



ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು  
**Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore**

4th T Block, Jayanagar, Bangalore – 560 041

AUTH/REV-BPT/ 025/2015-16

27/08/2015

### NOTIFICATION

Sub: Ordinance relating to revised syllabus of **Bachelor of Physiotherapy (BPT)**.

- Ref:1) Recommendations of Board of Studies in Physiotherapy, through its meeting dated 08.05.2015.  
2) Approval of Academic Council through its meeting dated 28.05.2015  
3) Approval of Syndicate in its 113<sup>th</sup> Meeting held on 26.06.2015

In exercise of the powers conferred by Section 35(2) of RGUHS Act 1994, the Syndicate in its 113<sup>th</sup> meeting held on 26/06/2015, is pleased to notify the Approval of ordinance relating to revised Syllabus of **Bachelor of Physiotherapy (BPT)** as shown in Annexure appended herewith.

The Ordinance shall come into force from the academic year 2015-16.

By Order,

REGISTRAR

To:

The Principals of colleges affiliated to RGUHS conducting MPT course.

Copy to:

1. The Principal Secretary to Governor, Governor's Secretariat, Raj Bhavan, Bangalore – 560 001.
2. Principal Secretary to Government, Health & Family Welfare Department, (Medical Education), Vikasa Soudha, Bangalore –560 001.
3. The Director, Department of Medical Education, Anand Rao Circle, Bangalore – 560 009.
4. PA to Vice-Chancellor / Registrar / Registrar (Eva.) / Finance Officer.
5. Director, Curriculum Development Cell.
6. The System Analyst, RGUHS to host it on RGUHS Website.
7. Guard File / Office Copy.

# **Bachelor of Physiotherapy - BPT**

**(4 ½ Year Degree Course)**

## **REGULATION & CURRICULUM**

**2015**



**Rajiv Gandhi University of Health Sciences, Karnataka**

**4<sup>th</sup> 'T' Block, Jayanagar, Bangalore 560 041.**

**Revised Ordinance Governing Regulations and Curriculum of  
BPT 4 ½ Year Course – 2015**

**Rs.**

Copies may be obtained from :

The Director,  
Prasaranga,  
Rajiv Gandhi University of Health Sciences,  
4<sup>th</sup> T Block, Jayanagar,  
Bangalore 560 041

# Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore

## The Emblem



The Emblem of the Rajiv Gandhi University of Health Sciences is a symbolic expression of the confluence of both Eastern and Western Health Sciences. A central wand with entwined snakes symbolises Greek and Roman Gods of Health called Hermis and Mercury is adapted as symbol of modern medical science. The pot above depicts Amrutha Kalasham of Dhanvanthri the father of all Health Sciences. The wings above it depicts Human Soul called Hamsa (Swan) in Indian philosophy. The rising Sun at the top symbolises knowledge and enlightenment. The two twigs of leaves in western philosophy symbolises Olive branches, which is an expression of Peace, Love and Harmony. In Hindu Philosophy it depicts the Vanaspathi (also called as Oushadi) held in the hands of Dhanvanthri, which are the source of all Medicines. The lamp at the bottom depicts human energy (kundalini). The script “Devahitham Yadayahu” inside the lamp is taken from Upanishath Shanthi Manthram (Bhadram Karnebhi Shrunuyanadev...), which says “**May we live the full span of our lives allotted by God in perfect health**” which is the motto of the Rajiv Gandhi University of Health Sciences.

# **Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore**

## **Vision Statement**

The Rajiv Gandhi University of Health Sciences, Karnataka, aims at bringing about a confluence of both Eastern and Western Health Sciences to enable the humankind “Live the full span of our lives allotted by God in Perfect Health.”

It would strive for achievement of academic excellence by Educating and Training Health Professionals who

- ☞ Shall recognize health needs of community,
- ☞ Carry out professional obligations Ethically and Equitably and in keeping with National Health Policy,

It would promote development of scientific temper and Health Sciences Research.

It would Encourage inculcation of Social Accountability amongst students, teachers and institutions.

It would Support Quality Assurance for all its educational programmes

## **Motto**

**“Right for Rightful Health Sciences Education”**

(Schedule annexed to University Notification No.ACA/ORD/BPT-9/2006-07 dated 08.08.2006)

**Revised Ordinance Governing Regulations and Curriculum of  
Bachelor of Physiotherapy Degree Course (4 ½ Year)**

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## SECTION – 1

### **Regulations Governing BPT Degree Course**

These ordinances shall be called “The Ordinances, Syllabus and Scheme of Examination pertaining to the Bachelor of Physiotherapy course, BPT.”

#### **1. ELIGIBILITY**

##### **1.1 Qualifying Examination**

A Candidate seeking admission to first year Bachelor in Physiotherapy (BPT):

i) Should have passed two year Pre University examination conducted by Department of Pre-University Education, Karnataka State, with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually also.

OR

ii) Shall have passed any other examination conducted by Boards/Councils/Intermediate examination established by State Government/Central Government and recognized as equivalent to a two year Pre University Examination by Rajiv Gandhi University of Health Sciences/ Association of Indian Universities (AIU), with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually also.

OR

iii) Candidates who have completed Pre-university course with Vocational Physiotherapy as their optional subject are eligible for admission to BPT course.

##### **1.2 Marks**

The selection of students to a course of Physiotherapy shall be based on merit provided that:

a). In case of admission on the basis of qualifying examination, a candidate for admission to BPT course must have passed individually in the subjects of Physics, Chemistry, Biology and English and must have obtained not less than 45% marks taken together in Physics, Chemistry and Biology in the qualifying examination. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or Category I, the marks obtained in Physics, Chemistry and Biology together in qualifying examination is not less than 40% instead of 45% as above.

### 1.3 Age:

A candidate seeking admission to Bachelor of Physiotherapy course should have completed 17 years of age, as on 31<sup>st</sup> December of the year of admission.

Every candidate before admission to the course shall furnish to Principal of the Institution a certificate of Medical Fitness from an authorized Government Medical Officer to the effect, that the candidate is physically fit to undergo Physiotherapy course.

## 2. DURATION OF THE COURSE

The duration of the BPT Course shall be **four and half years** including internship of six months.

## 3. MEDIUM OF INSTRUCTION

English shall be the medium of instruction for all the subjects of study and for the examinations of the BPT Course.

## 4. COURSE OF STUDY - SUBJECTS AND HOUR DISTRIBUTION

TABLE – I

First year BPT [Duration 0 -12 months]					
Sl. No.	Subject	Teaching hours			
		Weekly Class hours	Total	Theory	Practical
<i>Main Subjects: For University Examination</i>					
<b>1</b>	<b>Anatomy</b>	<b>8</b>	<b>240</b>	<b>150</b>	<b>90</b>
<b>2</b>	<b>Physiology</b>	<b>7</b>	<b>210</b>	<b>150</b>	<b>60</b>
<b>3</b>	<b>Biochemistry</b>	<b>2</b>	<b>60</b>	<b>60</b>	
<b>4</b>	<b>Biomechanics</b>	<b>6</b>	<b>180</b>	<b>90</b>	<b>90</b>
<b>5</b>	<b>Psychology</b>	<b>2</b>	<b>60</b>	<b>60</b>	
<b>6</b>	<b>Sociology</b>	<b>2</b>	<b>60</b>	<b>60</b>	
<i>Subsidiary subjects: Not for University Examination</i>					
7	English	2	60	60	
8	Kannada	2	60	60	
9	Basic Nursing	1	30	20	10
10	Orientation to Physiotherapy	1	30	30	
11	Integrated Seminars / PBL sessions	3	90	90	
	Total	36	1080	830	250

**TABLE - II**

Second year BPT [Duration 13 -24 months]						
Sl. No.	Subject	Teaching hours				
		Weekly Class hours	Total	Theory	Practical	Clinics
<i>Main Subjects: For University Examination</i>						
<b>1</b>	<b>Pathology</b>	<b>2</b>	<b>60</b>	<b>45</b>	<b>15</b>	
<b>2</b>	<b>Microbiology</b>	<b>2</b>	<b>60</b>	<b>45</b>	<b>15</b>	
<b>3</b>	<b>Pharmacology</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>4</b>	<b>Exercise Therapy</b>	<b>9</b>	<b>270</b>	<b>120</b>	<b>150</b>	
<b>5</b>	<b>Electrotherapy</b>	<b>8</b>	<b>240</b>	<b>90</b>	<b>150</b>	
<i>Subsidiary subjects: Not for University Examination</i>						
6	Ethics and Admin	1	30	30		
7	First Aid & CPR	1	30	10	20	
8	Constitution of India	1	30	30		
9	Introduction to Treatment	1	30	30		
10	Clinical Observation Posting	9	270			270
	<b>Total</b>	<b>34</b>	<b>1080</b>	<b>460</b>	<b>350</b>	<b>270</b>

**TABLE-III**

Third year BPT [Duration 25 -36 months]						
Sl. No.	Subject	Teaching hours				
		Weekly Class hours	Total	Theory	Practical	Clinics
<i>Main Subjects: For University Examination</i>						
<b>1</b>	<b>General Medicine</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>2</b>	<b>General Surgery</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>3</b>	<b>Orthopedics &amp; Traumatology</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>4</b>	<b>Musculoskeletal And Sports Physiotherapy</b>	<b>5</b>	<b>150</b>	<b>90</b>	<b>60</b>	
<b>5</b>	<b>Cardio-Respiratory &amp; General Physiotherapy</b>	<b>5</b>	<b>150</b>	<b>90</b>	<b>60</b>	

<b>6</b>	<b>Supervised Rotatory Clinical Training</b>	<b>18</b>	<b>540</b>			<b>540</b>
<i>Subsidiary subjects: Not for University Examination</i>						
7	Allied Therapies	2	60	60		
	Total	36	1080	420	120	540

**TABLE -IV**

Fourth year BPT [Duration 37 - 48 months]						
Sl. No.	Subject	Teaching hours				
		Weekly Class hours	Total	Theory	Practical	Clinics
<i>Main Subjects: For University Examination</i>						
<b>1</b>	<b>Neurology &amp; Neurosurgery</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>2</b>	<b>Community Medicine</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>3</b>	<b>Neuro-Physiotherapy</b>	<b>5</b>	<b>150</b>	<b>90</b>	<b>60</b>	
<b>4</b>	<b>Community Physiotherapy</b>	<b>5</b>	<b>150</b>	<b>90</b>	<b>60</b>	
<b>5</b>	<b>Research Methodology &amp;</b>	<b>2</b>	<b>60</b>	<b>60</b>		
<b>6</b>	<b>Supervised Rotatory Clinical Training</b>	<b>18</b>	<b>540</b>			<b>540</b>
<i>Subsidiary subjects: Not for University Examination</i>						
7	Evidence Based Physiotherapy Practice	1	30	20		
8	Project	1	30		20	
	Total	37	1080	400	140	540

## 5. ATTENDANCE

A candidate is required to attend at least 80 percent of the total classes conducted in a year in all subjects prescribed for that year, separately, in theory and practical / clinical to become eligible to appear for the university examination in the first attempt. Principals should notify at their college, the attendance details at the end of each term without fail, under intimation to the University.

## **6. INTERNAL ASSESSMENT**

It shall be based on evaluation of periodic tests assignments, clinical presentations etc., (see Annexure -I for example). Regular periodic examinations should be conducted throughout the course. There should be a minimum of two (2) sessional examinations during I, II, III and final year. The average of the two examination marks should be reduced to 20 and 10 for Theory and Practical/Clinical respectively, and sent to the University before the University examination as per notification. Proper record which forms the basis of the Internal Assessment should be maintained for all students and should be available for scrutiny. The marks of periodical tests should be displayed on the student notice board by Principals.

**A Candidate must obtain a 35% mark in theory and practical separately in internal assessment to be eligible to write the university examination.**

## **7. SCHEDULE OF EXAMINATION**

There will be two examinations in a year, to be conducted as per notification issued by the University from time to time.

First, Second, Third and Final Examinations of BPT course shall be held at the end of 1<sup>st</sup> year, 2<sup>nd</sup> year, 3<sup>rd</sup> year and 4<sup>th</sup> year respectively. The particulars of subjects for various examinations and distribution of marks are shown separately in Tables V to VIII.

The examination for main subjects shall be conducted by the University and for subsidiary subjects by the respective college.

## **8. CRITERIA FOR PASS**

### **1. Main Subjects**

A candidate is declared to have passed university examination in a subject, if she/he secures 50 % of the marks in theory and 50 % in practical separately. For computation of 50 % marks in theory, the marks scored in the internal assessment [theory] shall be added to the University conducted written and viva voce examination and for a pass in practical, the marks scored in University conducted practical examination and internal assessment [practical] shall be added together.

## 2. Subsidiary Subjects

For a pass in Subsidiary subjects, a candidate shall secure 35% of the total marks prescribed for the subject. The marks obtained should be sent to the University 15 days prior to the commencement of University examination.

