinical features of pulmonary embolism, Deep vein thrombosis, pulmonary infarct.
7. Congenital heart disease - List ASD, VSD, Fallot's Tetralogy and PDA & briefly outline the pathologic anatomy.

## **UNIT III**

**18**

### **Bone, Joint and Connective Tissue Disorders**

1. Brief introduction to concept of autoimmune disease.
2. Define: Systemic lupus erythematosus, Polymyositis, Dermatomyositis, Polyarteritis Nodosa, and Scleroderma.
3. Rheumatoid arthritis - Describe aetiology, clinical features and complications, drug therapy and non pharmacological therapy.
4. Osteoarthritis - Describe aetiology, clinical features and complications and review non-steroidal anti-inflammatory drugs and steroids.

## **Renal Diseases**

1. Define and briefly outline acute and chronic renal failure.
2. Urinary tract infection. - Pathogenesis, Outline common clinical conditions complicated by UTI.

## **Metabolic Diseases**

1. Diabetes - define and outline aetiology. List types of diabetes & complications and briefly outline use of insulin, diet and oral hypoglycaemic agent in management of diabetes.
2. Obesity - Define and outline management.

## **Geriatrics**

1. List diseases commonly encountered in the elderly population and their role in causing disability: Hypertension, Ischemic Heart disease, Cerebrovascular accidents, Benign prostatic Hyperplasia, Cataracts & other causes of failing vision.

## **UNIT IV**

**18**

## **ENT, OPHTHAMOLOGY, DERMATOLOGY, PAEDIATRICS**

### **E.N.T**

1. Outline the anatomy and physiology of hearing, Use of audiometry in assessment of hearing.
2. Briefly classify causes of hearing loss. Outline the conservative and surgical intervention, including types and availability of hearing aids.
3. Outline the functions of vestibular apparatus
4. Outline the common ENT infections diseases which occur hearing, breathing and speech and their management.

### **Ophthalmology**

- Eye lesions in leprosy, including causes, treatment and complications of Igophthalmos.
- Field defects arising from lesions in the visual pathway, their clinical symptoms and methods of testing.
- Effect of Paralysis of ocular muscles and treatment.
- Causes, clinical features and a treatment of disorders of ocular movement occurring in diseases such, as myasthenia gravis, progressive supranuclear palsy and lower motor neuron diseases.

- Causes, clinical features, treatment and prognosis in Visual failure arising from cataract, inflammatory disorders, Vitamin A deficiency, Glaucoma and Trachoma ; emphasis on preventable causes and prophylactic measures.
- Define blindness, and visual disability evaluation. Investigative procedures used for testing visual failure, including basic screening procedures for visual acuity suitable for community health surveys.

## **Dermatology**

Diseases of skin – leprosy, pigmentary anomalies, vasomotor disorders, tropic ulcers their classifications and management dermatitis, coccal and fungal parasitic and viral infections, skin diseases related to rheumatology, tropical skin diseases and Hyperhydrosis.

## **Pediatrics**

1. Describe growth and development of a child from birth to 12 years: including physical, social, adaptive development.
2. List the maternal and neonatal factors contributing to high risk pregnancy & the neonate: Inherited disease: maternal infections - viral and bacterial: maternal diseases incidental to pregnancy, such as gestational diabetes, pregnancy included hypertension: chronic maternal diseases such as heart diseases, renal failure, tuberculosis, diabetes, epilepsy: bleeding in the mother at any trimester.
3. Briefly describe community programmes: International (WHO), national and local, for prevention of poliomyelitis, blindness, deafness, mental retardation and hypothyroidism. Outline the immunisation schedule for children.
4. Cerebral Palsy: Define and briefly outline etiology - Prenatal, perinatal and postnatal causes: briefly mention pathogenesis, types of cerebral palsy (Classification), findings on examination: General Examination, examination of C.N.S., Musculoskeletal system, respiratory system, GI tract & nutritional status.
5. Briefly outline associated defects; Mental retardation, microcephaly, blindness, hearing and speech impairment, squint and convulsions. Briefly outline treatment. Outline prevention: Appropriate management of high risk pregnancies, prevention of neonatal and postnatal infections, metabolic problems.
6. Muscular dystrophy: Outline various forms, modes of inheritance and clinical manifestation; physical findings in relation to disabilities, progression of various forms and prognosis. Describe treatment goals in forms which are and are not fatal.
7. Spinabifida, meningomyelocele: Outline development: clinical features - lower limbs, bladder and bowel control; complications - U.T.I. & hydrocephalus: medical treatment and surgical treatment.
8. Still's disease: Classification pathology in brief, physical findings, course & prognosis. Outline treatment, prevention and correction of deformity.

9. Acute C.N.S. infections : Classify (Bacterial and viral) and outline the acute illness, CNS sequelae leading to mental retardation, blindness, deafness, speech defect, motor paralysis, bladder and bowel problems, seizure disorder and specific problems such as subdural effusion, hydrocephalus, pressure sores, feeding difficulties.
10. Normal diet of newborn and child: List dietary calorie, 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 resistant rickets.
11. Lung infections: Outline the clinical findings, complications and medical treatment of bronchiectasis, lung abscess and Bronchial asthma.

## **UNIT V**

**18**

### **PHARMACOLOGY**

1. Terminology
2. Classification of drugs
3. Factors influencing the dosage of drugs and its actions.
4. Drug Allergy
5. Principles of drug administration and routes.
6. Definition, action, indications, contra – indications, adverse reactions of the following :
  - Anti inflammatory
  - Anti epileptic
  - Sedatives, Hypnotics, Tranquilizers
  - Muscle relaxants
  - Alcohol
  - Pulmonary effects of general anesthetic agents
- Mucolytic agents
  - a. Local anaesthetic agents
  - b. Narcotic Steroids
  - c. Vasodilators
  - d. Insulin and oral hypoglycemic agents
  - e. Antibiotics – Bactericidal, Bacteriostatic
  - f. Chemotherapeutic drugs in leprosy and tuberculosis.

### **Evaluation**

**Total Hours: 90**

Unit tests, term examinations and assignments are conducted to evaluate the student.



**Text Books:**

1. Davidson, A Text Book of Medicine, Churchill Livingstone, 21 st Ed, 2010.
2. S.D.Seth , Text Book of Pharmacology, Churchill Livingstone, 8 Ed, 2012

**References:**

1. K.D.Tripathi , Essentials of Medical Pharmacology, JayPee Brothers.1Ed, 2007
2. Harrison, Principles of Medicine, Mc Graw hill, 17 th Ed, 2008.
3. OP Ghai, Essential Pediatrics, CBS Publishers, 7<sup>th</sup> Ed, 2010.
4. Kumar and Clarks , Clinical medicines, Jaypee Brothers, 3 rd Ed, 2013.
5. Multani, Principles of geriatrics physiotherapy, Jaypee Brothers, 1 st Ed, 2008.
6. Tripathi, Essentials of medical pharmacology, Jaypee Brothers, 7<sup>th</sup> Ed, 2013.

**Course Objective:**

The objectives of this course is that after 170 hours of lectures, demonstrations, practical and clinics the student will be able to list the indications and contra - indications of various types of exercise therapy, demonstrate the different techniques, and describe their effects.

**Course Outcomes:**

1. This provides fundamentals of muscle and joint function
2. To gain knowledge on various muscle grading
3. This demonstrates the active and passive movements of each joint
4. This illustrates practical knowledge on passive movement, passive stretching and resisted exercise
5. This illustrates practical knowledge on muscle grading, muscle re-education and joint mobilization

**UNIT I****34****Introduction**

- Definition, types of exercise, Principles

**Muscle**

- Definition, types, muscle work, angle of pull & mechanical efficiency of muscle

- starting position:

Types muscle work, forces involved, equilibrium

- Derived position:

Types muscle work, forces involved, equilibrium

**Movement**

Explain the following terms, with suitable examples:

1. Classifications of movement: Active, Passive.
2. Effects of exercise: Physiological effects, Therapeutic effects.
3. List the indications and contra - indications of the following and demonstrate the technique for each:

**Pelvic Tilt**

Describe the following:

1. Normal pelvic tilts, Alterations from normal, anterior tilt (forward), Posterior tilt (backward), Lateral tilt.

2. Muscles responsible for alterations and pelvic rotation.
3. Identification of normal pelvic tilt, pelvic rotation and altered tilts and their corrective measures.

## UNIT II

34

**Passive Movements:** Relaxed passive, Mobilizing passive (forced P.M. manipulations, Serial manipulations) Demonstrate passive stretching of following muscles/muscle groups and describe the indications. contra – indications, physiological effects, advantages and disadvantages of each.  
 Upper Limb: pectoralis major, biceps brachii, triceps brachii, long flexors of the fingers.  
 Lower Limb: rectus femoris, iliotibial band (tensor fascialata), gastrocnemius soleus, Hamstrings, hip abductors, ilio- psoas, Quadriceps.  
 Neck: Sternocleidomastoid

Practical (Passive movement and stretching)

## UNIT III

34

### Resisted exercise

1. Describe the types, techniques, indications and contra-indications, physiological effects, advantages and disadvantages and demonstrate three resisted exercises in progression for the following muscle groups:

Shoulder abductors, Shoulder forward flexors, Triceps Brachii, Hip abductors, Hip flexors, Quadriceps femoris, Abdominal muscles, Back extensors.

1. Describe the home programme for strengthening neck muscles and back extensors

### Progressive Resisted Exercises

1. Describe the following exercises, their advantages and disadvantages and demonstrate the techniques of the following types of PRE: Fractional system, Mac Queen's set system, Mac Queen's power system, Delorms, Oxford.
2. Demonstrate the skill to grade upper and lower limb, neck and trunk muscles. Delorms, Dumbbells, Sand bags Pulleys, Power board and Weigh cuffs.

Practical (Resisted exercise)

## UNIT IV

34

### Muscle Grading

1. Describe the types of muscles grading, principles of muscle testing key to muscle grading, techniques of muscle testing - easy test and hard test and functional test (ADL).
2. Demonstrate the skill to grade upper and lower limb, neck and trunk muscles.

## **Re - Education of Muscle**

1. Muscle weakness causes of muscle paralysis / weakness prevention of muscle wasting, early, re-education.
2. Describe the following in re-education of muscles: the term re-education of muscles, Techniques, Spatial summation, Temporal summation.
3. Demonstrate the various re-education techniques and facilitating methods on various groups of muscles.
4. Demonstrate the progressive re-education exercises in strengthening using various applications: (according to their muscle power) Grade I - Grade V.
5. Muscle strengthening – PNF Hold relax, slow reversal, Rhythmic stabilisation, repeated contractions.

Practical (Muscle Grading, relaxation and PNF)

## **UNIT V**

**34**

### **Joint Mobility**

Describe the following:

1. Joint ranges (outer range, middle range, inner range), Individual joint structures, joint movements (anatomic, accessory), causes of joint range limitations, prevention of joint stiffness, positioning (physiological resting position).
2. Passive range of movement, methods of relaxation, active exercises, manual mobilization techniques, gliding techniques.
3. Accessory movements: Posterior glide, Anterior glide, Superior and Inferior glide, Traction and approximation.
4. Indications and contra - indications for mobilisation of individual joints and demonstrate practically the various mobilisation techniques for individual joints and teaching home programme.

Practical (Accessory movements)

**TOTAL HOURS: 170**

### **Text Books:**

1. Dena Gardiner , Principles of Exercise therapy, Bell and Hymes, 4<sup>th</sup> Ed, 1981.

### **References:**

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6<sup>th</sup> Ed, 2012
2. Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004
3. Kendell, manual Muscle Testing,ELBS, 2Ed, 1997
4. Sebastian, Principles of Manual Therapy, Jaypee Brothers , 2 nd Ed, 2013

**Course Objectives:**

The objective of this course is that after 170 hours of lectures, demonstration, practicals and clinical the student will be able to list the indications and contra – indications of various types of electrotherapy, demonstrate the different techniques, and describe their effects.

**Course Outcomes:**

1. Knowledge about various types of therapeutic currents and its physiological, therapeutic effects gained.
2. Knowledge about pain and pain modulation mechanism gained.
3. Knowledge about different types of low and medium frequency currents. Its indication, contraindication, method of application gained.
4. Knowledge about Traction, external compression device , Its indication, contraindication, method of application gained.
5. Diagnosis of neuromuscular dysfunctions by electro-diagnostic test. Practical application of electrotherapy modalities for various conditions gained.

**UNIT I****34****Introduction**

- A. Introduction to Electrotherapy - Definition and types, Therapeutic uses. Instrumentation, Importance of currents in treatment, Equipment demonstration.
- B. Shock-Electrical and earth: causes, effects, management, precautions, Safety measures in Electrotherapy Department.

**UNIT II****34****A) Basics of Low Frequency stimulating currents**

1. Bio-electricity - electrical charge within body.
2. Types of low frequency currents used in therapeutics

**B) Low Frequency currents**

- a) Direct current – Galvanic current
- b) Interrupted DC
- c) Faradic current
- d) Surged Faradic current
- e) Pathophysiology of nerve lesion - Principles of selection of modes for assessment of nerve muscle function.

**All types of therapeutic currents must be taught under the following sequence**

1. Definition: Production (Brief) - wave forms – duration
2. Indication & contra indications
3. Physiological effects
4. Therapeutic effects
5. Technique of application

**C) IONTOPHORESIS**

1. Theory
2. Physiological effect and uses of various iontophoresis
3. Effects of various ions.
4. Techniques of Iontophoresis for pain relief, reduction of oedema, wound healing and hyperhidrosis.

**D) Transcutaneous electrical nerve stimulation (TENS)**

1. Physiology of pain, pain modulation Gate control theory.
2. TENS – Definition, Production, Types, Therapeutic and physiological effects, Indication & Contraindication, Technique of application.

**UNIT III**

**34**

**A) Medium frequency currents**

- a) Interferential current
- b) Russian current
- c) Didynamic current
- d) Sinusoidal current

All types of medium frequency currents must be taught under the following sequence.

1. Definition: Production (Brief) - wave forms – duration
2. Indication & contra indications
3. Physiological effects
4. Therapeutic effects
5. Technique of application

**UNIT IV**

**34**

**A) Electromyography, Nerve conduction & Bio – Feedback testing, Electro-diagnostic testing like FG test, SD curve.**

1. Principles

2. Instrumentation
3. Application and uses.

## **UNIT V**

**34**

### **A) TRACTION**

1. Types
2. Indications and contraindications.
3. Physiological and therapeutic effects
4. Principles and application of traction

### **B) EXTERNAL COMPRESSIVE DEVICES**

1. Types
2. Indications and contraindications.
3. Physiological and therapeutic effects
4. Principles and application of compressive devices

### **Evaluation**

**TOTAL HOURS: 170**

### **Text Books:**

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Book seller.9<sup>th</sup> Ed, 2012.
2. John Low and AneeReed ,Electrotherapy Explained –, Butterworth Heinmann Pub. 4<sup>th</sup> Ed, 2003
3. Edward BellisClayton , Nigel Palastanga, Claytons Electrotherpy:Theory and practice, 9<sup>th</sup> Ed, 1985
4. Valma, J.Robertson, Eletrotherpy explained, Butterworth , Heinmann, Elsevier, 4<sup>th</sup> Ed, 2014.

### **References:**

1. Jagmohan Singh, Electrotherapy ,Jaypee Brothers, 2<sup>nd</sup> Ed, 2012.
2. Basanta Kumar Nanda, Electrotherpy explained, Jaypee Brothers, 1<sup>st</sup> Ed, 2006.
3. Tim Watson Electrotherpay evidence based practice, Churchill Livingston, 12<sup>th</sup> Ed, 2008.

**Course Objectives:**

The objectives of this course is that after 90 hours of lectures and demonstrations the student will be able to demonstrate an understanding of the principles of Biomechanics and Kinesiology and their application in the health and disease pertaining to muscles and joints of upper limb.

