Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category A by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with A++Grade by NAAC. Recognised by UGC under Section 12 B
Coimbatore - 641 043, Tamil Nadu, India

(BPT) BACHELOR OF PHYSIOTHERAPY

Programme Outcomes:

1. Apply possessed knowledge of fundamental subjects to solve different problems
2. Analyse various research and scientific problems.
3. Design Rehabilitation services with appropriate consideration to safety, economy, health and Environmental Considerations.
4. To incorporate significant clinical and professional training opportunities, providing hands-on Experience with real patients in a supervised environment.
5. Uses model Therapeutic techniques, resources and equipments
6. 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.
7. Function individually and in multidisciplinary teamwork
8. Communicate effectively in both verbal and written forms.
9. 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.
10. Manage the work and finance of a research, application projects.
11. During this BPT degree, one can gain a comprehensive knowledge of physiotherapy, including areas such as Orthopaedics, neurology, cardiac & Respiratory conditions, OBG and preventative health care.

Programme Specific Outcomes:

1. 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.
2. To apply Advance Physiotherapy techniques to treat challenging condition and adapt to emerging changes in the field of Physiotherapy
3. Acquire skills set in diagnostic, therapeutic, rehabilitative and preventive health care services.

Scheme of Instruction & Examinations

(For students admitted from 2023-2024 & onwards)

Part	*Subject Code*	*Name of the Paper/Component*	*Hrs. of Instruction/Week*		*Scheme of Examination*					
			T	*P*	*Duration of Exam*		*CIA*	*CIE*	*Total*	*Credit*
					T	*P*				
		First Semester								
		Core Course								
III	22BPTC01	Anatomy – I	6	-	3	-	50	50	100	4
	22BPTC02	Physiology and Applied Physiology-I	6	-	3	-	50	50	100	4
	22BPTC03	Anatomy and Physiology Practical and Oral –I	-	4	-	3	50	50	100	3
	22BPTC04	Basic and Applied Physics for Physiotherapy-I	2	2	3	-	50	50	100	2
	22BPTC05	Psychology	4	-	3	-	50	50	100	3
		Discipline Specific Elective (DSE) Course								
	22BPTD01	**DSE I:** Sociology	2	3	3	-	50	50	100	3
		Games		1	-	-	-	-	-	-
IV	23BVBWE1	Workstation Ergonomics-I	-	-	-	-	100	-	100	1
		Second Semester								
I	22BLATA1/	Tamil: Pothu tamil thazh I-Tamil Ilakkiam/ Hindi: Grammar, Translation	3	-	3	-	50	50	100	3

	22BLAHI1/ 22BLAFR1	and General Essay / French: Fundamentals of French								
II	22BLEN02	English Language for Communication-II	3	-	3	-	50	50	100	3
		Core Course								
III	22BPTC06	Anatomy – II	5	-	3	-	50	50	100	4
	22BPTC07	Physiology and Applied Physiology-II	4	-	3	-	50	50	100	4
	22BPTC08	Anatomy and Physiology Practical and Oral –II	-	3	-	3	50	50	100	3
	22BPTC09	Basic and Applied Physics for Physiotherapy-II	2	2	3	-	50	50	100	3
	22BPTC10	Microbiology	3	-	3	-	50	50	100	3
		Discipline Specific Elective (DSE) Course								
	22BPTD02	**DSE II:** Clinical Biochemistry	2	3	3	-	50	50	100	3
		Games	-	1	-	-	-	-	-	-
IV	23BVBWE2	Workstation Ergonomics -II	-	-	-	-	100	-	100	1
		Third Semester								
	Core Course									
III	22BPTC11	General Medicine and Pharmacology -I	3	2	3	-	50	50	100	3
	22BPTC12	General Pathology	3	2	3	-	50	50	100	3
	22BPTC13	Biomechanics-I	3	2	3	-	50	50	100	4
	22BPTC14	Exercise Therapy-I	3	2	3	-	50	50	100	4
	22BPTC15	Exercise Therapy and Biomechanics - Practical and Oral -I	-	5	-	3	50	50	100	3

		Discipline Specific Elective (DSE) Course								
	22BPTD03	**DSE III**: Basics of Radio Diagnostics	2	3	3	-	50	50	100	3
IV	23BVBWE3	Workstation Ergonomics -III	-	-	-	-	100	-	100	1
		Fourth Semester								
	Core Course									
III	22BPTC16	General Medicine and Pharmacology -II	3	2	3	-	50	50	100	3
	22BPTC17	General Surgery, Paediatric and Geriatric	3	2	3	-	50	50	100	3
	22BPTC18	Biomechanics-II	3	2	-	3	50	50	100	4
	22BPTC19	Exercise Therapy-II	3	2	3	-	50	50	100	4
	22BPTC20	Exercise Therapy and Biomechanics - Practical and Oral -II	-	5	-	3	50	50	100	3
		Discipline Specific Elective (DSE) Course								
	22BPTD04	**DSE IV:** Digital Health	2	3	3	-	50	50	100	3
IV	23BVBWE4	Workstation Ergonomics-IV	-	-	-	-	100	-	100	1
Clinical Observation During Summer Vacation 30 days										
		Fifth Semester								
	Core Course									
	22BPTC21	Electrotherapy - Low and Medium Frequency Current	3	3	3	-	50	50	100	4
	22BPTC22	Electrotherapy-Low and Medium Frequency Current - Practical and	-	4	-	3	50	50	100	3

		Oral								
III	22BPTC23	Physiotherapy in Women's Health	3	3	3	-	50	50	100	3
	22BPTC24	Community Medicine	3	3	3	-	50	50	100	3
	22BPTC25	Biostatistics and Research	4	1	3	-	50	50	100	3
	22BPTC26	Hospital Management (Self Study)	1	-	3	-	100	-	100	4
	22BPTC27	Physiotherapy (Computer Based test)	-	-	1		-	100	100	2
	22BPTC28	Clinical Observation	-	-	-	-	100	-	100	5
IV	23BVBWE5	Workstation Ergonomics -V	-	-	-	-	100	-	100	1
		Generic Elective course	2	-	3	-	100	-	100	2
		Sixth Semester								
	Core Course									
III	22BPTC29	Electrotherapy -High Frequency Current	3	3	3	-	50	50	100	3
	22BPTC30	Electrotherapy-High Frequency Current-Practical and Oral	-	5	-	3	50	50	100	3
	22BPTC31	Clinical Cardio-Respiratory Diseases	3	2	3	-	50	50	100	4
	22BPTC32	Physiotherapy in Cardio- Respiratory Conditions	3	3	3	-	50	50	100	3
	22BPTC33	Physiotherapy and Clinical Cardio-Respiratory -Practical and Oral	-	3	-	3	50	50	100	3
	22BPTC34	Hospital Posting	-	4	-	-	100	-	100	4

IV	23BVBWE6	Workstation Ergonomics -VI	-	-	-	-	100	-	100	1
		Seventh Semester								
III	***Core Course***									
	22BPTC35	Clinical Orthopedics	3	3	3	-	50	50	100	4
	22BPTC36	Physiotherapy in Orthopedics	3	3	3	-	50	50	100	4
	22BPTC37	Physiotherapy and Clinical Orthopedics- Practical and Oral	-	3	-	3	50	50	100	3
	22BPTC38	Rehabilitation Medicine-I	3	2	3	-	50	50	100	3
	22BPTC39	Physiotherapeutic-I	3	3	3	-	50	50	100	3
	22BPTC40	Hospital Posting	-	4	-	-	100	-	100	4
III		**Eight Semester**								
	Core Course									
	22BPTC41	Clinical Neurology	3	3	3	-	50	50	100	4
	22BPTC42	Physiotherapy in Neurology	3	3	3	-	50	50	100	4
	22BPTC43	Physiotherapy and Clinical Neurology Practical and Oral	-	3	-	3	50	50	100	3
	22BPTC44	Rehabilitation Medicine-II	3	3	3	-	50	50	100	3
	22BPTC45	Physiotherapeutic-II	3	3	3	-	50	50	100	3
	22BPTC46	Project –viva voce	-	3	-	-	50	50	100	4
		Ninth Semester								
		Internship Training Programme								

	22BPTC47	Internship Training in Neurology	-	5	-	3	50	50	100	5
	22BPTC48	Internship Training in Orthopedics	-	5	-	3	50	50	100	5
	22BPTC49	Internship Training in ICU &NICU	-	5	-	3	50	50	100	5
	22BPTC50	Internship Training in Cardiology and Cardio Thoracic Surgery	-	5	-	3	50	50	100	5
	22BPTC51	Internship Training in OBG/ Paediatrics/ Geriatrics	-	5	-	3	50	50	100	5
	22BPTC52	Internship Training in Rehabilitations	-	5	-	3	50	50	100	5
	Part I,II& III							**Total**		**206**
	Part IV									**20**
										226

Part IV

COMPONENTS

S. No	Components	Subject Code	Semester	Hrs. Of Instruction/week/course	No. of Credits
I	**A. Ability Enhancement Courses**				
	Environmental Studies	23BAES01	I	4	4
	Fundamentals of Research	23BAFU01	II	2	2
II	**Skill Enhancement Course(SEC)**				
	Communication Skills	23BSCS01	III	3	2
	Soft Skills	23BSSS01	IV	3	2
III	**Skill Based Elective Course**	1 Course	IV		2
IV	**Value Based Elective Course I**				
	NCC/ **NSS/** **Sports/** **WorkStation Ergonomics ** (for Bachelor of Physiotherapy)**	**23BVBNC1-6** **23BVBNS1-6** **23BVBSP1-6** **23BVBWE1-6**	**1-6**	-	24 Credits* 6 Credits 6 Credits 6 Credits
V	**Value Based Elective Course II**	1 Course	III	-	2
Total Credits					**38/20**

Total credits to earn the degree

S.no	Components		Credits
1.	Part I, II & III components	-	206
2.	Part IV components	-	38/20

Total credits		**-**	**244 credits**

* Clinical observation: minimum 15 days (4 credits) - Maximum 30 days (6 credits)
The above may be within the regular working hours or during the vacation of the I year and II year.

****** Internship (6 Months) -180 days (30 credits)

Other Course Offered by the Department: Value Added Course- 23BPTV01- **Health and Fitness**

Anatomy – I

Semester I
22BPTC01

Hours of Instruction/week: 6
No of Credits: 4

Objectives:

- To demonstrations and practical the student will be able to demonstrate knowledge in human anatomy as in necessary for the study and practice of physiotherapy.
- To develop an ability to apply the principles of anatomy in clinical practice

Unit I Introduction **18**

a. Introduction

Anatomy and its subdivisions. Name regions, cavities and system of the body. Anatomical position and anatomical terms.

b. Cell

c. Tissues

Unit II Introduction to Osteology & Myology **18**

a. Introduction to Bones (Osteology)

b. Introduction to Joints (Syndesmology /Arthology)

- Joint and Articulation.
- Classification of the joints and gives examples for each type.
- The basic features of a synovial joint.
- The axis and movements possible in a synovial joint.
- Range of movement and limiting factors.
- The blood supply and nerve supply in general.
- Stability of a joint.
- Demonstration common movements.
- 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.

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

Skeletal muscle, fine fasciae, tendon, and aponeurosis. Classification of the skeletal muscles by shape etc.,

- The 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.
- 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)

The groups of muscles by position and action, group action and nerve supply of Group of muscles. Segmental innervations of muscles.

Unit III Upper Extremity **18**

- Pectoral regions
- Scapular region
- Axilla
- Shoulder Girdle
- Shoulder joint
- Upper arm
- Elbow Joint
- Forearm, Wrist and Hand
- Nerves of Upper limb
- Blood Vessels of Upper Limb
- Cutaneous Nerves of Upper Limb

Unit IV Head, Neck and Special Senses **18**

- Skull (features, joints of skull bone, parts)
- Internal and external auditory meatus, foramen magnum, stylomastoid foramen and structures passing through them
- Anterior and posterior triangles of neck (boundaries and contents)
- Muscles of the face (origin, insertion, action, nerve supply, applied anatomy)
- Cranial nerve (origin, course, relation, innervations)
- Trigeminal nerve (origin, course, relation, innervations)
- General features of typical cervical vertebrae, atlas, axis, seventh cervical vertebrae.
- Cervical plexus (formation, distribution, root values)
- Sternomastoid, erector spinae, scalene
- Atlantoaxial joint (articular surface, muscles, movements, ligaments, blood supply, NS)
- Atlantooccipital joint (articular surface, muscles, movements, ligaments, blood supply,NS)
- Position and extent of subclavian, vertebral, carotid arteries
- Components of circle of Willis and its supply, applied importance
- Internal jugular and sub clavian vein (position, formation, and termination)
- ANS

- Parts of brain and its function, applied importance
- Eye (parts, retina, optic pathway, nerve supply, muscles of eye)
- Nose (parts, boundaries of nose, nasal cavity, sinuses)
- Temperomandibular joint (type, articular surfaces, ligaments, movements, muscle responsible, nerve supply)
- Ear (parts, organ of corti, nerve of hearing and its applied importance)
- Skin

Unit V Systems **18**

a. Endocrine system
b. Digestive System
c. Genito-Urinary System

Total Hours 90

Text Books:

1. Ranganathan Ts, (2013) Textbook of Human Anatomy. 6th edition S Chand and Company Pvt Ltd Publisher, New Delhi.
2. Ross and Wilson, Anatomy and Physiology in Health and Illness, Anne Waugh 2010, Publisher ELBS with Churchill Livingstone.
3. B.D. Chaurasia, Human Anatomy -Vol. I, II, III, (1979 reprint 2008) CBS Publishers and Distributors, New Delhi

Reference books

1. Romanes G.J, Cunningham's Manual of Practical Anatomy. (1986) 15thedition, Reprint 2008Oxford Medical Publications.
2. SinghI.B**,** Text Book of Human Osteology, (2006) Jaypee Brothers, Medical Publishers.
3. Ross M.H, E. and Williams L.J and Wilkins Romell, Kaye G.I,Histology: A Text and Atlas (1995),3rd edition, Anne Waugh 2010, ELBS with Churchill LivingstonePublishers.
4. Inderbir Singh,Textbook of Human Histology.(2002), 4th Edition Jaypee Brother, New Delhi.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the structural and functional importance of cell and different types of tissues.
CO2: Knowledge of osteology
CO3: Understanding the different type of classification and general features of bone,

joints and muscular tissues in upper limb.
CO4: 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
CO5: Understand anatomical knowledge of Digestive & Genito- Urinary and outline of Endocrine system.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PS O1	PS O2	PS O3
CO 1	H	M	M	M	L	M	L	L	M	L	M	M	M	M
CO 2	H	M	M	M	L	M	L		M	L	M	M	M	M
CO 3	H	M	L	M	M			L	L	M	H	M	M	M
CO 4	H	M	M	M	M	L	L		H	M	H	M	M	M
CO 5	H	M	H	M	M	M	M		M	M	H	H	H	H

Physiology and Applied Physiology – I

Semester I
22BPTC02

Hours of Instruction/week: 6
No of Credits: 4

Objectives:

- To explore the normal functioning of the living organisms.
- To acquire knowledge of the normal physiology of various human body systems.
- To learn their principles, mechanisms and control.

Unit I Introduction **18**

A. Cell Introduction

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 II Muscle **18**

Muscles classification. 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. Muscleaction potential. EMG –overview. Aerobic & anaerobic view. Endurance & muscle strength. Age related changes in muscle. Age related changes in physical work capacity.