## 9. SCHEME OF EXAMINATION

### 9.1 SUBJECTS AND DISTRIBUTION OF MARKS

<b>BPT - I</b>								
Sl.No	Subject	Theory				Practical		Total
		Written		Viva-Voce	Internal Assessment	Practical	Internal Assessment	
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	Anatomy	3 Hrs	100	30	20	40	10	200
2.	Physiology	3 Hrs	100	30	20	40	10	200
3.	Biochemistry	3 Hrs	80	-	20	-	-	100
4	Biomechanics	3 Hrs	100	30	20	40	10	200
5	Section A- Psychology	3 Hrs	40	-	10	-	-	100
	Section B- Sociology		40	-	10	-	-	

<b>BPT - II</b>								
Sl. No	Subject	Theory				Practical		Total
		Written		Viva-Voce	Internal Assessment	Practical	Internal Assessment	
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	Section A-Pathology	3 Hrs	40	-	10	-	-	100
	Section B-Microbiology		40	-	10	-	-	
2.	Pharmacology	3 Hrs	80	-	20	-	-	100
3.	Exercise Therapy	3 Hrs	100	30	20	40	10	200
4.	Electrotherapy	3 Hrs	100	30	20	40	10	200

<b>BPT - III</b>								
Sl.No	Subject	Theory				Practical		Total
		Written		Viva-Voce	Internal Assessment	Practical	Internal Assessment	
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	General Medicine	3 Hrs	80	-	20	-	-	100
2.	General Surgery	3 Hrs	80	-	20	-	-	100
3.	Orthopedics & Traumatology	3 Hrs	80	-	20	-	-	100
4	Orthopedics & Sports Physiotherapy	3 Hrs	100	30	20	40	10	200
5	Cardio-Respiratory & General Physiotherapy	3 Hrs	100	30	20	40	10	200

<b>BPT - IV</b>								
Sl.No	Subject	Theory				Practical		Total
		Written		Viva-Voce	Internal Assessment	Practical	Internal Assessment	
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	Neurology & Neurosurgery	3 Hrs	80	-	20	-	-	100
2.	Community Medicine	3 Hrs	80	-	20	-	-	100
3	Neuro-Physiotherapy	3 Hrs	100	30	20	40	10	200
4	Community Based Rehabilitation	3 Hrs	100	30	20	40	10	200
5.	Research Methodology & Biostatistics	3 Hrs	80	-	20	-	-	100

## 9.2 QUESTION PAPER PATTERN FOR BPT EXAMINATION

### THEORY

SUBJECTS HAVING MAXIMUM MARKS = 100		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	<b>2</b> (Any <b>TWO</b> out of Three)	10
SHORT ESSAY TYPE	<b>12</b> (Any <b>TWELVE</b> out of Fourteen)	5
SHORT ANSWER TYPE	<b>10</b>	2

SUBJECTS HAVING MAXIMUM MARKS = 80		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	<b>2</b> (Any <b>TWO</b> out of Three)	10
SHORT ESSAY TYPE	<b>8</b> (Any <b>EIGHT</b> out of Ten)	5
SHORT ANSWER TYPE	<b>10</b>	2

SUBJECTS HAVING SECTION A & SECTION B [40 MARKS + 40 MARKS = 80 MARKS]		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	SECTION A – <b>1</b> (Any <b>ONE</b> out of Two) SECTION B – <b>1</b> (Any <b>ONE</b> out of Two)	10



SHORT ESSAY TYPE	SECTION A – 4 (Any <b>FOUR</b> out of Five) SECTION B – 4 (Any <b>FOUR</b> out of Five)	5
SHORT ANSWER TYPE	SECTION A – 5 SECTION B – 5	2

PRACTICAL

MAXIMUM MARKS = 40		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
LONG CASE	<b>1</b>	20
SHORT CASE	<b>2</b>	10

VIVA-VOCE

MAXIMUM MARKS = <b>30</b>
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### ***10. DECLARATION OF CLASS***

- A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with Distinction.
- A candidate having appeared in all subjects in the same examination and passed that examination in the first attempt and secures 65% of marks or more but less than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.
- A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 65% of grand total marks prescribed will be declared to have passed the examination in Second Class.
- A candidate passing the university examination in more than one attempt shall be placed in Pass class irrespective of the percentage of marks secured by him/her in the examination.
- The marks obtained by a candidate in the subsidiary subjects shall not be considered for award of Class or Rank.

[Please note fraction of marks should not be rounded off clauses (a), (b) and (c)]

## ***11. CARRY OVER***

I Year [5 main subjects] :

A candidate who has failed in I year is permitted to carry any **two** of the five main subjects and shall have to pass these subjects before appearing for the II year examination.

II Year [4 main subjects]:

A candidate who has failed in II year is permitted to carry any **one** of the four main subjects and shall have to pass these subjects before appearing for the III year examination.

III Year [5 Main subjects]:

A candidate is permitted to carry any **two** of the failed subjects and shall have to pass these subjects before appearing for the final year examination.

Subsidiary subject - may be carried over by a failed candidate but shall have to pass the same before appearing for the final year examination.

## ***12. INTERNSHIP***

There shall be six months (26 weeks) of Internship after the final year examination for candidates declared to have passed the examination in all the subjects. Internship should be done in a teaching hospital recognised by the University limited to within Karnataka only.

No candidate shall be awarded degree certificate without successfully completing six months of Internship.

The Internship should be rotatory and cover clinical branches concerned with Physiotherapy such as Orthopaedics, Cardiothoracic including ICU, Neurology, Neurosurgery Paediatrics, General Medicine, General Surgery, Obstetrics and Gynaecology both in patient and outpatient services.

The 6 months of rotational posting must be covered in the following pattern.

Physiotherapy OPD (including Pediatrics and OBG wards)	1 month
Orthopedic wards	1 month
General Medicine wards (including MICU and CCU )	1 month
General Surgery wards (including CTS wards, CTS-ICU and Burns)	1 month
Neurology and Neurosurgery wards (including Neuro ICU)	1 month
Community Posting –	1 month

Successful Completion – The student must maintain a logbook. On completion of each posting, the same will have to be certified by the faculty in charge of the posting for both attendance as well as work done. On completion of all six postings, the duly completed logbook will be submitted to the Principal/Head of program to be considered as having successfully completed the internship program.

## SECTION – 2

### First Year

### Course Content

ANATOMY	
Subject Title Duration Total Hours Theory Practical	: ANATOMY : 0 – 12 Months : 240 : 150 Hrs : 90 Hrs
Total Hours / Week Lecture Practicals Seminars / Tutorials	: 8 Hrs : 4 Hours / Week : 3 Hours / Week : 1 Hour / Week
Method of Assessment	: Written, Oral, Practical

#### Course Description

It is designed to provide students with the working knowledge of the structure of the human body which is essential foundation for their clinical studies. Studies are concerned with the topographical and functional anatomy of the limbs and thorax. Particular attention is paid to the muscles, bones and joints of the regions. The abdomen, pelvis, perineum, head and neck and central nervous system (CNS) are studied with particular reference to topics of importance to physiotherapists. The study of the CNS includes detailed consideration of the control of motor function.

#### THEORY

Histology + Embryology + Regional Anatomy	: 30 Hours
Musculo-skeletal Anatomy	: 60 Hours
Neuro Anatomy	: 30 Hours
Applied Anatomy	: 30 Hours

## 1. **Histology**

General Histology, study of the basic tissues of the body;

Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS, Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue, Skin and its appendages.

## 2. **Embryology**

- a) Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.
- b) Development of skin, Fascia, blood vessels, lymphatic,
- c) Development of bones, axial and appendicular skeleton and muscles,
- d) Neural tube, brain vessels and spinal cord,
- e) Development of brain and brain stem structures

## 3. **Regional Anatomy**

### **Thorax:**

#### a) **Cardio – Vascular System**

Mediastinum: Divisions and contents

Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.

#### b) **Respiratory system**

Outline of respiratory passages

Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on bronchopulmonary segments

Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.

Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action.

#### c) **Abdomen:**

Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.

Large blood vessels of the gut

Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

d) **Pelvis:**

Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.

e) **Endocrine glands:**

Position, shape, size, function, blood supply and nerve supply of the following glands : Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus.

**4. Musculo Skeletal Anatomy -(All the topics to be taught in detail)**

- a) Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc)
- b) Connective tissue classification.
- c) Bones- Composition & functions, classification and types according to morphology and development.
- d) Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.
- e) Muscles – origin, insertion, nerve supply and actions
- f) Upper Extremity :
  - a. Osteology : Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
  - b. Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.
  - c. Joints : Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
  - d. Arches of hand, skin of the palm and dorsum of hand.
- g) Lower Extremity
  - a. Osteology : Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
  - b. Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.
  - c. Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.
- h) Trunk & Pelvis:
  - a. Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs
  - b. Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Inter-vertebral disc.
  - c. Pelvic girdle and muscles of the pelvic floor

- i) Head and Neck:
  - a. Osteology : Mandible and bones of the skull.
  - b. Soft parts : Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck,
  - c. Gross anatomy of eyeball, nose, ears and tongue.

## 5. Neuro Anatomy

- a) Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system
- b) Cranial nerves
- c) Peripheral nervous system
  - a. Peripheral nerve
  - b. Neuromuscular junction
  - c. Sensory end organs
- d) Central Nervous System
  - a. Spinal segments and areas
  - b. Brain Stem
  - c. Cerebellum
  - d. Inferior colliculi
  - e. Superior Colliculi
  - f. Thalamus
  - g. Hypothalamus
  - h. Corpus striatum
  - i. Cerebral hemisphere
  - j. Lateral ventricles
  - k. Blood supply to brain
  - l. Basal Ganglia
  - m. The pyramidal system
  - n. Pons, medulla, extra pyramidal systems
  - o. Anatomical integration

## PRACTICAL

### List of Practical / Demonstrations \*

#### Topics

1. Upper extremity including surface Anatomy[20Hrs]
  2. Lower extremity including surface Anatomy[20Hrs]
  3. Head & Spinal cord and Neck and Brain including surface Anatomy[20Hrs]
  4. Thorax including surface anatomy, abdominal muscles joints[10Hrs]
  5. Histology-Elementary tissue including surface Anatomy[10Hrs]
  6. Embryology-models, charts & X-rays[10Hrs)
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Demonstration of the muscles of the whole body and organs in thorax and abdomen in a cadaver

Demonstration of movements in important joints.

Surface making of the lung, pleura, fissures and lobes of lungs, heart, liver, spleen, Kidney, cranial nerves, spinal nerves and important blood vessels.

Identification of body prominences on inspection and by palpation especially of extremities. Points of palpation of nerves and arteries.

### **Recommended Text books:**

1. SNELL [Richard S], *Clinical Anatomy for Medical students : Ed. 5. Little Brown and Company Boston. 1995, p898, \$26.50*
2. B.D Chaurasia's *Human Anatomy – Regional And Applied; Volume I, Volume Ii And Volume Iii.*
3. MOORIE [Kieth L], *Clinically Oriented Anatomy. Ed.3., Williams and Wilkins, Baltimore, 1992, p917,\$30*
4. DATTA[A.K], *Essentials of human Anatomy: Thorax and Abdomen Ed 2. Vol. I Current Book International, Culcutta 1994, p433, Rs. 200/-* DATTA[A.K], *Essentials of human Anatomy: Head and Neck Ed 2. Vol. II, Current Book International, Culcutta 1995, p363, Rs. 150/-*
5. SINGH [Inderbir], *Text book of Anatomy with colour atlas: Introduction, Osteology, Upper Extremity, Lower Extremity. Vol I. P Brothers, New Delhi 1996, Rs. 200/-*
6. SINGH [Inderbir], *Text book of Anatomy with colour Atlas: Thorax and Abdomen. Vol II. JP Brothers, New Delhi 1996, Rs. 175/-*
7. SINGH [Inderbir], *Text book of Anatomy with colour Atlas: Head and Neck Central Nervous System. Vol III. JP Brothers, New Delhi 1996, Rs. 175/-*
8. SINGH [Inderbir], *Human Osteology. JP Brothers, New Delhi 1990,p191, Rs. 50/-*

### **Practicals**

1. ROMANES [G J], *Cunningham manual of practical anatomy: upper and lower limb ed 15 Vol I Oxford Medical Publication, Oxford 1996, P263, Rs. 325/-*
2. ROMANES [G J], *Cunningham manual of practical anatomy : Thorax and abdomen ed 15 Vol II Oxford Medical Publication, Oxford 1996, P298, Rs. 325/-*
3. ROMANES [G J], *Cunningham manual of practical anatomy : Head and Neck and Brain ed 15 Vol II Oxford Medical Publication, Oxford 1996, P346, Rs. 325/-*



## PHYSIOLOGY

Subject Title	: PHYSIOLOGY
Duration	: 0 – 12 Months
Total Hours	: 210
Theory	: 150 Hrs
Practical	: 60 Hrs
Total Hours / Week	: 7 Hrs
Lecture	: 4 Hours / Week
Practicals	: 2 Hours / Week
Seminars / Tutorials	: 1 Hour / Week

Method of Assessment : Written, Oral, Practical

### Subject Description

The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body.

The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; sensory receptors; special senses; motor unit; spinal cord; control of movement; hypothalamic functions; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

Practical classes include hematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.

### THEORY

#### General Physiology [2 Hours]

Cell: Morphology. Organelles: their structure and functions  
 Transport Mechanisms across the cell membrane  
 Body fluids: Distribution, composition. Tissue fluid – formation.

#### Blood [10 Hours]

Introduction: Composition and functions of blood.  
 Plasma: Composition, formation, functions. Plasma proteins.  
 RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticulo-endothelial system (in brief) Haemoglobin - Anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.  
 WBC: Classification. Morphology, functions, count, its variation of each. Immunity  
 Platelets: Morphology, functions, count, its variations  
 Hemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders.  
 Anticoagulants.

Blood Groups: Landsteiner's law. Types, significance, determination, Erythroblastosis foetalis.

Blood Transfusion: Cross matching. Indications and complications.

Lymph: Composition, formation, circulation and functions.

### Nerve Muscle Physiology [15 Hours]

Introduction: Resting membrane potential. Action potential – ionic basis and properties.

Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibres. Nerve injury – degeneration and regeneration.

Neuroglia: Types and functions.

Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction : Structure.

Neuromuscular transmission, myasthenia gravis, Excitation-Contraction coupling, Rigor mortis. Motor unit. Properties of skeletal muscles, Strength- Duration curve, Length-tension relationship, fatigue, load.

Smooth muscle: Structure, types, mechanism of contraction. Plasticity.

### Cardiovascular System[ 20 Hours]

Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organisation of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties.

Conducting system: Components. Impulse conduction Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character. ECG: Definition. Different types of leads. Waves and their causes. P-R interval. Heart block.

Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation.

Heart rate and its regulation. Their variations

Arterial Blood Pressure: Definition. Normal values and its variations. Determinants.

Peripheral resistance. Regulation of BP.

Arterial pulse.

Shock – Definition. Classification–causes and features

Regional Circulation: Coronary, Cerebral and Cutaneous circulation.

Cardiovascular changes during exercise.

### Respiratory System [ 15 Hours]

Introduction: Physiological anatomy – Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system. Respiratory muscles.

Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration.

Chest expansion. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions. RDS

Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance.

Maximum ventilation volume. Respiratory minute volume.

Dead Space: Types and their definition.

Pulmonary Circulation. Ventilation-perfusion ratio and its importance.

Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Factors affecting it. P50, Haldane and Bohr effect. Carbon dioxide transport: Different forms, chloride shift.

Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control.

## Chemical Regulation.

Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygen therapy. Acclimatization  
Hypercapnoea. Asphyxia. Cyanosis – types and features. Dysbarism

Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea,  
tachypnoea. periodic breathing – types

Artificial respiration

Respiratory changes during exercise.

## Digestive System [ 5 Hours]

Introduction: Physiological anatomy and nerve supply of alimentary canal. Enteric nervous system

Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication (in brief)

Swallowing: Definition. Different stages. Functions.

Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.

Pancreatic Secretion: Composition, production, function. Regulation.

Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions.

Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation.

Mechanism of Defaecation.

## Renal System [ 8 Hours]

Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxtaglomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.

Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.