**Course outcomes:**

The Course outcome is to know about the

1. Categorizing the structure & functions of cervical, thoracic, lumbar and sacral vertebra.
2. Understanding general and specific features of the hip, knee, and ankle complex.
3. Evaluation of the pathological basis of injury and aging of the hip, knee and ankle complex
4. Analysis of the different postural malalignment like scoliosis, kyphosis, lordosis and fixed flexion deformity
5. Variation between different pathological gait patterns

**UNIT I****18****Joint Structure and Function**

1. Describe the basic principles of joint design and a human joint.
2. Describe the tissues present in human joints including dense fibrous tissue, bone, cartilage and connective tissue.
3. Classify Joints- Synarthrosis, Amphiarthrosis, Diarthrosis, Sub classification of synovial joints.
4. Describe joint function, kinematic chains, range of motion.
5. Describe the general effects of injury and disease.
6. Dislocation, degeneration (OA), R.A, Soft tissue injury, Sprain, Strain, Capsulitis, Bursitis.

**UNIT II****18****Muscle Structure and Function**

1. Describe Mobility and Stability functions of muscles.
2. Describe elements of muscle structure- Composition of a muscle fiber, the motor unit, types of muscle fibres, muscle fibre size, arrangements and number, muscle tension, length-tension relationship.



3. Describe types of muscle contraction, speed and angular velocity, applied load, voluntary control, Torque & Isokinetic exercise.
4. Summarise factors affecting muscle tension.
5. Classify muscles: Spurt and Shunt muscles, Tonic and Phasic muscles.
6. Factors affecting muscle function: Type of joint and location of muscle attachment, number of joints, Passive insufficiency, Sensory receptors.

### **UNIT III**

**18**

#### **a) Thorax & Chest Wall**

1. Review of Basic Anatomy related to chest, wall.
2. Diaphragm & its function.
3. Lab Activity – Palpation Of Sterno Clavicular Joint And Ribs.

#### **b) Temporomandibular joint**

1. Anatomy of Temporomandibular joint, ligaments, capsule & muscles that act at Temporomandibular Joint
2. Movement of Temporomandibular joint.
3. Role of temporomandibular joint in equilibrium
4. Lab Activity – Palpation Of Mastoid Process And Sternocleidomastoid Muscle And Scalene Muscles

### **UNIT IV**

**18**

#### **a) The Shoulder Joint**

1. 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
2. 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.
3. Describe the muscles of elevation (Deltoid, Supraspinatus, Infraspinatus, Teres minor, Subscapularis, Upper Trapezius, Lower Trapezius, Serratus anterior, and Middle Trapezius & Rhomboids).
4. Describe the muscles of depression (Latissimus dorsi, Pectoralis, Teres major, Rhomboids)

5. Muscles functioning around shoulder.
6. Effect of injury & aging.
7. PA, dislocation, ligament instability.
8. Lab Activity –Gleno Humeral Joint, Acromio Clavicular Joint And Soft Tissue Palpation Around The Shoulder Complex

#### **b) The Elbow joint**

1. Describe the structure of the Humero-ulnar and Humero radial joints including articulating surfaces, Joint capsule Ligaments & Muscles.
2. Describe the function of the Humero-ulnar and Humeroradial joints including the Axis of motion, Range of motion, Muscle action.
3. Describe the structure of the superior and inferior radioulnar joints.
4. Describe the function of the superior and inferior radioulnar joints.
5. Describe the mobility and stability of the Elbow complex and its relationship to Hand and Wrist.
6. Describe the effects of injury & aging.
7. Dislocation, Bursitis Dislocation, Ligament instability, Cubitus Varus, Cubitus valgus.
8. Lab Activity –Superior And Inferior Radio Ulnar Joint In Wrist And Hand. Carpal And Metacarpal Bone Palpation.

### **UNIT-V**

**18**

#### **The Wrist and Hand complex**

1. Describe the wrist complex including Radiocarpal joint, Mid carpal joint and the Ligaments of the wrist complex.
2. Describe the function of the radiocarpal and Midcarpal joints including the movements and muscles involved.
3. Describe the Hand complex including: Structure of fingers (Carpometacarpal, Metacarpophalangeal and interphalangeal joints of fingers, ligaments & range of motion).
4. 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.
5. Describe the structure of the Carpometacarpal, MCP and IP joints of thumb.
6. Describe the Thumb musculature including the Extrinsic and Intrinsic thumb muscles.
7. Describe Precision, Power, Cylindrical, Spherical & Hook grips.
8. Describe Precision handling, Pad to pad, Tip to tip and Pad to side Prehension and Functional position of wrist and hand.
9. Effect of injury & aging, dislocation, deformities of hand paralysis of hand muscles.

**Evaluation****TOTAL HOURS: 90****Text Book:**

1. Cynthia C Norkins, Joint Structure and Function – a Comprehensive Analysis, Jaypee Brothers, 5Ed, 2010.
2. Kinesiology of the Musculoskeletal System – foundations for Physical rehabilitation – Donald A. Neumann third edition

**References:**

1. Gary I Soderberg, Kinesiology – Application to Pathological Motion – (especially for patho biomechanics) Williams & Wilkins, 2nd Ed, 2007
2. I.A.Kapandji, Physiology of joint structure- Churchill Livingstone pub, 6th Ed, 2010.

**Course objective**

The objective of this course is that after 90 hours of Lecture, the students will be able to understand about the knowledge of pathology, microbiology including immunity, virology, antiseptics and allergy.

**Course Outcomes:**

1. Knowledge about disease and changes in structure and function of cells during disease condition gained.
2. Knowledge about importance of nutrition, function of nutrition and its deficiency diseases gained
3. Pathogenesis and pathological changes of disease in various body system is understood properly.
4. Knowledge about the various microorganism, its classification and structure gained.
5. To Know about the various disease caused by microorganism and its prevention.

**UNIT I****PATHOLOGY****18**

- A. Introduction: Disease, concepts of disease, classifications of lesions.
- B. Bacterial, viral and parasitic infections a general outline.
- C. Cell injury, necrosis and gangrene. Inflammation, healing and repair, Degeneration.
- D. Haemorrhage, shock, thrombosis, embolism.
- E. Tuberculosis, typhoid.
- F. Deficiency diseases.
- G. Tumours: Aetiology & spread. Common tumour.
- H. Blood: Anaemia, Heart and blood vessels, Common congenital anomalies, Rheumatic & coronary heart diseases.

**UNIT II****18**

- A. Respiratory system: Pneumonia, Bronchiectasis, Emphysema, Chronic bronchitis, Asthma.
- B. Bone and joints : Autoimmune disease, Septic arthritis, Osteomyelitis.
- C. Skin: Leprosy.
- D. Urinary system.
- E. Central nervous system: CNS infections, vascular disorders.
- F. Rheumatoid Arthritis.
- G. Scleroderma and Psoriasis.
- H. Diseases of muscle including Poliomyelitis, Myopathies.
- I. Volkmann's ischemia.

**UNIT III****MICROBIOLOGY****18**

- A. Introduction and history of microbiology.
- B. General lectures on micro-organisms:
  - 1. Classification.
  - 2. Shape and arrangement.
  - 3. Special characteristics - spores, capsules, enzymes, motility, reproduction.

**UNIT IV****18**

- 1. Disinfection and antiseptics.
- 2. Sterilisation and asepsis.
- 3. Antibacterial agents - fundamental aspect. Susceptibility test
- 4. Infection - source of infection.
  - portals of entry.
  - Spread of infection.

**UNIT V****18**

- 1. Immunity - natural and acquired, non-specific immunity.
- 2. Allergy and hypersensitivity.
- 3. Outline of common pathogenic bacteria and the diseases produced by them.  
Treatment and prevention.
  - a. Respiratory tract infections.
  - b. Meningitis.
  - c. Enteric infections.
  - d. Anaerobic infections
  - e. Urinary tract infections.
  - f. Leprosy, tuberculosis and miscellaneous infections.
  - g. Wound infections.
  - h. Sexually transmitted diseases.
  - i. Hospital acquired infections.
- 4. Pathogenic Yeasts and fungi.
- 5. Virology -Virus infections, with special mention of  
Hepatitis, Poliomyelitis & Rabies.

**Evaluation****Total Hours:90****Text Books:**

1. SatishGupte, The Short text book of Medical Microbiology by, JayPee Brothers,2<sup>nd</sup> Ed, 2004.
2. Ananthanarayananan & Jayaram Paniker,Text book of Micro biology, Orien Longman, 9<sup>th</sup> Ed, 2013.
3. Harsh mohan, Text book of Pathology, Jaypee brothers, 7<sup>th</sup> edition-2015.

**References:**

1. Kumar, Essentials of Microbiology , JP, 1<sup>st</sup> Ed, 2014.
2. Datta, Textbook of Pathology, JP , 2<sup>nd</sup> Ed, 2004.

**Course Objective**

The objectives of this course is that after 170 hours of lectures, demonstrations, practical and clinics the student will be able to list the indications and contra - indications of various types of exercise therapy, demonstrate the different techniques, and describe their effects.

**Course Outcome:**

1. To gain knowledge on joint range and their measurements
2. This demonstrates posture, movement retraining, balance and co ordination.
3. This illustrates pathological gait and use of different mobility aids
4. This provides basic information on therapeutic massage and its effect on different systems of the body
5. This demonstrates face, neck, back, upper limb, lower limb massage and suspension therapy

**UNIT – I****34****Abnormal Gaits**

1. Describe abnormal Gaits, Causes for Abnormal Gaits
2. Demonstrate Abnormal Gaits, Gait Training for Abnormal Gaits.

**Mobility Aids**

1. Describe Mobility Aids.
2. Describe the indications, Contra-Indications, Measurements, Advantages and Disadvantages, precautions of the Following Mobility Aids-canes, Crutches, Walking Frame, Wheel chair
3. Demonstrate the ambulation and transfers using the above Mobility Aids.

Practical (Mobility Aids and gait retraining)

**UNIT – II****34****Suspension therapy**

1. Describe the basic physics of simple pendulum and pendular movement.
2. Describe types of suspension:vertical, axial and eccentric fixation (changing/shifting point of suspension)
3. Explain the indications and techniques for each type of suspension
4. Demonstrate axial and eccentric fixation for mobilizing and strengthening and reeducation of various muscles and joints.

## **Hydrotherapy**

1. Definition, Forces, Principles of Hydrotherapy
2. Indications, Contra-indications, Precautions-Hydrotherapy

## **Posture**

1. Normal & Abnormal Posture
2. Good & Bad posture. Factors responsible for good posture causes for faulty posture.

Practical (Suspension for upper and lower limb)

## **UNIT – III Goniometry**

**34**

1. Describe the following: Normal range of various joints. Description of goniometer, Range of measuring system (180 foot trunk and head). Techniques of goniometry.
2. Demonstrate measuring of individual joint range using goniometer.

## **Hazards of bed rest**

1. Hazards of prolonged bed rest
2. Principles & Methods of Maintenance
3. Individual & Group exercises – principles
4. Table & Scheme of exercises.

Practical (range of motion measurement)

## **UNIT – IV**

**34**

## **Co – ordination**

1. Define co-ordination , Nervous control of co- ordination,
2. Inco- ordination – Definition, causes and its management, Frenkel’s Exercise
3. Demonstrate Frenkel’s Exercise
4. Describe in coordination due to : Lower motor neuron lesions (flaccidity), Upper motor neurone lesions (spasticity), Cerebellar lesions, loss of kinaesthetic sense (tabes dorsalis, syringomyelia, leprosy), Imbalance due to muscular disease.

## **Define balance (static & dynamic)**

1. Re – education of balance
2. Re – education techniques for balance  
Practical (Inco-ordination exercise)



**MASSAGE****Describe briefly :**

1. History of massage.
2. Mechanical points to be considered.
3. Points to be considered while giving massage.
  - a. Manipulations.
  - b. The time of day for treatment.
  - c. The comfort and support of the patient (draping, bolstering and positioning).
  - d. Position of operator (therapists stance)
  - e. Using body weight.
  - f. Contact and continuity.
  - g. Techniques, indications and contra-indications.
4. Physiological effects of massage on various systems of body. Effects on: Excretory system, Circulatory system, muscular system, Nervous system & Metabolism system.

**Define and describe the various manipulation techniques used in massage.**

1. Stroking manipulation : Effleurage, Stroking.
2. Pressure manipulations : Kneading: Squeezing, Stationary, Circular, Ironing (reinforced kneading), Finger kneading, Petrissage (picking up , wringing, rolling ) , frictions.
3. Percussion manipulation : tapotement, Hacking, Clapping, Beating & Pounding.
4. Shaking manipulations : Vibration, Shaking.

**Define and describe the techniques, effects & uses and contra - indications of the following manipulations :**

1. Massage for upper limb:
  - a. Scapular region
  - b. Shoulder joint
  - c. Upper arm
  - d. Elbow joint
  - e. Forearm
  - f. Wrist joint
  - g. Hand
2. Massage for lower limb:
  - a. Thigh
  - b. Knee joint
  - c. Leg
  - d. Foot (including ankle joints and toes)
3. Massage for back:

- a. Neck and upper back
- b. Middle and lower back
- c. Gluteal region, arm & leg
4. Massage for the face:  
Practical (Face, Neck, back, upper and lower limb)

**Evaluation**

**TOTAL HOURS: 170**

**Text Books:**

1. Dena Gardiner, Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.
2. Beard , Therapeutic Massage, WB Saundres, 3 rd Ed, 1981

**References:**

1. Carolyn Kisner , Therapeutic Exercise, Jaypee Brothers, 6th Ed, 2012
2. Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004
3. Cynthia Norkin, Practical Goniometry, MCgraw Hill, 3Ed, 2008
4. Sebastian, Principles of Manual Therapy, Jaypee Brothers, 2 nd Ed, 2013
5. Sinha, Principles and Practice of therapeutic Massage, Jaypee Brothers, 2 nd Ed, 2010

**Course Objectives**

The objective of this course is that after 170 hours of lectures, demonstration, practicals and clinical the student will be able to list the indications and contra – indications of various types of electrotherapy, demonstrate the different techniques, and describe their effects.

**Course Outcomes:**

1. Knowledge about various types of therapeutic high frequency currents and its physiological, therapeutic effects gained.
2. Knowledge about LASER therapy and its uses gained.
3. Effects of various types of heat therapy and method of applications
4. Knowledge about Cryotherapy and its method of application, effect and uses gained.
5. Knowledge about recent physical modalities and its method of application, effect and uses gained. Practical application of electrotherapy modalities for various conditions.

**Course Outline:****UNIT I****34**

- A. Define electricity and types, electromagnetic induction, Principles construction & types of transformers, Condensers, Valves, Rectifiers, Oscillation, Review the physics and principles of Magnetism.
- B. Fuse and grid-explain with diagram the working and use of these two.

**UNIT II****34****A. SHORT WAVE DIATHERMY**

Describe the following:

1. Properties of H.F. currents - Sustained and unsustained, Damped and undamped, Impedence, Define Nodes and Antinodes. Explain, with examples, the fields, set up, Define wavelength.
2. Types of high frequency currents.
3. Production of H.F. currents – Principles, Construction of apparatus with diagram, Tuning of machine, Regulation of current, Physiological and therapeutic effects.
4. Methods - Condenser field, Cable method, Effects of 2 fields.
5. Technique of Applications - Testing machine, Preparation of patient, Types of electrodes, Position and size of electrodes, Application of current, Dosage.
6. Dangers and precautions.
7. Pulsed diathermy: Indications and contra-indications, application.

## **B. MICROWAVE DIATHERMY**

1. Describe the following - Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

## **C. LONG WAVE DIATHERMY**

1. Describe the following - Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

## **D. SHOCKWAVE THERAPY**

1. Describe the following - Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

## **E. INFRARED RADIATION**

1. Describe the following - Infrared Radiation, wavelength and frequency, Types of generators and its working, Physiological effects, Therapeutic effects and uses.
2. Technique of irradiation - Choice of apparatus, Preparation of patient, Arrangement of lamp, Application of treatment, Duration and frequency.
3. Dangers
4. Indications & contra-indications

## **F. ULTRA VIOLET RADIATION**

1. Electric arc - Process of ionization & Transmission of current through gases, Types of lamps, Construction of lamps, Fluorescent tube for U.V. production.
2. PUVA apparatus and Care of lamp.
3. Physiological and therapeutic effects - in detail photosensitization.
4. Indications, contra-indications and dangers.
5. Technique of application: Test dose, Local treatment and General irradiation.
6. Conditions (common) in which above treatment is given.
7. Sensitisers
8. Filters

## **UNIT III**

**34**

### **A. ULTRASOUND THERAPY**

1. Definition, Properties of Ultrasound – Reflection, Transmission, Absorption. Piezo-electric effects
2. Properties of ultrasonic fields: depth of penetration in relation to (a) intensity and (b) frequency.
3. Physiological and therapeutic Effects on tissues – Thermal, Mechanical, Chemical and biological.