Unit III DIGESTION **18**

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

Unit IV SPECIAL SENSES **18**

Vision. Audition. Olfaction. Gustation. Vestibular apparatus

Unit V ENDOCRINE SYSTEM **18**

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

Total Hours 90

Text Books:

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

Reference books

1. L. Prakasam Reddy,Concise Medical Physiology, JP Brothers, 3rdEdi,1999
2. Shetty nandhini, Biochemistry for Physiotherapist and AHS, JP bros, 1 Ed,2008
3. Sembulingam, Essentials of Physiology, JP Medical Ltd, 6th 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 25thedition.
7. D.M .Vasudevan Textbook of biochemistry for medical students 7thedition.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Outline of structural and functional importance of cell, skin and blood.

CO2: Detail knowledge of muscles and classifications.

CO3: Outline of different parts and functions of digestive system.

CO4: Basic of special senses

CO5: Understanding the endocrine system.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PSO1	PSO2	PSO3
CO 1	H	M	M	M	L	M	L	L	M	L	M	M	M	M
CO 2	H	M	M	M	L	M	L		M	L	M	M	M	M
CO 3	H	M	L	M	M			L	L	M	H	M	M	M
CO 4	H	M	M	M	M	L	L		H	M	H	M	M	M
CO 5	H	M	H	M	M	M	M		M	M	H	H	H	H

Anatomy and Physiology Practical and Oral -I

Semester I
22BPTC03

Hours of Instruction/week: 4
No of Credits: 3

Objectives:

- To enhance the students with practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

List of Experiments

1. Anatomical positions, axis and planes
2. Identification of upper limb bones
3. Anatomical Identification head and neck
4. Anatomy and physiology of endocrine system
5. Anatomy and physiology of digestive system.
6. Anatomy and physiology of Genito-Urinary System
7. Anatomy of upper extremities, head and neck joints and muscles
8. Determination of blood groups
9. Measurement of Vitals: HR, Respiratory rate, Temperature, SPO2
10. Recording of blood pressure
11. Anatomy and physiology of skin
12. Anatomy and physiology special senses

Total hours 60

Text Books:

1. Jain.A.K, Manual Of Practical Physiology For MBBS, (2012), 4th Edition, AvichalPublishing Company
2. Chaurasia, Human Anatomy - VOL I, VOL II, VOL III,7th Edition, CBS,2016.

Reference Books:

1. Michael Swash, Michael Glynn, Hutchinson's Clinical Methods (2007).22nd Edition, Saunders Ltd
2. Sri Nageswari.K, Rajeev Sharma, Practical Workbook of Human Physiology (2006), Ist Edition, Jaypee Brothers Medical Publishers (P) Ltd

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Demonstration of various anatomical positions.

CO2: Identification of upper limb bones, head and neck.

CO3: Brief knowledge in anatomy and physiology of endocrine system, digestive system and Genito-Urinary System.

CO4: Demonstration of the various tests and procedures in hospital and community settings.
CO5: Knowledge about the anatomy and physiology of skin and special senses.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO 1	PSO 2	PS O3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Basic and Applied Physics for Physiotherapy-I

Semester I
22BPTC04

Hours of Instruction/week: 4
No of Credits: 2

Objectives:

- The student will be able to understand about the knowledge of mechanics, muscle action, Electricity, magnetism and ionization.
- To apply the basic physics in physiotherapy aspect

Unit I Mechanics **12**

- Mechanics and Biomechanics
- Force - Classification of forces, concurrent, Co planar and co-linear forces, composition andresolution of forces, angle of pulls of muscle
- Gravity - line of gravity, Centre of gravity

Unit II **12**

- Equilibrium - Supporting base, types, and equilibrium in static and dynamic state
- Pulleys - system of pulleys, types and application
- Springs - properties of springs, springs in series and parallel, elastic materials in use
- Levers - function, classification and application of levers in physiotherapy order of Levers with example of lever in human body

Unit III **12**

- Speed, Velocity, Work, Energy, Power, Acceleration, Momentum - principles, and Practical application
- Newton's Laws
- Friction
- Elasticity - Definition, stress, strain, HOOKE'S Law

Unit IV **12**
CURRENTS:

- DC Currents -Modern concept of electricity: fundamental electric charges (proton and electron), bound and free electrons, free electrons and current, static electric charge, charging of an object potential and capacitance, potential difference and EMF
- A. C. currents: Sinusoidal wave from, frequency, wavelength, Amplitude and phase of a sine wave, Average & RMS value of a sine wave
- Quantity of electricity, magnitude of current, conductors and insulators, resistance Of conductor and Ohm's law, resistances in series and parallel

Unit V

- Capacitors: Electric field around a capacitor, charging and discharging a capacitor, types of capacitors with application of each in Physiotherapy department **12**
- Rheostat: series and shunt Rheostat with application of each in the Physiotherapy department
- Effects of electric Current: Thermal effect, chemical effect (ionization) and magnetic effect. Electric shock, Earth shock, causes and its prevention.

Total Hours **60**

Text Books:

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

Reference books

1. Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed,2012.
2. Low & Read, Electrotherapy Explained, Butterworth-Heinminn, 4th Ed,2006

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To know the mechanics, force and gravity.

CO2: Knowledge about the muscle work, types of muscle work and forces involved and equilibrium.

CO3: To Know the laws and principles.

CO4: Knowledge about DC and AC currents along with its physiological and therapeuticeffects.

CO5: Understand about capacitors, rheostat and electric current in therapeutic interventions

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PSO1	PSO 2	PSO3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Psychology

Semester I
22BPTC05

Hours of Instruction/week: 4
No of Credits: 3

Objectives:

- To demonstrate and practice and clinics the student will be able to recognize and help with the psychological factors involved in disability, pain, disfigurement, chronic illness, death, bereavement and medical – surgical patients/conditions.
- To understand the elementary principles of behavior for applying in the physiotherapeutic environment

Unit I **12**

Definition of Psychology

Psychology, basic information in relation to following school's methods and Schools: structuralism, functionalism, behaviorism, and psychoanalysis, gestalt psych. Me introspection, observation, inventory and experimental method. Branches: general, child, abnormal, industrial, clinical, counseling

Heredity and Environment

Twins, relative importance of heredity and environment their role in relation to physical characteristics, intelligence and personality, nature – nurture controversy.

Development and Growth Behavior

Infancy, childhood, adolescence, adulthood, middle age, old age

Unit II **12**

Intelligence

IQ, mental age, list of various intelligence tests- WAIS, WISC, Bhatia performance test, Raven progressive matrices test.

Motivation

Motive, drive, incentive, reinforcement, basic information about primary Needs: hunger, thirst, sleep, avoidance of pain, attitude to sex

Emotions

Differentiate from feelings, physiological changes of emotion. Rule of RAS, hypothalamus, cerebral cortex, SNS, adrenal gland, heredity and emotion, Nature and control of anger, fear, and anxiety. Stress-Physiological and psychological changes, relation to health and sickness: psychosomatics, professional stress, burnout

Unit III **12**

Personality

The components: physical characteristics. The role of heredity, nervous system, physical characteristics, abilities, Family and culture on personal development. Basic concepts of Freud: unconscious, conscious, id, ego, super ego. Personality Assessment: interview, standardized, non-standardized, exhaustive and Stress interviews. List and define inventories BAL, CPI, MMPI. Projective tests-Rorschach, TAT, Sentence completion test.

Learning

The laws of learning as proposed by Thorndike.

Types of learning: Classical conditioning, Operant conditioning, Insight learning, Observational, Trial and error type.

The effective ways of learning: Massed & spaced, Wole & part, Recitation & reading, Serial & free recall, knowledge of results, associations organizations, mnemonic methods, incidental & international learning, role of language.

Thinking

Concepts, creativity, steps in creative thinking. List the traits of creative People, delusions.

Frustration

Sources, solution, conflict; approach – approach, avoidance – avoidance,
Approach – Avoidance.

Unit IV **12**

Sensation, Attention and Perception

Sensation – vision, hearing, olfactory, gestation and cutaneous sensation, movement, Equilibrium and visceral sense.

Attention – Define attention and list the factors that determine attention: nature of Stimulus intensity, color, change, extensity, repetition, primary motives.

Perception – Define perception and list the principles of perception figure ground, Constancy, similarity, proximity, closure, continuity, values and interest, past experience context, needs, moods, religion, sex, perceived benefits and socioeconomic status. Define illusion and hallucination.

Leadership

Qualities of leadership: physical factors, intelligence, sociability, will and dominance.

Unit V

Psychological Reactions of Patient **12**

Psychological reactions of patient during admission and treatment – anxiety, shock, denial, suspicion, questioning, loneliness, regression, shame, guilt, rejection, Fear, withdrawal, depression, ego, concern about small matters, narrowed interest, emotional over reaction, perpetual changes, confusion, disorientation, hallucinations, delusions, illusions, anger, loss of hope.

Communication

Types – Verbal, non- verbal, elements in communication, developing effective communication, specific communication technique. Counseling – Definition, aim, differentiate from guidance, principles in counseling.

Emotional Needs

Emotional needs and psychological factors in relation to unconscious patient, handicapped patients, bed-ridden patients, chronic pain, spinal cord injury, paralysis, cerebral palsy, Burns, amputation, head injury, parkinsonism, leprosy, incontinence.

Geriatric Psychology and Pediatric

Specific psychological reactions and needs of geriatric patient. Specific psychological reactions and needs of pediatric patients.

Behavior Modification

Application of various conditioning and learning principles to modify patient behavior

Total Hours 60

Text Books:

Morgan &King, Introduction to Psychology, 3rd Ed,1994

Reference books

1. Cliford T.Morgan – Introduction to Psychology, ELBS, 2 Ed, 1990
2. Hilgard & Atkinson - Introduction to Psychology, CBS, 3 Ed, 1994

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Know the Psychosocial assessment of patients in various developmental stages.

CO2: Knowledge about the concept of stress and its relationship to health, sickness and one's profession.

CO3: Understand ego defense mechanisms and learn counseling techniques to help those in need.

CO4: Understand the reason of non – compliance among patients and improve compliance behavior.

C05: Understand gain insight into the applications of psychology in the field of Physiotherapy

CO /PO	PO1	PO 2	PO3	PO4	PO 5	PO6	PO7	PO 8	PO 9	PO 10	PO11	PS O1	PS O2	PS O3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Discipline Specific Elective (DSE-I) Course
Sociology

Semester I
22BPTD01

Hours of Instruction/week: 2+3
No of Credits: 3

Objectives:

- To understand study of social life, social changes and causes and consequences of human behavior.
- To ability to investigate the structure of groups, organizations and societies.

Unit I Introduction **15**

Sociology as a science of society, uses of study of sociology, application of knowledge of sociology in Physiotherapy.

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 people.

Socialization

Meaning of socialization, influence of social factors on personality, socialization in hospital, socialization in rehabilitation of patient.

Unit II Social Group **15**

Concepts of social groups influence of formal and informal groups on health and sickness, the role of primary groups and secondary groups in the hospital and rehabilitation settings.

Family

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

Community

Rural community: Meaning and features –Health hazards of rurality's, health hazards to tribal community. Urban community: Meaning and features- Health hazards of urbanities.

Unit III Culture **15**

Components of culture, impact of culture on human behavior, cultural meaning of Sickness and response of sickness & choice of treatment, culture induced symptoms and disease, sub-culture of medical workers.

a. Concept of Health

b. Concept of Culture

c. Culture and Health

d. Culture and Health Disorders

Caste System

Features of the modern caste system and its trends.

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 rehabilitation.

Unit IV Social Control **15**

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

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.

Unit V Social Security

Social security and social legislation in relation to the disabled. **15**

Social Worker

Meaning of Social Work. The role of a Medical Social Worker.

Total Hours 75

Text Books:

1. Sachdeva D.R. & Bhushan.V, An introduction to Sociology, Kitab Mahal Limited, 1974.
2. Textbook of Sociology for Physiotherapy Students by Neeraja

Reference books

1. Madan.G.R. Indian Social Problems, Vol.1, Chennai Applied Publications, 1973.
2. Sociology for Physiotherapists Paperback by Bid

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the Sociology, uses and how to apply it in physiotherapy

CO2: Knowledge concept of social groups, family and community

C03: Understand the concept of culture, caste and social change

C04: Know the social control and social problems of the disabled

C05: Understand the social security and to know the role of social worker.

CO /PO	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO 11	PSO1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Anatomy – II

Semester II
22BPTC06

Hours of Instruction/week: 5
No of Credits: 4

Objectives:

- To demonstrations and practical the student will be able to demonstrate knowledge in human anatomy as in necessary for the study and practice of physiotherapy.
- To develop an ability to apply the principles of anatomy in clinical practice

15

Unit I Osteology and Myology of Lower Extremity

- Hip bone, femur, tibia, fibula and patella.
- 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.
- The origin, insertion, nerve supply and action of the muscles in the front of thigh.
- The boundaries and contents of femoral triangle and sub-sartorial canal.
- The position, course and distribution of femoral nerve.
- The course and main branches of femoral artery and mention the blood supply of neck of femur.
- The position of femoral vein.
- Medial side of Thigh
- Back of Thigh
- Gluteal region
- Hip Joints
- Back of Thigh
- Gluteal region
- Hip Joints
- Knee Joints
- Popliteal fossa
- Gluteal region
- Front of Leg and Dorsum of Foot
- Lateral Side of Leg
- Back of Leg and Sole of Foot
- Nerves
- Blood vessels

15

Unit II Trunk and Thorax

- Vertebral Column

- Thorax

Unit III Abdomen and Pelvis **15**

- Abdomen
- Pelvis

Unit IV Neuroanatomy

Nervous System **15**

- The subdivisions of nervous system - central, peripheral and autonomic nervous system and their subdivisions. The position and form of the spinal cord, its structure and functions in terms of neuronal connections
- The subdivisions of the brain. The external features of the brain.
- The nature and basics of muscle tone, the anatomical pathways involved in the production and maintenance of muscle tone.
- The formation, circulation and drainage of CSF, the ventricles. The meninges and spaces around it and the cisterns. Lumbar puncture and cisternal puncture. The feature of the meninges. Extradural, subdural and subarachnoid hemorrhage.
- Major blood vessels around the brain and spinal cord.
- The position and structure of the autonomic nervous system.
- The cranial nerves in serial order.
- Anatomy of spinal cord review.

Unit V Systems

Cardio – Vascular System **15**

- The external and internal features of the structure of the heart and their implications.
- The basic features of blood supply and nerve supply of the heart.
- The position and general distribution of major arteries and veins. Their main branches. The types of arteries and veins. The basic microscopic structure of types of blood vessels.

Lymphatic System

- The general and regional arrangements of the lymphatic system.
- The lymphatic organs and mention their location.
- The basic structural features of lymphatic vessel, lymphatic, thymus, spleen and tonsils.
- Functional roles to the lymphatic system.
- The position and immediate relation of the spleen.

Respiratory System

1. a. The parts of the respiratory system.
   b. The functional anatomy of the parts of the respiratory system.

c. The basic features of innervations of bronchi and lungs.

2. The position, extent, gross and microscopic structure of the parietal pleura

Total Hours 75

Text Books:

1. Ranganathan Ts, (2013) Textbook of Human Anatomy. 6th editions Chand and Company PvtLtd Publisher, New Delhi.
2. Ross and Wilson, Anatomy and Physiology in Health and Illness, Anne Waugh 2010, Publisher ELBS with Churchill Livingstone.
3. B.D. Chaurasia, Human Anatomy -Vol. I, II, III, (1979 reprint 2008) CBS Publishers andDistributors, New Delhi.