Tubular Reabsorption: Reabsorption of  $\text{Na}^+$ , glucose,  $\text{HCO}_3^-$ , urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance:  $\text{TmG}$ . Renal threshold for glucose.

Tubular Secretion: Secretion of  $\text{H}^+$  and  $\text{K}^+$ . PAH clearance.

Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.

Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.

Acid-Base balance (very brief)

Artificial Kidney: Principle of haemodialysis.

Skin and temperature regulation.

## Endocrine System [10 Hours]

Introduction: Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones

Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.

Pituitary-Hypothalamic Relationship.

Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxoedema, Cretinism, Grave's disease.

Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.

Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome. Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Pheochromocytoma.

Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.

Calcitriol, Thymus and Pineal gland (very brief).

Local Hormones. (briefly).

### Reproductive System [ 5 Hours]

Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder

Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.

Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: oestrogen and progesterone-action. regulation of secretion. Menstrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods

### Special Senses [ 10 Hours]

Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.

Visual Pathway and the effects of lesions.

Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.

Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation. Color vision – color blindness. Nyctalopia.

Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of Corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.

Taste: Taste buds. Primary tastes. Gustatory pathway.

Smell: Olfactory membrane. Olfactory pathway.

Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders

### Nervous System [ 20 Hours]

Introduction: Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.

Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal

pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. tabes dorsalis, sensory ataxia.

Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.

Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex– structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL

Spinal cord Lesions: Complete transection and Hemisection of the spinal cord.

Cerebellum: Functions. Cerebellar ataxia.

Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.

Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome

Reticular Formation and Limbic System: Components and Functions.

Basal Ganglia: Structures included and functions. Parkinson's disease.

Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.

EEG : Waves and features. Sleep: REM and NREM sleep.

CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance.

Blood brain barrier. Hydrocephalus.

ANS: Features and actions of parasympathetic and sympathetic nervous system.

### Physiology of Exercise [15 Hours]

#### A. Effects of acute and chronic exercise on

- 1) O<sub>2</sub> transport
- 2) Muscle strength/power/endurance
- 3) B.M.R./R.Q.
- 4) Hormonal and metabolic effect
- 5) Cardiovascular system
- 6) Respiratory system
- 7) Body fluids and electrolyte

#### B. Effect of gravity / altitude /acceleration / pressure on physical parameters

### Applied Physiology [15Hours]

More detailed study of the physiology and practical applications of the following selected topics with emphasis on aspects, which should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy.

#### a. Pulmonary Functions

1. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
2. Respiratory adjustments in exercises.
3. Artificial respiration
4. Breath sounds.

#### b. Cardio vascular Functions

1. Blood flow through arteries, arterioles, capillaries, veins and venuoles.
2. Circulation of Lymph, Oedema

3. Factors affecting cardiac output.
4. Circulatory adjustment in exercise and in postural and gravitational changes,
5. Pathophysiology of fainting and heart failure.

c. Muscles and Nervous System Functions

1. Peripheral nervous system, Neuromuscular transmission, Types of nerve fibres.
2. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV
3. Degeneration and regeneration of nerve, Reactions of denervations.
4. Synaptic transmission, Stretch reflex- Mechanism and factors affecting it.
5. Posture, Balance and Equilibrium/Coordination of voluntary movement
6. Voluntary motor action, clonus, Rigidity, Discordination,
7. Special senses- Vision, taste, hearing, vestibular, Olfaction
8. Sympathetic and Parasympathetic regulation, Thermoregulation,

d. Blood functions

1. Thalassemia Syndrome, Hemophilia, VWF
2. Anemia, Leucocytosis
3. Bone marrow transplant

e. Metabolic Functions

Diabetes Mellitus, Physiological basis of Peptic Ulcer, Jaundice, GIT disorders and Dietary fiber, Thyroid functions, Vitamins deficiency,

## PRACTICAL

### I. Haematology[ 20 Hours]

To be done by the students

1. Study of Microscope and its uses
2. Determination of RBC count
3. Determination of WBC count
4. Differential leukocyte count
5. Estimation of hemoglobin
6. Calculation of blood indices
7. Determination of blood groups
8. Determination of bleeding time
9. Determination of clotting time

Demonstrations only

1. Determination of ESR
2. Determination of PCV

### II. Clinical Examination [20 Hours]

1. Examination of Radial pulse.
2. Recording of blood pressure
3. Examination of CVS
4. Examination of Respiratory system
5. Examination of Sensory system
6. Examination of Motor System
7. Examination of reflexes

8. Examination of cranial nerves

III. Amphibian Experiments – Demonstration and Dry charts Explanation. [15 Hours]

1. Instruments used for frog experiments. Kymograph, heart liver, Muscle trough, stimulator.
2. Simple muscle curve.
3. Effect of increasing the strength of the stimuli
4. Effect of temperature on muscle contraction.
5. Effect of two successive stimuli.
6. Effect of Fatigue.
7. Effect of load on muscle contraction
8. Genesis of tetanus and clonus.
9. Velocity of impulse transmission.
10. Normal cardiogram of amphibian heart.
11. Properties of Cardiac muscle
12. Effect of temperature on cardiogram.

IV. Recommended Demonstrations [ 5 Hours]

1. Spirometry
2. Artificial Respiration
3. ECG
4. Perimetry
5. Mosso's Ergometry

**Recommended text books:**

1. *Text book of medical physiology – Guyton Arthur*
2. *Concise medical physiology – Chaudhuri Sujit K.*
3. *Human Physiology – Chatterjee C.C.*
4. *Text book of practical Physiology – Ranade.*
5. *Text of Physiology – A.K.Jain.*
6. *Basics of Medical physiology- Venkatesh D & Sudhakar H H*
7. *Manipal Manual of Physiology – Prof. C N Chandrashekar*

**Reference:**

8. *Review of Medical Physiology – Ganong William F.*
9. *Physiological basis of Medical practice – Best & Taylor*

<b>BIOCHEMISTRY</b>	
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Subject Title	: BIOCHEMISTRY
Duration	: 0 – 12 Months
Total Hours	: 60
Theory	: 60 Hrs
Lecture	: 2 Hours / Week
Method of Assessment	: Written

## THEORY

### 1. Nutrition [ 7 Hours]

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  
Physical activities - Energy expenditure for various activities.  
Calculation of energy requirement of a person  
Balanced diet  
Recommended dietary allowances  
Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers  
Role of lipids in diet  
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  
Nutritional disorders

### 2. Carbohydrate Chemistry [3 Hours]

Definition, general classification with examples, Glycosidic bond  
Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides.  
Glycosaminoglycans (mucopolysaccharides)

### 3. Lipid Chemistry [ 3 Hours]

Definition, general classification  
Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol  
Essential fatty acids and their importance  
Lipoproteins: Definition, classification, properties, Sources and function  
Ketone bodies

### 4. Amino-acid Chemistry [ 3 Hours ]

Amino acid chemistry: Definition, Classification, Peptide bonds  
Peptides: Definition, Biologically important peptides  
Protein chemistry: Definition, Classification, Functions of proteins,

### 5. Enzymes [ 3 Hours]

Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)

### 6. Nucleotide and Nucleic acid Chemistry [2 Hours]

Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.  
Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.

### 7. Digestion and Absorption [ 3 Hours]

General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance,

### 8. Carbohydrate Metabolism [ 5 Hours]

Introduction, Glycolysis – Aerobic, Anaerobic



Citric acid cycle, Substrate level phosphorylation  
Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen,  
Gluconeogenesis, Cori cycle  
Hormonal regulation of glucose, Glycosuria, Diabetes mellitus,

#### 9. Lipid Metabolism [ 5 Hours]

Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids -oxidation of fatty acids,  
Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol  
synthesis, fat metabolism in adipose tissues  
Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis,  
Rothera's test  
Cholesterol metabolism: synthesis, degradation, cholesterol transport  
Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases)  
Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver

#### 10. Amino acid and Protein Metabolism [3 Hours]

Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia,  
transport of ammonia, Urea cycle  
Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine  
and tyrosine.

#### 11. Vitamins [ 7 Hours]

Definition, classification according to solubility,  
Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and  
transport, deficiency and toxicity

#### 12. Mineral Metabolism [ 2 Hours]

Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of  
Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum,  
copper. Phosphate, calcium and iron in detail

#### 13. Cell Biology [ 2 Hours]

Introduction, Cell structure, Cell membrane structure and function, various types of absorption.  
Intracellular organelles and their functions, briefly on cytoskeleton

#### 14. Muscle Contraction [ 2 Hours]

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

#### 15. Biochemistry of Connective tissue [ 2 Hours]

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

#### 16 Hormone Action [ 2 Hours]

Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second  
messengers and cell function

#### 17 Acid-Base balance[ 2 Hours]

Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system  
Role of lungs and kidneys in acid base balance, Acid base imbalance

#### 18 Water balance[ 1 Hour]

Water distribution in the body, Body water, water turnover, Regulation of water balance: role of  
ADH and thirst centre

### 19 Electrolyte balance[ 1 Hour]

Osmolarity. Distribution of electrolytes

Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF

### 20 Clinical Biochemistry [ 2 Hours]

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

#### **Recommended Text books**

1. MURRAY [ROBERT KK], *Harper's Bio Chemistry Ed 24, Prentice Hall. 1996, p925, Rs. 650/-*
2. RAMAKRISHNA [S], PRASANNA [KG], RAJAN [R], *Text Book of Medical Biochemistry, Ed 1, orient Langman, Bombay 1980, p717.*
3. VASUDEVAN [DM] and SREE KUMARI [S], *Text Book of Bio Chemistry for Medical students, Ed 1, Jaypee Brothers, New Delhi, 1995, p637, Rs.175/-.*
4. DAS [Debajyothi], *Biochemistry, Ed. 7, Academic Publishers Calcutta, 1992, p648, Rs. 175/-.*
5. PRASAD RM, *RM's Physiotherapy Textbook Series, Text book of Biochemistry for Bachelor of Physiotherapy First Edition, RM Publications, Mangalore.*

#### **Reference**

1. LEHNINGER [Albert] et. al., *Principles of Biochemistry, Ed. 3, LBS Publishers, Delhi, 1993, p1143, Rs.795/-*
2. ORTEN [James M] and NEUHAUS [OHO.W]. *Human Biochemistry, Ed. 9, Mosby, St.Louis, 1975 p994.*
3. Strayer [LUBERT], *Biochemistry, Ed. 4, WH, Freeman & Co., Ny.1995, p1064, \$49.95*
4. DEVLIN [Thomas M], *Biochemistry with Clinical Correalation, Ed. 4, Willey Libs, Ny 1997, p1186, \$30.95.*

## **BIOMECHANICS**

Subject Title	: BIOMECHANICS
Duration	: 0 – 12 Months
Total Hours	: 180
Theory	: 90 Hours
Practical	: 90 Hours
Total Hours / Week	: 6 Hrs
Lecture	: 2 Hours / Week
Practicals	: 3 Hours / Week
Seminars / Tutorials	: 1 Hour / Week
Method of Assessment	: Written, Oral, Practical

## Course Description

Biomechanics involves the study of basic concepts of human movement, and application of various biomechanical principles in the evaluation and treatment of disorders of Musculoskeletal system. Students are taught to understand the various quantitative methods of movement. Mechanical principles of various treatment methods are studied. Study of posture and gait are also included.

## THEORY

### 1. **Basic Concepts in Biomechanics: Kinematics and Kinetics [3 Hours]**

- a) Types of Motion
- b) Location of Motion
- c) Direction of Motion
- d) Magnitude of Motion
- e) Definition of Forces
- f) Force of Gravity
- g) Reaction forces
- h) Equilibrium
- i) Objects in Motion
- j) Force of friction
- k) Concurrent force systems
- l) Parallel force systems
- m) Levers
- n) Pulleys
- o) Work
- p) Moment arm of force
- q) Force components
- r) Equilibrium of levers

### 2. **Joint structure and Function [ 3 Hours]**

- a) Joint design
- b) Materials used in human joints
- c) General properties of connective tissues
- d) Joint function
- e) Joint motion

### 3. **Muscle structure and function [ 3 Hours]**

- a) Mobility and stability functions of muscles
- b) Elements of muscle structure
- c) Muscle function

### 4. **Biomechanics of the Thorax and Chest wall [ 3Hrs]**

- a) General structure and function
- b) Rib cage movements and
- c) The muscles associated with the rib cage

### 5. **The Temporomandibular Joint [ 2 Hours]**

- a) General features, structure and function

## **6. Biomechanics of the vertebral column [10 Hours]**

- a) General structure and function
- b) Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region
- c) Muscles of the vertebral column
- d) Ligaments of Vertebral Column

## **7. Biomechanics of the peripheral joints (to include kinetics and kinematics) [ 52 Hours]**

- a) The shoulder complex: Structure and components of the shoulder complex and their integrated function
- b) The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex.
- c) The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; prehension; functional position of the the wrist and hand.
- d) The hip complex: structure and function of the hip joint.
- e) The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint.
- f) The ankle and foot complex.: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot.

## **8. Analysis of Posture and Gait [9 Hours] :**

- a) Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture,
- b) General features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running.

**9. Movement Analysis [ 2 hours] :** ADL activities like sitting – to standing, lifting, various grips , pinches.

**10. Goniometry[ 2 hours]:** Parts, types, principles and uses of a goniometry. Techniques for measurement of ROM of all peripheral joints.

**11. Walking Aids[1 hour]:** Parallel bars, crutches, canes, walkers – types, parts and uses.

**The following topics are part of applied Biomechanics and are required to be taught but not for examination.**

- a) General effects of disease, injury and immobilization.
- b) Effects of immobilization, injury and aging
- c) Changes in normal structure and function I relation to pregnancy, scoliosis and COPD
- d) Effects of posture on age, pregnancy, occupation and recreation;

**PRACTICAL: [90 Hours]** shall be conducted for various joint movements and analysis of the same. Demonstration may also be given as how to analyze posture and gait. The demonstrations

may be done on models or skeleton.

The student shall be taught and demonstrated to analysis for activities of daily living – ADL – (like sitting to standing, throwing, lifting etc.) The student should be able to explain and demonstrate the movements occurring at the joints, the muscles involved, the movements or muscle action produced, and mention the axis and planes through which the movements occur.

Measurement of Joint ROM using goniometer.

Identification of walking aids.