4. Indication and Contra Indications
5. Coupling media
6. Pulsed Ultrasound Therapy - Principles of pulsed Ultrasound, Effects and uses of pulsed Ultrasound.
7. Techniques of application: a. Methods - direct contact, water bath, water bag. b. Dosage in acute and chronic conditions
8. Dangers
9. Phonophoresis – Method and effects, Choice of drug used for phonophoresis.

## **UNIT IV**

**34**

### **A. PARAFFIN WAX**

1. Describe the following - Methods of heating tissues, Effects and indications, Circulatory effects

Effects on sensory nerves, Effects on skin, Indications & contra indications, Its uses in various Conditions.

### **B. MOIST HEAT (FLUIDOTHERAPY)**

1. Describe the following - Methods of heating tissues, Effects and indications, Circulatory effects

Effects on sensory nerves, Effects on skin, Indications & contra indications, Its uses in various Conditions.

### **C. CRYOTHERAPY**

1. Describe the following - Physical principles, Physiological effects and uses, Techniques of application – Preparation, Application, Modification.
2. Methods: Ice pack, Ice towel, Immersion, Ice cube.
3. Indications & contra-indications.
4. Cryokinetics and its effect.

## **UNIT V**

**34**

### **A. LASER**

1. Define LASER and briefly outline its therapeutic indications, contra-indications, efficacy and precautions advisable.

**Evaluation****TOTAL HOURS: 170****Text Books:**

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Book seller.9<sup>th</sup> Ed, 2012.
2. John Low and AneeReed ,Electrotherapy Explained –, Butterworth Heinmann Pub. 4<sup>th</sup> Ed, 2003
3. Edward BellisClayton , Nigel Palastanga, Claytons Electrotherapy:Theory and practice, 9<sup>th</sup> Ed, 1985
4. Valma, J.Robertson, Eletrotherpy explained, Butterworth , Heinmann, Elsevier, 4<sup>th</sup> Ed, 2014.

**References:**

1. Jagmohan Singh, Electrotherapy ,Jaypee Brothers, 2<sup>nd</sup> Ed, 2012.
2. Basanta Kumar Nanda, Electrotherpy explained, Jaypee Brothers, 1<sup>st</sup> Ed, 2006.
3. Tim Watson Electrotherpay evidence based practice, Churchill Livingston, 12<sup>th</sup> Ed, 2008.

**Course Objectives**

The objectives of this course is that after 90 hours of lectures, demonstrations that the student will be able to demonstrate an understanding of the principles of Biomechanics and Kinesiology and their application pertaining to spine, lower limbs and locomotion.

**Course Outcomes:**

1. Categorize the structure & functions of cervical, thoracic, lumbar and sacral vertebra.
2. Understands general and specific features of the hip, knee, and ankle complex.
3. Evaluate the pathological basis of injury and aging of the hip, knee and ankle complex
4. Analyse the different postural malalignment like scoliosis, kyphosis, lordosis and fixed flexion deformity
5. Knows about the variation between different pathological gait patterns

**UNIT I****18****The Vertebral column**

1. Describe the general structure and function of the vertebral column including: Primary and secondary curves, Articulations, Ligaments and muscles, typical vertebra, intervertebral disc.
2. Describe factors affecting stability and mobility.
3. Regional structure and function of cervical, dorsal, lumbar and sacral vertebrae.
4. Describe the muscle of the vertebral column – Flexors, Extensors, Rotators and Lateral Flexors.
5. Describe the effects of injury and developmental deficits.
6. Scoliosis, Kyphosis, Lordosis, Spondylosis, Spondylolisthesis, Spondylitis, IVDP.
7. Lab Activity – Palpation Of Vertebral Body And Spinous Process. Levels Of Vertebra For Cervical, Thoracic, Lumbar And Sacral Spine

**UNIT II****18****The Hip Complex**

1. Describe the general features of the hip joint including the articulating surfaces on the pelvis & the femur, Angulations, Angle of inclination, Angle of Torsion, internal architecture of femur and pelvis, Joint capsule, Ligaments & Muscles (flexors, Extensors –one joint extensors, two joint extensors, Adductors, Medial rotators and Lateral rotators.)

2. Describe the function of the hip – Rotation between pelvis, lumbar spine and hip: Pelvic motion, Anterior posterior pelvic tilting, Lumbar pelvic rhythm, Lateral pelvic tilting, and Pelvic rotation.
3. Summarise the pelvic motions in the static erect posture.
4. Describe femoral motion.
5. Describe Hip stability in Erect Bilateral stance, Sagittal plane equilibrium and unilateral stance.
6. Describe reduction of forces with Weight shifting and using a cane and deviations from normal in muscular weakness & Bony abnormalities.
7. Effect of injury & aging, coxa vara, coxa valga, dislocation, muscle paralysis, ligament instability
8. Lab Activity – Bony Landmarks Around The Hip Joint Complex (Iliac Crest, Asis, Psis, Greater Trochanteric, Soft Tissue Around Hip Joint)

### **UNIT – III**

**18**

#### **The Knee Complex**

1. Describe the structure of the Tibiofemoral joints: Articulating surfaces on femur and tibia, the menisci, joint capsule and bursa, Ligaments and other supporting structures, Anterior- posterior and Medial- Lateral stability: Muscle structure: Knee flexors & extensors: Axes of knee complex: Mechanical axis, Anatomic axis and axis of motion.
2. Describe the function of the Tibiofemoral joint: Range of motion, Flexion and extension, Rotation, Abduction and Adduction, locking and unlocking, Function of Menisci and Muscle function.
3. Describe the structure of the Patellofemoral joint.
4. Describe the function of the Patellofemoral joint.
5. Describe the effects of injury and disease in the Tibiofemoral and Patellofemoral joints.
6. Describe the effect of injury & aging, genu valgum, genu varum, osteoarthritis, meniscal injury, ligament instability, bursitis, chondromalacia patella.
7. Lab Activity – Palpation Of Femoral Condyles, Soft Tissue Around Knee Joint Complex.

### **UNIT – IV**

**18**

#### **Type Ankle – Foot Complex**

1. Describe the structure, ligaments, axis and function of the following: ankle joint, tibiofibular joints subtalar joints, Talocalcaneonavicular joints, Transverse Tarsal joint, Tarso metatarsal joint, Plantar arches, Metatarsophalangeal joint, Interphalangeal joints.
2. Define the terminology unique to the ankle foot complex, including inversion – eversion, pronation-supination, dorsiflexion-plantar flexion, flexion-extension and adduction and abduction.
  - a. Weight distribution in the ankle joint during unilateral & bilateral stance.



- b. Effects of injury & aging, muscle paralysis, posture, Pes planus, pes cavus, Hammer toe, claw toe, Hallux valgus.
3. Lab Activity – Palpation Of Metatarsals And Calcaneum And Soft Tissues Around The Heel Region.

## **UNIT V**

**18**

### **Posture**

1. Describe the effects of gravity and indicate the location of the gravity line in the Sagittal plane in optimal posture.
2. Analyse posture with respect to the optimal alignment of joints in the antero-posterior and lateral views.
3. Postural malalignment in scoliosis, kyphosis, Lordosis, fixed flexion deformity.

### **Gait**

Define:

1. The stance, swing and double support phases of gait.
2. The subdivisions of the stance and swing phases of gait.
3. The time and distance parameters of gait.
4. Gait determinants
5. Gait analysis in sagittal & frontal plane
6. Pathological gait:  
Ataxic, circumduction, High stepping gait, short stepping gait, scissoring gait, Antalgic gait, Waddling gait, lurching gait, quadriceps palm gait, sailors gait.

Describe:

1. Joint motion at the hip, knee and ankle for one extremity during a gait cycle.
2. The location of line of gravity in relation to the hip, knee and ankle during the stance phases of gait.
3. The gravitational moments of force acting at the hip, knee and ankle during the stance phase.

Explain:

1. Muscle activity at the hip, knee and ankle throughout the gait cycle, including why and when a particular muscle is active and the type of contraction required.
2. The role of each of the determinants of gait.
3. The muscle activity that occurs in the upper extremity and trunk.

Compare:

1. Motion of upper extremities and trunk with motion of pelvis and lower extremities.

2. The traditional gait terminology with the new terminology.
3. Normal gait with a gait in which there is unequal leg lengths.  
Posture including postural deviation.  
Gait including gait analysis and pathological gait

**TOTAL HOURS: 90**

**Text Book:**

1. Cynthia C Norkins, Joint Structure and Function – a Comprehensive Analysis, Jaypee Brothers, 4th Edition, 2012.
2. Kinesiology of the musculoskeletal system foundations for rehabilitation, Donald A. Neumann. Third edition.

**References:**

1. Gary I Soderberg, Kinesiology – Application to Pathological Motion – (especially for patho-biomechanics) Williams & Wilkins, 2nd Edition, 2007
2. I.A. Kapandji, Physiology of joint structure- Churchill Livingstone pub, 3rd Edition, 2005
3. Zeevi Dvir, Clinical Biomechanics, Churchill Livingstone, 2000

**Course Objectives:**

The objectives of this course is that after 100 hours of lectures and demonstrations, in addition to clinics the student will be able to demonstrate a general understanding of the diseases that therapists would encounter in their practice. They should have a brief idea of the aetiology and pathology, about the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the disease on any therapy that may be prescribed. Broad outline of goals of pharmacological and surgical therapy should be imparted in those diseases in which physical will be an important component of overall treatment.

**Course Outcomes:** The Course outcome is to know about the

1. Knowledge of principles of surgery and the application of basic sciences to surgical treatment.
2. Abdominal surgical incisions and Analyse the causes, indication, types of incisions, pre operative assessment, procedure, post operative assessment, its complications and management for various surgeries.
3. Principles of plastic surgery and splinting procedures
4. Knowledge about management of burns, Flap design, tissue handling, haemostasis and oedema control.
5. The students can assess, evaluate and frames physiotherapy management in Pre and post operative conditions.

**UNIT I** **20**

Describe the regions of abdomen and its surgical incisions.

**UNIT II** **20**

Outline the site extent of incision indications & post operative complications in

- a. Nephrectomy
- b. Appendicectomy
- c. Herniorrhaphy
- d. Mastectomy
- e. Thyroidectomy
- f. Colostomy
- g. Adrenalectomy
- h. Cystectomy
- i. Hysterectomy

- j. Prostatectomy
- k. Cholecystectomy
- l. Ileostomy.
- m. Gastrectomy

**UNIT III** **20**

Structure and functions of skin.

Classify burns by depth and surface area.

Outline the causes, medical management and precautions in the acute stage. List the potential deformities due to burns, methods of prevention and precautions.

Mention cosmetic and functional treatment measures.

**UNIT IV** **20**

Outline the plastic surgery procedures and management in rehabilitation of burns, including splinting methods for common deformities and prevention of burns contractures.

**UNIT V** **20**

Physiotherapy goal setting in General Surgery, Plastic Surgery & Burns

**Evaluation** **TOTAL HOURS: 100**

**Text Books:**

1. Hemdon, Total burn care, , CBS publishers,4th Ed ,2012
2. Janis , Essentials of Plastic surgery, CBS Publishers, 2nd Ed, 2014.
3. Jeschkie, Handbook of burns, vol – I, CBS Publishers, 2012,

**References:**

1. S.Das, A practical guide to operational surgery, 4th Edition SD publications, 2004.
2. Grabb , Plastic Surgery, Jaypee Brothers, 2nd Ed, 2002.
3. Cash’s text book of general medicine, JP, 3Ed, 2012
4. Tidys Physiotherapy, Mosby Pub, 15th Ed, 2013.

**Course Objective**

After 100 hours of lecture, students should be able to understand the principles of physiotherapy profession, should be able to understand principles of management in personal management, times management and administration including budgeting.

**Course Outcomes:**

1. This course provides basic knowledge on legal responsibility and professional culture .
2. This course explains the role of different national professional bodies
3. This provides information on organization principles and budget planning, Management and Administration
4. This gives knowledge on job recruitment, preparation for 1<sup>st</sup> job and career development
5. Rules and Regulations of governing bodies of Physiotherapy can be well understood

**UNIT I PROFESSIONAL ETHICS AND LEGAL ISSUES 20**

1. The implications and confirmation to the rules of professional conduct.
2. Legal responsibility for their actions in the professional context and understanding liability and obligations in case of medico-legal action.
3. A wider knowledge of ethics relating to current social and medical policy in the provision of health care.

**UNIT II PROFESSIONAL BODIES 20**

1. National and international professional bodies; Professional associations ( IAP) and educational body. Difference between scientific association (Professional body) and statutory body.
2. The role of international health agencies such as WHO and WCPT.

**UNIT III MANAGEMENT STUDIES FOR PHYSIOTHERAPY 20**

1. Definition – Branches of management- Principles of health sector management.
2. General principles of management: Theories of management.
3. Personnel management: Policies and procedures. Basic concepts and theories.

**UNIT IV ORGANIZATION 20**

1. Financial issues including budget and income generation.
2. Principles of an organizational chart.
3. Organization of a department: Planning, space, manpower, materials and basic requirements.

**UNIT V****RESOURCE AND QUALITY MANAGEMENT****20**

1. Resource and quality management: planning with change and coping with change.
2. Self management
  - a. Preparing for 1st job
  - b. Time management
  - c. Career development

**Evaluation****Total Hours: 100****Text books:**

1. Larry J Nosse, Management Principles for Physical therapist, Lippincott Williams, 2<sup>nd</sup> Ed, 2005
2. Chris croft, Time Management, International Thomson Business press, 1996.

**References:**

1. Elaine Lynne ,Management in Health Care, Macmillan Publisher,4<sup>th</sup> Ed,1994.
2. Willam A. Reinke, Health Planning for Effective Management, Oxford University Press,3<sup>rd</sup> Ed,1988.

**Course objective:**

The objective of this course is after 100 hours of lecture demonstration the student will be able to clearly outline the need to make clinical decisions in today's context of Physiotherapy, the methodology in making clinical decisions and also the need to upgrade knowledge with recent advances in skills through research literature.

**Course Outcomes:**

1. Student will be able to Define evidence based practice & Gain confidence in making clinical decisions on diagnosis and treatment
2. Student will be able to Make decisions based on prescriptive, descriptive and artificially added approach & Categorize the subjects and objects of knowledge
3. Student will be able to Differentiate between screening and diagnosis & Understand the importance of history taking and physical examination
4. Student will be able to Differentiate types of research methods , Modification and justification of physiotherapy treatment approaches & Identify and manage ambiguity and ambiguous patient problem
5. Student will be able to Identify and appreciate ethical principles in physiotherapy, Emphasize the importance of patient consent , & Identify situations beyond the scope of physiotherapists

**UNIT I****20**

Introduction to evidence-based practice  
 Concepts of evidence-based physiotherapy  
 Awareness  
 Consultation  
 Judgement  
 Creativity  
 Identifying different sources of evidence -electronic bibliographic database and world wide web  
 Step by step search for evidence

**UNIT II****20**

Clinical decision making  
 Evaluation  
 Documentation  
 Problem oriented medical record  
 Assessment  
 Goals  
 Treatment

### **UNIT III**

**20**

Clinical data methods and types  
Research approaches  
Prescriptive  
Descriptive  
Categorisation  
Organisation and content  
Artificially aided approach  
Index medicus

### **UNIT IV**

**20**

Research methodology  
Research design  
Screening  
Selection and interpretation of tests  
Sensitivity and specificity  
Parametric and nonparametric tests

### **UNIT V**

**20**

Professional growth and research  
Journal reviews and presentation of latest research literature  
Influence of ethical values on patient care

### **Evaluation**

**Total Hours: 100**

### **Text books:**

1. Sackett DL, Evidence Based Medicine-How to practice and teach, Churchill livingstone,2ED 1995
2. Bury TJ, Mead JM,Evidence based health care: a practical guide for therapists. Butter worth – Heinemann, oxford Pub,1998

### **References:**

1. Koehn D –. The ground of professional ethics, Routledge, London.1994
2. Edwards A, Elwyng –Evidence based patient choice, oxford university press, oxford 2001



**Course objective:**

The objective of this course is after 200 hours of lecture demonstration the student will be able to acquire knowledge & skill about biomechanical principles of application of aids & appliances used for ambulation, protection & prevention.