Reference books

1. Romanes G.J, Cunningham's Manual of Practical Anatomy. (1986) 15thedition, Reprint 2008 Oxford Medical Publications.
2. SinghI.B**,** Text Book of Human Osteology, (2006) Jaypee Brothers, Medical Publishers.
3. Ross M.H, E. and Williams L.J and Wilkins Romell, Kaye G.I,Histology: A Text and Atlas(1995),3rd edition, Anne Waugh 2010, ELBS with Churchill Livingstone Publishers.
4. Inderbir Singh,Textbook of Human Histology.(2002), 4th Edition Jaypee Brother, New Delhi.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the anatomical knowledge of lower extremities.

CO2: Knowledge anatomical knowledge of trunk and thorax.

CO3: Understand the structural and functional importance abdomen and pelvis.

CO4: Knowledge Basic neuroanatomy.

CO5: Learn about the cardiovascular system, lymphatic system and respiratory system.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiology and Applied Physiology – II

Semester II
22BPTC07

Hours of Instruction/week: 4
No of Credits: 4

Objectives:

- To explore the normal functioning of the living organisms.
- To acquire knowledge of the normal physiology of various human body systems.
- To learn their principles, mechanisms and control

Unit I Nervous System **12**

Structure of a neuron. Classification of nerve fibres. Properties of nerve fibres. Receptors. Synapse and 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.

Unit II Cardiovascular System **12**

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. Hemorrhage. Circulatory Shock. Cardiovascular adjustments during exercise.

Unit III Respiration **12**

Overview of respiratory tract. Defense 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 IV Excretion

Structure of nephron. Juxta Glomerular apparatus. Renal circulation. Formation of urine. Micturition. Renal failure. **12**

Unit V Reproductive System

Male & female reproductive system. Menstrual cycle. Pregnancy and parturition. Placenta & its functions. Lactation. Contraceptive measures. Physiology of fetus. Factors affecting fetal growth. **12**

Total Hours **60**

Text Books:

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

Reference books

1. L. PrakasamReddy,Concise Medical Physiology, JP Brothers, 3rd Edi,1999
2. Shetty nandhini, Biochemistry for Physiotherapist and AHS, JP bros, 1 Ed,2008
3. Sembulingam, Essentials of Physiology, JP Medical Ltd, 6th Ed,2013
4. Sujith Kumar Chaudhri, Concise medical physiology, New Central BookAgency, 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 25th edition.
7. DM .Vasudevan Textbook of biochemistry for medical students 7th edition.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Obtain Knowledge understanding of nervous system.
CO2: Understand the cardiovascular system
CO3: Knowledge of respiration.
CO4: Understand of excretion system.
CO5: Learn different parts and functions of reproductive system

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H		H	H
CO2	H	L	H			H	M		L	M	M	M	M	
CO3	H		M			H	L			M	H	M	H	
CO4	H	L	H		M	H		M			H	H	H	M
CO5	H		M	H		H	M	M			H		H	H

Anatomy and Physiology Practical and Oral -II

Semester II
22BPTC08

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To enhance the students with practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

List of Experiments

1. Identification of lower limb Bones
2. Anatomical Identification trunk and thorax
3. Anatomy and physiology of abdomen
4. Anatomy of pelvis
5. Neuro anatomy
6. Anatomy and physiology of cardiovascular system
7. Anatomy and physiology of Limbic system
8. Anatomy and physiology of Respiratory system
9. Anatomy and physiology of Nervous System
10. Physiology of excretion
11. Anatomy and physiology of reproductive system

Total hours **45**

Text Books:

1. Jain.A.K, Manual of Practical Physiology For MBBS, (2012), 4th Edition, Avichal Publishing Company.
2. Chaurasia, Human Anatomy - VOL I, VOL II, VOL III,7th Edition, CBS,2016.

Reference Books:

1. Michael Swash, Michael Glynn, Hutchinson's Clinical Methods (2007). 22nd Edition, Saunders Ltd
2. Sri Nageswari.K, Rajeev Sharma, Practical Workbook of Human Physiology (2006), Ist Edition, Jaypee Brothers Medical Publishers (P) Ltd

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge of bones-lower limb
CO2: Understand the anatomical identification of trunk and thorax
CO3: Understand Anatomy and physiology of abdomen and pelvis
CO4: Brief knowledge about anatomy and physiology of cardiovascular system, Limbic system, Respiratory system, Nervous System and reproductive system.
CO5: Knowledge about excretion

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H		H	H
CO 2	H	L	H			H	M		L	M	M	M	M	
CO 3	H		M			H	L			M	H	M	H	
CO 4	H	L	H		M	H		M			H	H	H	M
CO 5	H		M	H		H	M	M			H		H	H

Basic and Applied Physics for Physiotherapy-II

Semester II
22BPTC09

Hours of Instruction/week: 2+2
No of Credits: 3

Objectives:

- The student will be able to understand about the knowledge of mechanics, muscle action, Electricity, magnetism and ionization.
- To apply the basic physics in physiotherapy aspect

Unit I **12**

- Magnetism: Magnetic - non-magnetic substances and their properties, properties of magnet, molecular theory, poles of magnet and its properties, magnetic lines of force and their properties, Electromagnetism, magnetic effects of electric current, Electromagnetic induction, Lenz's law, Inductor and Inductance types of inductor, reactance and impedance.
- Condenser – Potential & capacity, Principles, factors determining capacity, Construction. Electric field, charging & discharging and use of condenser in Electrotherapy.

Unit II 12

- Cosine law and its implications.
- Physical effects of heat and radiation. Laws governing radiation.
- Law of Grotthus and its implications.

Unit III 12

- Thermionic Valves: Thermionic emission, Diode and Triode valves and their characteristics, Construction and application of Cathode Ray Oscilloscope.
- Semiconductor Devices: Intrinsic and extrinsic semiconductors, Light Emitting Diodes, integrated circuit.
- Electronic Circuits: Rectifiers & smoothing circuits, Oscillators -Sinusoidal and
- non-sinusoidal types

Unit IV

A.C. AND D.C. meters: Functions and applications of Ammeter and volt meters, Ohmmeters, Wheatstone bridge **12**

Introduction to Therapeutic Energies – Thermal, Mechanical, Electrical, Electromagnetic and magnetic - Definition, description, physiological effects, Pathological effects and drugs.

Unit V

- Medical Instrumentation for Physical Therapy: Brief description of generation, **12**

Circuit diagrams and testing.

- Low frequency currents, Direct currents, medium frequency currents

Total Hours 60

Text Books:

1. M. Dena Gardiner, The Principles of Exercise therapy, Bell &Hymes, 4thEd,1981
2. Edward Bellis Clayton, Clayton's Electrotherapy, Bailllier Tindill, 9th Edition,1985

Reference books

1. Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed,2012 2.Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed,2012
2. Low& Read, Electrotherapy Explained, Butterworth-Heinminn, 4th Ed,2006

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about magnetism and condenser.

CO2: Learn about the laws

CO3: Understand about electricity-thermionic valves, semiconductor devices and electronic circuits and its therapeutic uses and importance of currents in treatment.

CO4: Recollect about alternating and static currents along with its physiological and therapeutic effects.

CO5: Understand the medical instrumentations for physical therapy and low frequencycurrent in therapeutic interventions.

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H		H	H
CO 2	H	L	H			H	M		L	M	M	M	M	
CO 3	H		M			H	L			M	H	M	H	
CO 4	H	L	H		M	H		M			H	H	H	M
CO 5	H		M	H		H	M	M			H		H	H

Microbiology

Semester II
22BPTC10

Hours of Instruction/week: 3
No of Credits: 3

Objectives:

- To demonstrate and understand about the knowledge of microbiology including immunity, virology, antiseptics and allergy.
- A general understanding of the diseases that therapists would encounter in their practice

UNIT I **9**

Introduction, Classification, Shape and arrangement, Disinfection and antiseptic

UNIT II **9**

Sterilization and asepsis, Allergy & hypersensitivity and Immunology – Definition, antigen, Antibody reaction, autoimmunity, natural and Acquired immunity.

UNIT III **9**

Infection – Definition, source of infection, portal of entry, spread of infection, type. Bacteriology – Infection caused by Gram Positive bacteria – clostridium tetani & coryne bacterium diphtheria. Gram negative bacteria – klebsiella, pseudomonas, salmonella, v.cholera

UNIT IV **9**

Mycobacterium – M.tuberculosis, M.leprae, a typical mycobacteria.Outline the bacteria causing the following diseases

- RTI
- Meningitis
- Enteric infection
- Anaerobic infection
- UTI
- Leprosy, TB
- STD
- Wound infection
- Hospital acquired infection

9

UNIT V

Viruses – Definition, size, shape, structure, classification, cultivation, diagnosis of Viral infection.

Outline the virus causing the following diseases

- HIV
- Hepatitis
- Polio
- Measles
- Rubella
- Herpes.

Total Hours 45

Text Books:

1. Satish Gupte, The Short text book of Medical Microbiology by, JayPee Brothers,2nd Ed, 2004.
2. Anantha narayananan & Jayaram Paniker, Text book of Micro biology, Orien Longman, 9th Ed, 2013.

Reference books

Kumar, Essentials of Microbiology, JP, 1st Ed, 2014.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about disease and changes in structure and function of cells during disease condition gained.

CO2: Understand about importance of nutrition, function of nutrition and itsdeficiency diseases gained

CO3: Learn the Pathogenesis and pathological changes of disease in various body systems.

CO4: Knowledge about the various microorganisms, its classification and structure gained.

CO5: To Know about the various disease caused by microorganism and its prevention

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H		H	H
CO 2	H	L	H			H	M		L	M	M	M	M	
CO 3	H		M			H	L			M	H	M	H	
CO 4	H	L	H		M	H		M			H	H	H	M
CO 5	H		M	H		H	M	M			H		H	H

Discipline Specific Elective (DSE-II) Course

Clinical Biochemistry

Semester II **Hours of Instruction/week: 2+3**
22BPTD02 **No. of Credits: 3**

Objectives:

- To understand and learn the collection of biological samples and preservation
- To know about the clinical significance of abnormalities in metabolism of carbohydrate, protein and lipid.
- To learn about the clinical importance of enzymes.

Unit I

Basics **15**

Muscle Contraction - Contractile elements in muscle, briefly on the process of muscle contraction,Energy for muscle contraction.

Biochemistry of Connective tissue - a. Introduction, various connective tissue proteins: Collagen,elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.

Specimen collection- Blood, urine, feces, cerebrospinal fluid and amniotic fluid. Preservation ofthe specimens - anticoagulants and normal values of biochemical parameters.

Unit II

Energy Systems **15**

- Hormone Action - a. Definition, classification, Mechanism of hormone action. Receptors, signaltransduction, second messengers and cell function.
- Acid-Base balance - a. Acids, bases and buffers, pH. Buffer systems of the body, bicarbonatebuffer system Role of lungs and kidneys in acid base balance, Acid base imbalance.
- Water balance - a. Water distribution in the body, Body water, water turnover, Regulation ofwater balance: role of ADH and thirst centre.
- Electrolyte balance - a. Osmolarity. Distribution of electrolytes. b. Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF
- ATP Production.
- Aerobic & Anaerobic Metabolism
- Lactic acid production
- Lactic acid clearance mechanism.

Unit III

Nutrition **15**

a. Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food.

b. Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person

c. Balanced diet i. Recommended dietary allowances ii. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers

iii. Role of lipids in diet iv. Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and

non- essential amino acids. Nitrogen balance v. Nutritional disorders.

Unit IV

Metabolism **15**

1. Protein metabolism – General characteristics of digestion and absorption and Disorders of digestion and absorption – Lactose intolerance. Urea cycle 2. Carbohydrate metabolism 3. Fat metabolism Metabolic equivalence 2. Types of energy expenditure 3. Liver function test 4. Renal function test 5. Lipid profile in serum.

Unit V

Clinical Implication **15**

Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.

Total Hours:75

Text Books:

1. Chatterjee, M.N. (2011).Text Book of Medical Biochemistry, Eight Edition, Jaypee Brothers Medical Publishers, New Delhi.
2.Chawla, R.(2008).Practical Clinical Biochemistry - Methods and Interpretations, Third Edition, Jaypee Brothers Medical Publishers, New Delhi.
3. Bhagavan, N.V. (2004).Medical Biochemistry, Fourth Edition, Academic Press, Calfornia.

References:

1. Gaw, A., Murphy, M.J., Cowan, R.A., Rectly, D.S., Stewart, M.J. and Shepherd, J. (2008), Clinical Biochemistry, 4th ed, Churchill Livingstone, New York.
2. Gowenlock, A.H., Murray, J.R. and Lauchlan, D.M. (2006), Practical clinical Biochemistry, 6thed, CBS Butterworth publishers, New Delhi.
3. Nayak, B. (2002), Manipal Manual of Clinical Biochemistry, 1st ed, Jay Pee brothers, New Delhi.

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge of basics biological samples and preservation.
CO2: Understand the energy systems
CO3: Knowledge about the nutrition and activities
CO4: Understand the basic about the concept of metabolism
CO5: Knowledge about the clinical implications.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Medicine and Pharmacology–I

Semester III **Hours of instruction /week:3+2**

22BPTC11 **No of credits:3**

Objective:

- 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.

UNIT I **15**

Infections

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

Hematology

Clinical aspects of iron deficiency, B12 and folic acid deficiency anemia. Types of bleeding diathesis. The clinical features of Hemophilia.

UNIT II **15**

Respiratory Tract

- Bronchitis - Define, lists etiological factors and describe symptoms.
- Pneumonia - List types of pneumonia (lobar, broncho, aspiration pneumonia)
- Etiologic agents and briefly outline symptoms and complications of pneumonia.
- Asthma - The etiological factors and clinical features of acute exacerbation.
- Chronic obstructive airway diseases - Define emphysema and chronic bronchitis. The pathology, symptoms of disease and clinical course.
- Tuberculosis - The aetiology, pathology and clinical features of pulmonary TB.
- Bronchiectasis - The pathology and clinical symptoms of bronchiectasis, bronchopulmonary segments and basis of postural drainage.
- Emphysema - Etiological factors.
- Chest well deformities - funnel chest, Pigeon chest barrel chest, Kyphoscoliosis of thoracic spine.
- Functional disability of occupational, Lung diseases, List pneumoconiosis.

UNIT III **15**

Cardio - Vascular System

- Cardiac failure – Definition causes and symptoms.
- Rheumatic fever - Definition and aetiology and gross pathology of rheumatic heart disease.
- Infective endocarditic. - Definition and outline aetiology, symptoms and complications.
- Ischemic heart disease- Pathology of IHD, Angina pectoris and Myocardial infarction, The clinical features and Medical and surgical therapy.
- Hypertension - The clinical features, complications and goals of therapy.
- Pathogenesis and clinical features of pulmonary embolism, Deep vein thrombosis, and pulmonary infarct.
- Congenital heart disease - ASD, VSD, Fallot's Tetralogy and PDA and the pathologic anatomy.

UNIT IV **15**

Bone, Joint and Connective Tissue Disorders

- Brief introduction to concept of autoimmune disease.
- Systemic lupus erthymatosis, Polymyositis, Dermatomysitis, Polyarteritis Nodosa, and Scleroderma.
- Rheumatoid arthritis - Describe aetiology, clinical features and complications, drug therapy and non-pharmacological therapy.
- Osteoarthritis - Describe aetiology, clinical features and complications and review non steroidal anti-inflammatory drugs and steroids.

UNIT V **15**

Pharmocology

- Terminology
- Classification of drugs
- Factors influencing the dosage of drugs and its actions.
- Drug Allergy
- Principles of drug administration and routes.