***Recommended Text books :***

1. *Joint Structure and Function – A comprehensive Analysis, JP Bros Medical Publishers, New Delhi.*
2. *Brunstrom, Clinical Kinesiology, JP Bros Medical Publishers, Bangalore, 5<sup>th</sup> Ed 1996, 1<sup>st</sup> Indian Ed 1998, Rs 250.00*
3. *Clinical Kinesiology for Physical Therapist Assistants, JP Bros Medical Publishers, Bangalore, 1<sup>st</sup> Indian Ed 1997, Rs 300.00*

## PSYCHOLOGY & SOCIOLOGY

### Course description

Human Psychology involves the study of various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups. Sociology will introduce student to the basic sociology concepts, principles and social process, social institutions [ in relation to the individual, family and community] and the various social factors affecting the family in rural and urban communities in India will be studied.

The study of these subjects will help the student to understand their clients while assessment and while planning appropriate treatment methods.

### PSYCHOLOGY

Subject Title	: PSYCHOLOGY
Duration	: 0 – 12 Months
Total Hours	: 60
Theory	: 60 Hrs
Lecture	: 2 Hours / Week
Method of Assessment	: Written

### THEORY

1. Introduction to Psychology ( 6 Hours)
  - a. Schools: Structuralism, functionalism, behaviorism, Psychoanalysis.
  - b. Methods: Introspection, observation, inventory and experimental method.
  - c. Branches: pure psychology and applied psychology
  - d. Psychology and physiotherapy
2. Growth and Development ( 6 Hours)
  - a. Life span: different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age).
  - b. Heredity and environment: role of heredity and environment in physical and psychological development, “Nature v/s Nurture controversy”
3. Sensation, attention and perception (6 Hours)
  - a. Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense.
  - b. Attention: Types of attention, Determinants of attention (subjective determinants and objective determinants)
  - c. Perception: Gestalt principles of organization of perception (principle of figure ground and principles of grouping), factors influencing perception (past experience and context)
  - d. Illusion and hallucination: different types
4. Motivation (4 Hours)
  - a. Motivation cycle (need, drive, incentive, reward).
  - b. Classification of motives.

- c. Abraham Maslow's theory of need hierarchy
5. Frustration and conflict (2 Hours)
    - a. Frustration: sources of frustration.
    - b. Conflict: types of conflict.
    - c. Management of frustration and conflict
  6. Emotions (6 Hours)
    - a. Three levels of analysis of emotion (physiological level, subjective state, and overt behavior).
    - b. Theories of emotion
    - c. Stress and management of stress.
  7. Intelligence (6 Hours)
    - a. Theories of intelligence.
    - b. Distribution of intelligence.
    - c. Assessment of intelligence
  8. Thinking (4 Hours)
    - a. Reasoning : deductive and inductive reasoning
    - b. Problem solving: rules in problem solving (algorithm and heuristic)
    - c. Creative thinking: steps in creative thinking, traits of creative people
  9. Learning (8 Hours)
    - a. Factors effecting learning.
    - b. Theories of learning: trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory.
    - c. The effective ways to learn: Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.
  10. Personality (8 Hours)
    - a. Approaches to personality: type & trait, behavioristic, psychoanalytic and humanistic approach.
    - b. Personality assessment: observation, situational test, questionnaire, rating scale, interview, and projective techniques.
    - c. Defense Mechanisms: denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out.
  11. Social psychology (4 Hours)
    - a. Leadership: Different types of leaders. Different theoretical approaches to leadership.
    - b. Attitude: development of attitude. Change of attitude

***Recommended text books:***

1. Feldman.R.H(1996). *Understanding Psychology*. New Delhi: Tata McGraw hill.
2. Morgan et al(2003). *Introduction to Psychology*. New Delhi: Tata McGraw hill.
3. Lefton( ). *Psychology*. Boston: Alwin & Bacot Company.
4. Mangal, S.K (2002). *Advanced Educational Psychology*. New Delhi: prentice hall.
5. Atkinson(1996). *Dictionary of Psychology*.

## ***SOCIOLOGY***

Subject Title Duration Total Hours Theory Lecture	: SOCIOLOGY : 0 – 12 Months : 60 : 60 Hrs : 2 Hours / Week
Method of Assessment	: Written

### **THEORY**

#### **1. Introduction:**

1. Meaning- Definition and scope of sociology
2. Its relation to Anthropology, Psychology, Social Psychology.
3. Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.
4. Importance of its study with special reference to Health Care Professionals.

#### **2. Social Factors in Health and disease situations:**

1. Meaning of social factors
2. Role of social factors in health and illness

#### **3. Socialization :**

1. Meaning and nature of socialization
2. Primary, Secondary and Anticipatory socialization
3. Agencies of socialization

#### **4. Social Groups :**

1. 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 setup.

#### **5. Family:**

1. The family, meaning and definitions.
2. Functions of types of family
3. Changing family patterns
4. Influence of family on the individuals health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy.

#### **6. Community :**

1. Rural community : Meaning and features –Health hazards of ruralities, health hazards to tribal community.
2. Urban community : Meaning and features- Health hazards of urbanities.



7. Culture and Health :

1. Concept of Health
2. Concept of Culture
3. Culture and Health
4. Culture and health disorders.

8. Social change :

1. Meaning of social changes.
2. Factors of social changes.
3. Human adaptation and social change
4. Social change and stress.
5. Social change and deviance.
6. Social change and health programme
7. The role of social planning in the improvement of health and rehabilitation.

9. Social Problems of disabled :

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

1. Population explosion
2. Poverty and unemployment
3. Beggary
4. Juvenile delinquency
5. Prostitution
6. Alcoholism
7. Problems of women in employment
8. geriatric problems
9. Problems of underprivileged.

10. Social Security :

Social security and social legislation in relation to the disabled.

11. Social worker :

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

*Recommended Text Books*

1. *Sachdeva and Vidyabushan, Introduction to the study of sociology*
2. *INDRANI T K, Text Books of Sociology for Graduates Nurses and Physiotherapy Students, JP Brothers, New Delhi, 10 e and Health Disorders*



## ENGLISH

Subject Title	: ENGLISH
Duration	: 0 – 12 Months
Total Hours	: 60
Theory	: 60 Hrs
Lecture	: 2 Hours / Week
Method of Assessment	: Written, Oral

Course description: This course is designed to help the student acquire a good command and comprehension of the English language through individual, papers and conferences.

### THEORY

#### Behavioural Objectives:

The student at the end of training is able to

1. Read and comprehend English language
2. Speak and write grammatically correct English
3. Appreciates the value of English literature in personal and professional life,

#### Unit –I :

Introduction:

Study Techniques

Organisation of effective note taking and logical processes of analysis and synthesis

The use of the dictionary

Enlargement of vocabulary

Effective diction

#### Unit - II:

Applied Grammar:

Correct usage

The structure of sentences

The structure of paragraphs

Enlargements of Vocabulary

#### Unit - III:

Written Composition:

Precise writing and summarising

Writing of bibliography

Enlargement of Vocabulary

#### Unit - IV

Reading and comprehension

Review of selected materials and express oneself in one's words.

Enlargement of Vocabulary. .

#### Unit - V

The Study of Various Forms of Composition Paragraph, Essay, Letter, Summary, Practice in

writing

Unit - VI

Verbal Communication:

Discussions and Summarization, Debates, Oral reports, use in teaching

*Reference*

1. *English Grammar Collins, Birmingham University, International Language Data Base, Rupa & Co. 1993*
2. *Wren and Martin - Grammar and Composition, 1989, Chanda. & Co, Delhi*
3. *Letters for all Occassions\_A S Myers. Pub - Harper Perennial*
4. *Spoken English V Shasikumar and P V Dhanija\_ Pub. By: Tata Mcgraw Hill, New Delhi*
5. *Journalism Made Simple , D Wainwright*
6. *Writers Basic Bookshelf Series, Writers Digest series*
7. *Interviewing by Joan Clayton Platkon*
8. *Penguin Book of Interviews.*

## BASIC NURSING

Subject Title	: BASIC NURSING
Duration	: 0 – 12 Months
Total Hours	: 30
Theory	: 20 Hours
Practical	: 10 Hours
Lecture + Practical	: 1 Hours / Week
Method of Assessment	: Written, Oral,

### THEORY

1. What is Nursing ? Nursing principles. Inter-Personnel relationships. Bandaging : Basic turns; Bandaging extremities; Triangular Bandages and their application.
2. Nursing Position: Environment safety; Bed making, prone, lateral, dorsal, dorsal recumbent, Flower's positions, comfort measures, Aids and rest and sleep.
3. Lifting and Transporting Patients : Lifting Patients up in the bed. Transferring from bed to wheel chair. "Transferring from bed to stretcher".
4. Bed side Management : Giving and taking Bed pan, Urinal : Observation of stools, urine. Observation of sputum, Understand use and care of catheters, enema giving.
5. Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion
6. Care of Rubber Goods: Obervation, Reporting and Recording Temperature, Respiration and Pulse, Simple aseptic Technique, Sterlisation and Disinfection.
7. Surgical Dressing : Observation of dressing procedures

## KANNADA

Subject Title	: KANNADA
Duration	: 0 – 12 Months
Total Hours	: 30
Theory	: 30 Hours
Lecture	: 1 Hours / Week
Method of Assessment	: Written, Oral

**ಕನ್ನಡ : ಒಂದು  
ಪಠ್ಯಕ್ರಮದ ರೂಪರೇಖೆ**

- ಸ್ಥಾನ : ಬೇಸಿಕ್ ಬಿ.ಎಸ್ಸಿ., (ನರ್ಸಿಂಗ್) ಮೊದಲ ವರ್ಷ  
ಸಮಯ : 15 ಘಂಟೆಗಳು (ಹದಿನೈದು ಘಂಟೆಗಳು)  
ಪಠ್ಯಕ್ರಮದ ವಿನ್ಯಾಸ : ವಿನ್ಯಾಸ/ವಿನ್ಯಾಸನಿಯಂತ್ರಣ ದಿನನಿತ್ಯ ಸಂಪರ್ಕಿಸಬಹುದಾದ  
ಜನಸಾಮಾನ್ಯರೊಡನೆ ಶುಶ್ರೂಷೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಕನ್ನಡದಲ್ಲಿ  
ಸಂಭಾಷಣೆ ಮಾಡಲು ಹಾಗೂ ತಿಳುವಳಿಕೆ ನೀಡಲು ಸಹಕಾರ  
ವಾಗುವಂತೆ ಪಠ್ಯಕ್ರಮದ ಮಾದರಿಯನ್ನು ಅಳವಡಿಸುವುದು.  
ಉದ್ದೇಶ : 1. ದಿನ ಬಳಕೆಯ ವ್ಯವಹಾರದಲ್ಲಿ ಶುಶ್ರೂಷೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಕನ್ನಡ ಭಾಷೆಗೆ  
ಅಳವಡಿಕೆ  
2. ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಭಾಷೆಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

**ಪಠ್ಯಕ್ರಮದ ವಿವರ**

- ಘಟಕ ಒಂದು : (ಅ) ಅಕ್ಷರಮಾಲೆ, ಸ್ವರಗಳು, ವ್ಯಂಜನಗಳು  
(ಆ) ಪದ, ಪದಪುಂಜ, ವಾಕ್ಯ ರಚನೆ, ಪತ್ರಲೇಖನ ಪ್ರಬಂಧರಚನೆ  
ಎರಡು : ಶುಶ್ರೂಷಾ ಪದಗಳು (ಇಂಗ್ಲೀಷಿನಿಂದ ಕನ್ನಡಕ್ಕೆ  
ಶುಶ್ರೂಷೆಯಲ್ಲಿ ಸಾಮಾನ್ಯ ಬಳಕೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ)  
ಮೂರು : ರೋಗಿ ಹಾಗೂ ಶುಶ್ರೂಷಕರ ಮಧ್ಯೆ ಸಾಮಾನ್ಯವಾಗಿ ನಡೆಯುವ ಸಂಭಾಷಣೆ  
(ಅ) ಪ್ರಶ್ನಾರ್ಥಕ ಸಲಹೆ ಕೊಡುವ ವಾಕ್ಯಗಳು  
(ಆ) ವೈದ್ಯರೊಂದಿಗೆ ಹಾಗೂ ಇತರೆ ಸಹಚರರೊಂದಿಗೆ ವ್ಯವಹರಿಸಲು,  
ಸಂಭಾಷಣೆ ನಡೆಸಲು ಬೇಕಾದ ವಾಕ್ಯಗಳು.

**ಅಧ್ಯಯನಕ್ಕೆ ಶಿಫಾರಸ್ಸು ಮಾಡಲಾಗಿರುವ ಗ್ರಂಥಗಳು**

1. ಕನ್ನಡ ವ್ಯಾಕರಣ (8. 9 ಮತ್ತು 10ನೇ ತರಗತಿಗಳಿಗೆ ಕರ್ನಾಟಕ ಸರ್ಕಾರ, ಪಠ್ಯಪುಸ್ತಕಗಳಇಲಾಖೆ)
2. ವ್ಯವಹಾರಿಕ ಕನ್ನಡ : ಎಚ್.ಎಸ್.ಎಸ್.
3. ಪತ್ರ ಲೇಖನ : ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್ತು
4. ಲೇಖನ ಕಲೆ : ಎನ್. ಪ್ರಹ್ಲಾದ್‌ರಾವ್
5. ಆರೋಗ್ಯ ಮತ್ತು ಇತರೆ ಪ್ರಬಂಧಗಳು : ಡಾ|| ಪಿ. ಎನ್. ಶಂಕರ್
6. ವೈದ್ಯ ಪದಗಳ ಪುಟ್ಟ ರಚನೆ : ಡಾ|| ಡಿ.ಎನ್. ಶಿವಪ್ಪ

ಕನ್ನಡ : ಎರಡು  
ಪಠ್ಯಕ್ರಮದ ರೂಪರೇಖೆ

- ಸ್ಥಾನ : ಬೇಸಿಕ್ ಬಿ.ಎಸ್ಸಿ. (ನರ್ಸಿಂಗ್) ಮೊದಲ ವರ್ಷ  
ಸಮಯ : 15 ಘಂಟೆಗಳು (ಹದಿನೈದು ಘಂಟೆಗಳು)  
ಉದ್ದೇಶ : ಜನಾರೋಗ್ಯದ ಬಗ್ಗೆ ಜನಸಮುದಾಯಕ್ಕೆ ತಿಳುವಳಿಕೆ ಕೊಡುವುದು.