**Course outline:**

1. Students should have understood the principles and mechanics behind the construction of orthotics and prosthetics
2. Students should be able answer what are the other mobility aids which is available in the market.
3. Students should be able to answer biomechanical principles behind the construction of every orthotics and prosthetics.
4. Students should have understood the differentiation of both the upper motor and lower motor neuron lesion and cerebellar dysfunction
5. Students should be able to explain the safety measures to the patient should understand while using the devices.

**UNIT 1****40****Bio mechanical principles**

Bio mechanical principles involved in the designing of static and dynamic alignment of the following: Aids & Appliances, Splints & orthotic devices for spine, upper & lower limbs.

**UNIT II****40****Orthotics**

Principles & Mechanics of orthotics,  
Classification of Aids & appliances.  
Indications, contraindications, advantages and disadvantages for orthotics  
Assessment, Application and training of orthotics and their function.  
Needs and benefits of orthosis

## UNIT III

40

### Prosthetics

Principles and mechanism of prosthesis

Classification, Indication, contraindications, advantages and disadvantages for prosthesis

Assessment, application and training for prosthesis and their functions. Needs and benefits of prosthesis

## UNIT IV

40

### Assistive technology in geriatrics and paediatric conditions

Review the use of splints, braces, ambulatory aids in neurological conditions: spastic upper motor neuron lesions, lower motor neuron lesions, in dorsal column dysfunction and cerebellar dysfunction, cerebral palsy, peripheral nerve injury.

Demonstrate the fabrication of simple hand and foot splints out of POP.

Assessment for ambulatory aids for paediatric conditions

Assessment for ambulatory aids for geriatric conditions

## UNIT V

40

### Advanced Technology in Gait training.

Robotics, body weight treadmill training, digital aids, serial splinting, foot sensor, postural analysis software, simulated video games, virtual reality.

### Evaluation

**Total Hours:200**

### Text books:

1. Susan. O. Sullivan, physical rehabilitation, jaypee, 6<sup>th</sup> ed, 2014.
2. Multani, principles of geriatric physiotherapy, jaypee, 1st ed, 2008.

### References:

1. Valevie, J Berg rice ergonomics in health care & rehabilitation, butter worth, 1998.
2. Sunder, textbook of rehabilitation, jaypee, 3<sup>rd</sup> ed, 2010.
3. Karen Jacobs, ergonomics for therapists, mosby Elsevier, 3<sup>rd</sup> ed, 2008.

**Course Objectives**

The objectives of this course is that after 90 hours of lectures & demonstrations, in addition to clinics, the student will be able to demonstrate an understanding of cardio respiratory conditions causing disability and their management.

**Course outcome:** The Course outcome is to know about the

1. The cardiac conditions pathology like infectious diseases ischemic diseases
2. Lung infections and diseases its pathology are clearly studied.
3. Cardio pulmonary resuscitation, uses of defibrillators
4. Chest deformities and spinal deformities.
5. Movements and muscles responsible for respiration and thoracic cage

**UNIT I****18****Anatomy and physiology**

- Upper respiratory tract, lower respiratory tract, muscles of respiration
- Mechanism of respiration, respiratory centre, regulation of respiration
- Chest wall movements, lung and chest compliance, ventilation - perfusion relationship.
- Airway resistance, applied aspects of chest, spinal deformities
- Lung volumes and capacities, spirometer, lung function test, pulmonary circulation, cough reflex.

**UNIT II****18**

- Structure of heart and its blood supply – coverings, chambers, conductive system, valves.
- Cardiac output, coronary circulation, heart sounds, blood pressure, pulse.
- Investigative procedures – ECG, Echocardiography, chest x ray, Angio, ABG, stress testing and its principles, EECPP.

**UNIT III****18**

## Cardiovascular system

1. Acquired heart disease – Ischemic heart disease, myocardial infarction, angina, heart failure, rheumatic fever, hypertension, infective endocarditis, myocarditis, cardiomyopathy.
2. Congenital heart disease
  - a. Acyanotic heart disease – Atrial Septal Defect, Ventricular Septal Defect, Coarctation Of Aorta, Patent Ductus Ateriosis, Over Riding Of Aorta.

- b. Cyanotic heart disease- Tetralogy Of Fallot (ventricular septal defect, pulmonary stenosis, right ventricular hypertrophy, transposition of greater vessels), Pentalogy Of Fallot.
- 3. Valvular heart disease – mitral stenosis, mitral regurgitation, aortic stenosis, aortic regurgitation.
- 4. Cyanosis, syncope.

#### **UNIT IV**

**18**

- 1. Respiratory system
  - a. COPD – chronic bronchitis, emphysema
  - b. Bronchial asthma, bronchiectasis, lung abscess, bronchopneumonia, bronchostenosis.
  - c. Infectious diseases – pulmonary tuberculosis, pneumonia.
  - d. Interstitial lung disease
  - e. Occupational lung disease
  - f. Pulmonary vascular disease – pulmonary hypertension, pulmonary thromboembolism.
  - g. Lung cancer, aspergillosis, cystic fibrosis
  - h. Pleural diseases – empyema, pleural effusion, pneumothorax.
- 2. Chest wall injuries  
Flail chest, fracture rib, haemothorax, haemopneumothorax, lung contusion and laceration, injury to heart and its greater vessels.

#### **UNIT V**

**18**

- 1. Cardiac surgeries and reoccurring conditions
  - a. Open heart surgery  
Thoracotomy – median sternotomy (CABG, valve replacement, valvotomy, transplant, cyanotic heart diseases, valvular heart diseases).
  - b. Closed heart surgery  
PTCA, angioplasty, PDA, COA.
- 2. Thoracic surgeries – extent, use and complications
  - a. Thoracotomy, Lobectomy, Segmentectomy, Bilobectomy, Pneumonectomy, Pleuropneumonectomy, Decortications, Lung Transplantation, Tracheostomy, ICD.
  - b. Heart lung machine (ECMO), ventilators - types, modes, uses, defibrillators, CPR.
  - c. Pulmonary embolism, DVT, peripheral vascular disease, diabetes mellitus, hypertension.
  - d. Common drugs used in cardio pulmonary conditions and its use.

**Text Books:**

1. Crofton & doogles Respiratory Diseases Vol – I & II, SEATON,1 Ed, 2003
2. Downie, Cash text book of chest, Heart & Vascular disorders –ELBS, 1 Ed, 2005
3. Berne, Cardio Vascular Physiology ,Mosby, 4Ed, 2012.

**References:**

1. Nelson, ECG interpretation, Jaypee, 1<sup>st</sup> ed, 2011.
2. Bhalrao, Essentials of clinical cardiology, Jaypee, 1st ed , 2013
3. Chattergee, Cariology an illustrated Text book , Jaypee,1<sup>st</sup> ed, 2012.
4. Beachey, Respiratory care- Anatomy and physiology :foundation, CBS ,3<sup>rd</sup> ed, 2013.
5. George Mathew & Praveen Aggarwal – Manual for UG, Medicine ed,2015.

**Course Objectives:**

The objective of this course is that after 170 hours of lectures, demonstrations, practical and clinics the student will be able to identify cardio respiratory dysfunction, set treatment goals and apply their skills in exercises therapy, electrotherapy and massage in clinical situations to restore cardio respiratory function.

**Course Outcomes:** The Course outcome is to know about the

1. Basic anatomy , physiology of heart and lungs
2. Importance of physiotherapy intervention in ICU for cardiac and pulmonary disease.
3. Pre and post operative care for all surgery
4. Assessment of both cardiac and pulmonary patients
5. Adjuncts used along with physiotherapy and ventilators

**UNIT I****34**

1. Respiratory system
  - Trachea and Bronchial tree , Bronchopulmonary segments ,
  - Respiratory unit , Muscles of respiration, Lung & Chest wall compliance , v/q ratio
  - Anatomical dead space and Physiological dead space , Pulmonary defence mechanism , Mechanics of breathing ,
  - Surface anatomy of lungs , Lung volumes and Lung capacities ,
  - Respiratory investigation – PFT, X-Ray, ABG, Exercise tolerance
  - Auscultation, Normal and abnormal breath sounds. Measurement Chest expansion at different levels (axillary, nipple, xiphoid),
2. Cardiovascular system
  - Structure and function of cardiovascular system, surface anatomy of heart.
  - Coronary and pulmonary circulation ,
  - Conductive system of heart , Cardiac cycle, cardiac output.
  - CVS investigations – ECG, Echo, Angio, Stress testing. EECp

**UNIT II****34**

1. ASSESSMENT
  - Subjective assessment – chief complaints, history, Functional assessment – ADL assessment , Objective assessment – physiotherapy assessment of cardiothoracic conditions.
  - Assessment for Respiratory Conditions - Obstructive lung disease – Chronic bronchitis and Emphysema , Bronchiectasis, Bronchial asthma , Lung abscess, Chest Infections –

Pneumonia, Restrictive lung disease – OLD, Chest wall deformities, Pulmonary Surgery – Pneumonectomy, Lobectomy, Segmenectomy Pre-operative and post-operative PT management.

- Assessment for Cardiac conditions - Coronary artery diseases – IHD, MI, Heart failure , Hypertension , Cardiac surgery – CABG, PTCA Pre-operative and Post-operative PT management

## 2. PT TREATMENT

- Define, indications, contraindication, physiological effect, types, steps, precaution, complication of the following chest physical therapy technique Breathing exercise –DBE, Costal, Segmental, Apical Breathing control Breathing re-education during functional activities.
- Relaxation position for breathlessness patient, Forced expiratory technique, Thoracic expansion exercise, Chest mobility exercise, Active cycle of breathing, Positive expiratory pressure, Manual hyperinflation, Incentive Spirometry
- Postural drainage – Modified PD, Home PD, Cough – Stages of cough, types of cough, steps in teaching voluntary cough , Factors affecting cough mechanism , Huff – Low, Mid, High lung volume huff. Vibrations, Percussion, Shaking.

## UNIT III

34

### 1. Physiotherapy in intensive care unit

Ventilator – Definition of ventilator, Types of ventilator, Principles of Ventilator, Indication Of ventilator, PT assessment of ventilator dependent patient, weaning. Humidification – Physiology, Bubble jet, Pass over, Ultrasonic nebulizer 77 humidifier Nebulization – Physiology, MDI, Ultrasonic, Suctioning – Oropharyngeal, Nasopharyngeal, intubated, steps, complications.

## UNIT IV

34

### 1. Cardiopulmonary rehabilitation and pediatric physiotherapy

Pulmonary Rehabilitation Define, indication, outcomes, steps in pulmonary rehabilitation, contraindication Education Cardiac Rehabilitation . Define, Indication, Phases of cardiac rehabilitation, contraindication, benefits.

Define, Indications, Types of ICU, Equipment used in adult and pediatric ICU, Assessment, Principles of physiotherapy for a patient in ICU including chest Physiotherapy and adjacent for adult and pediatric patient. Physiotherapy for ventilator dependent patient

Physiotherapy in general surgery and other conditions

Education Physiotherapy in general surgery Pre-operative and Post-operative management for patient with abdominal surgery Conditions – appendicectomy, mastectomy, gastrectomy, hysterectomy, herniography, cholecystectomy, colostomy Physiotherapy in Intensive Care Unit

PT management Physiotherapy for peripheral vascular diseases Definition, Physiology, Conditions of PVD, evaluation-arterial, venous, lymphatic, Doppler, Treatment-Buerger's exercise, cold laser, electrical stimulation, Intermittent compression.

**Evaluation****Total Hours:170****Text Books:**

1. Amrohit , Text book of chest physiotherapy, Jaypee ,1<sup>st</sup> ed, 2010,
2. Madhuri , Text book of physiotherapy for cardiothoracic surgery condition ,CBS, 1<sup>st</sup> ed , 2008.

**References:**

1. Patricia Downie , Cash's Text Book of chest heart and vascular disorders for Physiotherapists, Jaypee, 4<sup>th</sup> ed, 1993.
2. Joanne Watchie , Cardio-pulmonary physical therapy, Jaypee ,3<sup>rd</sup> ed, 1998
3. Brompton , A-Clinical guide to chest PT, Jaypee, 2nd ed,1992



**Course Objective:**

After 170 hours of lectures and demonstrations the student will be able to give physiotherapeutic techniques in Obstetrics and Gynecological conditions for relief of pain, relaxation, conditioning and posture.

**Course Outcomes:**

1. The students can know about developmental anatomy of embryonic and fetal periods.
2. Learn about difference between normal, forceps and caesarean section. Understands the musculoskeletal changes during pregnancy & delivery. Its complications and its management.
3. Recognizes & comprehends the physiotherapy management for various gynecological problems in adolescence and adult conditions like infections, urogenital dysfunction and prolapse of uterus.
4. Demonstrate the exercise protocol to relieve pain during the antenatal, prenatal and postnatal period
5. Become familiar with the hydrotherapy and yoga for treating the gynecological conditions.

**UNIT I****34**

1. Review of anatomy related to OBG.
2. Developmental anatomy – embryonic and fetal periods.
3. Physical and physiological changes during pregnancy and during labour.

**UNIT II****34**

1. Preparation for labour – antenatal training, breathing, relaxation.
2. Lower extremity exercises, abdominal and pelvic floor exercises.
3. Mechanism of labour.
4. Normal delivery, forceps delivery, cesarean section including management, care of the scars.
5. Postnatal period, postnatal complications & management.
6. Episiotomy and wound care.

**UNIT III****34**

1. Common gynecological problems in adolescence and adults
2. Post-surgical management.

## **UNIT IV**

**34**

1. PT management in OBG, obstetric TENS.
2. Pelvic inflammatory diseases salpingitis.
3. Prolapse of uterus.
4. Urogenital dysfunction – incontinence.

## **UNIT V**

**34**

1. Use of hydrotherapy in women's health.
2. Pregnancy yoga.
3. Prenatal and antenatal exercises – relief of pain. Postnatal care including care of the breasts and use of special garments.
4. Diet and nutrition in pregnancy.
5. Diastasis recti management.

## **Evaluation**

**Total Hours:170**

### **Text books:**

1. Margaret polden, Jill Mantle, Physiotherapy in Obstetrics and Gynecology –Jaypee Brothers, 1st Edition – 2007.
2. Carolyn kisner, therapeutic exercise – foundation & techniques, Jaypee, 6th edition-2012.

### **References:**

1. D.C. Dutta, textbook of obstetrics, central – 2004.
2. G.B. Madhuri, textbook of physiotherapy for OBG, Jaypee 1st edition – 2007.
3. Patricia Downie, Cash's Text Book of General Medical and Surgical Conditions for physiotherapists, Editor Jaypee Brothers, 2nd Edition,1994
4. Cesarean Section – Therapeutic Exercise – Carolyn Kisner, Lynn Allen Colby.
5. Jean M. Irion, Glenn L. Irion, Wom

**Course Objective:**

The objective of the course is that after 90 hours of lectures, demonstrations, practical and clinics, the student will be able to demonstrate and understanding of the influence of social and environmental factors of individual and society.

**Course Outcome:** The Course outcome is to know about the

1. Epidemiological implications of impairment and handicap and disability, health statistics
2. National health schemes and its benefits.
3. Categorizes various rehabilitations and describes its advantages and disadvantages.
4. Explains about communicable and non communicable diseases and its implications.
5. Role of community leaders and health professionals in health education.

**UNIT I****18**

1. Outline the natural history of diseases and the influence of social, economic and cultural aspects of health and diseases.
2. Outline the various measures of prevention and methods of intervention – especially for diseases with disability.
3. Outline the national care delivery system and the public health administration system at central and state Government level.

**UNIT II****18**

1. Outline selective national health schemes.
2. Define occupational health and list methods of prevention of occupational hazards.
3. Outline the Employees State Insurance scheme and its benefits.