Total hour :75

Text Books:

1. Davidson,A Text Book of Medicine, Churchill Livingston, 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, 7th 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, 7th Ed, 2013.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the medicines encountered in the management of physiotherapy

CO2: Know the basic idea of different diseases and infections

CO3: Knowledge on symptoms and pathology of diseases

CO4: Analyzing and interpretation imaging findings into the physical therapy diagnostic process

C05: Understand the pharmacology

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Pathology

Semester III **Hours of instruction / week:3+2**

22BPTC12 **No of credits:3**

Objectives:

- To understand about the knowledge of pathology.
- To acquire knowledge about diseases.

UNIT 1 **15**

Introduction to Pathology

- Introduction: Disease, concepts of disease, classifications of lesions. Bacterial, viral and parasitic infections a general outline.
- Cell injuries –
  - Aetiology and Pathogenesis with a important aspects of normal cell structure.
  - Reversible cell injury: Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoid changes.
  - Irreversible cell injury: Types of Necrosis and Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic.
  - Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations, Pigments - Melanin / Hemosiderin.
- Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.
- Immunopathology –
  - Immune system: General concepts.
  - Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. Secondary immunodeficiency including HIV infection.
  - Auto-immune disorders: Basic concepts and classification, SLE.
  - AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

UNIT II **15**

Infectious diseases

a. Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.

b. Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.

c. Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Rickttsia, Chlamydial infection, HIV infection.

d. Fungal disease and opportunistic infections.

e. Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

Circulatory Disturbances

a. Hyperemia/Ischemia and Haemorrhage Edema: Pathogenesis and types. Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology Thrombosis and Embolism: Formation, Fate and Effects.

b. Infarction: Types, Common sites.

c. Shock: Pathogenesis, types, morphologic changes.

Growth Disturbances and Neoplasia

a. Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.

b. Precancerous lesions.

c. Neoplasia: Definition, classification, Biological behaviour: Benign and Malignant, Carcinoma and Sarcoma.

d. Malignant Neoplasia: Grades and Stages, Local & Distant spread.

e. Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer.

f. Benign & Malignant epithelial tumours. Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours. Eg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma.

UNIT III **15**

Nutritional Disorders

Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples.

Genetic Disorders

Basic concepts of genetic disorders and some common examples and congenital malformation.

Hematology

a. Constituents of blood and bone marrow, Regulation of hematopoiesis. Anemia: Classification, clinical features & lab diagnosis.

b. Nutritional anemias: Iron deficiency anemia, Folic acid,Vit. B 12 deficiency anemia including pernicious anemia. Hemolytic Anaemias: Classification and Investigations. Hereditary hemolytic anaemias: Thalessemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies.

c. Acquired hemolytic anaemias

i. Alloimmune, Autoimmune

ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia.

d. Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis. Coagulopathies –

i. Inherited

ii. Acquired with lab diagnosis.

e. Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.

f. Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Multiple myeloma and disproteinemias.

g. Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis.

UNIT IV **15**

Alimentary tract:

a. Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumour of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumours.

b. Stomach: Gastritis, Ulcer &Tumours.

c. Tumours and tumour like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma.

d. Pancreatitis and pancreatic tumours :i) Exocrine, ii) Endocrine Salivary gland tumours : Mixed, Warthin's

Hepato – Biliary Pathology

a. Jaundice: Types, aetio-pathogenesis and diagnosis. Hepatitis: Acute, Chronic, neonatal.

b. Alcoholic liver disease

c. Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumours of Liver.

UNIT V **15**

Lymphatic System

a. Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma. Lymphadenitis - Nonspecific and granulomatous. Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non hodgkin's Lymphomas, Metastatic Tumours.

b. Causes of Splenic Enlargements.

Endocrine pathology

a. Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis.

b. Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.

Dermatopathology:

Skin tumours: Squamos cell carcinoma, Basal cell carcinoma, Melanoma

Total hour :75

Text Books:

1. Ananthanarayananan & Jayaram Paniker,Text book of Micro biology, Orien Longman, 9 th Ed, 2013.
2. Harsh mohan, Text book of Pathology, Jaypee brothers, 7th edition-2015.

References:

1. Datta, Textbook of Pathology, JP , 2nd Ed, 2004.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about disease and changes in structure and function of cells during disease condition gained.

CO2: Knowledge about importance of nutrition, function of nutrition and its deficiency diseases gained

CO3: Understand pathogenesis and pathological changes of disease in various body system is understood properly.

CO4: Knowledge about the pathology of respiratory system, cardiovascular, endocarditis, ischemic heart diseases

CO5: Know about the pathology in lymphatic system, musculoskeletal and endocrine pathology

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Biomechanics-I

Semester III **Hours of instruction per week:3+2**

22BPTC13 **No of credits:4**

Objectives:

- 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.

UNIT I **15**

Joint Structure and Function

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

UNIT II **15**

Muscle Structure and Function

- Mobility and Stability functions of muscles.
- Elements of muscle structure- Composition of a muscle fiber, the motor unit, types of muscle fibres, muscle fiber size, arrangements and number, muscle tension, length- tension relationship.
- Types of muscle contraction, speed and angular velocity, applied load, voluntary control, Torque & Isokinetic exercise.
- Factors affecting muscle tension.
- Muscles: Spurt and Shunt muscles, Tonic and Phasic muscles.
- Factors affecting muscle function: Type of joint and location of muscle attachment, number of joints, Passive insufficiency, Sensory receptors.

UNIT III **15**

Thorax & Chest Wall

- Basic Anatomy related to chest, wall.
- Diaphragm & its function.
- Lab Activity – Palpation of Sterno Clavicular Joint and Ribs.

Temporomandibular joint

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

Lab Activity – Palpation of Mastoid Process and Sterncleido mastoid Muscle and Scalene Muscles

UNIT IV **15**

The Shoulder Joint

- The structural components of the shoulder complex including the articulating surfaces, capsular attachments and ligaments and movements of the following joints.
    - Sterno-clavicular
    - Acromio-clavicular
    - Scapulo-thoracic
    - Gleno-humeral
- 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.
- The muscles of elevation (Deltoid, Supraspinatus, Infraspinatus, Teres minor, Subscapularis, Upper Trapezius, Lower Trapezius, Serratus anterior, and Middle Trapezius and Rhomboids).
- The muscles of depression (Latissimus dorsi, Pectoralis, Teres major, Rhomboids)
- Muscles functioning around shoulder.
- Effect of injury & aging.
- PA, dislocation, ligament instability.
- Lab Activity –Gleno Humeral Joint, Acromio Clavicular Joint and Soft Tissue Palpation Around The Shoulder Complex

The Elbow joint

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

UNIT-V **15**

The Wrist and Hand complex

- The wrist complex including Radiocarpal joint, Mid carpal joint and the Ligaments wrist complex.
- The function of the radiocarpal and Midcarpal joints including the movements and muscles involved.
- The Hand complex including: Structure of fingers (Carpometacarpal, Metacarphalangeal and interphalangeal joints of fingers, ligaments & range of motion).
- The finger musculature including Extrinsic & Intrinsic finger flexors and the Extensor mechanism on the MCP, PIP and DIP joint function and intrinsic finger muscles.
- The structure of the Carpometacarpal, MCP and IP joints of thumb.
- The Thumb musculature including the Extrinsic and Intrinsic thumb muscles.
- Precision, Power, Cylindrical, Spherical & Hook grips.
- Precision handling, Pad to pad, Tip to tip and Pad to side Prehension and
- Functional position of wrist and hand.
- Effect of injury & aging, dislocation, deformities of hand paralysis of hand muscles.

Total hours :75

Text Books:

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

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Categorizing the joint structure & functions.

CO2: Understanding muscle structure and function.

CO3: Evaluation of the pathological basis of injury thorax, chest wall and TMJ

CO4: Analysis of the shoulder joint and elbow joint

CO5: Understand the wrist and hand complex

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy-I

Semester III **Hours of instruction per week:3+2**

22BPTC14 **No of credits:4**

Objective:

- To demonstrate and list the indications and contra - indications of various types of exercise therapy, demonstrate the different techniques, and describe their effects.

UNIT I **15**

Introduction

Definition, types of exercise, Principles

Muscle

Definition, types, muscle work, angle of pull and mechanical efficiency of muscle starting position: Types muscle work, forces involved, equilibrium, Derived position: Types muscle work, forces involved, equilibrium

Movement

- Classifications of movement: Active, Passive.
- Effects of exercise: Physiological effects, Therapeutic effects.

Pelvic Tilt

- Normal pelvic tilts, Alterations from normal, anterior tilt (forward), Posterior tilt, (backward), Lateral tilt.
- Muscles responsible for alterations and pelvic rotation.
- Normal pelvic tilt, pelvic rotation and altered tilts and their corrective measures.

UNIT II **15**

Passive Movements

Relaxed passive, Mobilizing passive (forced P.M. manipulations, Serial manipulations) Passive stretching of following muscles/muscle groups and 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: Strernocleidomastoid.

UNIT III **15**

Resisted exercise

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. The home programme for strengthening neck muscles and back extensors

Progressive Resisted Exercises

- Exercises, advantages and disadvantages and demonstration of the techniques types of PRE: Fractional system, Mac Queen's set system, Mac Queen's power system, Delorms, Oxford.
- The skill to grade upper and lower limb, neck and trunk muscles. Delorms, Dumbells, Sand bags Pulleys, Power board and Weigh cuffs.

UNIT IV **15**

Muscle Grading

- 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).
- Demonstration of the skill to grade upper and lower limb, neck and trunk muscles.

Re - Education of Muscle

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

UNIT V **15**

Joint Mobility

- 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).
- Passive range of movement, methods of relaxation, active exercises, manual mobilization techniques, gliding techniques.
- Accessory movements: Posterior glide, Anterior glide, Superior and Inferior glide, Traction and approximation.
- Indications and contra - indications for mobilisation of individual joints and demonstrate practically the various mobilisation techniques for individual joints and teaching home programme.

Total hours :75

Text Books:

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

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th 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, JaypeeBrothers , 2 nd Ed, 2013.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the fundamentals of muscle and joint function

CO2: Gain knowledge on various muscle grading

CO3: Understand the active and passive movements of each joint

CO4: Learn practical knowledge on passive movement, passive stretching and resisted exercise

CO5: Understand and illustrates practical knowledge on muscle grading, muscle re-education and joint mobilization

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy and Biomechanics
Practical and Oral -I

Semester III **Hours of Instruction/week: 5**
22BPTC15 **No. of Credits:3**

Objectives

- Knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

1. Effects of exercise: Physiological effects, Therapeutic effects.
2. Demonstration of Movement- active and passive
3. Demonstration of stretching
4. Demonstration of resisted exercises and its type
5. Muscle grading -MMT
6. Demonstration of relaxation techniques
7. Demonstration of PNF
8. Demonstration of accessory movements
9. Demonstration of muscle re-education technique
10. Demonstration of joint mobilization
11. Biomechanical of shoulder, elbow and wrist joint

Total hours: 75

Text Books:

Dena Gardiner , Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th 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, JaypeeBrothers , 2 nd Ed, 2013

Course outcomes:

On the successful completion of the course, students will be able to

CO1: To Understand various assessment tests in exercises therapy.
CO2: Demonstration of the various assessment tests in exercises therapy
C03: Knowledge about Effects of exercise
CO4: Demonstration of the various exercises therapy techniques
C05: Brief knowledge biomechanics in upper limb joint

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Discipline Specific Elective (DSE-III) Course

Basics of Radio Diagnostics

Semester III **Hours of Instruction/week:2+3**

22BPTD03 **No. of Credits: 3**

Objectives

- Knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students, distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Unit I

Introductions **15**

General Instructional Concepts Basic Imaging Modality

Basic Imaging Modality Properties and its common clinical diagnostic application

Radiography (X-ray)

Scintigraphy (Bone Scan)

Unit II **15**

Basic Imaging Modality Properties and its common clinical diagnostic application

Computed Tomography (CT)

Magnetic Resonance Imaging (MRI)

Sonography (Ultrasound)

Unit III **15**

Study of electrodes. ECG

Study of Defibrillator, Larynscope

Study of Ambu bag, Suction m/c

Vitals signs monitoring –BP and NIBP Monitoring

Study of Spiro meter, Pulse oximeter. Temperature monitoring.

Unit IV **15**

Typical Imaging Modality Applications normal and abnormal identification

Shoulder Region

Elbow Region

Wrist and Hand Region

Hip/Pelvis Region

Knee Region

Ankle and Foot Region

Unit V **15**

Typical Imaging Modality Applications normal and abnormal identification

Thoraco lumbar Spine Region

Cervical Spine Region

Neurological imaging abnormalities differences between CT and MRI

Total Hours: 75

Textbook

1. The Radiology Handbook The Radiology Handbook J. S. Benseler.
2. Textbook of Radiology and Imaging by David Sutton

Reference

Imaging Education Manual 2015

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Gain knowledge on various recording techniques and diagnostic applications.

CO2: Understand the clinical application of basic imaging modality

CO3: Learn about the clinical application of therapeutic devices in cardiac care.

CO4: Knowledge about the Clinical Equipment and assessment finding in regional aspects.

CO5: Understand about the Clinical modality application normal and abnormal identification.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Medicine and Pharmacology–II

Semester IV **Hours of instruction/week:3+2**
22BPTC16 **No of credits:3**

Objective:

- To demonstrate a general understanding of the diseases that therapists would encounter intheir practice.
- They should have a brief idea of the etiology and pathology, what the patient's symptomsand the resultant functional disability

UNIT I **15**

Renal Diseases

Acute and chronic renal failure. Urinary tract infection. - Pathogenesis,Common clinical conditions complicated by UTI.

Metabolic Diseases

Diabetes – etiology, types of diabetes and complications and use of insulin, diet and oral hypoglycemic agent in management of diabetes. Obesity and its management.

UNIT II **15**

NEUROLOGY

- CVA – thrombosis, embolism, hemorrhage
- Extra pyramidal lesion – parkinsonism, athetosis, chorea, dystonia
- Disorders of muscle – myopathy, SMA, MND, Syringomyelia
- Multiple sclerosis
- Infections of nervous system – encephalitis, neurosyphilis, meningitis, transverse
- Myelitis, tabes dorsalis, TB spine
- Epilepsy
- Alzheimer disease
- Disorder of myoneural junction – myasthenia gravis

UNIT III **15**

E.N.T

- The anatomy and physiology of hearing, Use of audiometry in assessment of hearing.
- Causes of hearing loss. The conservative and surgical intervention, including types and availability of hearing aids.
- The functions of vestibular apparatus
- The common ENT infectious diseases which occular hearing, breathing and speech and their management.

UNIT IV **15**

Ophthalmology

- Eye lesions in leprosy, causes, treatment and complications of Lagophthalmos.
- Field defects arising from lesions in the visual pathway, 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 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.
- Blindness and visual disability evaluation. 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, skindiseases related to rheumatology, tropical skin diseases and Hyperhydrosis.

UNIT V **15**

PHARMACOLOGY

Definition, action, indications, contra – indications, adverse reactions: Anti- inflammatory Anti-epileptic**,** Sedatives, Hypnotics, Tranquilizers Muscle relaxants**,** Alcohol Pulmonary effects of general anesthetic agents Mucolytic agents**,** Local anesthetic agents, Narcotic Steroids**,** Vasodilators**,** Insulin and oral hypoglycemic agents**,** Antibiotics – Bactericidal, Bacteriostatic**,** Chemotherapeutic drugs in leprosy and tuberculosis.