ಪಠ್ಯಕ್ರಮದ ವಿವರ

- ಘಟಕ ಒಂದು : ಜನಾರೋಗ್ಯದ ಶುಶ್ರೂಷೆಯಲ್ಲಿ ಸಂದೇಶಗಳು ವ್ಯವಸ್ಥೆ ಸಂದರ್ಶನ ಮಹತ್ವ, ಸಂದರ್ಶನದ ಗುಣಗಳು.  
ಅನುಸರಿಸಬೇಕಾದ ನಿಯಮಗಳು  
ಅವ್ಯೂ ಮಾಹಿತಿಗಳ ಸಂಗ್ರಹ, ಸಂದೇಹಗಳು (ಶಂಕೆಗಳು)  
ಕುಟುಂಬ ಸಂಪರ್ಕ, ಸಂದರ್ಶಕ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ ಬಳಕೆ  
ಎರಡು : ವೈಯಕ್ತಿಕ ಆರೋಗ್ಯ  
ಮೂರು : ನೈಸರ್ಗಿಕ ನೈರ್ಮಲ್ಯ  
ನಾಲ್ಕು : ಸಾಂಕ್ರಾಮಿಕ ರೋಗಗಳು ಮತ್ತು ಅವುಗಳ ತಡೆಗಟ್ಟುವಿಕೆ  
ಐದು : ಆಹಾರ ಮತ್ತು ಆರೋಗ್ಯ  
ಆರು : ತಾಯಿ ಮತ್ತು ಮಗುವಿನ ಆರೋಗ್ಯ  
ಏಳು : ಕುಟುಂಬ ಕಲ್ಯಾಣ ಯೋಜನೆ

ಅಧ್ಯಯನಕ್ಕೆ ಶಿಫಾರಸ್ಸು ಮಾಡಲಾಗಿರುವ ಗ್ರಂಥಗಳು

1. ಸಮಾಜ ಆರೋಗ್ಯ : ಡಾ|| ಎಸ್. ಎ. ನಾರಾಯಣ್
2. ತಾಯಿ ಮಗು : ಡಾ|| ಅನುಪಮ ನಿರಂಜನ್
3. ರೋಗೋಪಚಾರ : ಡಾ|| ಎಸ್. ಆರ್. ಕಾವಳಿ  
(ಸೆಂಟ್‌ಜಾನ್ ಅಂಬುಲೆನ್ಸ್ ಅಸೋಸಿಯೇಷನ್)
4. ಪರಿಸರ ಸಂದರ್ಶನ
5. ಪರಿಸರ ಮಲಿನತೆ : ಕರ್ನಾಟಕ ರಾಜ್ಯ ವಿಜ್ಞಾನ ಪರಿಷತ್ತಿನ ಪ್ರಕಟಣೆಗಳು
6. ಆರೋಗ್ಯ ಶಿಕ್ಷಣ ಮತ್ತು ಶಾಲಾ ಮಕ್ಕಳ ಆರೋಗ್ಯ (ಆರೋಗ್ಯ ಮತ್ತು ಕುಟುಂಬ ಯೋಜನೆ ಇಲಾಖೆ, ಬೆಂಗಳೂರು ಪ್ರಕಟಗೊಳಿಸಿರುವ ಪ್ರಸ್ತುತ ಪುಸ್ತಕಗಳು)

## ORIENTATION TO PHYSIOTHERAPY

Subject Title	: ORIENTATION TO                      PHYSIOTHERAPY
Duration	: 0 – 12 Months
Total Hours	: 30
Theory	: 30 Hours
Lecture + Practical	: 1 Hours / Week
Method of Assessment	: Written, Oral

### THEORY

#### I Patterns of Health Care Delivery:

- a. National Trends and resources
- b. Local trends and resources
- c. Overview of Health Science Professions

#### II Components of Physiotherapy Profession:

- a. History of Medical Therapeutics
- b. History of Physiotherapy
- c. Overview of Health Science Professions

#### III Role of Physiotherapy in meeting Health Care Needs in India.

- a. Needs versus Demands
- b. Physiotherapist as 'Educator'
- c. Typical Job settings
- d. Common problems and solutions



## SECTION – 2

### Second Year

<b>PATHOLOGY &amp; MICROBIOLOGY</b>
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#### Subject Description

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

#### PATHOLOGY

Subject Title	: PATHOLOGY
Duration	: 13 – 24 Months
Total Hours	: 60
Theory	: 45 Hrs
Practical	: 15 Hrs
Lecture + Practical	: 2 Hours / Week
Method of Assessment	: Written

Theory [45 Hours]

General Pathology

1. Introduction to Pathology [1 Hour]

2. Cell injuries: [3 Hours]

Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure.

Reversible cell injury : Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoïd changes. Irreversible cell injury: Types of Necrosis & 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.

3. Inflammation and Repair [3 Hours]

Acute inflammation: features, causes, vascular and cellular events.

Inflammatory cells and Mediators. Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples.

Repair, Wound healing by primary and secondary union, factors promoting and delaying the process.

Healing in specific site including bone healing.

#### 4. Immunopathology [2 Hours]

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.

#### 5. Infectious diseases [3 Hours]

Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.

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

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

Fungal disease and opportunistic infections.

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

#### 6. Circulatory Disturbances [3 Hours]

Hyperemia/Ischemia and Haemorrhage

Edema: Pathogenesis and types.

Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology

Thrombosis and Embolism: Formation, Fate and Effects.

Infarction: Types, Common sites.

Shock: Pathogenesis, types, morphologic changes.

#### 7. Growth Disturbances and Neoplasia [3 Hours]

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

Precancerous lesions.

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

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

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

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.

#### 8. Nutritional Disorders [1 Hour]

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

#### 9. Genetic Disorders [1 Hour]

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

## Systemic pathology

### 10. Hematology [4 Hours]

Constituents of blood and bone marrow, Regulation of hematopoiesis.

Anemia: Classification, clinical features & lab diagnosis.

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.

Acquired hemolytic anaemias

i. Alloimmune, Autoimmune

ii. Drug induced, Microangiopathic

Pancytopenia - Aplastic anemia.

Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis.

Coagulopathies - (i) Inherited (ii) Acquired with lab diagnosis.

Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.

Leukemia: Classification, clinical manifestation, pathology and Diagnosis.

Multiple myeloma and dysproteinemias.

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

### 11. Respiratory System [2 Hours]

Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases

### 12. Cardiovascular Pathology [2 Hours]

Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus.

Endocarditis.

Rheumatic Heart disease.

Vascular diseases: Atherosclerosis, monckeberg's medial calcification, Aneurysm and Arteritis and tumours of Blood vessels.

Ischemic heart Disease: Myocardial infarction.

Hypertension and hypertensive heart Disease.

### 13. Alimentary tract [3 Hours]

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

Stomach : Gastritis, Ulcer & Tumours.

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

Pancreatitis and pancreatic tumours : i) Exocrine, ii) Endocrine

Salivary gland tumours : Mixed, Warthin's

### 14. Hepato – biliary pathology [ 2 Hours]

Jaundice: Types, aetio-pathogenesis and diagnosis.

Hepatitis: Acute, Chronic, neonatal.

Alcoholic liver disease

Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic,

parasitic and Amoebic.  
Tumours of Liver

15. Lymphatic System [ 2 Hours]

Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma.

Lymphadenitis - Non specific and granulomatous

Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non Hodgkin's Lymphomas, Metastatic Tumours.

Causes of Splenic Enlargements.

16. Musculoskeletal System [3 Hours]

Osteomyelitis, acute, chronic, tuberculous, mycetoma

Metabolic diseases: Rickets/Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease.

Tumours Classification: Benign, Malignant, Metastatic and synovial sarcoma. Arthritis: Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous.

17. Endocrine pathology [ 3 Hours]

Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis

Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis.

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

18. Neuropathology [3 Hours]

Inflammations and Infections : TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess

Tuberculosis, Cysticercosis

CNS Tumors, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma

19. Dermatopathology [1 Hour]

Skin tumors : Squamous cell carcinoma, Basal cell carcinoma, Melanoma

Practical [15 Hours]

Demonstration of Slides – The students may be demonstrated the common histopathological, hematological and cytological slides and specimens and charts and their interpretations.

*Recommended Textbooks*

1. *Text book of pathology: Harshmohan*
2. *General systemic pathology: Churchill Livingstone*
3. *Text book of Pathology: Robbins*

## MICROBIOLOGY

Subject Title	: MICROBIOLOGY
Duration	: 13 – 24 Months
Total Hours	: 60
Theory	: 45 Hrs
Practical	: 15 Hrs
Lecture + Practical	: 2 Hours / Week
Method of Assessment	: Written

### Theory

#### 1. General Microbiology [5 Hours]

Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.

Normal flora of the human body.

Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections.

Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence, associated.

Physiology: Essentials of bacterial growth requirements.

Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.

Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

#### 2. Immunology [5 Hours]

Basic principles of immunity immunobiology : lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.

Humoral immunity and its role in immunity Cell mediated immunity and its role in immunity.

Imunology of hypersensitivity, Measuring immune functions.

#### 3. Bacteriology [12 Hours]

To be considered under the following headings

Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports

Staphylococci,

Streptococci and Pneumococci,

Mycobacteria: Tuberculosis, M.leprae, atypical mycobacteria,

Enterobacteriaceae,

Vibrio : V. cholerae and other medically important vibrios, Campylobacters and Helicobacters,

Pseudomonas,

Bacillus anthracis,  
Sporing and non-sporing anaerobes: Clostridia, Bacteroides and Fusobacteria,

#### 4. General Virology [8 Hours]

General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections. Immunity and prophylaxis of viral diseases. Principles of laboratory diagnosis of viral diseases. List of commonly used antiviral agents.

#### 5. Mycology [3 Hours]

General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mycoses opportunistic infections including Mycotoxins, systemic mycoses. General principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples. Antifungal agents.

#### 6. Clinical/Applied Microbiology [12 Hours]

Streptococcal infections: Rheumatic fever and Rheumatic heart disease,  
Meningitis.

Tuberculosis,

Pyrexia of unknown origin,

leprosy,

Sexually transmitted diseases,

Poliomyelitis,

Hepatitis,

Acute-respiratory infections,

Central nervous System infections,

Urinary tract infections,

Pelvic inflammatory disease,

Wound infection,

Opportunistic infections,

HIV infection,

Malaria,

Filariasis,

Zoonotic diseases.

#### Practical [15 Hours]

1. Demonstration of Microscopes and its uses
2. Principles, uses and demonstration of common sterilization equipment
3. Demonstration of common culture media
4. Demonstration of motility by hanging drops method
5. Demonstration of Gram Stain, ZN Stain
6. Demonstration of Serological test: ELISA
7. Demonstration of Fungus

*Recommended Textbooks:*

1. *Short text book of Medical Microbiology by Sathish Gupta*
2. *Text book of Microbiology by Jayaram Panicker*
3. *Microbiology & Parasitology by Rajeshwar Reddy*
4. *Text book of Microbiology by Anantha Narayanan*
5. *Microbiology by Baveja*
6. *Text book of microbiology by Chakraborty*

<b>PHARMACOLOGY</b>
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### Course Description

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

Subject Title	: PHARMACOLOGY
Duration	: 13 – 24 Months
Total Hours	: 60
Theory	: 60 Hrs
Lecture	: 2 Hours / Week
Method of Assessment	: Written

#### 1. General Pharmacology [5 Hours]

Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration, Distribution of drugs, Metabolism and Excretion of drugs Pharmacokinetics, Pharmacodynamics, Factors modifying drug response, Adverse effects.

#### 2. Autonomic Nervous system [5 hours]

General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System  
Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.

#### 3. Cardiovascular Pharmacology [10 Hours]

Drugs Used in the Treatment of Heart Failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors  
Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators

Antiarrhythmic Drugs

Drugs Used in the Treatment of Vascular Disease and Tissue Ischemia : Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics

Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers

Cerebral Ischemia

Peripheral Vascular Disease

#### 4. Neuropharmacology [8 Hours]

Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines

Antianxiety Drugs: Benzodiazepines, Other Anxiolytics

Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic

Antidepressants, Atypical Antidepressants, Lithium

Antipsychotic drugs

#### 5. Disorders of Movement [6 Hours]

Drugs used in Treatment of Parkinson's Disease

Antiepileptic Drugs

Spasticity and Skeletal Muscle Relaxants

#### 6. Inflammatory/Immune Diseases [14 Hours]

Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactions with NSAIDs

Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids

Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout

Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematosus, Scleroderma, Demyelinating Disease

Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis

#### 7. Digestion and Metabolism [6 Hours]

Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea

Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemics

#### 8. Geriatrics [6 Hours]

Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension

#### *Recommended Textbooks*

1. *Lippicott's Pharmacology.*

2. *Essential of Medical Pharmacology by Tripathi*

3. *Text book of Medical Pharmacology by Padmaja udaykumar*



4. *Pharmacology by N.Muruges*
5. *Pharmacology & Pharmacotherapeutics by Sadoskar.*

<b>EXERCISE THERAPY</b>
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### Course Description

In this course, the students will learn the principles and effects of exercise as a therapeutic modality and will learn the techniques in the restoration of physical functions.

Subject Title	:EXERCISE THERAPY
Duration	: 13 – 24 Months
Total Hours	: 240
Theory	: 90 Hrs
Practical	: 150 Hrs
Total Hours / Week	: 8 Hrs
Lecture	: 2 Hours / Week
Practicals	: 5 Hours / Week
Seminars / Tutorials	: 1 Hour / Week
Method of Assessment	: Written, Oral, Practical

### Theory

#### 1. Introduction to Exercise Therapy [3 Hours]

The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment

#### 2. Methods of Testing [15 Hours]

##### a) Functional tests

b) Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses., Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints- **revision**

##### c) Tests for neuromuscular efficiency

Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group & individual muscles : Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine

Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf

Static power Test

Dynamic power Test

Endurance test

Speed test

Measurement of Limb Length: true limb length, apparent limb length, segmental limb length.

Measurement of the angle of Pelvic Inclination.

d) Tests for Co-ordination

3. Relaxation [4 Hours]

Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation-Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.

4. Passive Movements [ 4 Hours]

Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses , Techniques of giving passive movements.

5. Active Movements [ 6 hours]

Definition of strength, power & work, endurance, muscle actions.

Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fiber type, motor unit, force gradation.

Causes of decreased muscle performance

Physiologic adaptation to training: Strength & Power, Endurance.

Types of active movements

Free exercise: Classification, principles, techniques, indications, contraindications, effects and uses

Active Assisted Exercise: principles, techniques, indications, contraindications, effects and uses

Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses

Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses

Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise,

Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

6. Specific exercise regimens

Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training

Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle Isometrics

Isokinetic regimens

## 7. Physiology of muscle performance: [2 hours]

Structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fibre type, motor unit, force gradation. Causes of decreased muscle performance  
Physiologic adaptation to training: Strength & Power, Endurance.