**UNIT III****18**

1. Describe the social security measures for protection from occupational hazards, accidents, diseases, and workman's compensation act.
2. Outline the objectives and strategies of the national Family Welfare Programme.
3. Define Community based rehabilitation and Institution based rehabilitation. Describe the advantages and disadvantages of institution based and community based rehabilitation.

**UNIT IV****18**

1. Describe the following communicable diseases with reference to water reservoir, mode of transmission, route of entry and levels of prevention. a. Poliomyelitis, b. Meningitis, c. Encephalitis, d. Tuberculosis, e. Filariasis, f. Leprosy, g. Tetanus & h. Measles.
2. Describe the Epidemiology of Rheumatic heart disease, cancer, chronic degenerative disease and Cerebrovascular accident.
3. Outline the influence of nutritional factors such as protein Energy Malnutrition, Anemia, Vitamin deficiency and mineral deficiency on disability.

## **UNIT V**

**18**

1. List the principles of health education, methods of communication, and role of health education in rehabilitation services.
2. Define the role of community leaders and health professionals in health education.
3. Outline the role of international health agencies in rehabilitation of the disabled.

### **Evaluation**

**Total Hours: 90**

### **Text Books:**

1. Park's Text Book of preventive and Social Medicine – K Park, 24<sup>TH</sup> ED, BDB Publishers,2017.
2. Prabhakar, Short text book of preventive and social medicine, , Jaypee, 2nd Ed 2012,

### **Reference:**

1. Retan, Handbook of preventive and social medicine, 9<sup>th</sup> ed, 2007.

**Course Objectives:**

The objectives of this course is that after 90 hours of lectures & demonstrations, in addition to clinics, the student will be able to demonstrate an understanding of neurological conditions causing disability and their management.

**Course Outcomes:**

The following were the outcome measures of this course

1. To identify, analyse and apply the neuro anatomical basis of brain for various clinical neurological conditions.
2. Becomes familiar with Neurophysiological basis of neurological conditions which drives the students to evaluate the patients with certain disorders
3. Becomes beware of the causes, signs, symptoms, clinical management of the Cerebrovascular Accidents, head and Spinal Cord Injury
4. Knowledge to assess the neurological functions of the brain and spinal cord, congenital and acquired diseases of the spinal cord
5. Would be able to characterize the demyelinating, degenerative disease of the brain, diseases like myopathies, infections and peripheral neuropathy

**UNIT I****18****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 Extrapyrmidal system, relationship of the spinal nerves to the spinal cord segments, Long tracts of the spinal cord, the Brachial and Lumbar plexuses and Cranial nerves.

**Neurophysiology**

Review in brief the Neurophysiological basis of: Tone, Disorders of tone and posture, Bladder control, muscle contraction, movement and pain.

**UNIT II****18****Clinical Features & Management**

Briefly outline the clinical features and management of the following Neurological Disorders:

1. Congenital and childhood disorders.
  - a. Cerebral palsy.

- b. Hydrocephalus.
- c. Spina Bifida.
- d. A.C. malformation, Dandy-Walker syndrome
- 2. Cerebrovascular Accidents.
  - a. General classification, thrombotic, embolic, haemorrhagic & inflammatory strokes.
  - b. Gross localisation and sequelae.
  - c. Detailed rehabilitative programme.
- 3. Trauma - broad localisation, first aid and management of sequelae of head injury and spinal cord injury – paraplegia, quadriplegia, neurogenic bladder – types
- 4. Diseases of the spinal cord.
  - a. Craniovertebral junction anomalies.
  - b. Syringomyelia.
  - c. Cervical and Lumbar disc disease.
  - d. Tumours.
  - e. Spinal arachnoiditis.
  - f. T.B. Spine
- 5. Demyelinating diseases (central and peripheral).
  - a. Guillain- Barrie Syndrome.
  - b. Acute disseminated encephalomyelitis.
  - c. Transverse Myelitis.
  - d. Multiple Sclerosis.
- 6. Degenerative Disorders.
  - a. Parkinson's Disease.
  - b. Dementia.

### UNIT III

18

- 1. Infections.
  - a. Pyogenic Meningitis sequelae.
  - b. Tuberculous infection of Central Nervous System.
  - c. Poliomyelitis.
  - d. Brain abscess
- 2. Diseases of the muscle including Myopathies: Classification, signs, symptoms, progression and management.
  - a. Myopathies
  - b. Muscular dystrophy
  - c. Spinal muscular atrophy
- 3. Peripheral Nerve Disorders.
  - a. Peripheral nerve injuries, localisation and management.
  - b. Entrapment Neuropathies.
  - c. Peripheral Neuropathies including Diabetic Neuropathy
- 4. Disorders of Autonomic Nervous system

5. Toxic and Metabolic Disorders of Nervous System
6. Deficiency disorders
7. Miscellaneous.
  - a. Epilepsy; Definition, classification and management.
  - b. Myasthenia Gravis; Definition, course and management.
  - c. Intracranial tumours; Broad classification, signs and symptoms.
  - d. Motor neuron disease.

## **UNIT IV**

**18**

### **Assessment**

Clinical assessment of Neurological function to be taught through bed side or demonstration clinic spread out over at least 5 sessions.

1. Basic history taking to determine whether the Brain, Spinal Cord or Peripheral Nerve is involved.
2. Assessment of Higher Mental function such as orientation, memory, attention, speech and language.
3. Assessment of Cranial Nerves.
4. Assessment of Motor power.
5. Assessment of Sensory function touch, pain and position.
6. Assessment of Tone-spasticity, rigidity and hypotonia.
7. Assessment of Cerebellar function.
8. Assessment of Higher Cortical function-apraxia etc.
9. Assessment of Gait abnormalities.

## **UNIT V**

**18**

### **Introduction to Psychiatry**

1. Introduction – classifying Mental Disorders (DSM – IV) – standards of care for psychiatric – psychiatric interviewing – Therapeutic and Non-therapeutic communication – legal and ethical issues Rights of the mentally ill – physiotherapist and patient relationship. Disorders of children and Adolescents
  1. Disorders of the Elderly
  2. Schizophrenic disorders
  3. Mood Disorders
  4. Anxiety Disorder
  5. Somatoform Disorders

6. Dissociative Disorders
7. Personality disorders
8. Eating disorder
9. Sleep Disorder
10. Therapies

**Evaluation**

**Total Hours:90**

**Text books:**

1. Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6<sup>th</sup> ed. – 2014
2. Kenneth W Lindsay, Neurology and Neurosurgery – illustrated, Churchill Livingstone, 5Ed, 2010

**References:**

1. Sir Ruger Bannister, Brain and Bannister's Clinical Neurology, Oxford,7<sup>th</sup> Edition, 1992
2. Davidson's Principles and practice of Medicine 23<sup>rd</sup> Edition, 2018
3. Hokmes Bullock, Introduction to nervous System, WH Freeman and company,3<sup>rd</sup> Edition, 2002
4. Carpenter, Mental Health & Learning disability, Eurret Pub, 2<sup>nd</sup> Edition, 1998
5. Ropper, principles of Neurology, JP, 10<sup>th</sup> Edition, 2014
6. Raymond D. Adams, Principles of Neurology, 5th Edition,



**Course Objectives**

The objectives of this course is that after 170 hours of lectures, demonstrations, practical and clinics the student will be able to identify disability due to neurological dysfunction, set treatment goals and apply their skills in Exercise Therapy, Electrotherapy and Massage in clinical situations to restore neurological function.

**Course Outcomes:**

1. To evaluate, differentiate, and comprehend the neuroanatomical and neurophysiological basis of the structure and functions of the brain and spinal cord.
2. Becomes well known about the analysis of the different aspects of the neurological physiotherapy assessment which includes assessment of Central nervous system and peripheral nervous system and the treatment techniques for neurological conditions
3. Development of disorders of CNS early detection of brain damaged child, high risk babies, Neuro-paediatric Examination that includes congenital & acquired disorders.
4. Knowledge about Neuro-Intensive Care Unit patients and physiotherapy management of the Cerebrovascular accidents, Head injury and spinal cord injury in the intensive care unit.
5. Practical application of integrated approach like MRP, Bobath, Brunnstroms and Roods approach.

**UNIT I****34****Review of Neuroanatomy and Physiology:**

Review the structure and function of a) neuron b) synapse c) supporting tissue. Review the organisation and function of a) cerebral hemispheres b) cerebellum c) spinal cord d) peripheral nerves e) pyramidal system f) extrapyramidal system. Review the factors influencing alpha motor neuron activity. Review the neurological basic of muscle tone and movement and demonstrate the following a) hypotonia b) hypertonia - spasticity and rigidity c) ataxia d) athetosis e) chorea.

**Principles of Assessment:**

Review a) skills in history taking b) assessment of higher functions, cortical sensations, cranial nerves, dorsal column sensations and pain & temperature sensations c) assessment of motor function grading of muscle power, assessment of range of movement, balance and coordination d) assessment of superficial and deep reflexes e) assessment of reflex maturation in terms of stimulus, position, negative/positive reactions and their significance f) assessment of gait – both normal and abnormal (spastic, ataxic and paralytic patterns), Emphasis should be placed on teaching accurate assessment techniques and various recording methods (ex) Colour coding on body charts, graphs etc.

## UNIT II

34

**Principles of Treatment:** Review the treatment Principles as follows:

- a) Sensory re-education: hypersensitivity, hyposensitivity and anaesthesia.
- b) Treatment of altered tone: hypertonicity and hypotonicity
- c) Moto re-education: strengthening exercises, co-ordination exercises, joint mobilisation exercises, use of equilibrium and labyrinthine systems, use of PNF patterns, controlled sensory stimulation to bias the spindle cells e.g. vibration, tactile, ice etc., use of stretch to elicit movement (facilitation), light joint compression (inhibition), use of reflex activity to improve motor function, phylogenetic sequence of motor behaviour.
- d) Treatment to improve function: free exercises, gait training with and without aids, activities of daily living exercises and exercises in recreation.

## UNIT III

34

### Cerebral Palsy:

1. Assessment options in paediatrics.
2. Identification of motor/sensory dysfunction in paediatrics. Including weakness, abnormal tone, posture and motor control deficit and lack of endurance
3. Clinical approaches to motor/sensory dysfunction in paediatrics including weakness, abnormal tone, posture and motor control deficits and lack of endurance
4. Application of assessment and treatment approaches in paediatric conditions including
  - a. Cerebral palsy
  - b. Development delay
  - c. Branchial Plexus injury (Erb's Palsy, Klumpky's paralysis)
  - d. Spina Bifida
  - e. Head Injury
  - f. Muscular Dystrophy (all types)
  - g. Poliomyelitis

## UNIT IV

34

1. Assessment options in adult neurological patients.
2. Identification of motor, sensory perceptual dysfunction in adult neurological patients including weakness, abnormal tone, motor control deficits and lack of endurance.
3. Clinical approaches to motor, sensory postural dysfunction in adult neurological patients including weakness, abnormal tone, postural and motor control deficits and lack of endurance
4. Application of assessment and treatment approaches in adult neurological conditions including:
  - a. Stroke
  - b. Monoplegia

- c. Brain tumour
  - d. Parkinsonism
  - e. Cerebellar lesions
  - f. Motor Neuron Diseases
  - g. Disorders of Spinal Cord
  - h. Muscular dystrophies
  - i. Head injury
  - j. Guillain Barrie syndrome
  - k. Peripheral nerve lesions/injuries
  - l. VII cranial nerve palsy
  - m. Low back pain syndrome
  - n. Brachial neuralgia
  - o. Neuro intensive care unit patients.
5. Post surgical Physical therapy in neurosurgical procedures:  
Craniotomy, Laminectomy, Shunts, SOL resection,  
Surgical treatment of spasticity, cervical cord decompression.

## UNIT V

34

### Evaluation of Physical Dysfunction

Demonstrate methods of evaluation for physical dysfunction & management of disabilities with particular reference to: Spinal cord injury (paraplegia and tetraplegia), Poliomyelitis, Brain injury, (including stroke and cerebral palsy) Arthritic conditions Muscular Dystrophy, Hansen's disease, Peripheral nerve lesions, Fracture diseases & Chronic cardio – respiratory dysfunction.

### Electro Diagnosis:

History of Clinical Neurophysiology: Introduction to electro diagnostic signals and their measurements. Electro diagnostic procedures & Prognosis in Neurological disorders. Strength duration curve, EMG, NCV

### Integrated Approach

Integrated neuro muscular control and physiotherapeutic prevention, curative and rehabilitative measures for sensory motor dysfunction, pain control, postural re-adjustment/control using following hypothetical theories

- a. Motor development (Bobath) approach
- b. Vojta
- c. Motor Re-learning Programme (MRP)
- d. Brunnstrom Movement therapy
- e. Roods Approach

- f. Sensory Integration therapy  
Merits and demerits of each approach to be explained.

**Practical:**

Practical demonstration of assessment and physiotherapy management to be demonstrated in the class and students must practice on each other / model before applying them in clinicals under supervision.

**Evaluation**

**Total Hours:170**

**Text books:**

1. Susan B'O' Sullivan, physical rehabilitation, Jaypee, 6<sup>th</sup> edition. – 2014
2. Neurological Rehabilitation VI Edition, Daray Umphered - 2006
3. Patricia. A. Downie, cash's text book of neurology for physiotherapist – Jaypee, 4<sup>th</sup> edition– 1993.
4. Sophie Levitt, treatment of cerebral palsy & motor delay, Wiley – Blackwell, 5<sup>th</sup> edition – 2013.

**References:**

1. Sophie Levitt, Cerebral Palsy – Treatment of cerebral palsy and motor delay, Blackwell sciences,5Ed, 2013
2. Catherine A Trombly, Occupational Therapy for physical dysfunction, Williams & Wilkins, 4Ed, 1998
3. Roberta B. Shepherd, Physiotherapy in Neurology, William Heinemann Medical books Limited, 2nd Edition, 1974
4. Ida Bromley, Tetraplegia and paraplegia, a guide for physiotherapist, Churchill Livingstone, 5th Edition, 1998.
5. Jan Stephen Tecklin, Pediatric Physical Therapy, Lippincott Williams & Wilkins, 3<sup>rd</sup> Edition, 1999

**Course Objectives:**

The objectives of this course is that after 90 hours of lectures & demonstrations, in addition to clinics, the student will be able to demonstrate an understanding of orthopaedic conditions causing disability and their management.

**Course outcome:**

1. Knowledge about fractures of various bones. Types, mechanism, clinical features, complications and management of fractures gained and Dislocation of major joints and prevention are understood.
2. Knowledge about major surgical procedures in orthopaedics including amputations gained.
3. Knowledge about bone and joint infectious diseases and tumors in bones and joints gained.
4. Knowledge about arthritis, degenerative disorders of bones and joint, congenital and postural deformities gained.
5. Knowledge about peripheral nerve injuries and deformities gained.

**UNIT I****18****Introduction to Orthopaedics**

1. Joint structure & function
2. Muscle structure & function
3. Introduction to orthopaedic terminology, types of pathology commonly dealt with, clinical Examination, common investigations and outline of non-operative & operative management.

**UNIT II****18****Fractures & Dislocations: General Principles**

Outline the following:

1. Types of Fractures including patterns, open and closed fractures and fracture-dislocations.
2. Differences between dislocations & subluxation.
3. General & local signs & symptoms of fractures & dislocations.
4. Principles of management of fractures & dislocations.
5. Prevention & Treatment of complications including: Fracture-diseases, Volkmann's Ischaemic contracture, Sudek's Atrophy, Carpal Tunnel Syndrome, Myositis ossificans, Avascular necrosis and Shoulder – hand syndrome.
6. Fracture healing.

## **Upper Limb Fractures & Dislocations**

1. Enumerate major long-bone fractures and joint injuries.
2. Briefly describe their clinical features, principles of management and complications.

## **Lower Limb Fractures & Dislocations**

1. Enumerate major long bone fracture and joint injuries.
2. Briefly describe their clinical features, principles of management and complications.

## **Spinal Fractures and Dislocations**

Outline the mechanism, clinical features, principles of management and complications of spinal injuries.

## **Recurrent Dislocations**

Outline the mechanism, clinical features, principles of management and complications of recurrent dislocations of the shoulder and patella.