Total hours :75

Text Books:

1. Davidson. A Text Book of Medicine, Churchill Livingston, 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, 7th 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, 7th Ed, 2013.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge renal and metabolic disease
CO2: Understand the diseases and infections neurology
CO3: Provides brief knowledge on ENT
CO4: Knowledge on ophthalmology and dermatology
CO5: Provides knowledge on pharmacology

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

General Surgery, Paediatric and Geriatric

Semester IV **Hours of instruction/week:3+2**
22BPTC17 **No of credits:3**

Objectives:

- To demonstrate a general understanding of the diseases that therapists would encounter in their practice.
- They should have a brief idea of the etiology and pathology, about the patient'ssymptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the disease on any therapy that may beprescribed.

UNIT I **15**

Surgical Incisions

The regions of abdomen and its surgical incisions. The site extent of incision indications and post operative complications in

- Nephrectomy
- Appendicectomy
- Herniorrhaphy
- Mastectomy
- Thyroidectomy
- Colostomy
- Adrenalectomy
- Cystectomy
- Hysterectomy
- Prostatectomy
- Cholecystectomy
- Ileostomy.
- Gastrectomy

UNIT II **15**

Burns

Structure and functions of skin. Classification of burns by depth and surface area. The causes, medical management and precautions in the acute stage. The potential deformities due to burns, methods of prevention and precautions. Cosmetic and functional treatment measures. The plastic surgery procedures and management in

rehabilitation of burns, including splinting methods for common deformities and preventionof burns contractures

- Physiotherapy goal setting in General Surgery, Plastic Surgery & Burns.
- Goals of pharmacological and surgical therapy.

UNIT III **15**

Paediatrics

- Growth and development of a child from birth to 12 years: including physical, social, adaptivedevelopment.
- The maternal and neonatal factors contributing to high-risk pregnancy and 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.
- Community programmes: International (WHO), national and local, for prevention of poliomyelitis, blindness, deafness, mental retardation and hypothyroidism. The immunization schedule for children.
- Cerebral Palsy, Mental retardation, microcephaly, blindness, hearing and speech impairment, squint and convulsions. Treatment. Prevention: Appropriate management of high-risk pregnancies, prevention of neonatal and postnatal infections, metabolic problems.

UNIT IV **15**

Paediatrics Condition

Muscular dystrophy, Still's disease: Classification pathology, physical findings, course & prognosis. Treatment, prevention and correction of deformity. Acute C.N.S. infections***:*** Normal diet of new-born and child: List dietary calorie, fat, protein, mineral and vitamin requirement in a normal child and in a child with malnutrition. Etiology, findings and treatment of Rickets: Vitamin D deficiency and resistant rickets. Lung infections: The clinical findings, complications and medical treatment of bronchiectasis, lung abscess and Bronchial asthma.

UNIT V **15**

Geriatrics

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

Total hours: 75

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 Outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge of principles of surgery and the application of basic sciences to surgical treatment and describes abdominal surgical incisions.

CO2: Analysis the causes, indication, types of incisions, pre operative assessment, procedure, postoperative assessment, its complication

CO3: Understand about growth and development in paediatric population

CO4: Know the treatment and prevention of paediatric conditions

CO5: Knowledge about geriatric diseases

CO /PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PS O 1	PS O 2	PS O 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H		L	H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Biomechanics-II

Semester IV **Hours of instruction/week:3+2**

22BPTC18 **No of credits:4**

Objectives:

- To demonstrate an understanding of the principles of Biomechanics and Kinesiology
- Tostudy their application in the health and disease pertaining to muscles and joints of upper limb.

UNIT I **15**

The Vertebral column

- The general structure and function of the vertebral column including: Primary and secondary curves, Articulations, Ligaments and muscles, typical vertebra, intervertebral disc.
- Factors affecting stability and mobility.
- Regional structure and function of cervical, dorsal, lumbar and sacral vertebrae.
- The muscle of the vertebral column – Flexors, Extensors, Rotators and LateralFlexors.
- The effects of injury and developmental deficits.
- Scoliosis, Kyphosis, Lordosis, Spondylosis, Spondylolisthesis, Spondylitis, IVDP.
- Lab Activity – Palpation of Vertebral Body and Spinous Process. Levels of Vertebra for Cervical, Thoracic, Lumbar and Sacral Spine

UNIT II **15**

The Hip Complex

- The general features of the hip joint including the articulating surfaces on the pelvis and the femur, Angulations, Angle of inclination, Angle of Torsion, internal architecture of femurand pelvis, Joint capsule, Ligaments & Muscles (flexors, Extensors –one joint extensors, two joint extensors, Adductors, Medial rotators and Lateral rotators.)
- 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.
- The pelvic motions in the static erect posture.
- Femoral motion.
- Hip stability in Erect Bilateral stance, Sagittal plane equilibrium and unilateralstance.

- Reduction of forces with Weight shifting and using a cane and deviations fromnormal in muscular weakness & Bony abnormalities.
- Effect of injury and aging, coxa vara, coxa valga, dislocation, muscle paralysis, ligamentinstability
- Lab Activity – Bony Landmarks Around The Hip Joint Complex (Iliac Crest,Greater Trochanteric, Soft Tissue Around Hip Joint)

UNIT III **15**

The Knee Complex

- The structure of the Tibiofemoral joints: Articulating surfaces on femur and tibia, themenisci, 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.
- 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.
- The structure and function of the Patellofemoral joint.
- The effects of injury and disease in the Tibiofemoral and Patellofemoral joints.
- The effect of injury & aging, genu valgum, genu varum, osteoarthritis, meniscal injury, ligament instability, bursitis, chondromalacia patella.
- Lab Activity – Palpation of Femoral Condyles, Soft Tissue around Knee Joint Complex.

UNIT IV **15**

Type Ankle – Foot Complex

- 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.
- The terminology unique to the ankle foot complex, including inversion – eversion, pronation-supination, dorsiflexion-plantar flexion, flexion-extension and adduction and abduction.
  - Weight distribution in the ankle joint during unilateral & bilateral stance.
  - Effects of injury & aging, muscle paralysis, posture, Pes planus, pes cavus, Hammer toe, clawtoe, Hallux valgus.
- Lab Activity – Palpation of Metatarsals and Calcaneum and Soft Tissues around the Heel Region.

UNIT V **15**

Posture

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

Gait

- The stance, swing and double support phases of gait.
- The subdivisions of the stance and swing phases of gait.
- The time and distance parameters of gait.
- Gait determinants
- Gait analysis in sagittal & frontal plane
- Pathological gait: Ataxic, circumduction, High stepping gait, short stepping gait, scissoring gait, Antalgic gait, Waddling gait, lurching gait, quadriceps palm gait, sailors gait.
- Joint motion at the hip, knee and ankle for one extremity during a gait cycle.
- The location of line of gravity in relation to the hip, knee and ankle during the stance phasesof gait.
- The gravitational moments of force acting at the hip, knee and ankle during the stance phase.
- Muscle activity at the hip, knee and ankle throughout the gait cycle, including why and whena particular muscle is active and the type of contraction required.
- The role of each of the determinants of gait.
- The muscle activity that occurs in the upper extremity and trunk.Compare:
- Motion of upper extremities and trunk with motion of pelvis and lower extremities.
- The traditional gait terminology with the new terminology.
- 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: 75

Text Book:

1. Cynthia C Norkins, Joint Structure and Function – a Comprehensive Analysis, JaypeeBrothers, 4th Edition, 2012.

2. Kinesiology of the musculoskeletal system foundations for rehabilitation, Donald A. Neumann. Third edition.

References:

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

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the structure and functions of cervical, thoracic, lumbar and sacral vertebra.

CO2: Understands general and specific features of the hip, knee, and ankle complex.

CO3: Evaluate the pathological basis of injury and aging of the hip, knee and ankle complex

C04: Learn the different postural malalignment like scoliosis, kyphosis, lordosis and fixedflexion deformity

CO5: Knows about the variation between different pathological gait patterns

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy-II

Semester IV **Hours of instruction /week:3+2**

22BPTC19 **No of credits:4**

Objective:

- To list the indications and contra - indications of various types of exercise therapy.
- To demonstrate the different techniques of exercise therapy and describe their effects.

UNIT I **15**

Abnormal Gaits

- Abnormal Gaits, Causes for Abnormal Gaits
- Demonstrate Abnormal Gaits, Gait Training for Abnormal Gaits.

Mobility Aids

- The indications, Contra-Indications, Measurements, Advantages and Disadvantages, precautions of the Following Mobility Aids-canes, Crutches, Walking Frame, Wheel chair
- The ambulation and transfers using the above Mobility Aids. Practical (Mobility Aids and gait retraining)

UNIT II **15**

Suspension therapy

- The basic physics of simple pendulum and pendular movement.
- Types of suspension: vertical, axial and eccentric fixation (changing/shiftingpoint of suspension)
- The indications and techniques for each type of suspension
- Axial and eccentric fixation for mobilizing and strengthening and reeducation of various muscles and joints.

Hydrotherapy

- Definition, Forces, Principles of Hydrotherapy
- Indications, Contra-indications, Precautions-Hydrotherapy

Posture

- Normal & Abnormal Posture
- Good and Bad posture. Factors responsible for good posture causes for faulty posture.

UNIT III **15**

Goniometry

- Normal range of various joints. Description of gonimeter, Range of measuring system. Techniques of goniometry.
- Hazards of bed rest
- Hazards of prolonged bed rest
- Principles & Methods of Maintenance

- Individual & Group exercises – principles
- Table & Scheme of exercises

UNIT IV **15**

Co – ordination

- Co-ordination, Nervous control of co- ordination, Inco- ordination – Definition, causes and its management, Frenkel's Exercise
- In-coordination due to : Lower motor neuron lesions (flaccidity), Upper motor neuron lesions (spasticity), Cerebellar lesions, loss of kinaesthetic sense (tabes dorsalis, syringomyelia, leprosy), Imbalance due to muscular disease.
- Balance (static & dynamic)
- Re – education of balance
- Re – education techniques for balance

UNIT V **15**

Soft tissue manipulation

- History of 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 (therapist's stance) e. Using body weight. f. Contact and continuity. g. Techniques, indications and contra-indications.
- Physiological effects of massage on various systems of body.

o Effects on: Excretory system, Circulatory system, muscular system, Nervous system & Metabolism system.

o The various manipulation techniques used in massage.

- Stroking manipulation: Effleurage, Stroking.
- Pressure manipulations: Kneading: Squeezing, Stationary, Circular, Ironing (reinforced kneading), Finger kneading, Petrissage (picking up , wringing, rolling) , frictions.
- Percussion manipulation: tapotement, Hacking, Clapping, Beating & Pounding.
- Shaking manipulations: Vibration, Shaking.
- The techniques, effects & uses and contra - indications of the followingmanipulations:
- Massage for upper limb: a. Scapular region b. Shoulder joint c. Upper arm d. Elbow joint e. Forearm f. Wrist joint g. Hand
- Massage for lower limb: a. Thigh b. Knee joint c. Leg d. Foot (including ankle joints and toes)
- Massage for back: Neck and upper back b. Middle and lower back c. Gluteal region, arm & leg
- Massage for the face: Practical (Face, Neck, back, upper and lower limb)

Total Hours:75

Text Books:

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

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th 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, JaypeeBrothers , 2 nd Ed, 2013

Course Outcome:

On the successful completion of the course, students will be able to

CO1: To gain knowledge on joint range and their measurements

CO2: Understand posture, movement retraining, and balance and co ordination.

CO3: Evaluate the pathological gait and use of different mobility aids

CO4: knowledge about the basic information on therapeutic massage and its effect on different systemsof the body.

CO5: Learn the demonstration of face, neck, back, upper limb, lower limb massage and suspension therapy.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Exercise Therapy and Biomechanics Practical and Oral -II

Semester IV **Hours of Instruction/week: 5**
22BPTC20 **No. of Credits: 3**

Objectives

- To practice the knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and communitysettings.
- To enable the distinguish between normal and abnormal data derived as a result of tests whichshe has performed and observed in the laboratory.

Practical

List of Experiments

1. The normal gait pattern and Abnormal Gaits
2. The ambulation and transfers using the Mobility Aids
3. Suspension therapy
4. Indications, Contra-indications, Precautions-Hydrotherapy
5. Measuring of individual joint range using goniometer
6. Re -education of balance and Frenkel's Exercise
7. Manipulation techniques used in massage- upper body and lower body
8. The techniques, effects & uses and contra - indications of manipulation
9. Biomechanics of vertebral column, hip complex and knee complex
10. Biomechanics of ankle and foot

Total Hours:75

Text Books:

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

References:

1. Carolyn Kisner, Therapeutic Exercise, ,Jaypee Brothers, 6th 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, JaypeeBrothers , 2 nd Ed, 2013

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the demonstration of the normal gait pattern, Abnormal Gaits, Gait Training for Abnormal Gaits, ambulation and transfers using the Mobility Aids

CO2: Knowledge and practice about the suspension therapy

CO3: Understand the Indications, Contra-indications, Precautions-Hydrotherapy

CO4: Knowledge about the measuring of individual joint range using goniometer, Re - education of balance and Demonstrate Frenkel's Exercise

CO5: To Analyze the Manipulation techniques used in massage- upper body and lower body and thetechniques, effects & uses and contra - indications of manipulation

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Discipline Specific Elective (DSE-IV) Course
Digital Health

Semester IV **Hours of Instruction/week:2+3**
22BPTD04 **No. of Credits: 3**

Objectives:

- To know about the basics of Digital Health.
- To know about AI use in the healthcare systems.
- To know about3D products in healthcare system.

Unit 1: Digital Health **15**

Introduction of Digital Health – Vision - Benefits of Digital Health – Digital Health Initiatives – National Digital Health Mission – Ecosystem – Architecture – Applications of Digital Health -Learning Health System –Characteristics of Learning Health Care System

Unit 2: Digital Health Care Products **15**

Categories of Digital Health Products and Services - Wearable Fitness Tracker — Smart health watches – Wearable ECG Monitors – Wearable Blood Pressure Monitor – Wearable Biosensor –mHealth –Telehealth – Telemedicine -Difference between mHealth vs telehealth -Difference between Telehealth vs Telemedicine

Unit 3: ML and DL in Healthcare **15**

About machine Learning – Benefits of ML in Healthcare – Cognitive Computing – Trend of ML in Medical Health – Applications of ML in Pharma and Medicine – Applications of ML in Healthcare –Big Data – Benefits of Big Data in Healthcare – Features of Big Data in Healthcare – Methods for analysing Big Data in Healthcare - Applications of Big Data in Healthcare -Introduction on Deep Learning –Deep Learning Algorithms– Deep Learning in Clinical Image Analysis.

Unit 4: Artificial Intelligence in Healthcare **15**

AI-assisted Robotic surgery – Virtual nursing assistant – Aid Clinical judgment or diagnosis – Administrative task – Image Analysis–Develop Medicines – Analyses Unstructured Data –Forecast Kidney Disease – Contributes to Cancer Research and Treatment – Supports Health Equity – AI in Neuroscience – AI in Thoracic Surgery – AI in Cardiac Management.

Unit 5: Robotics &3D Printing in Healthcare **15**

Role of Robots in Healthcare – Benefits of robots in Healthcare - Types of Robots in Healthcare – Surgical Robots –Exoskeletons – Care Robots – Hospital Robots –3D Printing for Healthcare – Preoperative planning – Customized Surgery – Designing medical devices

– Improving surgical instruments – Creating Protheses – 3D Printed implants – 3D Digital Dentistry – Streamlining drug administration

Total Hours 75

Reference Books:

1. Dac-Nhuong Le, Chung Van Le, Jolanda G. Tromp, GiaNhu Nguyen, (2018). "Emerging Technologies for Health and Medicine - Virtual Reality, Augmented Reality, Artificial Intelligence, Internet of Things, Robotics, Industry 4.0", ISBN 978-1-119-50981-3
2. Thomas-Vazquez, Daniel & Singh, Deepti&Hatamleh, Muhanad&Tripathi, Anuj&Vishnoi, Tanushree& Bhat, Sumrita& Thompson, Andrew & Jason, Jeremy & Kim, Keekyoung&Gleadall, Andy & Ruiz, Laura. (2019). "3D Printing in Medicine and Surgery", Woodhead Publishing Series in Medicine, ISBN 978-0-85709-233-5.