## 8. Proprioceptive Neuromuscular Facilitation [6 Hours]

Definitions & goals

Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb

Procedure: components of PNF

Techniques of facilitation

Mobility: Contract relax, Hold relax, Rhythmic initiation

Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization

Stability: Alternating isometric, rhythmic stabilization

Skill: timing for emphasis, resisted progression

Endurance: slow reversals, agonist reversal

## 9. Suspension Therapy [6 Hours]

Definition, principles, equipments & accessories, Indications & contraindications, Benefits of suspension therapy

Types of suspension therapy: axial, vertical, pendular

Techniques of suspension therapy for upper limb

Techniques of suspension therapy for lower limb

## 10. Functional Re-education [4 hours]

Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lowerlimb and Upperlimb activities.

## 11. Aerobic Exercise [4 Hours]

Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.

## 12. Stretching [3 Hours]

Definition of terms related to stretching; Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.

## 13. Manual Therapy & Peripheral Joint Mobilization [5 Hours]

Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan

Biomechanical basis for mobilization, Effects of joint mobilisation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization

for upper limb, lower limb, Precautions.

#### 14. Balance [ 4 Hours]

Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output

Components of balance (sensory, musculoskeletal, biomechanical)

Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types

Balance retraining

#### 15. Co-ordination Exercise [ 4 Hours]

Anatomy & Physiology of cerebellum with its pathways

Definitions: Co-ordination, Inco-ordination

Causes for Inco-ordination, Test for co-ordination: equilibrium test, non equilibrium test

Principles of co-ordination exercise

Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.

#### 16. Posture [3 Hours]

Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.

#### 15. Walking Aids [3 hours] Walking aids Revision. Application : Pre crutch Training and crutch gaits.

#### 16. Massage [ 4 Hours]

History and Classification of Massage

Technique Principles, Indications and

Contraindications Technique of Massage

Manipulations

Physiological and Therapeutic Uses of Specific Manipulations

#### 17. Hydrotherapy [ 3 Hours]

Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipments, techniques, Effects and uses, merits and demerits

#### 18. Individual and Group Exercises [ 3 Hours]

Advantages and Disadvantages, Organisation of Group exercises, Recreational Activities and Sports

#### 19. Introduction to Yoga [ 5 Hours]

Asanas – Principles and elements;

Pranayamas – Principles, Methods and Techniques

## Practicals

The students of exercise therapy are to be trained in Practical Laboratory work for all the topics discussed in theory. The student must be able to evaluate and apply judiciously the different methods of exercise therapy techniques on the patients. They must be able to-

1. Demonstrate the technique of measuring using goniometry
2. Demonstrate muscle strength using the principles and technique of MMT
3. Demonstrate the techniques for muscle strengthening based on MMT grading
4. Demonstrate the PNF techniques
5. Demonstrate exercises for training co-ordination – Frenkel's exercise
6. Demonstrate the techniques of massage manipulations
7. Demonstrate techniques for functional re-education
8. Assess and train for using walking aids
9. Demonstrate mobilization of individual joint regions
10. Demonstrate to use the technique of suspension therapy for mobilizing and strengthening joints and muscles
11. Demonstrate the techniques for muscle stretching
12. Assess and evaluate posture and gait
13. Demonstrate to apply the technique of passive movements
14. Demonstrate various techniques of Active movements
15. Demonstrate techniques of strengthening muscles using resisted exercises
16. Demonstrate techniques for measuring limb length and body circumference.

### *Recommended Textbooks*

1. *Therapeutic exercise by Barbara Bandy*
2. *Therapeutic exercise by Carolyn Kisner*
3. *Principles of exercise therapy by M.Dena Gardiner*
4. *Practical Exercise therapy by Hollis Margaret*
5. *Therapeutic exercise by Sydney Litch*
6. *Therapeutic exercise by Hall & Brody*
7. *Therapeutic exercise by Basmajian*
8. *Physical Rehabilitation by o'Sullivan.*
9. *Therapeutic massage by Sinha*
10. *Principles of muscle testing by Hislop.*

## ELECTROTHERAPY

### Course Description.

In this course the student will learn the Principles, Techniques, Effects, Indication, Contra-Indication. and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function. The objective of this course is that after 240hrs. of lectures, demonstration, practical and clinics the student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

Subject Title Duration Total Hours Theory Practical	:ELECTROTHERAPY : 13 – 24 Months : 240 : 90 Hrs : 150 Hrs
Total Hours / Week Lecture Practicals Seminars / Tutorials	: 8 Hrs : 2 Hours / Week : 5 Hours / Week : 1 Hour / Week
Method of Assessment	: Written, Oral, Practical

### Theory

#### **Section I - Introductory Physics. [This unit will have questions for short essay and short answer only]**

1. Electricity definition, types [1 Hour]
2. Static electricity [2 Hour]
  - a. Production of electrical charges.
  - b. Characteristics of charged body.
  - c. Characteristics of lines of forces.
  - d. Potential difference and EMG.
3. Current Electricity [5 Hour]
  - a. Units of Electricity, faraday, volt, ampere, coulomb, watt.
  - b. Resistance in series and parallel.
  - c. Ohms law and its application to DC/AC.
  - d. Fuse.
  - e. Shock: Micro/ Macro shocks, safety precaution and management, earthing techniques & precautions.

- f. Burns: electrical & chemical burns, prevention and management.
  - g. Condensers: definition, principles, types, construction, working and uses.
4. Magnetism: Definition, properties, electro-magnetic induction, electro- magnetic spectrum. [1 Hour]
  5. Valves, transformers, types, principles, construction and working. [1 Hour]
  6. Ionization: Principles, effects of various technique of medical ionization. [1 Hour]

## **Section II – Therapeutic Electricity**

### **Section II A - Low frequency Currents**

1. Basic types of current [1 Hour]
  - a. Direct Current: types, physiological & therapeutic effects.
  - b. Alternating Current
2. Types of Current used in Therapeutics [1 Hour]  
Modified D.C, Faradic Current, Galvanic Current, Modified A.C, Sinusoidal Current and Diadynamic Current.
3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers. [2 Hours]
4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles. [2 Hours]
5. Sinusoidal Current & Diadynamic Current in Brief. [1 Hour]
6. HVPGS – Parameters & its uses [1 Hour]
7. Ionization / Iontophoresis : Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, wound healing. [1 Hour]
8. Cathodal / Anodal galvanism. [1 Hour]
9. Micro Current & Macro Current [1 Hour]
10. Types of Electrical Stimulators [1 Hour]

NMES- Construction component.

Neuro muscular diagnostic stimulator- construction component Components and working Principles.

11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance. [2 Hours]
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair. [2 Hours]
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications. [3 Hours]
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

### **Section II B - Electro-diagnosis**

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase. [2 Hours]
3. Nerve conduction velocity studies [1 Hour]
4. EMG: Construction of EMG equipment.[1 Hour]
5. Bio-feed back.[1 Hour] **Section II C - Medium Frequency**

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications. [2 Hour]
2. Russian Current
3. Rebox type Current [1 Hour]

### **Section III - Thermo & Actinotherapy (High Frequency Currents)**

1. Electro Magnetic Spectrum. [1 Hour]
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters [8 Hours]



3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME. [1 Hour]
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD. [2 Hours]
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, Commonly used drugs, Uses. Dosages of US. [8 Hours]
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication. [2 Hours]
7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp [8 Hours]
8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density [8 Hours]

#### **Section IV – Superficial heating Modalities**

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers. [2 Hours]
2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications. [1 Hour]
3. Moist Heat Therapy: Hydro collar packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications. [1 Hour]
4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications. [1 Hour]
5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications. [1 Hour]
6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications. [1 Hour]

7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication. [1 Hour]
8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages. [4 Hours]

### Practical

The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.

1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.
2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.
3. Demonstrate placement of electrodes for various electrotherapy modalities
4. Electrical stimulation for the muscles supplied by the peripheral nerves
5. Faradism under Pressure for UL and LL
6. Plotting of SD curve with chronaxie and rheobase
7. Demonstrate FG test
8. Application of Ultrasound for different regions-various methods of application
9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
11. Demonstrate treatment method using IFT for various regions
12. Calculation of dosage and technique of application of LASER
13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
14. Demonstrate the treatment method using whirl pool bath
15. Winding up procedure after any electrotherapy treatment method

### *Recommended Textbooks*

1. *Claytons Electrotherapy by Forster & Plastangs*
2. *Electrotherapy Explained by Low & Reed*
3. *Clinical Electrotherapy by Nelson*
4. *Electrotherapy Evidence based practice by Sheila Kitchen*
5. *Physical agents by Michile Cameroon*
6. *Principles of Electrotherapy by Michile Camreeon*
7. *Thermal agents by Susan Michlovitz.*

## ETHICS & ADMINISTRATION

Subject Title Duration Total Hours Theory / Lecture	: ETHICS AND ADMINISTRATION : 25 – 36 Months : 30 : 1 Hour / Week
Method of Assessment	: Written

### ETHICS

1. History of physiotherapy, Ethical principles in health care, Ethical principles related to physiotherapy, Scope of practice, Enforcing standards in health profession-promoting quality care, Professional ethics in research, education and patient care delivery, Informed consent issues, Medical ethics and Economics in clinical decision-making. [3 hours]
2. Rules of professional conduct [2 hours]
  - Physiotherapy as a profession
  - Relationship with patients
  - Relationship with health care institutions
  - Relationship with colleagues and peers
  - Relationship with medical and other professional.
3. Confidentiality and Responsibility, Malpractice and negligence, Provision of services and advertising,  
Legal aspects: Consumer protection act, Legal responsibility of physiotherapist for their action in professional context and understanding liability and obligations in case of medico-legal action [2 hours]
4. IAP - Memorandum Of Association & Rules And Regulations [3 hours]

### ADMINISTRATION AND SUPERVISION

1. Introduction: Branches of administration, Nature and scope of administration, How to be an effective administrator, Planning hospital administration as part of a balanced health care program. [2 hours]
2. Principles of hospital administration and its applications to physiotherapy. [2 hours]
3. Planning and organization: Planning cycle, Principles of organizational charts, Resource and quality management, Planning change -innovation [2 hours]
4. Financial issues including budget and income generation [2 hours]
5. Hospital administration: Organization, Staffing, Information, Communication, Coordination, Cost of services, Monitoring and evaluation. [2 hours]

6. National health policy and health care system in India [2 hours]
7. Organization of physiotherapy department: Planning, Space, Manpower, Other basic resources. [2 hours]
8. Organizing meetings, committees, and negotiations [1 hour]
9. Personnel management: Personnel performance appraisal system, Quality care delivery from the staff [2 hours]
10. Material management [1 hour] Pharmacy  
Hospital waste disposal
11. Quality assurance [1 hours] Hospital acquired infection  
Quality assurance through record review and medical audit.
12. Public relations in hospital and human resource management. [1 hours] Recommended books:

1. Medical Ethics by C M Francis.
2. George V Lobo – Current Problems in Medical Ethics
3. Consumer Protection Act – 1986, Government of India, New Delhi.
4. Francis C M – Hospital Administration
5. Davies, R and Macaulay, BMC – Hospital Planning and Administration
6. Health Services Management, Analysis & Application , Wadsworth Publishing Company, Belmont

## FIRST AID & CPR

### Course Description

At the completion of this course the student of First Aid and CPR must be able to identify and manage situation of common emergencies.

Subject Title	: FIRST AID & CPR
Duration	: 13 – 24 Months
Total Hours	: 30
Theory	: 10 Hours
Practical	: 20 Hours
Lecture + Practical	: 1 Hour / Week
Method of Assessment	: Written, Oral, Practical

1. Importance of First Aid in Physiotherapy.
2. Examination of Vital Signs
3. First Aid in cardiac arrest.
4. First Aid in Respiratory failure.
5. First Aid in Burns.
6. First Aid in Electric shock.
7. First Aid in Drowning.
8. First Aid in Spinal cord injuries.
9. First Aid in Hypovolemic Shock.
10. First Aid in Poisoning
11. Instrumentation used in First Aid (First Aid kit).
12. First Aid in RTA.
13. Indication of CPR.
14. Assessment and technique of CPR.
15. Artificial ventilation.

### *Recommended Textbooks*

1. *First aid in emergency – St-john. Ambulance Association.*
2. *Physiotherapy for burns & Reconstruction – Glassey.*
3. *Surgical & Medical Procedures for Nurses & Paramedical staff – Nathan.*
4. *First aid & management of general injuries & common ailments-Gupta & Gupta*

## CONSTITUTION OF INDIA

Subject Title	: CONSTITUTION OF INDIA
Duration	: 13 – 24 Months
Total Hours	: 30
Theory	: 30
Lecture	: 1 Hour / Week
Method of Assessment	: Written

1. Meaning of the term “Constitution” making of the Indian Constitution 1946-49
2. The democratic institution created by the Constitution Bicameral system of Legislature at the Centre and in the States.
3. Fundamental Rights and Duties...Their content and significance.
4. Directive Principles of States Policies ...The need to balance Fundamental Rights with Directive Principles.
5. Special Rights created in the Constitution for: Dalits, Backwards, Women and Children and the Religious and Linguistic Minorities.
6. Doctrine of Separation of Powers-----Legislative, Executive and Judicial and their functioning in India.
7. The Election Commission and State Public Service Commissions.
8. Method of amending the Constitution.
9. Enforcing rights through Writs: Certiorari, Mandamus, Quo warranto and Habeas Corpus.
10. Constitution and Sustainable Development in India.

### *Recommended Textbooks:*

1. *J.C. Johari: The Constitution of India—A Politico-Legal Study— Sterling Publication, Pvt. Ltd. New Delhi.*
2. *J.N Pandey: Constitution Law of India, Allahabad, Central Law Agency, 1998.*
3. *Granville Austin: The Indian Constitution—Corner Stone of a Nation— Oxford, New Delhi, 2000.*

## INTRODUCTION TO TREATMENT

Subject Title Duration Total Hours Theory Lecture	: INTRODUCTION TO TREATMENT : 13 – 24 Months : 30 : 30 : 1 Hour / week
Method of Assessment	: Written, Oral

2. General Information regarding Hospital wards, Patients hospital records and Functioning of department in patient management and departmental clinical units
  - a. Physiotherapy OPD
  - b. Neurological Physiotherapy
  - c. Orthopedic Physiotherapy
  - d. Developmental Pediatric Physiotherapy
  - e. Cardio-Pulmonary Physiotherapy( ICU, NICU and Post-Op ICU, Wards)
  - f. Health Fitness Physiotherapy- Obesity, Diabetic clinic, Life style modification clinic
  - g. Geriatric Physiotherapy
  - h. Industrial Physiotherapy and Ergonomics
  - i. Community Physiotherapy
  - j. Women's Health Physiotherapy, Incontinence clinic
2. History taking, assessment, tests, Patient communication, documentation of findings, treatment organization and planning/execution for intervention.
3. Record keeping and information retrieval.
4. Techniques of use of electrotherapy equipments on patients, monitoring of dosages and winding up procedure.
5. Introduction about standardized tests and scales used in various types of cases for assessment and interpretation.
6. Exercise therapy treatment organization and methods of application on various types of cases

**SECTION – 2**  
**Third Year**

**GENERAL MEDICINE**

**Subject Description**

This subject follows the basic science subjects to provide the knowledge about relevant aspects of general medicine. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various medical conditions.