## **UNIT III**

**18**

### **Amputations**

1. Definition, Classification, indications for amputations.
2. Levels of amputation
3. Complications & medical approaches

### **Bone & Joint Infections**

Outline the etiology, clinical features, management and complications of: Septic arthritis, Osteomyelitis, (Acute & chronic), Tuberculosis (including spinal T.B.)

### **Bone & Joint Tumours**

Causes, Classification, Clinical features, management and complications of the following) bone and joint tumours (benign / malignant) : Osteoma, Osteosarcoma, Osteoclastoma, Ewing's sarcoma, Multiplemyeloma.

### **Leprosy**

Causes, Pathological changes, clinical features, management and complications of neuritis, muscle paralysis, Trophic ulcer, hand & feet deformities.

## **UNIT IV**

**18**

### **Chronic Arthritis**

Outline the pathology, clinical features, mechanism of deformities, management and complications of Rheumatoid arthritis, Osteoarthritis of major joints and spine, Ankylosing spondylitis.

## **Regional conditions in Upper limb and Lower limb**

Outline the causes, mechanism, clinical features and management for the common Tendinitis, capsulitis, bursitis, Synovitis. ( Periarthritis shoulder, Painful arc syndrome, Biceps tendinitis, Rotator cuff injury, Medial epicondylitis, Lateral epicondylitis, Dequervains synovitis, Quadriceps tendinitis, TA tendinitis)

## **Spinal conditions and deformities**

Low back ache, IVDP, Spondylolisthesis.  
Classify spinal deformities and outline the salient clinical features, management and complications.

## **Poliomyelitis**

Describe the pathology, microbiology, prevention, management and complications of poliomyelitis.

Outline the treatment of residual paralysis including the use of orthosis, Principles of muscle transfers.

## **Congenital Deformities**

Outline the clinical features and management of CTEV, CDH, Flat foot, vertical talus, limb deficiency

(Radial club hand and femoral, tibial and fibular deficiencies) meningomyelocele, Arthrogryposis, Mutiplex congenita, Osteogenesis imperfecta.

## **UNIT V**

**18**

## **Peripheral Nerve Injuries**

Outline the clinical features and management, including reconstructive surgery of:

1. Radial, median and ulnar nerve lesions.
2. Sciatic and lateral popliteal nerve lesions.
3. Brachial Plexus injuries including Erbs, Klumpke's & Crutch Palsy.

## **Sprain & Strains**

List common sites of sprains and muscle strains

Describe the clinical manifestations and treatment of common sprain and strain.

## **Sports injuries**

Sports injuries (musculo skeletal/ open injuries) pathomechanics, preventive measures, testing/prescription, training Emergencies on the field management.

## **Hand Injuries**

Outline of clinical features, management and complications of : skin and soft tissue injury, Tendon injury, Bone and joint injury.

## **Principles of Operative treatment**

List indications, Contraindications and briefly outline principles of: Athrodesis, Arthroplasty, Osteotomy, Bone-grafting and Tendon-Transfers.

## **Investigations in orthopaedic conditions**

### **Evaluation**

**Total Hours: 90**

### **Text Books:**

1. Mayil vahanan Natrajan, Text book of orthopaedics and trumatology, Lippincott, 7<sup>th</sup> Ed, 2011
2. Jayant Joshi, Essentials of Orthopaedics and applied physiotherapy, Elsevier, 2<sup>nd</sup> ed, 2011.

### **References:**

1. John Crawford Adams, Outline of Orthopaedics, Churchill Livingstone, 2007.
2. Turek's orthopaedics, Mosby, 4Ed, 2004.
3. John Crawford Adams, Outline of orthopaedics, Churchill Livingston, 13<sup>th</sup> Edition, 2001.
4. William A Mc Ardle, Exercise physiology, Lippincott, 7<sup>th</sup> ed, 2010.



### Course Objectives

The objectives of this course is that after 170 hours of lectures, demonstrations, practical's and clinics the student will be able to identify disability due to musculoskeletal dysfunction, set treatment goals and apply their skills in exercise therapy, electrotherapy and massage in clinical situations to restore musculoskeletal function.

### Course Outcomes:

1. Knowledge about assess, diagnose and plan the physiotherapy treatment for various musculo skeletal problems gained.
2. Physiotherapy management for various fractures are understood.
3. Knowledge about physiotherapy management for various orthopaedic surgeries gained.
4. Physiotherapy management for various soft tissue injury and degenerative disorders of bones and joints are understood.
5. Knowledge about physiotherapy management for amputation and burns gained.

## UNIT I

34

### General orthopaedic assessment

Subjective and objective assessment including on observation and examination.

### Fractures general

Define fractures. Review the types, the signs and symptoms, first-aid measures, principles of immobilisation, operative and non operative management of fractures and healing of fractures.

Describe the PT assessment of a patient with a fracture during the immobilization and post immobilization periods.

List the aims of PT management in a patient with a fracture.

Review manual, mechanical, skin and skeletal traction.

Describe the methods of mobilization of a patient/extremity after healing of a fracture.

**Regional fractures**

Review the mechanism of injury, clinical features, treatment and complications and describe the PT management and home programme for the following injuries:

1. Fractures clavicle, upper 1/3 of humerus, shaft of humerus, supra - and intercondylar fractures of the humerus.
2. Fracture head of radius, olecranon process, shafts of radius and ulna, Colles. Fracture scaphoid, Bennett's and metacarpal neck.
3. Fracture of femur, tibia, patella and injuries of the hip, knee joint
4. Fracture both bones of leg, Pott's and Dupuytren's, calcaneum and metatarsal (march).

**Spinal fractures**

Mechanism, causes, method of immobilisation, complication, PT assessment and management.

**Dislocation** of [a] hip (Congenital, Traumatic posterior & Central) [b] Shoulder (Anterior & Recurrent) [c] Patella.

## UNIT III

1. **Amputation:** Review the indications and principles of amputations of the upper and lower limbs and describe the PT management and training of amputees before and after prosthetic fitting. Review immediate post-operative prosthetic fitting and list its advantages.
2. **Burns:** Describe the different degrees of Burns and review relevant first aid measures. Outline the PT assessment of burns as follows, degree and % of burns, presence of oedema and adherent skin, ROM of involved joints, muscle power, contractures, deformities, altered posture and chest movements. Review Medical and Surgical management including skin grafting. Describe the Pt aims and management of a patient with burns along with a home programme.
3. **Leprosy**  
Define leprosy. Review the incidence and mode of transmission of leprosy. Review the clinical features and common deformities and Medical management. Review the common tendon transfer operations and describe PT management before and following tendon transfers. Describe the risks of anaesthetic limbs and outline its care to prevent complications. review plantar ulcers in leprosy and its management (including foot wear).
4. **Cerebral palsy** Define Cerebral Palsy. Review its causes, signs, symptoms, classification and common deformities. Outline PT assessment aims and management along with a home programme. Review common surgical corrections and its PT management.
5. **Poliomyelitis**  
Define poliomyelitis and review the etiology, clinical features, staging and medical

management. Outline Pt assessment during the acute, subacute and chronic stages. Describe PT aims and demonstrate treatment techniques. List the common deformities seen in polio and methods of preventing them. Review common reconstructive tendon transfer operations in polio and its PT management. Review the common orthoses used and describe the techniques of measurement for a Kafo and its check - out along with a detailed home programme including care of the orthosis.

## UNIT IV

34

### Spinal conditions

1. Describe briefly the general and PT assessment of the vertebral column. Subjective history. occupation, symptoms, major problems, Objective examination. (1) Observation - body type, musculature, deformity & gait. (2) Palpation - Temperature swelling, bony Prominences, local tenderness. (3) Postural evaluation using a plumb line. (4) Active movements the vertebral column - Flexion, extension, lateral flexion and rotation. (5) Specific test - straight leg raising, prone knee bend, passive neck flexion, Kernig's sign. (6) Proximal joints of pelvic and shoulder girdles. (7) Neurological tests - muscle strength, sensation and reflexes.
2. Review cervical and lumbar spondylosis, spondylolysis, TB spine  
Outline PT assessment. List PT aims and describe principles of management and a detailed home programme.
3. Review the clinical features and describe the PT management of Ankylosis spondylitis.
4. Intervertebral Disc Prolapse : Review basic anatomy and biomechanics of the spine. Review causes, signs, symptoms and investigations done for IVDP. Review the different types and degrees of IVDP. List its aims and demonstrate treatment techniques.
5. Spinal deformities List the common postural abnormalities affecting the spine. Review Kyphosis, Lordosis and scoliosis, outline PT assessment and PT aims and management along with a home programme.

### Regional conditions

Define the following terms, review their aetiology & clinical features and describe their PT assessment and treatment - bursitis (Subacromial & Prepatellar) synovitis, tendonitis, tenosynovitis, fibrositis, fibromyositis, rupture and avulsion of tendons (Tendoachillis & Quadriceps), tennis elbow, torticollis, tendonitis (supraspinatus & bicepital), peri-arthritis shoulder, and shoulder - hand syndrome.

## **Chronic arthritis**

1. Define Rheumatoid Arthritis. Review its signs, symptoms, radiological features, pathology, common deformities, Medical and Surgical management. Describe the PT assessment, aims and management in the acute and chronic stages and a detailed home programme.
2. Define Osteoarthritis. review its signs, symptoms, radiological features, pathology, common deformities, Medical and Surgical management. Describe the PT assessment, aims and management and a detailed home programme, with special emphasis on Osteoarthritis of hip, knee, ankle and shoulder joints.

## **UNIT-V**

**34**

1. Sprain and strain – mechanism of injury, grades, PT assessment and management of common sprain and strain of shoulder, knee, ankle joint.),
2. Sports injuries Sports injuries (musculo skeletal/ open injuries) pathomechanics, preventive measures, testing/prescription, training Emergencies on the field management.
3. PT Protocols for major orthopaedic surgeries
  - Reconstructions
  - Replacement
  - Tendon transfer

## **Evaluation**

**Total Hours:170**

## **Text book:**

1. David J Magee, Orthopaedic Physical assessment, Saunders, 5th ed, 2008

## **References:**

1. John Crawford Adams, Outline of Orthopaedics, Churchill Livingstone, 2007.
2. Turek's orthopaedics, Mosby, 4Ed, 2004.
3. John Crawford Adams, Outline of orthopaedics, Churchill Livingstone, 13<sup>th</sup> Edition, 2001.
4. William A Mc Ardle, Exercise physiology, Lippincott, 7<sup>th</sup> ed, 2010

**Course Objective:**

The objective of this course is after 120 hours of lecture demonstration the student will be able to have a community based perspective with Physiotherapeutic approach.

**Course outcome:**

1. One can very well understand about the members of rehabilitation team and their role in Rehabilitating the patient.
2. Geriatric assessment, evaluation and rehabilitation can be known and about the principles of disability evaluation
3. Student can understand about the importance of therapeutic exercise in treating various condition like diabetes, hypertension, obesity etc.,
4. Communication and behavioral disorders can be well understood
5. The knowledge of role of physiotherapy in managing cancer patients can be gained

**UNIT I****24**

- 1) Definition of Rehabilitation. Explanation about its aim & principles
- 2) Rehabilitation team and the role of team members
- 3) Approaches of Rehabilitation
- 4) Definition and differentiation between community based rehabilitation & institute based rehabilitation
- 5) Concepts, Principles and component based rehabilitation
- 6) Planning and Implementation of community based rehabilitation

**UNIT II****24**

- 1) Physiology and theories of aging
- 2) Degenerative systemic changes:
  - Musculo-Skeletal changes (Atrophy, Osteoporosis, Stiffness, Hypotonia)
  - Cardio-respiratory Problems
  - Post Menopausal changes
  - Neurological changes
- 3) Role of Physical therapists in treatment of degenerative systemic changes

- 4) Psycho-Social aspects of aging
- 5) Assessment, Prescription of exercise & training of geriatric patient
- 6) Institutionisation of the aged, role of physiotherapist in planning and management?

**UNIT III** **24**

Exercise in various conditions

- Exercise principles & Training
- Exercise in Diabetes
- Exercise in Hypertension
- Exercise in Obesity
- Exercise in Renal conditions

**UNIT IV** **24**

- 1) Architectural barriers
- 2) Communication disorders
- 3) Behavioural disorders

**UNIT V** **24**

- 1) Outline the principles of disability evaluation and discuss its use
- 2) Outline the legal aspects of disability in terms of compensation for disability and benefits available for the disabled
- 3) Outline the social implications of disability for the individual and for the community
- 4) Role of Physiotherapy in management of cancer patients undergoing treatments

**Evaluation** **Total Hours: 120**

**Text Books**

1. Waqar Naqvi, Physiotherapy in community health and Rehabilitation, JP Brothers, 1<sup>st</sup> Ed, 2011.
2. S.Pruthvish, Community-Based Rehabilitation of persons with disabilities, JP Brothers, 1<sup>st</sup> Ed, 2006.
3. Mutani, Principles of Geriatric Physiotherapy, Jaypee, 1<sup>st</sup> Ed, 2008.
4. William Mc Ardle, Essentials of exercise physiology, Lippincott, 3<sup>rd</sup> Ed, 2006.

**References**

1. Judith Pitt-Brooke, Rehabilitation of movement – Theoretical basis of clinical practice, W.B .Saunders, 2<sup>nd</sup> Ed, 2002.
2. OSA Kackson, Physical therapy of geriatric patient, Churchill living stone, 3<sup>rd</sup> Ed, 2009.

**Course Objective:**

After 120 hours of lectures and clinical practice, students should be able to

1. Explain the concepts and principles of various approaches.
2. Demonstrate assessment of patients using various Principles.
3. Conclude physical diagnosis.
4. Analyze the patient's problems and come to a clinical diagnosis.

**Course Outcomes:**

1. Knowledge about advanced concept of PT assessment and PT management can be gained
2. The Students can well understand about manipulation and mobilization techniques
3. Advanced neuro techniques can be well understood
4. Students should have understood the differential test procedure available in field of cardio-respiratory.
5. student should have understood the rehabilitation protocols available in the field of cardio-respiratory & should have understood the guidelines available for exercise prescription for individual patients

**UNIT I****24****Recording and communication.**

1. Problem oriented Medical Record, History, Concept and Advantages.
2. Communication with the patient – Principles and methods.

**UNIT II****24****Physical Diagnosis****Musculo skeletal system**

- a. Maitland's Concept
- b. Cyriax Concept
- c. Mckenzie's concept
- d. Kaltenbone concept
- e. Neural tension tests – Normal and abnormal findings.

**UNIT III****24****Neuro Muscular system :** ( for CNS Problems)

- a. Bobath's approach ( Normal movement concept)
- b. Motor Relearning process (MRP)
- c. Vojta approach

- d. Clinical reasoning and clinical decision and clinical making in neurological conditions.
- e. Rationale of plan of treatment for neurological conditions.

#### **UNIT IV**

**24**

##### **Cardio respiratory system:**

- a. Clinical Reasoning in Cardio pulmonary patients.
- b. Concepts of cardio pulmonary evaluation and analysis (subjective, objective & Physical examinations)
- c. Analysis and Interpretation of Investigations in relevance to prescribe exercises
- d. ECG, echo, lipid profile, ABG analysis, pulmonary function testing, chest x-ray

#### **UNIT V**

**24**

Various protocols followed in stress testing (Bruce Balk, Naughton, Howard step test, 12 minute walking test, six minute walking test, shuttle walking test)

1. Cardiac Rehabilitation
2. Pulmonary Rehabilitation

#### **Evaluation**

**Total Hours: 120**

#### **Text books:**

1. Janet H carr, a motor re leaning programme for stroke, aspen publishers, 2<sup>nd</sup>, 1987
2. Berta bobath, adult hemiplegia, butterworth Heinemann, 3<sup>rd</sup> ed, 1990.

#### **Reference:**

1. David J. magee, orthopaedic physical assessment, saunders, 5<sup>th</sup> ed, 2008.
2. Maitland textbook of pheripheral and vertebral manipulation 4<sup>th</sup> edition.
3. Robin mckenzie textbook of mechanical diagnosis and therapy for cervical, thoracic and lumbar spine volume 1.
4. Freddy . M. kalternborn textbook of manual mobilization volume 1



**Course Objectives**

This assignment of clinical study / review of literature is designed to develop the aptitude among students towards further reading and selecting references and present a written dissertation, or conduct a comparative study of the value / efficacy of a physiotherapy procedure in selective group of patients and normal subjects or justify the chosen procedure.