Website links:

1. https://www.ncbi.nlm.nih.gov/books/NBK470260/
2. https://www.insiderintelligence.com/insights/wearable-technology-healthcare-medical-devices/
3. https://www.singlecare.com/blog/telehealth-vs-telemedicine/
4. https://www.mobihealthnews.com/news/contributed-top-10-use-cases-ai-healthcare
5. https://www.researchgate.net/publication/330724271_Big_Data_in_Health_Care_Applications_and_Challenges
6. https://www.mobihealthnews.com/news/contributed-top-8-healthcare-uses-3d-printing
7. https://amfg.ai/2019/08/30/3d-printing-in-healthcare-where-are-we-in-2019/

Course Outcome: On the successful completion of the course, students will be able to

1. Get familiar with Digital Health.
2. Understand the working nature of the Wearable Devices used in Digital Health.
3. Knowledge on Machine Learning techniques used in healthcare system.
4. Knowledge on AI embedded Healthcare system.
5. Get familiar with 3D Model Products and Robots in healthcare systems.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O 1	PS O 2	PS O 3
CO1	M	M	H		H	H		M				M	H	
CO2	M	M	H		H	H		M				H	H	
CO3	M	H	H	H	H	H	M	M		M		M	H	
CO4	M	H	H	H	H	H	M	M		M		M	H	
CO5	M	M	H	H	H	H		M		M		M	H	

Electrotherapy -Low and Medium Frequency Current

Semester V **Hours of Instruction/week: 3+3**
22BPTC21 **No. of Credits: 4**

Objectives

- To list the indications and contraindications of various types of Electrotherapy
- To demonstrate the different techniques of Electrotherapy and describe their effects.

UNIT I **18**

Introduction

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

UNIT II **18**

A) Basics of Low Frequency stimulating currents

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

B) Low Frequency currents

- Direct current – Galvanic current
- Interrupted DC
- Faradic current
- Surged Faradic current
- Pathophysiology of nerve lesion - Principles of selection of modes for assessment of nerve muscle function

All types of therapeutic currents

- Production (Brief) - wave forms – duration
- Indication & contra indications
- Physiological effects
- Therapeutic effects
- Technique of application

C) Iontophorosis

- Theory
- Physiological effect and uses of various iontophoresis
- Effects of various ions.
- Techniques of lontophorosis for pain relief, reduction of oedema, wound healing and hyperhidrosis.

D) Transcutaneous electrical nerve stimulation (TENS)

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

UNIT III **18**

A) Medium frequency currents

- Interferential current
- Russian current
- Didynamic current
- Sinusoidal current

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

- Production - wave forms – duration
- Indication and contra indications
- Physiological effects
- Therapeutic effects
- Technique of application

UNIT IV **18**

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

- Principles
- Instrumentation
- Application and uses.

UNIT V **18**

A) Traction

- Types
- Indications and contraindications.
- Physiological and therapeutic effects
- Principles and application of traction

B) External Compressive Devices

- Types
- Indications and contraindications.
- Physiological and therapeutic effects
- Principles and application of compressive devices

Total hours: 90

Text Books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Bookseller.9th Ed, 2012.
2. John Low and Anee Reed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed, 2003
3. Edward Bellis Clayton , Nigel Palastanga, Claytons Electrotherapy :Theory and practice, 9th Ed,1985
4. Valma, J.Robertson, Electrotherapy explained, Butterworth, Heinmann, Elsevier, 4th Ed, 2014.

References:

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

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about various types of therapeutic currents and its physiological, therapeutic effects gained.

CO2: Understand about pain and pain modulation mechanism gained.

CO3: Evaluate about different types of low and medium frequency currents. Its indication, contraindication, method of application gained.

CO4: Learn about Traction, external compression device, its indication, contraindication, methodof application gained.

CO5: Diagnosis of neuromuscular dysfunctions by electro-diagnostic test. Practical application ofelectrotherapy modalities for various conditions gained.

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Electrotherapy -Low and Medium Frequency Current Practical and Oral

Semester V **Hours of Instruction/week: 4**
22BPTC22 **No. of Credits: 3**

Objectives

- To enhance the practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

List of Experiments

1. Types of Therapeutic current – low frequency
2. Types of Therapeutic current – medium frequency
3. Techniques of Iontophorosis
4. TENS
5. Electromyography
6. Nerve conduction study
7. Bio – Feedback testing,
8. Electro-diagnostic testing like FG test, SD curve.
9. Traction
10. External compressive devices

Total hours: 60

Text Books:

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

References:

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

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Understand various concepts of electrotherapy

CO2: Demonstration of the various assessment tests in electrotherapy

CO3: Knowledge about Effects of electrotherapy

C04: Knowledge about different types of low and medium frequency currents. Its indication, contraindication,method of application gained.

CO5: Know about Traction, external compression device, its indication, contraindication, method of application gained.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiotherapy in Women's Health

Semester V **Hours of Instruction/week: 3+3**
22BPTC23 **No. of Credits: 3**

Objective:

- To give physiotherapeutic techniques in Obstetrics and Gynecological conditions and relief of pain, relaxation, conditioning and posture.

UNIT I **18**

- Anatomy related to OBG.
- Puberty and all types' manorial problems.
- Developmental anatomy – embryonic and fetal periods.
- Physical and physiological changes during pregnancy and during labour.

UNIT II **18**

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

UNIT III **18**

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

UNIT IV **18**

- PT management in OBG, obstetric TENS.
- Pelvic inflammatory diseases salpingitis.
- Prolapse of uterus.
- Urogenital dysfunction – incontinence.

UNIT V **18**

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

Total hours :90

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 physio9therapy for OBG, Jaypee 1st edition – 2007.
3. Patricia Downie, Cash's Text Book of General Medical and SurgicalConditions for physiotherapists, Editor Jaypee Brothers, 2nd Edition,1994
4. Cesarean Section – Therapeutic Exercise – Carolyn Kisner, Lynn Allen Colby.

Course outcome:

On the successful completion of the course, students will be able to

CO1: Know about the musculoskeletal changes during pregnancy and duringdelivery.
CO2: Understand the antenatal and postnatal complications and its management and become wellversed with antenatal, prenatal and post-natal physiotherapy management.
CO3: Recognizes the common gynecological problems in adolescence and adults.
CO4: Comprehend the physiotherapy management of various conditions like infections, urogenital dysfunction and prolapsed uterus.
CO5: Learn the exercise protocol to relive pain during the prenatal and postnatal period and become familiar with the hydrotherapy and yoga for treating the gynecological conditions.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Community Medicine

Semester V **Hours of Instruction/week: 3+3**
22BPTC24 **No. of Credits: 3**

Objective:

- To demonstrate and understanding of the influence of social and environmental factors of individual and society.

UNIT I **18**

Introduction

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

UNIT II **18**

Schemes

- Selective national health schemes.
- Occupational health and list methods of prevention of occupational hazards.
- The Employees State Insurance scheme and its benefits.

UNIT III **18**

Community Based Rehabilitation

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

UNIT IV **18**

Communicable diseases and Epidemiology

- 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. Filaria, f. Leprosy, g. Tetanus & h.Measles.

- The Epidemiology of Rheumatic heart disease, cancer, chronic degenerative disease and Cerebrovascular accident.
- The influence of nutritional factors such as protein Energy Malnutrition, Anemia, Vitamin deficiency and mineral deficiency on disability.

UNIT V **18**

Roles of health

- The principles of health education, methods of communication, and role of health education in rehabilitation services.
- The role of community leaders and health professionals in health education. The role of international health agencies in rehabilitation of the disabled.

Total hours :90

Text Books:

1. Park's Text Book of preventive and Social Medicine – K Park, 24th 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, 9th ed, 2007.

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Gain knowledge about Epidemiological implications of impairment and handicap and disability, health statisticsand National health schemes and its benefits.

CO2: Learn about Immunization programmes – malnutrition and early detection of disablingconditions

CO3: Understand the categorizes various rehabilitations and describes its advantages and disadvantages.

CO4: Evaluate the communicable and non-communicable diseases and its implications.

CO5: Recognize of nutritional factors on disability and Role of community leaders and health professionals in health education.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Biostatistics and Research

Semester V **Hours of Instruction/week: 4+1**
22BPTC25 **No. of Credits: 3**

Objective

- To have basic knowledge on Research Methodology and Biostatistics.

UNIT I **15**

Introduction to Biostatistics

- Biostatistics-Introduction: Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales.
- Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.
- Frequency distribution, Measures of dispersion, Probability and Standard Distributions: Meaning of probability of standard distribution, the binominal distribution, the normal distribution, Divergence from normality – skewness, kurtosis.

UNIT II **15**

Measures of central tendency - Measure of Central Tendency: Need for measures of central Tendency, Calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped. Meaning and calculation of mode, Comparison of the mean, median and mode, Guidelines for the use of various measures of central tendency.

Statistical Tool

- Probability
- Correlation & regression
- Statistical inference

UNIT III **15**

- Sampling techniques: Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors, Sampling variation and tests of significance.
- Analysis of variance & covariance: Analysis of variance (ANOVA), Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANACOVA).
- Format of scientific documents. (Structure of protocols, formats reporting in scientific journals, systematic reviews and meta-analysis).

Community and Hospital Statistics

- Vital statistics
- Health statistics

UNIT IV **15**

Research Methodology

- Introduction to Research methodology: Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by researchers in India.
- Research problem: Statement of research problem., Statement of purpose and objectives of research problem, Necessity of defining the problem
- Research design: Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design
- Sampling Design: Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design
- Measurement & scaling techniques: Measurement in research- Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification. Important scaling techniques.

UNIT V **15**

Research Report

- Methods of data collection: collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.
- Sampling fundamentals, need for sampling & some fundamental definitions, important sampling distributions.
- Processing & analysis of data: Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.
- Testing of hypothesis: hypothesis Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis.
- Computer technology: Introduction to Computers, computer application in research, computers and researcher.

Total hour :75

Textbooks:

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

Reference:

1. Sundar rao, Introduction to biostatistics and Research Methodology, CBS, 1Ed, 2002.
2. C.R Kothari, Research methodology, New Age international publication, 3Ed, 2001

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge about the implement hypothesis testing

CO2: Understand the important concepts relating to research design and measurements and scaling techniquesand to analyze experimental and observational study.

CO3: Knowledge of Processing and analyzing data can be gained

CO4: Evaluate, implement and calculate frequency distribution.

CO5: Learn the Interpretation and Report Writing can be well understood.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PS O 2	PS O3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Electrotherapy - High Frequency Current

Semester VI **Hours of Instruction/week: 6**
22BPTC29 **No. of Credits: 3**

Objectives

- To list the indications and contraindications of various types of electrotherapy.
- To demonstrate the different techniques of electrotherapy and describe their effects.

UNIT I **18**

A. Electricity

Electricity and types, electromagnetic induction, Principles construction and types of transformers, Condensers, Valves, Rectifiers, Oscillation, the physics and principles of Magnetism.

Fuse and grid- The working and use of these two.

B. **LASER**

LASER and its therapeutic indications, contra-indications, efficacy and precautions advisable

UNIT II **18**

A. Short Wave Diathermy

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

B. Microwave Diathermy

Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

C. Long Wave Diathermy

Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

D. Shockwave Therapy

Construction, Working, Indications, Contra indications, Therapeuticuses, Techniques of application and dosage.

UNIT III **18**

Infrared Radiation

Infrared Radiation, wavelength and frequency, Types of generators and its working, Physiological effects, Therapeutic effects and uses.

- Technique of irradiation - Choice of apparatus, Preparation of patient, Arrangement of lamp,Application of treatment, Duration and frequency.
- Dangers
- Indications & contra-indications

Ultra Violet Radiation

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

UNIT IV **18**

Ultrasound Therapy

- Properties of Ultrasound – Reflection, Transmission, Absorption. Piezo-electric effects
- Properties of ultrasonic fields: depth of penetration in relation to (a) Intensity and (b)frequency.
- Physiological and therapeutic Effects on tissues – Thermal, Mechanical, Chemical andbiological.
- Indication and Contra Indications
- Coupling media
- Pulsed Ultrasound Therapy - Principles of pulsed Ultrasound, Effects and uses of pulsed Ultrasound.
- Techniques of application: a. Methods - direct contact, water bath, water bag.

  b. Dosage inacute and chronic conditions
- Dangers
- Phonophoresis – Method and effects, Choice of drug used for phonophoresis.

UNIT V **18**

A. Paraffin Wax

- Methods of heating tissues, Effects and indications, Circulatoryeffects.
- Effects on sensory nerves, Effects on skin, Indications & contra indications, its uses in variousConditions.

B. Moist Heat (Fluidotherapy)

- Methods of heating tissues, Effects and indications, Circulatory effects.
- Effects on sensory nerves, Effects on skin, Indications and contra indications, its uses in various Conditions.

C. Cryotherapy

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

Total hours :90

Text Books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Bookseller.9th Ed, 2012.

2. John Low and AneeReed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed,2003

3. Edward BellisClayton , Nigel Palastanga, Claytons Electrotherpy:Theory and practice, 9thEd, 1985.

4. Valma, J.Robertson, Electrotherapy explained, Butterworth, Heinmann, Elsevier, 4th Ed,2014.

References:

1. Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.

2. Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.

3. Tim Watson Electrotherapy evidence based practice, Churchill Livingston, 12th Ed, 2008

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about various types of therapeutic high frequency currents and its physiological,therapeutic effects gained.

CO2: Knowledge about LASER therapy and its uses gained.

CO3: Effects of various types of heat therapy and method of applications

CO4: Knowledge about Cryotherapy and its method of application, effect and uses gained.

CO5: Knowledge about recent physical modalities and its method of application, effect and uses gained. Practical application of electrotherapy modalities for various conditions.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Electrotherapy-High Frequency Current Practical and Oral

Semester V **Hours of Instruction/week: 5**
22BPTC30 **No. of Credits: 3**

Objectives

- To gain knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and community settings.
- To enable the students distinguish between normal and abnormal data derived as a result of tests which she has performed and observed in the laboratory.

Practical

List of Experiments

1. Short wave diathermy
2. Microwave Diathermy
3. Long and Shockwave diathermy
4. Infrared radiation
5. Ultraviolet radiation
6. Ultrasound
7. Wax
8. Fluidotherapy
9. Cryotherapy
10. Laser

Total hour: 75

Text Books:

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

References:

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

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Understand various concepts of electrotherapy

CO2: Knowledge about Effects of electrotherapy

CO3: Understand the effects of various types of heat therapy and method of applications

CO4: Knowledge about Cryotherapy and its method of application, effect and uses gained.

CO5: Learn about recent physical modalities and its method of application, effect and uses gained. Practical application of electrotherapy modalities for various conditions

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Clinical Cardio-Respiratory Diseases

Semester VI **Hours of Instruction/week: 3+2**
22BPTC31 **No. of Credits: 4**

Objectives

- To demonstrate an understanding of cardio respiratory conditions causing disability and their management.

UNIT I **15**

Lung and its Investigation

Upper respiratory tract, lower respiratory tract, muscles of respiration. Mechanism of respiration, respiratory center, 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 **15**

Heart and its Investigation

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, EECP.