Subject Title Duration Total Hours Theory / Lecture	: GENERAL MEDICINE : 25 – 36 Months : 60 : 2 Hours / Week
Method of Assessment	: Written

1. Infection : Effects of Infection on the body – Pathology – source and spread of infection – vaccinations – generalized infections – rashes and infection – food poisoning and gastroenteritis – sexually transmitted diseases – HIV infections and Aids [3 Hours]
2. Poisoning : Clinical features – general management – common agents in poisoning – pharmaceutical agents – drugs of misuse – chemical pesticides – Envenomation [2 Hours]
3. Food and Nutrition : Assessment – Nutritional and Energy requirements; Deficiency diseases – clinical features and treatment; Protein – Energy Malnutrition : Clinical features and treatment; Obesity and its related disorders : Causes – Complications – benefits of weight loss – management of Obesity – diet, exercise and medications.[4 Hours]
4. Endocrine diseases : Common presenting symptoms of Endocrine disease – common classical disease presentations, clinical features and its management; Diabetes Mellitus : Etiology and pathogenesis of diabetes – clinical manifestations of the disease – management of the disease – Complications of diabetes. [4 Hours]
5. Diseases of the blood : Examinations of blood disorders – Clinical manifestations of blood disease; Anemia – signs and symptoms – types and management ; Hemophilia - Cause – clinical features severity of disease – management – complications due to repeated haemorrhages – complications due to therapy. [4 Hours]
6. Diseases of the digestive system : Clinical manifestations of gastrointestinal disease – Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achlasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Infections of Alimentary Tract ; Clinical manifestations of liver diseases - Aetiology, clinical features, diagnosis, complications and treatment of the following



conditions : Viral Hepatitis, Wilson's Disease, Alpha1-antitrypsin deficiency, Tumors of the Liver, Gall stones, Cholecystitis. [7 Hours]

7. Cardiovascular Disease : Examination of the Cardiovascular System – Investigations : ECG, Exercise Stress Testing, Radiology ; Clinical manifestations of Cardiovascular disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases and disorders of the heart : Pericarditis, Myocarditis, Endocarditis, Rheumatic Fever – resulting in valve disorders, Ischemic Heart Disease, Coronary Valve Disease, Congenital disorders of the Heart, Cardiac Arrest ; Examination and Investigations of diseases of arteries and veins ; Hypertension : Definition, causes, classification, types, assessment, investigations and management. [8 Hours]
8. Respiratory Disease : Examination of the Respiratory System – Investigations : Chest Radiographs, Pulmonary Function Testing, Arterial Blood Gas Analysis ; Clinical manifestations of Lung disease ; Patterns of lung disease – Chronic Obstructive Lung Disease and Restrictive Lung Disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following lung diseases : Chronic Bronchitis, Emphysema, Asthma, Bronchiectasis, Cystic Fibrosis, Upper Respiratory Tract Infections, Pneumonia, Tuberculosis, Fungal Diseases, Interstitial Lung Diseases, Diseases of the pleura, diaphragm and chest wall ; Respiratory failure – Definition, types, causes, clinical features, diagnosis and management. [9 Hours]
9. Diseases of the Skin : Examination and clinical manifestations of skin diseases ; Causes, clinical features and management of the following skin conditions : Leprosy, Psoriasis, Pigmentary Anomalies, Vasomotor disorders, Dermatitis, Coccal and Fungal Parasitic and Viral infections. [6 Hours]
10. Pediatrics : Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ; Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child. [8 Hours]
11. Psychiatric Disorders: Classifications, Causes, Clinical manifestations and treatment methods used in Psychiatry. [5 Hours]

Recommended books:

1. Davidson's Principles and Practice of Medicine
2. Harrison's Internal Medicine
3. Braunwald Text of Cardiology
4. Text Book of Cardiology by Hurst

## GENERAL SURGERY

### Subject Description

This subject follows the basic science subjects to provide the knowledge about relevant aspects of general surgery. The student will have a general understanding of the surgical conditions the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the indications for surgery, etiology, clinical features and surgical methods for various conditions.

Subject Title Duration Total Hours Theory / Lecture	: GENERAL SURGERY : 25 – 36 Months : 60 : 2 Hours / Week
Method of Assessment	: Written

1. Fluid, Electrolyte and Acid-Base disturbances – diagnosis and management ; Nutrition in the surgical patient ; Wound healing – basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, Scars – types and treatment. Hemostasis – components, hemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion ; Surgical Infections ; General Post – Operative Complications and its management [6 Hours]
  
2. Reasons for Surgery ; Types of anaesthesia and its affects on the patient ; Types of Incisions ; Clips Ligatures and Sutures ; General Thoracic Procedures – Radiologic Diagnostic procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery.[3 Hours]
  
3. Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pnuemothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions. [4 Hours]
  
4. Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer. [3 Hours]
  
5. Disorders of the Chest Wall, Lung and Mediastinum – Definition, Clinical features, diagnosis and choice of management for the following disorders – chest wall deformities, chest wall tumors, Spontaneous Pneumothorax, Pleural Effusion, Empyema Thoracis, Lung abscess, Bronchiectasis, Tuberculosis, Bronchogenic Carcinoma, Bronchial Adenomas, Metastatic tumors of the Lung, tracheal Stenosis, Congenital tracheomalacia, Neoplasms of the trachea, Lesions of the Mediastinum. Carcinoma of the female breast. [5 Hours]
  
6. Disorders of the Heart – Definition, Clinical features, diagnosis and choice of management for the following disorders : Congenital Heart diseases – Acyanotic congenital heart disease & Cyanotic congenital heart disease : Patent Ductus Arteriosus, Coarctation of Aorta, Atrial Septal Defect, Ventricular Septal Defect, Tetralogy of Fallot, Transposition of Great

Vessels ; Acquired Heart Disease – Mitral Stenosis & Insufficiency, Aortic Stenosis and Insufficiency, Ischemic Heart Disease – Coronary Artery Disease, Cardiac tumors. [6 Hours]

7. Thoracic surgeries – Thoracotomy – Definition, Types of Incisions with emphasis to the site of incision, muscles cut and complications. Lung surgeries : Pneumectomy, Lobectomy, segmentectomy – Indications, Physiological changes and Complications ; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung. Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extracardiac Operations, Closed Heart surgery, Open Heart surgery. Transplant Surgery – Heart, Lung and Kidney – Indications, Physiological changes and Complications. [6 Hours]
8. Diseases of the Arteries and Veins : Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases : Arteriosclerosis, Atherosclerosis, Aneurysm, Buerger's disease, Raynaud's Disease, Thrombophlebitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins. [5 Hours]
9. Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendectomy Mastectomy, Nephrectomy, Prostatectomy. [4 Hours]
10. Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps. [4 Hours]
11. Womens Health : Menstrual cycle and its disorders. Hormonal disorders of females-obesity and female hormones. Cancer of the female reproductive organs-management Infections and sexually transmitted disease in female Menopause - its effects on emotions and musculoskeletal system. Malnutrition and deficiencies in females. Sterility-pathophysiology-investigations-management. Maternal physiology in pregnancy. Musculo skeletal disorders during pregnancy. Prenatal complications-investigations- management. Child birth- Stages - complications-investigations-management – Pain relief in labour - Puerperium - Post Natal care. Surgical procedures involving child birth. Incontinence – Types, Causes, Assessment and Management. Definition, Indications and Management of the following surgical procedures – Hysterosalpingography, Dilatation and Curettage, Laparoscopy, Colposcopy, Hysterectomy. [8 Hours]
12. ENT: Common problems of ear, otitis media, Otosclerosis, functional deafness and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy. [3 Hours]
13. Ophthalmology: Ophthalmologic surgical conditions, refraction's, conjunctivitis, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra-ocular muscles-surgical management[3 Hours]

Recommended books:

1. General Surgical Operations – by Kirk / Williamson
2. Surgery by Nan
3. Bailey and Love's – Short Practice of Surgery
4. Chest Disease by Crofton and Douglas.
5. Patricia A Downie, Text book of Heart, Chest Vascular Disease for physiotherapists, JP Bros.

## ORTHOPEDECS & TRAUMATOLOGY

### Subject Description

This subject follows the basic science subjects to provide the knowledge about Orthopedic conditions the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to demonstrate an understanding of orthopedic conditions causing disability, list the etiology, clinical features and methods of investigations and management.

Subject Title	: ORTHOPEDICS & TRAUMATOLOGY
Duration	: 25 – 36 Months
Total Hours	: 60
Theory / Lecture	: 2 Hours / Week
Method of Assessment	: Written

#### 1. Introduction [3 Hours]

Introduction to orthopaedics. Clinical examination in an Orthopedic patient. Common investigative procedures. Radiological and Imaging techniques in Orthopaedics. Inflammation and repair, Soft tissue healing.

#### 2. Traumatology [3 Hours]

Fracture: definition, types, signs and symptoms. Fracture healing. Complications of fractures. Conservative and surgical approaches. Principles of management – reduction (open/closed, immobilization etc). Subluxation/ dislocations – definition, signs and symptoms, management (conservative and operative).

#### 3. Fractures and Dislocations of Upper Limb [6 Hours]

Fractures of Upper Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:

Fractures of clavicle and scapula. Fractures of greater tuberosity and neck of humerus. Fracture shaft of humerus. Supracondylar fracture of humerus. Fractures of capitulum, radial head, olecranon, coronoid, and epicondyles. Side swipe injury of elbow. Both bone fractures of ulna and radius. Fracture of forearm – Monteggia, Galeazzi fracture – dislocation. Chauffeur's fracture. Colle's fracture. Smith's fracture. Scaphoid fracture. Fracture of the metacarpals. Bennett's fracture. Fracture of the phalanges. (Proximal and middle.)

Dislocations of Upper Limb - Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher's and Hippocrates maneuver), surgical management (putti plat, bankart's) etc. Recurrent dislocation of shoulder. Posterior dislocation of shoulder – mechanism of injury, clinical features and management. Posterior dislocation of elbow – mechanism of injury, clinical feature, complications & management.

#### 4. Fracture of Spine [4 Hours]

Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications (quadriplegia); Management- immobilization (collar, cast, brace, traction); Management for stabilization, management of complication (bladder and bowel, quadriplegia). Clay shoveller's fracture. Hangman's fracture. Fracture odontoid. Fracture of atlas.

Fracture of Thoracic and Lumbar Regions - Mechanism of injury, clinical features, management—conservative and surgical of common fractures around thoracic and lumbar regions. Fracture of coccyx.

Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum.

#### 5. Fractures and Dislocations of Lower Limb [5 Hours]

Fracture of Pelvis and Lower Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:

Fracture of pelvis. Fracture neck of femur – classification, clinical features, complications, management - conservative and surgical. Fractures of trochanters. Fracture shaft femur—clinical features, mechanism of injury, complications, management-conservative and surgical. Supracondylar fracture of femur. Fractures of the condyles of femur. Fracture patella. Fractures of tibial condyles. Both bones fracture of tibia and fibula. Dupuytren's fracture Maisonneuve's fracture. Pott's fracture – mechanism of injury, management. Bimalleolar fracture Trimalleolar fracture Fracture calcaneum – mechanism of injury, complications and management. Fracture of talus. Fracture of metatarsals—stress fractures Jones's fracture. Fracture of phalanges.

Dislocations of Lower Limb - mechanism of injury, clinical features, complications, management of the following dislocations of lower limb.

Anterior dislocation of hip. Posterior dislocation of hip. Central dislocation of hip. Dislocation of patella. Recurrent dislocation of patella.

#### 6. Soft Tissue Injuries [3 Hours] - Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis.

Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries: Meniscal injuries of knee. Cruciate injuries of knee. Medial and lateral collateral injuries of knee. Lateral ligament of ankle. Wrist sprains. Strains- quadriceps, hamstrings, calf, biceps, triceps etc. Contusions- quadriceps, gluteal, calf, deltoid etc. Tendon ruptures-Achilles, rotator cuff muscles, biceps, pectorals etc.

#### 7. Hand Injuries [2 Hours]- mechanism of injury, clinical features, and management of the following - Crush injuries. Flexor and extensor injuries. Burn injuries of hand.

#### 8. Amputations [2 Hours] - Definition, levels of amputation of both lower and upper limbs, indications, complications.

#### 9. Traumatic Spinal Cord Injuries [2 Hours] - Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia.

#### 10. Deformities [6 Hours] - clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.

Congenital Deformities - CTEV. CDH. Torticollis. Scoliosis. Flat foot. Vertical talus. Hand anomalies- syndactyly, polydactyly and ectrodactyly. Arthrogryposis multiplex congenita (amyoplasia congenita). Limb deficiencies- Amelia and Phocomelia. Klippel feil syndrome. Osteogenesis imperfecta (fragile ossium). Cervical rib.

Acquired Deformities - Acquired Torticollis. Scoliosis. Kyphosis. Lordosis. Genu varum. Genu valgum. Genu recurvatum Coxa vara. Pes cavus. Hallux rigidus. Hallux valgus. Hammer toe. Metatarsalgia.

11. Disease of Bones and Joints [4 Hours]: Causes, Clinical features, Complications, Management- medical and surgical of the following conditions :

Infective conditions: Osteomyelitis (Acute / chronic). Brodie's abscess. TB spine and major joints like shoulder, hip, knee, ankle, elbow etc.

Arthritic conditions: Pyogenic arthritis. Septic arthritis. Syphilitic infection of joints.

Bone Tumors: classification, clinical features, management - medical and surgical of the following tumors : Osteoma. Osteosarcoma, Osteochondroma. Enchondroma. Ewing's sarcoma. Giant cell tumor. Multiple myeloma. Metastatic tumors.

Perthes disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis.

Metabolic Bone Diseases: Rickets. Osteomalacia, Osteopenia. Osteoporosis.