Thus the student will submit to the University a written project work/ case study report at the commencement of eighth semester of the four and half years B.P.T. degree course.

**Guidance**

Each student will receive guidance from the physiotherapy teacher towards referring relevant literature / collect required data and discuss them with the project guide Periodically.

After correction and edition of handwritten manuscripts by the project guide, the student will compile his / her study / work into a manual form for submission to the institution of study.

Under case study, the student may study the patients in clinical areas, consolidate the findings and discuss them with the project guide before compiling into final shape.

**Evaluation****Total Hours: 200**

**Syllabus**  
**Elective Courses**

## **Discipline Specific Electives**

## **Discipline specific elective I**

**19BPT101**

**ENGLISH FOR COMMUNICATION**

**2 0 0 2**

### **Course Objective:**

At the end of 70 hours of lectures the student will be able to:

1. Speak fluently, intelligibly and appropriately to teachers, Colleagues, Doctors, Patients and friends at the college, Hospital and hostel etc. about academic or (occupational) areas of interest.
2. Develop flexibility in reading; improve speed and rate of comprehension while tackling textbooks or reference material.
3. Write official letters to the warden, principal and other officials in the bank, post office etc.
4. Write reports about patients care.
5. Overcome the common errors in pronunciation and grammatical and idiomatic usage.

### **Course outcome:**

1. Become fluent in speaking and enhance the ability to communicate effectively with colleagues, doctors, patients etc.
2. Well versed with comprehension skills and vocabulary enhancement.
3. Become familiar with writing various official letters, writing patients reports and summarise scientific sessions.
4. Understand about the grammatical and idiomatic usages.
5. Well versed with various methods of teaching by involving in group activities, role plays etc.

## **UNIT I**

### **SPOKEN COMMUNICATION**

**14**

1. Learning to read the phonetic symbols
2. Stress
3. Intonation
4. Rhythm
5. Commonly mispronounced words
6. Correct pronunciation of important commonly used words in clinical practice
7. Note taking in lecture classes

## **UNIT II**

### **VOCABULARY AND READING**

**14**

1. Special features of English vocabulary
2. Common errors in choice of word
3. Semi technical vocabulary
4. Collecting material from library on scientific topics
5. Comprehensive exercises

**UNIT III** **WRITING** **14**

1. Writing letters regarding permission, Leave, opening bank account etc.
2. Note making from lecture / reading material
3. Writing reports on patient care
4. Summarizing scientific passages

**UNIT IV** **GRAMMATICAL AND IDIOMATIC USAGE** **14**

1. Correction of errors
2. Types of interrogative sentences
3. Active – Passive voice
4. Tense
5. Principles of precision, Clarity and specificity

**UNIT V** **14**

**1. METHODS OF TEACHING**

Lecture, pair work, group activities, role plays, simulations, debates, quiz, exercises and essay writing.

**2. METHODS OF EVALUATION**

Oral presentations  
Panel Discussions  
Summary/Essay writing  
Comprehension exercises

**Evaluation**

**Total Hours: 70**

**Text books:**

1. Bhaskar, W.W.S. and Prabhu, N.S, English through reading, Macmillan & Co of India Ltd, 4 Ed, 1993
2. Gimson A.E., An introduction to the pronunciation of English, Wing King Tong Co Ltd.5 Ed,1995
3. Randolph and Green Baum, A University Grammar of English ,Quick, Group (FE) Ltd.3Ed,1997
4. Thomson, A.J., And Martinel A.V.V - Practical English Grammar –.,Oxford University press, Delhi,2003

**References:**

1. Water F.V.A , Proficiency Course in English, Hodder and Stronghton Pub., London, 1994.
2. Tone Daniel, I.M., English Pronouncing Dictionary, Dent and sons Ltd. London. 2004.
3. O' Connor, I.D., Better English Pronunciation, Cambridge University 2009.



**UNIT IV****COMPUTER PACKAGES****14**

Computer packages  
MS Office  
MS word  
MS Excel  
MS PowerPoint  
Advantages and uses.

**UNIT V****COMPUTER NETWORKS & GRAPHICS****14**

Introduction to computer networks – Definition LAN, WAN advantage of Internet – worldwide web.

Computer Graphics: Definition – display devices – graphical input and output devices – multimedia – definition and application – computer applications in physiotherapy and clinical studies.

**PRACTICALS**

Exercises based on the following are to be dealt:

1. Computer operating systems like UNIX, MS-DOS etc.
2. Simple program In C.  
MS-Office (MS-Word, MS-Excel, MS-Access, MS-PowerPoint)

**Evaluation****Total Hours: 70****Text Books:**

1. C.Nellai Karunan, MS Office, CBS,4<sup>th</sup> Ed, 2006
2. Hunt N and Shelly J., Computers and commonsense, Prentice - hall of India New Delhi,2011

**References:**

1. E.Balaguruswamy – Programming in ANSI –C Tata Mc.Graw Hill-1997.
2. Byron Gottfield – Programming with C, Prentice - hall of India, 2<sup>nd</sup> Ed, 2000.
3. Popst and Perrum, computer aided drug design, Academic press New york1999.
4. Writh, systematic programming- an introduction, Prentice Pub,3<sup>rd</sup> Ed,2005.
5. Tanen Baum, Computer networks, 2 Ed, 2012.
6. Rajaraman ,Computer Graphics, Mc Graw Hill, 6 Ed, 2009.

## Discipline specific elective -III

19BPT103

**BIOSTATISTICS / RESEARCH METHODOLOGY**

**5 0 0 4**

### Course Objective

The objective of this course is after 100 hours of lectures the student should be able to have basic knowledge on Research Methodology and BioStatistics.

### Course Outcome:

1. The student will be able to implement hypothesis testing
2. Important concepts relating to research design and measurements and scaling techniques.
3. To analyze experimental and observational study
4. Knowledge of Processing and analyzing data can be gained
5. To implement and calculate frequency distribution.

#### **UNIT I**

**20**

##### **Introduction to Biostatistics**

1. Introduction to Biostatistics
2. Frequency distribution
3. Measures of central tendency
4. Measures of dispersion

#### **UNIT II**

**20**

##### **Statistical Tool**

1. Probability
2. Correlation & regression
3. Statistical inference

#### **UNIT III**

**20**

##### **Community and Hospital Statistics**

1. Vital statistics
2. Health statistics

#### **UNIT IV**

**20**

##### **Research Methodology**

1. Introduction to research methodology
2. Steps in research process

#### **UNIT V**

**20**

##### **Research Report**

1. Writing research report



2. Pilot Study

**Evaluation**

**Total Hours: 100**

**Textbooks:**

1. B.L Agarwal, Basic statistics , New Age International Publication.2012.

**Reference:**

1. Sundarrao, Introduction to biostatistics and Research Methodology, CBS, 1Ed, 2002.
2. C.R Kothari, Research methodology, New Age international publication, 3Ed, 2014.

## **Discipline Specific Elective –IV**

**19BPT105**

**ERGONOMICS**

**2 0 0 2**

### **Course objective**

The objective of this course is that after 80 hours of lectures & demonstrations, the student will be able to understand the knowledge about ergonomics issues, evaluation and safe practice standards.

### **Course Outcomes:**

1. Student should have understood the different types of work nature and its impact towards the human body.
2. Student should have understood how to perform the ergonomic evaluation & should also be aware of mandatory questions which needed to be asked related to the profession.
3. Student should also be aware of pre examination procedures and examination for a person before appointing them in to the work.
4. Student should be aware to perform a workplace assessment for all the profession & should have understood about all nature of work how it affects the normal system, body mechanics, and psychological level of the person.
5. Students should have understood what are the legal bodies existing in constructing the work place.

## **UNIT I**

**16**

### **Introduction**

1. History of ergonomics
2. Need of ergonomics
3. Domains in ergonomics

## **UNIT II**

**16**

### **Ergonomic Assessment**

1. Ergonomic cycle
2. Evaluation of ergonomic issues
3. Assessment tools
4. Exit assessment

**UNIT III** **16**

**Job analysis**

1. Requirement of job
2. Profile and candidate selection
3. Pre employment screening

**UNIT IV** **16**

**Analysis**

1. Job site analysis
2. Job task analysis
3. Avenues and benefits of ergonomics
4. Work hardening

**UNIT V** **16**

**Current Trends in Ergonomics**

1. Software in ergonomics
2. Regulatory bodies
3. Professionals in ergonomics
4. Legal issues and insurance policies

**Evaluation**

**Total Hours: 80**

**Textbook:**

1. Salvendy, Handbook of Human Factors and Ergonomics, Mosby, 1Ed, 2012

**Reference:**

1. Valevie, J Berg rice ergonomics in health care & rehabilitation, butter worth, 1998.

## **Discipline Specific Elective -V**

**19BPT104**

**CLINICAL TESTING**

**4 0 0 2**

### **Course objective:**

The objective of this course is that after 80 hours of lectures & demonstrations, the student will be able to understand the knowledge about importance of special tests and its implication to various conditions / problems / diseases.

### **Course Outcomes:**

1. To understand the concept of clinical testing and its significance
2. To be well versed in implications and significance of special tests
3. To be well versed in special tests of upper limb joints
4. To understand the special tests of spinal joints
5. To clearly explain the special tests of lower limb joints

## **UNIT I**

**16**

### **Clinical test and its Significance**

1. Introduction to clinical tests
2. Importance of clinical testing

## **UNIT II**

**16**

### **Implications of Special Tests**

1. Special tests of need
2. Implication and Significance of Special Tests

## **UNIT III**

**16**

### **Upper Limb Joints**

Special tests of upper limb joints  
-Shoulder Joint  
-Elbow Joint  
-Wrist Joint

## **UNIT IV**

**16**

### **Spinal Joints**

Special tests of spinal Joints

- Cervical Joint
- Thoracic Joint
- Lumbar Joint

## **UNIT V**

**16**

### **Lower Limb Joints**

Special tests of lower limb joints

- Hip Joint
- Knee Joint
- Ankle Joint

**Total Hours: 80**

### **Textbook:**

1. MC Rae , Clinical orthopaedic examination – ELBS, 2 Ed, 2003

### **Reference:**

1. David Magee , Orthopaedic physical assessment , MC GrawHill, 3Ed, 2005

## Discipline Specific Elective -VI

19BPT106

APPLIED PHYSICS

5 0 0 4

### Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about the forces acting in human body, gravity, electricity and magnetism.

### Course Outcomes:

1. Students will know about the human body functions applied by the force gravity
2. Recognize how observation, experiment & theory work together to continue to expand the frontiers of knowledge of the physical universe
3. Analyze interpret and evaluate scientific hypotheses and theories, laws using rigorous methods
4. Students can understand the basic scientific principles, theories & laws as was as an awareness of the changing nature of science
5. Students aid gain knowledge about the current elasticity to differentiate the mode of transmission

### UNIT – I

### INTRODUCTION

20

1. Forces in human body
2. Gravity, LOG, COG
3. Levers of the body
4. Anatomical pulleys
5. Body torque
6. Types of motion, Planes of motion, Axis, direction and quality of motion

### UNIT – II

### MUSCLES

20

1. Elasticity- Hook's law.
2. Stress / strain curve
3. Angle of pull & the mechanical efficiency of muscle
4. Types of muscle work



## Discipline Specific Elective -VII

19BPT107

APPLIED CHEMISTRY

5 0 0 4

### Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about the ATP production, energy source & body and other biochemical activity / changes that occur in our body.

### Course Outcomes:

1. Student will know about the energy source that invalid in human body
2. Student will know about the acidic reaction & mechanism
3. They will know about the metabolism of the body and how the process occur
4. Student will know about the nutrition and the deficiency
5. Student will know about the clinical tester to identify the internal function of the organs

### UNIT – I

### INTRODUCTION

20

1. Energy source of body
2. Carbohydrates
3. Protein
4. Fat

### UNIT – II

### ENERGY SYSTEMS

20

1. ATP Production
2. Aerobic & Anaerobic Metabolism
3. Lactic acid production
4. Lactic acid clearance mechanism

### UNIT – III

### METABOLISM

20

1. Protein metabolism – Digestion, absorption, Urea cycle
2. Carbohydrate metabolism
3. Fat metabolism



**UNIT – IV****NUTRITION****20**

1. Composition of food
2. Balanced diet
3. Nutritional deficiency disorders
4. Major dietary constituent & their importance

**UNIT – V****CLINICAL BIOCHEMISTRY****20**

1. Metabolic equivalence
2. Types of energy expenditure
3. Liver function test
4. Renal function test
5. Lipid profile in serum

**Total Hours: 100****Text Book:**

1. B.E. Deb, Basics in Bio chemistry – JP, 2Ed, 1997

**Reference:**

1. Chatterjee, Text book of medical biochemistry, JP, 8 Ed, 2012

## **Generic Electives**

## Generic elective I

19BPT151

MEDICAL ELECTRONICS & BIO - PHYSICS

2 0 0 2

### Course Objective:

The objective of this course is that after 70 hours of Lecture, the student will be able to understand about the knowledge of mechanics, muscle action, Electricity, magnetism and ionization.

### Course Outcomes:

1. Become familiar with mechanics and laws related to hydrotherapy.
2. Well versed with muscle work, types of muscle work and forces involved and equilibrium.
3. Know about electricity, its therapeutic uses and importance of currents in treatment.
4. Explain thoroughly about alternating and static currents along with its physiological and therapeutic effects.
5. Explain in detail about magnetism the effectiveness of magnetic field and magnetic forces in therapeutic interventions.

## UNIT I

14

### Mechanics, Laws related to Hydrotherapy

- Types of motion, planes of motion, axis, direction, quality of motion.
- Forces types, Components, forces in human body.
- Gravity, LOG, COG, Segmental centers of gravity, Stability of centre of gravity, relocation of COG.
- Reaction forces, Newton's Law of equilibrium
- Law of acceleration
- Anatomic pulleys
- Work done, Torque of moment arm
- Force system – Linear force system In action
- Concurrent force system 1. Convergent 2. Divergent
- Parallel force system e.g. Levers in relation with human body.
- Springs
- Tension
- Elasticity – Hooks Law.
- Archimedes principle
- Pascal law
- Buoyancy
- Surface tension
- Hydrostatic pressure.

## UNIT II

14

### Muscle

- Definition
- Types
- Muscle work
- Angle of pull & the mechanical efficiency of muscle
- Starting position
  - Types, Muscle work, forces involved, Equilibrium
- Derived position
  - Types, muscle work, forces involved, Equilibrium

## UNIT III

14

### High Frequency

Physics of heat & Radiation

- Cosmic Law
- Grother Law
- Inverse Square law.

Introductory Physics

#### a. Electricity

Definition, types, laws, therapeutic uses, Basic Physics, Working and Importance of Currents in treatments.

#### b. Electromagnetic Spectrum.

#### c. Static Electricity

- a. Production of electric charge.
- b. Characteristics of a charged body
- c. Characteristics of line of forces
- d. Potential energy and factors affecting it.
- e. Potential difference & EMF
- f. Effects of environmental & Man made EMF at the cellular level & risk factors on
- g. prolonged exposure

#### d. Current Electricity

- a. Units: farad, volt, ampere, coulombs, Watt.
- b. Resistance: in series & in parallel
- c. Ohm's law
- d. Potentiometer
- e. Fuse
- f. Transmission of electrical energy through solids, liquids, gases & Vacuum.
- g. Direct current: Definition, physiological effects, Chemical effects, Therapeutic & polar
- h. effects, Dangers – shock, Safety precautions & Management.
- i. Burns: Electrical & Chemical

- j. Condensers
- k. Main Electrical Supply.
- l. Alternating currents
  - Faradism
  - Surged Faradism
  - Physiological & Therapeutic effects.