UNIT III **15**

Cardiovascular diseases

- Acquired heart disease – Ischemic heart disease, myocardial infarction, angina, heart failure,rheumatic fever, hypertension, infective endocarditis, myocarditis, cardiomyopathy.
- Congenital heart disease
- Acyanotic heart disease – Atrial Septal Defect, Ventricular Septal Defect, Coarctation of Aorta,Patent Ductus Ateriosis, Over Riding of Aorta.
- Cyanotic heart disease- Tetrology of Fallot (ventricular septal defect, pulmonary stenosis, rightventricular hypertrophy, transposition of greater vessels), Pentalogy of Fallot.
- Valvular heart disease – mitral stenosis, mitral regurgitation, aortic stenosis, aortic regurgitation.
- Cyanosis, syncope.

UNIT IV **15**

Respiratory conditions

- COPD – chronic bronchitis, emphysema
- Bronchial asthma, bronchiectasis, lung abscess, bronchopneumonia, bronchostenosis.
- Infectious diseases – pulmonary tuberculosis, pneumonia.
- Interstitial lung disease
- Occupational lung disease
- Pulmonary vascular disease – pulmonary hypertension, pulmonary thrombo embolism.
- Lung cancer, aspergillosis, cystic fibrosis
- Pleural diseases – empyema, pleural effusion, pneumothorax.
- Chest wall injuries - Flial chest, fracture rib, haemothorax, haemopneumothorax, lung contrusion and laceration, injury to heart and its greater vessels.

UNIT V **15**

Cardio respiratory surgeries

Cardiac surgeries and reoccurring conditions

- Open heart surgery .Thoracotomy – median sternotomy (CABG, valve replacement, valvotomy,transplant, cyanotic hearty diseases, valvular heart diseases.
- Closed heart surgery -PTCA, angioplasty, PDA, COA.

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.

Total Hours:75

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, 1st ed, 2011.
2. Bhalrao, Essentials of clinical cardiology, Jaypee, 1st ed , 2013

3. Chattergee, Cariology an illustrated Text book , Jaypee,1st ed, 2012.
4. Beachey, Respiratory care- Anatomy and physiology: foundation, CBS ,3rd ed, 2013.
5. George Mathew & Praveen Aggarwal – Manual for UG, Medicine ed,2015.

Course outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge about the cardiac conditions pathology like infectious diseases ischemic diseases
CO2: Learn the Lung infections and diseases its pathology are clearly studied
CO3: Understand the Cardio pulmonary resuscitation, uses of defibrillators
CO4: Know the Chest deformities and spinal deformities
CO5: Knowledge about the movements and muscles responsible for respiration and thoracic cage

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	H		H	L		L		M			H	H	M	M
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Physiotherapy in Cardio-Respiratory Conditions

Semester VI **Hours of Instruction/week: 3+3**
22BPTC32 **No. of Credits: 3**

Objectives

- To identify cardio respiratory dysfunction, set treatment goals.
- To apply their skills in exercises therapy, electrotherapy and massage in clinical situations to restore cardiorespiratory function.

UNIT I **18**

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),

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 **18**

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, Cardiacsurgery – CABG, PTCA Pre-operative and Post-operative PT management

Physiotherapy Treatment

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, Manualhyperinflation, 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 **18**

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 **18**

Cardiopulmonary rehabilitation and pediatric physiotherapy.

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

UNIT V **18**

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-Buergers exercise,cold laser, electrical stimulation, intermittent compression.

Total Hours:90

Text Books:

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

References:

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

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the Basic anatomy, physiology of heart and lungs

CO2: Knowledge about taking assessment of cardio respiration in physiotherapy

CO3: Knowledge about the Importance of physiotherapy intervention in ICU for cardiac andpulmonary disease.

CO4: Assessment of Cardiopulmonary rehabilitation and pediatric physiotherapy.

CO5: Understand the Pre and post operative care for all surgery

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	H		H	L		L		M			H	H	M	
CO2	H	L	H			H	M		L	M	M		H	H
CO3	H		M			H	L			M	H		H	H
CO4	H	L	H		M	H		M			H	M	L	L
CO5	H		M	H		H	M	M			H	H	M	M

Physiotherapy and Clinical Cardio-Respiratory Practical and Oral

Semester VI **Hours of Instruction/week: 3**
22BPTC33 **No. of Credits: 3**

Objectives

- To enhance the practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and communitysettings.
- To enable distinguish between normal and abnormal data derived as a result of tests whichshe has performed and observed in the laboratory.

Practical

List of Experiments

1. Physiotherapy assessment of cardiothoracic conditions.
2. Chest physical therapy technique Breathing exercise
3. Pulmonary function test (normal lung volume and capacity)
4. Demonstration of Relaxation position for breathlessness patient, Forced expiratory technique, Thoracic expansion exercise, Chest mobility exercise, Active cycle of breathing,Positive expiratory pressure
5. Spirometry exercises
6. Heart and breath sound (on auscultation)
7. Postural drainage demonstration
8. Physiotherapy in intensive care unit.
9. Cardiopulmonary rehabilitation and pediatric physiotherapy
10. Physiotherapy in general surgery Pre-operative and Post-operative management for patientwith abdominal surgery Conditions
11. Physiotherapy for peripheral vascular diseases

Total Hours:45

Text Books:

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

References:

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

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Understand the Basic anatomy, physiology of heart and lungs

CO2: Knowledge about taking assessment of cardio respiration in physiotherapy

CO3: Knowledge about the Importance of physiotherapy intervention in ICU for cardiac and pulmonary disease.

CO4: Assessment of Cardiopulmonary rehabilitation and pediatric physiotherapy.

CO5: Understand the Pre and post operative care for all surgery

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Clinical Orthopedics

Semester VII **Hours of Instruction/week: 3+3**

22BPTC35 **No. of Credits: 4**

Objectives

- To understand the orthopedic conditions causing disability.
- To understand their management that helps to rule out the condition and treat.

UNIT I **18**

Introduction to Orthopedics

- Joint structure and function
- Muscle structure and function
- Introduction to orthopedic terminology, types of pathology commonly dealt with, clinical examination, common investigations and outline of non-operative and operative management.

UNIT II **18**

Fractures & Dislocations: General Principles

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

Upper Limb Fractures & Dislocations

- Major long-bone fractures and joint injuries.
- Clinical features, principles of management and complications.

Lower Limb Fractures & Dislocations

- Major long bone fracture and joint injuries.
- Clinical features, principles of management and complications.

Spinal Fractures and Dislocations

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

Recurrent Dislocations

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

UNIT III **18**

Amputations

- Definition, Classification, indications for amputations.
- Levels of amputation
- Complications & medical approaches

Bone & Joint Infections

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

Bone & Joint Tumors

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

Leprosy

Causes, Pathological changes, clinical features, management and complications of neuritis, muscleparalysis, Tropic ulcer, hand & feet deformities.

UNIT IV **18**

Chronic Arthritis

The pathology, clinical features, and mechanism of deformities, management and complicationsof Rheumatoid arthritis, Osteoarthritis of major joints and spine, Ankylosing spondylitis.

Regional conditions in Upper limb and Lower limb

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, Quadricepstendinitis, TA tendinitis)

Spinal conditions and deformities

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

Poliomyelitis

The pathology, microbiology,prevention,management and complications of poliomyelitis.

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

Congenital Deformities

The clinical features and management of CTEV, CDH, Flat foot, vertical talus, limb deficiency (Radial club hand and femoral, tibial and fibular deficiencies) meningomyelocoele, Arthrogryposis,Mutiplexcongenita, Osteogenesis imperfecta.

UNIT V **18**

Peripheral Nerve Injuries

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

Sprains and muscle strains. The clinical manifestations and treatmentof common sprain and strain.

Sports injuries

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

Hand Injuries

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

Principles of Operative treatment

Indications, Contraindications and briefly outline principles of: Athrodesis, Arthoplasty, Osteotomy, Bone-grafting and Tendon-Transfers.

Total Hours: 90

Text Books:

1. Mayilvahanan Natrajan, Text book of orthopedics and trumatology, Lippincott, 7th ed,2011
2. Jayant Joshi, Essentials of Orthopedics and applied physiotherapy, Elsevier, 2nd ed,2011.

References:

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

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: 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.

C02: Knowledge about major surgical procedures in orthopedics including amputations gained.

CO3: Knowledge about bone and joint infectious diseases and tumors in bones and joints gained.

CO4: Knowledge about arthritis, degenerative disorders of bones and joint, congenital and posturaldeformities gained.

C05: Knowledge about peripheral nerve injuries and deformities gained.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiotherapy in Orthopedics

Semester VII **Hours of Instruction/week: 3+3**

22BPTC36 **No. of Credits: 4**

Objectives

- To identify disability due to musculoskeletal dysfunction, set treatment goals.
- To apply their skills in Exercise therapy, electrotherapy and massage in clinical situations to restore musculoskeletal function.

UNIT I **18**

General orthopedic assessment

Subjective and objective assessment including on observation and examination.

Fractures general

Fractures, its types, the signs and symptoms, first-aid measures, principles of immobilization, operative and non-operative management of fractures and healing of fractures. The PT assessment of a patient with a fracture during the immobilization and post immobilization periods. PT management in a patient with a fracture. Manual, mechanical, skin and skeletal traction. The methods of mobilization of a patient/extremity after healing of a fracture.

UNIT II **18**

Regional fractures

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

- Fractures clavicle, upper 1/3 of humerus, shaft of humerus, supra - and intercondylar fractures of the humerus.
- Fracture head of radius, olecranon process, shafts of radius and ulna, Colles. Fracture scaphoid, Bennett'sand metacarpal neck.
- Fracture of femur, tibia, patella and injuries of the hip, knee joint
- Fracture both bones of leg, Pott's and Dupytrens, calcaneum and metatarsal (march).
- Spinal fractures Mechanism, causes, method of immobilization, complication, PT assessment and management.

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

UNIT III **18**

Amputation: 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. Immediatepost- operative prosthetic fitting and list its advantages.

Burns: The different degrees of Burns and review relevant first aid measures. 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. Medical and Surgical management including skin grafting. The PT aims and management of a patient with burns along with a home programme.

Leprosy

Leprosy. The incidence and mode of transmission of leprosy. The clinical features and common deformities and Medical management. The common tendon transfer operations and PT management before and following tendon transfers. The risks of anaesthetic limbs and outline its care to prevent complications. Plantar ulcers in leprosy and its management (including foot wear).

Cerebral palsy

Cerebral Palsy. Its causes, signs, symptoms, classification and common deformities. PT assessment aims and management along with a home programme. Common surgical corrections and its PT management.

Poliomyelitis

Poliomyelitis and the etiology, clinical features, staging and medical Management. PT assessment during the acute, sub acute and chronic stages. PT aims and demonstrate treatment techniques. The common deformities seen in polio and methods of preventing them. Common reconstructive tendon transfer operations in polio and its PT management. The common orthoses used and describe the techniques of measurement for a Kafo and its check - out alongwith a detailed home programme including care of the orthosis.

UNIT IV **18**

Spinal conditions

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.

- Cervical and lumbar spondylosis, spondylolysthesis, TB spine. PT assessment. PT aims and Principles of management and a detailed home programme.
- The clinical features and the PT management of Ankylyosis spondylitis.
- Intervertebral Disc Prolapse: basic anatomy and biomechanics of the spine. Causes, signs, symptoms and investigations done for IVDP. The different types and degrees of IVDP. Its aims and demonstrate treatment techniques.
- Spinal deformities, The common postural abnormalities affecting the spine. Kyphosis, Lordosis and scoliosis, PT assessment and PT aims and management along with a home programme.

Regional conditions

Etiology and clinical features and 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), periarthritis shoulder, and shoulder - hand syndrome.

Chronic arthritis

Rheumatoid Arthritis. Signs, symptoms, radiological features, pathology, common deformities, and Medical and Surgical management. The PT assessment, aims and management in the acute and chronic stages and a detailed home programme.

Osteoarthritis. Its signs, symptoms, radiological features, pathology, common deformities, and Medical and Surgical management. 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 **18**

Sports Orthopedics

1. Sprain and strain – mechanism of injury, grades, PT assessment and management of common sprain andstain of shoulder, knee, and 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 orthopedic surgeries
    - Reconstructions
    - Replacement
    - Tendon transfer

Total Hours: 90

Text book:

1. David J Magee, Orthopedic Physical assessment, Saundres, 5th ed, 2008

References:

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

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about assess, diagnose and plan the physiotherapy treatment for various musculo skeletal problems.

CO2: Physiotherapy management for various fractures is understood.

CO3: Knowledge about physiotherapy management for amputation, burns, leprosy, cerebral palsy and poliomyelitis.

CO4: Physiotherapy management for various spinal condition, regional condition and chronic arthritis.

CO5: Knowledge about physiotherapy management in sports orthopedics

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	
CO 3	H		M			H	L			M	H		H	L
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	

Physiotherapy and Clinical Orthopedics Practical and Oral

Semester VII **Hours of Instruction/week: 3**
22BPTC37 **No. of Credits: 3**

Objectives

- To enhance practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and communitysettings.
- To enable the distinguish between normal and abnormal data derived as a result of tests whichshe has performed and observed in the laboratory.

Practical

List of Experiments

1. General orthopedic assessment
2. Fracture assessment
3. Upper limb fracture and physiotherapy management
4. Lower limb fracture and physiotherapy management
5. Spinal fracture and physiotherapy management
6. Amputation of upper and lower limb physiotherapy management
7. Burns physiotherapy management
8. Leprosy physiotherapy management
9. Cerebral palsy and poliomyelitis physiotherapy management
10. Physiotherapy assessment and management for spinal, regional and chronic arthritis
11. Physiotherapy assessment and management for sprain and strain
12. Physiotherapy assessment and management for Sports injuries

Total Hours: 45

Text book:

1. David J Magee, Orthopedic Physical assessment, Saundres, 5th ed, 2008

References:

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

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about general orthopedic assessment

CO2: Understand the Physiotherapy management for fractures.

CO3: Knowledge about physiotherapy management for amputation and burns

CO4:Evaluate physiotherapy management for leprosy, cerebral palsy and poliomyelitis

CO5: Knowledge about physiotherapy management for sprain, strain and sports injuries.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	
CO 5	H		M	H		H	M	M			H	H	M	M

Rehabilitation Medicine-I

Semester VII **Hours of Instruction/week: 3+2**
22BPTC38 **No. of Credits: 3**

Objective:

- To have a community-based perspective with Physiotherapeutic approach.

UNIT I **15**

Rehabilitation

- Rehabilitation. Explanation about its aim & principles
- Rehabilitation team and the role of team members
- Approaches of Rehabilitation
- Concepts, Principles and component-based rehabilitation

UNIT II **15**

Community Based Rehabilitation

CBR module and compare this with an institutional based rehabilitation system. Planning and Implementation of community based rehabilitation.

UNIT III **15**

Degenerative Systemic Changes

- Physiology and theories of aging
- Degenerative systemic changes:
    - Musculo-Skeletal changes (Atrophy,Osteopporosis,Stiffness,Hypotonia)
    - Cardio-respiratory Problems
    - Post Menopausal changes
    - Neurological changes
- Role of Physical therapists in treatment of degenerative systemic changes
- Psycho-Social aspects of aging
- Assessment, Prescription of exercise & training of geriatric patient
- Role of physiotherapist in planning and management

UNIT IV **15**

Exercise in various conditions

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

UNIT V **15**

Evaluation of Physical Dysfunction

Evaluation for physical dysfunction and management of disabilities for

- Spinal cord injury
- Stroke
- Cerebral palsy
- Arthritis
- Muscular dystrophy
- Hansen disease
- Peripheral nerve lesion
- Fracture
- Cardio –respiratory dysfunction

Total Hours:75

Text books:

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

Reference:

1. David J. magee, orthopedic physical assessment, saunders , 5th ed, 2008.
2. Maitland textbook of peripheral and vertebral manipulation 4th edition.
3. Robin mckenzie textbook of mechanical diagnosis and therapy for cervical, thoracic and lumbar spine volume 1.