## UNIT IV

14

### Electromagnetic Induction

- a. Magnetism:  
Definition, Properties of magnets, Electromagnetic induction, Transmission by contact, Magnetic field and Magnetic forces, Magnetic effects of an electrical field.
- b. Moving coil milliammeter
- c. Voltmeter
- d. Transformer
- e. Chokes
- f. Electric valves or Therapeutic valves
  - Types: Diode, Triode, Double anode diode
  - Principles of valves
  - Construction & working
  - Uses
- g. Metal oxide Rectifier

## UNIT V

14

- a. Ionization:
  - Theory
  - Effects of Various ions.
  - Techniques of medical ionization and surgical ionization
- b. Potentionmeter.
- c. Oscilloscope
- d. Electrodes :
  - Types
  - Making of electrodes.

### Evaluation

**Total Hours:70**

### Text Books:

1. M. Dena Gardiner, The Principles of Exercise therapy, Bell & Hymes, 4<sup>th</sup> Ed,1981
2. Edward Bellis Clayton, Clayton's Electrotherapy, Baillier Tindill, 9<sup>th</sup> Edition, 1985

### References:

1. Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6<sup>th</sup> Ed, 2012.
2. Low & Read, Electrotherapy Explained, Butterworth-Heinmann, 4<sup>th</sup> Ed, 2006.



**Textbook:**

1. Chandra, Handbook of Interventional Cardiology, JP, 1 Ed, 2015

**Reference:**

1. Davidson,A Text Book of Medicine, Churchill Livingston, 21 st Ed, 2010.





**UNIT – IV****NEUROLOGICAL EVALUATION****20**

1. PT Evaluation in Neurology conditions
2. Myotomes
3. Dermatomes
4. Reflex testing
5. Tone assessment

**UNIT – V****SPORTS AND HAND EVALUATION****20**

1. PT Evaluation in Sports & Hand conditions
2. Common sports injuries
3. Hand functions
4. Ergonomic measures

**Total Hours: 100****Text Books:**

1. David Magee, Orthopaedic physical assessment, MCgH, 3<sup>rd</sup> Ed, 2005.
2. Frown Felter, Cardiopulmonary evaluation, ELBS, 2<sup>nd</sup> Ed, 1997.

**Reference:**

1. Lindsay, Neurology Assessment – Mosby, 3<sup>rd</sup> Ed, 2009.
2. David, Sports Injuries assessment and Rehab – CBS, 1<sup>st</sup> Ed, 2004.

## **Generic Elective – IV**

**19BPT154**

**CLINICAL DIAGNOSIS**

**5 0 0 4**

### **Course objective:**

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about Clinical diagnosing Ortho, Neuro and Cardio-respiratory Conditions.

### **Course Outcomes:**

1. One can understand the knowledge about clinical diagnosis of orthopaedic conditions
2. One can understand the knowledge about clinical diagnosis of neurological conditions
3. One can understand the knowledge about clinical diagnosis of cardiac conditions
4. One can understand the knowledge about clinical diagnosis of respiratory conditions
5. One can understand the knowledge about clinical diagnosis of OBG conditions

### **UNIT I            CLINICAL DIAGNOSIS OF ORTHOPAEDIC CONDITIONS            20**

1. Fracture
2. Congenital disorders
3. Deformities
4. Trauma & injury
5. Orthopedic disabilities arising due to neurological conditions

### **UNIT II            CLINICAL DIAGNOSIS OF NEUROLOGICAL CONDITIONS            20**

1. Stroke
2. Brain tumours
3. Psychiatric disorders
4. Cerebellar dysfunction
5. Epilepsy
6. Demyelinating disorders

### **UNIT III            CLINICAL DIAGNOSIS OF CARDIAC CONDITIONS            20**

1. Congenital heart diseases
2. Circulatory disorders
3. Arrhythmias
4. Cardiomegaly

**UNIT IV                      CLINICAL DIAGNOSIS OF RESPIRATORY CONDITIONS    20**

1. Abnormal breathing patterns
2. COPD
3. Occupational lung diseases
4. TB & Tumours

**UNIT V                      CLINICAL DIAGNOSIS OF OBG CONDITIONS                      20**

1. Prolapse of uterus
2. Hernia
3. Mastectomy
4. Antenatal complications
5. Post natal complications

**Total Hours: 100**

**Text Book:**

1. Davidson, A Text Book of Medicine, Churchill Livingstone, 21 st Ed, 2010.

**Reference:**

1. Magee, Textbook of orthopaedics, ELBS, 7Ed, 2002.

## **Ability Enhancement Compulsory Electives**

## Ability enhancement compulsory elective I

19BPT201

FOOD AND NUTRITION

2 0 0 2

### Course objective:

The objective of this course is that after 70 hours of L,D,P the student shall be able to understand the basic knowledge about Diet, balanced diet, metabolism, malnutrition, under-nutrition, overnutrition, deficiency disease.

### Course Outcomes:

1. Become familiar about the nutritive values of food.
2. Explain about the food sources from which we obtain vitamins.
3. Become familiar with different cooking methodologies.
4. Know and explain about food preparations by food manufacturer.
5. Explain thoroughly about the advantages and disadvantages of various convenience foods.

### UNIT I SOURCES OF FOOD 14

1. Nutritive value of foods,
2. Food Sources from which key vitamins are derived

### UNIT II DIGESTIVE SYSTEM 14

1. Digestion and absorption –Digestion at each stage of the digestive system
2. Dietary guidelines- Factors affecting food requirements. Planning and serving of family meals.Meals for all ages and occupations.

### UNIT III COMPOSITION OF FOOD 14

Composition and value of the main foods in the diet -  
Milk, meat, fish, cheese, eggs, margarine and butter  
cereals (wheat, rice, maize, millets, oats)  
fruits and vegetables

### UNIT IV PROCESSING OF FOOD 14

1. Cooking of food -Transfer of heat by conduction, convection and radiation.
2. Principles involved in the different methods of cooking – boiling, stewing, grilling, baking, roasting, frying, steaming, pressure cooking, cooking in a microwave oven.

**UNIT V****FOOD PREPARATION****14**

1. Convenience foods- Foods partly or totally prepared by a food manufacturer – dehydrated, tinned, frozen, ready to eat. Intelligent use of these foods.
2. Advantages and disadvantages.

**Total Hours:70****Text Book:**

1. Agarwal, Textbook of human nutrition, JP, 1 Ed, 2014

**Reference:**

1. Kenneth F. Kiple, Kriemhild Coneè Ornelas, The Cambridge world history of food, Cambridge University Press, Ist ed, 2000



**UNIT IV** **HOSPITAL MANAGEMENT** **16**

1. Hospital Architecture, Planning And Design
2. Materials Management
3. Hospital Operation – I (Patient Care)
4. Hospital Operation – II (Supportive Services)

**UNITV** **ETHICS & LAWS IN HOSPITAL MANAGEMENT** **16**

1. Bio-Sciences & Epidemiology
2. Hospital Information System
3. Health Laws & Policies
4. Hospital Environment and Ethics

**Total Hours:80**

**Textbook:**

1. Wallace J. Hopp, Hospital Operations: Principles of High Efficiency Health Care, Pearson higher education Publication, 2<sup>nd</sup> Ed, 2012

**Reference:**

1. Goyal &Sharma, Hospital Administration and Human Resource Management, PHI Publisher, 2013



## Ability Enhancement Compulsory Elective – III

19BPT203

ACUPUNCTURE

5 0 0 4

### Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about importance of acupuncture and various effects and techniques.

### Course Outcomes:

1. The student will understand the history of acupuncture & how it works, meridians of the human body
2. The theory of acupuncture is when the systems work more efficiently and how long it can be done
3. Surface anatomy is to know where to needle should be done & area of the involvements how clinically it works
4. How effectively the acupuncture works and how to stimulate the points
5. The students will know whom to treat and not to treat and for which conditions is complicated

### UNIT – I

### INTRODUCTION

20

1. Introduction to Acupuncture
2. History of acupuncture
3. The doctrine of five elements
4. Meridians

### UNIT – II

### THEORIES OF ACCUPUNCTURE

20

1. Yin – yang theory
2. Organ clock theory
3. Zang – fu theory
4. Philosophies in acupuncture

**UNIT – III                      CLINICAL ASPECTS OF ACUPUNCTURE                      20**

1. Surface anatomy in acupuncture
2. Tools in acupuncture(needle/stimulator)
3. Types of acupuncture

**UNIT- IV                              EFFECTS OF ACUPUNCTURE                              20**

1. Effects of acupuncture
2. Techniques of acupuncture
3. Stimulation
4. Contraindications
5. Complications

**UNIT – V SCIENTIFIC BACKGROUND IN ACUPUNCTURE                      20**

1. Acupuncture points
2. Extra ordinary points
3. Moxibustion
4. Selection of points

**Total Hours: 100**

**Text Book:**

1. Kothari / clinical acupuncture/ 2 ed / IIAA/ 2000

**Reference:**

1. Anton jayasuriya/Hand book of acupuncture/ 6ed/AAC/1996



2. Job levels in transcription
3. Scope of medical transcription

**UNIT – V**

**HEALTH HAZARDS**

**20**

1. Ideal transcriber
2. Health hazards
3. Ergonomics for transcribing

**Total Hours: 100**

**Text Book:**

1. Blanche Ettinger, Medical Transcription Paperback, Penguin Books Ltd; First edition (2005) – 2005

**Reference:**

1. Rachelle, Medical Transcription Handbook, Cengage Learning, 1997





## **Skill Enhancement Electives**

## **Skilled Enhancement Courses – Elective I**

**19BPT251**

**FITNESS**

**2002**

### **Course objective**

The objective of this course is that after 80 hours of lectures & demonstrations, the student will be able to understand about the importance of fitness, exercise and its importance to human body.

### **Course Outcomes:**

1. Definition of fitness, principles of exercises and testing of endurance and strength.
2. Understand the types of exercises and detail knowledge of aerobics and anaerobic exercises.
3. Knowledge of appropriate selection of exercises and advantages of exercises.
4. Understand the different type of muscle strengthening.
5. Understand the therapeutic effects of aerobic and Zumba dance.

### **UNIT I**

**16**

#### **Introduction to Fitness**

1. Fitness - Introduction to health
2. Principles of exercise, tests of endurance & strength

### **UNIT II**

**16**

#### **Fitness and Exercise**

1. Types of exercises
2. Aerobic
3. Anaerobic

### **UNIT III**

**16**

#### **Importance of Exercise in Fitness**

1. Selection of appropriate exercises
2. Beneficial & adverse effect of exercise



## **UNIT IV**

**16**

### **Fitness Training**

1. Resistance Training
2. CWT
3. Incremental exercise
4. Agility

## **UNIT V**

**16**

### **Forms of Fitness**

1. Aerobic Dance
2. Zumba

### **Evaluation**

**Total Hours: 80**

### **Textbook:**

1. Mcardal, Exercise Physiology, ELBS, 5<sup>th</sup> Ed, 2011.

### **Reference:**

1. Mary Beth Allan, Sports, Exercise, and Fitness: A Guide to Reference and Information Sources, Libraries unlimited publishers, 1st Ed, 2005.

## **Skilled Enhancement Courses – Elective II**

**19BPT252**

**YOGA**

**4 0 0 2**

### **Course Objective**

The objective of this course is that after 80 hours of lectures & demonstrations, the student will be able to understand the basic concepts about Asanas and its effects, therapeutics effects of Yoga.

### **Course Outcomes:**

1. Demonstrate the introduction and principles of yoga.
2. Knowledge of history of yoga and yoga in modern India.
3. Outline of yoga background and importance of yoga in modern world.
4. Learning the types and forms of asanas and description of physiological effect of yoga.
5. Understanding the role of yoga in physiotherapy.

### **UNIT I**

**16**

#### **Introduction to Yoga**

1. Introduction to Yoga
2. Principles of Yoga

### **UNIT II**

**16**

#### **Patanjali**

1. History of Yoga
2. Yoga in Ancient and Modern India

### **UNIT III**

**16**

#### **Folds of Yoga**

1. Types & Forms of Yoga
2. Asanas & its physiological effects

### **UNIT IV**

**16**

#### **Yogic Science**

1. Scientific background of Yoga
2. Yoga in modern world

## **UNIT V**

**16**

### **Advantages of Yoga**

1. Physiological Effects of Yoga
2. Therapeutic Uses of Yoga

### **Evaluation**

**Total Hours: 80**

### **Textbook:**

1. BKS Iyengar, Light of Yoga, JP, 1<sup>st</sup> Ed, 2012.

### **Reference:**

1. Payal Gidwani Tiwari, Body Gaurders, CBS, 2<sup>nd</sup> Ed, 2009.

## Skill Enhancement Courses Elective-III

19BPT253

Computer Languages

2 0 0 2

### Course objective:

The objective of this course is that after 40 hours of L,D,P the student shall be able to understand the basic knowledge about computer & its language, components, functions and networks

### Course Outcomes:

1. To know about basic computer knowledge and their programs
2. The student can know applications of computer languages and how to copyright
3. To know about the animations and for graphic designing
4. It make the therapist to maintain clinical records in hospitals or clinic
5. To design the exercise protocol and to plan the exercise

### UNIT – I INTRODUCTION 8

1. History of computer languages
2. Significance of softwares
3. Computer language significance
4. Common programming languages

### UNIT – II LEVELS OF COMPUTER LANGUAGE 8

1. Low level language
2. High level language
3. Advanced high level language

### UNIT – III APPLICATION OF COMPUTER LANGUAGE 8

1. Internet
2. Copy right
3. Application in clinical medicine



## Skill Enhancement Courses Elective-IV

**19BPT254**

**EFFECTIVE ENGLISH**

**2 0 0 2**

### Course Objective:

The objectives of this course is that after 40 hours of lectures, demonstrations and practicals the student will be able to Speak fluently, intelligibly and appropriately to teachers, Colleagues, Doctors, Patients and friends at the college, Hospital and hostel etc. about academic or (occupational) areas of interest.

### Course Outcomes:

1. Students can gain knowledge about the various traditions writer and followed in English
2. Individuals can gain self – confidence in their own voice and speak out their opinions with confidence
3. Students will gain the ability to become a accomplished active readers
4. Helps to build the knowledge and understanding simultaneously through listening and give their point of view
5. Students will be able to write effectively in variety of professional and social setting

### **UNIT – I** **INTRODUCTION** **8**

1. History of the language
2. Regional distribution
3. Variation in dialect and accent

### **UNIT – II** **PHONOLOGY** **8**

1. Consonants and vowels
2. Phontactics
3. Stress, rhythm and intonation
4. Regional variation

### **UNIT – III** **GRAMMER** **8**

1. Noun, Pronoun
2. Verb, Tense
3. Adjuncts
4. Adjectives

**UNIT – IV****SYNTAX****8**

1. Clause syntax
2. Auxillary verbs
3. Vocabulary
4. Word formation
5. Pronunciation

**UNIT – V****PRESENTATION****8**

1. Oral presentation & Panel discussion
2. Interview preparation
3. Clarity and specificity

**Total Hours: 40****Text Book:**

1. O' Connor, I.D., Better English Pronunciation - Cambridge, Cambridge University.2009

**Reference:**

1. Water F.V.A, Proficiency Course in English – Hodder and Stronghton, London.1994
2. Tone Daniel, I.M. , English Pronouncing Dictionary –Dent and sons Ltd. London.2004

## INTERNSHIP (6 MONTHS)

**Hours** - **1248 Hrs**

### Postings

- |  |   |         |
|--|---|---------|
| 1. Department of Orthopaedics            | - | 1 month |
| 2. Department of Neurology               | - | 1 month |
| 3. Department of Cardiology              | - | 1 month |
| 4. ICU Training                          | - | 15 days |
| 5. Geriatric & Pediatric rehabilitation  | - | 15 days |
| 6. Oncology & palliative care            | - | 15 days |
| 7. Department of Plastic Surgery & Burns | - | 15 days |
| 8. Orthotic & prosthetics                | - | 7 days  |
| 9. Fitness training                      | - | 7 days  |
| 10. Department of OBG                    | - | 15 days |

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6 Months  
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### **EVALUATION OF THE INTERNSHIP**

**ATTITUDE:** The student shall put up 100 % attendance during each assignment. Student's performance shall be graded by the respective clinic section in – charge at the end of each assignment. The candidates shall Repeat the particular assignment if the performance is found unsatisfactory (Grade – C or D)