Course outcome:

CO1: To understand about rehabilitation

CO2: Knowledge about the community-based rehabilitation

CO3: Understand about the Role of Physical therapists in treatment of degenerative systemic changes

CO4: To understand about the principles of exercising in various conditions

CO5: The knowledge of role of physiotherapy in evaluation of physical dysfunction

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiotherapeutic-I

Semester VII **Hours of Instruction/week: 3+3**
22BPTC39 **No. of Credits: 3**

Objective:

- To explain the concepts and principles of various approaches.
- Demonstrate assessment of patients using various Principles and Conclude physical diagnosis.
- Able to analyze the patient's problems and to clinically diagnose.

UNIT I **18**

Professional Ethics and Legal Issues

The implications and confirmation to the rules of professional conduct.

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

UNIT II **18**

Role of physiotherapy in oncology

Cardio pulmonary rustication (CPR)

Recording and communication.

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

UNIT III **18**

Techniques

Muscle Energy Techniques

Trigger Point Therapy/Myofascial Release Therapy

Facial Manipulation

Kinesio Taping

UNIT IV **18**

Techniques

Cupping Therapy

Manual Therapy

Positional Release Technique

Acqactic Therapy

UNIT V **18**

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.

Total Hours:90

Course outcome:

On the successful completion of the course, students will be able to

CO1: Knowledge about the professional ethics and legal issues

CO2: Understand the concept of role of physiotherapy in oncology, CPR and recording

CO3: Knowledge about the muscle energy techniques, trigger point therapy, fracial manipulation and kinesio taping

CO4: Evaluate the techniques

CO5: Understand about the physical diagnosis of musculo skeletal system and varies concepts.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	
CO 2	H	L	H			H	M		L	M	M		H	M
CO 3	H		M			H	L			M	H		H	
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Clinical Neurology

Semester VIII **Hours of Instruction/week: 3+3**
22BPTC41 **No. of Credits: 4**

Objectives

- To understand the neurological conditions causing disability and their management.

UNIT I

Neuroanatomy **18**

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 Extra pyramidal system, relationship of the spinal nerves to the spinal cord segments, long tracts of the spinal cord, the Brachialand Lumbar plexuses and Cranial nerves.

Neurophysiology

The Neurophysiologic basis of: Tone, Disorders of tone and posture, Bladder control, muscle contraction, movement and pain.

UNIT II **18**

Clinical Features and Management

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. Rehabilitative programme
3. Trauma - broad localization, first aid and management of sequelae of head injury and spinal cord injury – paraplegia, quadriplegia, neurogenic bladder – types

UNIT III **18**

Neurological diseases

1. 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

2. Demyelinating diseases (central and peripheral).
    a. Guillain- Barrie Syndrome.
    b. Acute disseminated encephalomyelitis.
    c. Transverse Myelitis.
    d. Multiple Sclerosis.
3. Degenerative Disorders
    a. Parkinson's disease.
    b. Dementia.

UNIT IV **18**

Infections

a. Pyogenic Meningitis sequelae.
b. Tuberculosis infection of Central Nervous System.
c. Poliomyelitis.
d. Brain abscess.
e. Diseases of the muscle including Myopathies: Classification, signs, symptoms, progression and management.
f. Myopathies
g. Muscular dystrophy
h. Spinal muscular atrophy

UNIT V **18**

Neurological disorders

1. Peripheral Nerve Disorders.
    a. Peripheral nerve injuries, localization and management.
    b. Entrapment Neuropathies.
    c. Peripheral Neuropathies including Diabetic Neuropathy
2. Disorders of Autonomic Nervous system
3. Toxic and Metabolic Disorders of Nervous System
4. Deficiency disorders
5. Miscellaneous.
    a. Epilepsy; Definition, classification and management.
    b. Myasthenia Gravis; Definition, course and management.
    c. Intracranial tumors ; Broad classification, signs and symptoms.
    d. Motor neuron disease.

Total hours : 90

Text books:

1. Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6th ed. – 2014
2. Kenneth W Lindsay, Neurology and Neurosurgery – illustrated, Churchil Livingston,5 Ed, 2010.
3. Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6th ed. – 2014
4. Kenneth W Lindsay, Neurology and Neurosurgery – illustrated, Churchil Livingston,5 Ed, 2010.

References:

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

Course outcome:

On the successful completion of the course, students will be able to

CO1: Understand the neuro anatomical basis of brain for various clinical neurological conditions with Neurophysiological basis of neurological conditions.

CO2: Learns about the medical and surgical management of the congenital and childhood disorders and able to differentiate the clinical features between those conditions

CO3: Understand about the neurological diseases

CO4: Recognizes the progression of the diseases like myopathies, infections and peripheral neuropathy

CO5: Knowledge about the neurological disorders

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	M

Physiotherapy in Neurology

Semester VIII **Hours of Instruction/week: 3+3**
22BPTC42 **No. of Credits: 4**

Objectives

- To understand the disability due to neurological conditions and to implement in the field of physiotherapy.

UNIT I **18**

Neuroanatomy and Physiology

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) extra pyramidal system.

The factors influencing alpha motor neuron activity.

The neurological basic of muscle tone and movement

a) hypotonia b) hypertonia - spasticity and rigidity c) ataxia d) athetosis e) chorea.

Principles of Assessment:

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 **18**

Principles of Treatment:

The treatment Principles as follows: a) Sensory re-education: hypersensitivity, hyposensitivity and anesthesia. b) Treatment of altered tone: hypertonicity and hypotonicity

c) Moto re-education: strengthening exercises, co-ordination exercises, joint mobilization 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 behavior. d) Treatment to improve function: free exercises, gait training with and without aids, activities of daily living.

UNIT III **18**

Cerebral Palsy

- Assessment options in pediatrics.
- Identification of motor/sensory dysfunction in pediatrics. Including weakness, abnormal tone, posture and motor control deficit and lack of endurance
- Clinical approaches to motor/sensory dysfunction in paediatrics including weakness, abnormal tone, posture and motor control deficits and lack of endurance
- 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 **18**

Assessment options in adult neurological patients

- Motor, sensory perceptual dysfunction in adult neurological patients including weakness, abnormal tone, motor control deficits and lack of endurance.
- Clinical approaches to motor, sensory postural dysfunction in adult neurological patients including weakness, abnormal tone, postural and motor control deficits and lack of endurance
- Application of assessment and treatment approaches in adult neurological conditions including: a. Stroke b. Monoplegia c. Brain tumor 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. Laminectomy p. Neuro intensive care unit patients.

UNIT V

Evaluation of Physical Dysfunction **18**

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.

Integrated Approach Integrated neuro muscular control and physiotherapeutic prevention, curative and rehabilitative measures for sensory motor dysfunction, pain control, postural readjustment/control using following hypothetical theories a. Motor development (Bobath)approach b. Motor re-learning process (MRP) c. Brunnstroms and Roods approach Merits and demerits of each approach to be explained.

Total hours: 90

Text books:

1. Susan B'O' Sullivan, physical rehabilitation, Jaypee, 6th edition. – 2014
2. Patricia. A. Downie, cash's text book of neurology for physiotherapist – Jaypee, 4th edition–1993.
3. Sophie Levitt, treatment of cerebral palsy & motor delay, Wiley – Blackwell, 5th 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, 3rd Edition,1999

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Evaluate, differentiate, and comprehend the neuroanatomical and neurophysiological basis ofthe structure and functions of the brain and spinal cord.

CO2: Knowledge about the analysis of the different aspects of the neurological physiotherapy assessment which includes assessment of Central nervous system and peripheral nervous system.

CO3: Learn about the principles of various treatment techniques and thereby students will be able toconstruct their own treatment protocol for neurological conditions.

CO4: Understand the clinical features and management of the pediatric, adult neurological conditionsthat include congenital & acquired disorders.

CO5: Identify the motor, sensory perceptual dysfunction of the adult and pediatric neurological conditions

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	M
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	

Physiotherapy and Clinical Neurology Practical and Oral

Semester VII **Hours of Instruction/week: 3**
22BPTC43 **No. of Credits: 3**

Objectives

- To enhance with practical knowledge of various tests and procedures.
- To gain the skills about various tests and procedures to perform in hospital and communitysettings.
- To enable the distinguish between normal and abnormal data derived as a result of tests whichshe has performed and observed in the laboratory.

Practical

List of Experiments

1. Assessment of higher function
2. Assessment of cranial nerves
3. Assessment of sensation – pain, temperature and dorsal column
4. Assessment of motor system – muscle power, joint mobility, balance, co-ordination
5. Assessment of muscle tone.
6. Assessment of reflexes – superficial and deep
7. Assessment of gait and gait abnormalities
8. Assessment of posture
9. Assessment of functional abilities
10. PNF, NDT, Carr& shepherd, brunstrom, rood approach
11. Sensory re education – hypersensitivity, hyposensitivity, anesthesia.
12. Motor re-education – strengthening exercises, balance and co-ordination exercise, jointmobilization exercise, use of PNF technique.
13. Treatment to improve function – free exercise, activities of daily living, mat exercise,Mobilization exercise and functional mobility exercises
14. Physiotherapy management of neurological conditions in adult
15. Physiotherapy management of neurological conditions in children
16. Neurological special test
17. CT AND MRI basic diagnostics

Total hours: 45

Text books:

1. Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6th ed. – 2014
2. Kenneth W Lindsay, Neurology and Neurosurgery – illustrated, Churchil Livingston, 5 Ed,2010

References:

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

Course outcomes:

On the successful completion of the course, students will be able to

CO1: Knowledge about the physiotherapy Assessment of higher function, cranial nerves, sensation – pain, temperature and dorsal column and motor system – muscle power, jointmobility, balance, co-ordination

CO2: To understand the muscle tone, reflexes – superficial and deep, gait and gait abnormalities, posture, functional abilities.

CO3: Analyze the techniques of PNF, NDT, Carr& shepherd, brunstrom, rood approachSensory re education – hypersensitivity, hyposensitivity, and anesthesia.

CO4: Knowledge about the Treatment to improve function – free exercise, activities of dailyliving, mat exercise, Mobilization exercise and functional mobility exercises

CO5: Recognize Physiotherapy management of neurological conditions in adult and children andneurological special test.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	M
CO 2	H	L	H			H	M		L	M	M		H	M
CO 3	H		M			H	L			M	H		H	L
CO 4	H	L	H		M	H		M			H	M	L	
CO 5	H		M	H		H	M	M			H	H	M	H

Rehabilitation Medicine-II

Semester VIII **Hours of Instruction/week: 3+3**

22BPTC44 **No. of Credits: 3**

Objective

- To have a community-based perspective with Physiotherapeutic approach.

UNIT I **18**

Therapeutic Techniques

The principles and mechanism of therapeutic techniques with relevant precaution and contraindication.

- Joint mobilization
- Reducing spasm
- Assisting weak muscles
- Increasing endurance
- Muscle re-education following muscle transfer surgery
- Strengthening muscles
- Increasing co-ordination
- Improving balance
- Gait training

UNIT II **18**

Disability Evaluation

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

UNIT III **18**

Orthotic Devices

The principals involved in prescribing orthotic devices for different parts of the Body. The purpose of each type and list major indications and contraindication and demonstrate methods of training in their use.

UNIT IV **18**

Prosthetic Devices

Types of artificial limbs and their functions. Methods of trainingin their use.

UNIT V **18**

Mobility Aids

The various types of mobility aids and their functions. Wheelchair, walker, crutch,cane. Architectural barriers.

Total Hours:90

Text Books

1) Waqar Naqvi, Physiotherapy in community health and Rehabilitation, JP Brothers,1st Ed,2011.

2) S.Pruthvish, Community-Based Rehabilitation of persons with disabilities, JP Brothers,1st Ed, 2006.

3) Mutani, Principles of Geriatric Physiotherapy, Jaypee, 1st Ed, 2008.

4) William Mc Ardle, Essentials of exercise physiology, Lippincott, 3rd Ed, 2006.

References

1) Judith Pitt-Brooke, Rehabilitation of movement – Theoretical basis of clinical practice, W.B .Saunders, 2nd Ed, 2002.

2) OSA Kackson, Physical therapy of geriatric patient, Churchill living stone, 3rd Ed, 2009

Course outcome:

On the successful completion of the course, students will be able to

CO1: Understand about the therapeutic techniques

CO2: Learn about the disability evaluation

C03: Understand about the orthotic devices

C04: Understand about the prosthetic devices

CO5: Knowledge of role of mobility aids

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	L
CO 2	H	L	H			H	M		L	M	M			H
CO 3	H		M			H	L			M	H		H	H
CO 4	H	L	H		M	H		M			H	M	L	
CO 5	H		M	H		H	M	M			H	H	M	M

Physiotherapeutic-II

Semester VIII **Hours of Instruction/week: 3+3**
22BPTC45 **No. of Credits: 3**

Course Objective:

- To explain the concepts and principles of various approaches.
- Demonstrate assessment of patients using various Principles and Conclude physical diagnosis and able to Analyze the patient's problems and come to a clinical diagnosis.

UNIT I **18**

Neurological conditions

- Clinical Reasoning and Clinical Decision and Clinical Making inNeurological Conditions.
- Rationale of Plan of Treatment for Neurological Conditions.

Sports

1. Physiotherapy Evaluation in Sports
2. Common Sports Injuries

UNIT II **18**

1. Neuro Muscular System: (For CNS Problems)
2. Bobath's Approach (Normal Movement Concept)
3. Motor Relearning Process (MRP)
4. Voijta Approach
5. Physiotherapy Instrument Mobilisation (PIM)/Instrument Assisted Soft Tissue Mobilisation(IASM)/ Graston Technique

UNIT III **18**

1. Neurodevelopmental Therapy [NDT]
2. Proprioceptive Neuromuscular Facilitation (PNF)
3. Progressive Resistance Training [PRE]
4. Neurodynamics/Neural Mobilization
5. Constrained Induce Movement Therapy [CIMT]

UNIT IV **18**

1. Sensorimotor Approach/ Rood Approach
2. Sensory Integration Therapy
3. Vestibular Rehabilitation/Canalith Repositioning Procedure
4. Mirror Therapy/Graded Motor Imagery
5. Craniosacral Therapy

UNIT V **18**

1. Virtual Rehabilitation and Robotic Therapy
2. Robotic Therapy
3. Pilates

Total hours: 90

Course outcome:

CO1: Knowledge about the Clinical Reasoning and Clinical Decision and Clinical Making in Neurological Conditions and sports evaluation

CO2: Understand the concept of Bobath's Approach, MRP, Voijta Approach, PIM/IASM/Graston Technique

CO3: Knowledge about the NDT,PNF,PRE, neurodynamic and CIMT

CO4: Analyze the Sensorimotor Approach/ Rood Approach, Sensory Integration Therapy, Vestibular Rehabilitation/Canalith Repositioning Procedure, Mirror Therapy/Graded Motor Imagery and Craniosacral Therapy

CO5: Learn about Virtual Rehabilitation and Robotic Therapy and Pilates.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO 1	H		H	L		L		M			H	H	M	
CO 2	H	L	H			H	M		L	M	M		H	H
CO 3	H		M			H	L			M	H		H	M
CO 4	H	L	H		M	H		M			H	M	L	L
CO 5	H		M	H		H	M	M			H	H	M	H