12. Inflammatory and Degenerative Conditions [4 Hours]: causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions :

Osteoarthritis. Rheumatoid arthritis. Ankylosing spondylitis Gouty arthritis. Psoriatic arthritis. Hemophilic arthritis. Still's disease (juvenile rheumatoid arthritis). Charcot's joints.

Connective Tissue Disorders- Systemic Lupus Erythematosus, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue Disease (MCTD)

13. Syndromes [3 Hours]: Causes, Clinical features, complications, management- conservative and surgical of the following :

Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costo clavicular syndrome. Levator scapulae syndrome. Piriformis syndrome.

14. Neuromuscular Disorders [3 hours]: Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions : Cerebral palsy. Poliomyelitis. Spinal Dysraphism. Leprosy.

15. Cervical and Lumbar Pathology [3 Hours]: Causes, clinical feature, patho-physiology, investigations, management-Medical and surgical for the following :

Prolapsed intervertebral disc (PID), Spinal Canal Stenosis. Spondylosis (cervical and lumbar) Spondylolysis. Spondylolisthesis. Lumbago/ Lumbosacral strain. Sacralisation. Lumbarisation. Coccydynia. Hemivertebra.

16. Orthopedic Surgeries [3 Hours]: Indications, Classification, Types, Principles of management of the following Surgeries :

Arthrodesis. Arthroplasty (partial and total replacement). Osteotomy , External fixators. Spinal stabilization surgeries (Harrington's, Luque's, Steffi plating) etc , Limb re-attachments.

17. Regional Conditions [4 Hours]: Definition, Clinical features and management of the following regional conditions

Shoulder: Periarthritic shoulder (adhesive capsulitis). Rotator cuff tendinitis. Supraspinatus Tendinitis. Infraspinatus Tendinitis. Bicipital Tendinitis. Subacromial Bursitis.

Elbow: Tennis Elbow. Golfer's Elbow. Olecranon Bursitis (student's elbow ). Triceps Tendinitis.

Wrist and Hand: De Quervain's Tenosynovitis. Ganglion. Trigger Finger/ Thumb. Mallet Finger, Carpal Tunnel Syndrome, Dupuytren's Contracture.

Pelvis and Hip : IT Band Syndrome. Piriformis Syndrome. Trochanteric Bursitis.

Knee: Osteochondritis Dissecans. Prepatellar and Suprapatellar Bursitis. Popliteal Tendinitis. Patellar Tendinitis. Chondromalacia Patella. Plica Syndrome. Fat Pad Syndrome (Hoffa's syndrome).

Ankle and Foot: Ankle Sprains. Plantar Fasciitis / Calcaneal Spur. Tarsal Tunnel Syndrome. Achilles Tendinitis. Metatarsalgia. Morton's Neuroma.

#### Books Recommended:

1. Outline of Fractures—John Crawford Adams.
2. Outline of Orthopedics.— John Crawford Adams.
3. Text book of Orthopedics.—Maheswari.
4. Apley's Orthopedics.
5. Textbook of Orthopedics and Traumatology— M.N.Natarajan

## MUSCULOSKELETAL & SPORTS PHYSIOTHERAPY

### Subject Description

The subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to musculoskeletal dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.

Subject Title	: MUSCULOSKELETAL AND SPORTS
Duration	PHYSIOTHERAPY
Total Hours	: 25 – 36 Months
Theory	: 150
Practical	: 90 Hours
	: 60 Hours
Total Hours / Week	: 5 Hrs
Lecture	: 3 Hours / Week
Practicals	: 2 Hours / Week
Method of Assessment	: Written, Oral, Practical

1. PT assessment for Orthopedic conditions –

**SOAP format-** Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness.

**Pain assessment-** intensity, character, aggravating and relieving factors, site and location.

**Objective-** on observation - body built swelling, muscle atrophy, deformities, posture and gait.

**On palpation-** tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances.

**On examination** – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental, girth measurement, muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination- dermatomes, myotomes and reflexes, special tests and functional tests.

Prescription of home program. Documentation of case records, and follow up. [5 Hours]

2. Fractures - PT management in complications - early and late - shock, compartment syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases.

Aims of PT management in fracture cases - short and long term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period. [9 Hours]

3. Specific fractures and dislocations : PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations



including pelvis. PT assessment and management spinal fractures. [6 Hours]

4. Selection and application of physiotherapeutic techniques, maneuver's, modalities for preventive, curative and rehabilitative means in all conditions. [2 Hours]
5. Principles of various schools of thought in manual therapy. (Briefly Maitland and Mc kenzie). [3 Hours]
6. Degenerative and Inflammatory conditions: PT assessment and management and home program for the following conditions – Osteoarthritis - emphasis mainly on knee, hip and hand, Rheumatoid Arthritis, Ankylosing spondylitis, Gout, Perthes disease, Periarthritic shoulder. [3 Hours]
7. Infective conditions: PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, Pyogenic arthritis, TB spine and major joints - knee and hip. [2 Hours]
8. Define, review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program. [3 Hours]
9. Deformities: Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions : Congenital : CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum. [3 Hours]
10. Cerebral palsy: Common orthopedic deformities, clinical features, complications, conservative and surgical management and home program with special emphasis on carrying techniques. PT management after surgical corrections. [2 Hours]
11. Poliomyelitis: Common deformities, conservative and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program. [2 Hours]
12. Leprosy:PT assessment, aims, and PT management after surgical procedures such as tendon transfer both pre and post operatively. [2 Hours]
13. Amputations: Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management. [3 Hours]
14. Spinal conditions: Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis, Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta. [5 Hours]
15. Effects of spinal traction, types of traction, modes of application, indications for spinal

traction, contraindications, precautions, limitations of traction. [2 Hours]

16. Osteoporosis- causes, predisposing factors, investigations and PT treatment. [1 Hour]
17. Orthopedic surgeries: Pre and post operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplasty-partial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy. [4 Hours]
18. Shoulder joint : Shoulder instabilities, TOS, RSD, Impingement syndrome - conservative and Post operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears- conservative and surgical repair. Subacromial decompression - Post operative PT management. [3 Hours]
19. Elbow and forearm: Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management. [2 Hours]
20. Wrist and Hand: Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management. [3 Hours]
21. Hip: Joint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - management. [2 Hours]
22. Knee: Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome- conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy- rehabilitation. [5 Hours]
23. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management. [1 Hour]
24. Introduction to Bio-Engineering; Classification of Orthoses and prostheses; Biomechanical principles of orthotic and prosthetic application; Designing of upper extremity, lower extremity and spinal orthosis, indications and check out; Designing of upper extremity and lower extremity prostheses, indications and check out; Psychological aspects of orthotic and prosthetic application; prescription and designing of footwear and modifications; Designing and construction of adaptive devices. [9 Hours]
25. Sports Physiotherapy : Physical fitness. Stages of soft tissue healing. Treatment guidelines for soft tissue injuries- Acute, Sub acute and chronic stages. Repair of soft tissues- rupture of muscle, tendon and Ligamentous tears. Soft tissue injuries- prevention and rehabilitation of, Lateral ligament sprain of ankle. Rotator cuff injuries. Collateral and Cruciate injuries of knee. Meniscal injuries of knee. Supraspinatus and Bicipital tendonitis . Pre patellar and Subacromial bursitis. Tennis and Golfer's elbow. Hamstring strains, Quadriceps contusion, TA rupture. Dequervain's tenosynovitis. Trigger and Mallet finger. Plantar fasciitis. Wrist sprains. [5 Hours]
26. Applied Yoga in orthopedic conditions [3 Hours]

Practical: 60 Hours

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions
2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

Recommended books:

1. Tidy's physiotherapy.
2. Textbook of orthopedics- Cash.
3. Clinical orthopedic rehabilitation- Brozman.
4. Orthopedic physiotherapy - Jayant Joshi.
5. Physical Rehabilitation Assessment and Treatment – O'Sullivan Schmitz
6. Sports physiotherapy- Maria Zuluaga

## CARDIO-RESPIRATORY & GENERAL PHYSIOTHERAPY

### Subject Description

The subject is designed to provide knowledge in assessing and planning physiotherapy interventions for various General, Medical and Surgical conditions. The student must be able to reassess the patient as necessary, to monitor the patient in regard to treatment, to monitor the patient's vital signs, and to provide appropriate interventions to the patient.

Subject Title	: CARDIO-RESPIRATORY & GENERAL PHYSIOTHERAPY
Duration	: 25 – 36 Months
Total Hours	: 150
Theory	: 90 Hours
Practical	: 60 Hours
Total Hours / Week	: 5 Hrs
Lecture	: 3 Hours / Week
Practicals	: 2 Hours / Week
Method of Assessment	: Written, Oral, Practical

Theory: 90 Hours

1. Anatomical and Physiological differences between the Adult and Pediatric lung [1 Hour]
2. Bedside assessment of the patient-Adult & Pediatric[5 Hours]
3. Investigations and tests – Exercise tolerance Testing – Cardiac & Pulmonary, Radiographs, PFT, ABG, ECG, Hematological and Biochemical Tests [6 Hours]
4. Physiotherapy techniques to increase lung volume – controlled mobilization, positioning, breathing exercises, Neurophysiological Facilitation of Respiration, Mechanical aids - Incentive Spirometry, CPAP,IPPB [3 Hours]
5. Physiotherapy techniques to decrease the work of breathing – Measures to optimize the balance between energy supply and demand, positioning, Breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP [3 Hours]
6. Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercises, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning [3 Hours]
7. Drug therapy – Drugs to prevent and treat inflammation, Drugs to treat Bronchospasm, Drugs to treat Breathlessness, Drugs to help sputum clearance, Drugs to inhibit coughing, Drugs to

improve ventilation, Drugs to reduce pulmonary hypertension, Drug delivery doses, Inhalers and Nebulisers.[1 Hour]

8. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars-U.V.R and other electro therapeutics for healing of wounds, prevention of Hypergranulated Scars Keoloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues. [2 Hours]
9. Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhydrosis. Massage maneuvers for cosmetic purpose of skin; use of specific oil as medium; Care of anesthetic hand and foot; Evaluation, planning and management of leprosy-prescription, fitting and training with prosthetic and orthotic devices [2 Hours]
10. Neonatal and Pediatric Physiotherapy – Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit [3 Hours]
11. Physiotherapy in Obstructive lung conditions [2 Hours]
12. Physiotherapy in Restrictive lung conditions [2 hours]
13. Management of breathlessness [2 hours]
14. Pulmonary Rehabilitation [4 Hours]
15. Physiotherapy following Lung surgeries [3 Hours]
16. Respiratory failure – Oxygen Therapy and Mechanical Ventilation [4 Hours]
17. Introduction to ICU : ICU monitoring –Apparatus, Airways and Tubes used in the ICU - Physiotherapy in the ICU – Common conditions in the ICU – Tetanus, Head Injury, Lung Disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock; Dealing with an Emergency Situation in the ICU[4 Hours]
18. Burns management - Role of physiotherapy in the management of burns, post grafted cases- Mobilization and Musculo-skeletal restorative exercises following burns [3 Hours]
19. Physiotherapy management following cardiac surgeries [3 Hours]
20. Cardiac Rehabilitation [4 Hours]
21. Physiotherapy management following PVD [3 Hours]
22. Abdominal Surgeries - Management of Pulmonary Restorative Dysfunction following Surgical procedures on Abdomen and Thorax [3 Hours]
23. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes [3 Hours]

24. Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases [3 Hours]
25. Home program and education of family members in patient care [2 Hours]
26. Physiotherapy in Obstetrics – Antenatal Care, Antenatal Education, Postnatal Care. Electrotherapy and Exercise Therapy measures for the re-education of Ano-Urethral sphincters. [3 Hours]
27. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity. [5 Hours]
28. Health Fitness and Promotion : Fitness Evaluation, Analysis of Body composition, Evaluation and prescription of Exercise, Factors affecting exercise Performance, Exercise Prescription for Specific groups : Elderly, Women and Children. [5 Hours]
29. Applied Yoga in Cardio-respiratory conditions [3 Hours]

Practical: 60 Hours

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions
2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

Recommended books:

1. Tidy's physiotherapy.
2. Cash's Text Book of Chest, Heart, Vascular Disorders for Physiotherapists.
3. The Brompton Guide to chest physiotherapy DU Gasket [Completed]
4. Physical Rehabilitation Assessment and Treatment – O'Sullivan Schmitz
5. Elements in Pediatric Physiotherapy – Pamela M Eckersley
6. Essentials of Cardio Pulmonary Physical Therapy by Hillegass and Sadowsky
7. Cardio pulmonary Symptoms in physical Therapy practice Cohen and Michel
8. Chest Physiotherapy in Intensive Care Unit by Mackenzi
9. Cash's Text book of General Medicine and Surgical conditions for Physiotherapists.
10. Physiotherapy in Psychiatry
11. Physical Therapy for the Cancer patient by M.C Garvey
12. Physiotherapy in Obstetrics and Gynecology by Polden

## ALLIED THERAPIES

### Subject Description

The Subject is designed to provide an overview in the basics of Occupational Therapy, Speech and Language Therapy and Alternative Medicine. This will help the student to make decisions during the course of patient evaluation to refer to the concerned specialist for a required therapy.

Subject Title	: ALLIED THERAPIES
Duration	: 25 - 36 Months
Total Hours	: 60
Theory	: 60
Lecture	: 2 Hour / week
Method of Assessment	: Written

### Basic Occupational Therapy

1. Introduction to Occupational Therapy
2. Principles of Occupational Therapy
3. Human Structure and Function in Occupational Therapy
4. Therapeutic Media in Occupational Therapy
5. Therapeutic Modalities in Occupational Therapy
6. Health Care Management in Occupational Therapy
7. Pathophysiology in Occupational Therapy
8. Mental Health in Occupational Therapy
9. Physical Function in Occupational Therapy

### Basic Speech Therapy

1. Anatomy and Physiology of the Organs of Language
2. Introduction to Audiology
3. Neurological Basis of Language, Linguistics, Phonetics and Phonology
4. Introduction to Language Disorders
5. Speech Therapy Intervention in Language Development Disorders, Aphasia, Speech Articulation Disorders, Deafness
6. Dyslexias and dysgraphias
7. Stuttering
8. Alternative Systems of Communication
9. Intervention in autism and Psychopathological Disorders
10. Intervention in Basic Language, Psychomotor Development
11. New Educational Methodologies for Children with Auditory Alterations
12. Technology Applied to Speech Processing
13. Speech Therapy Intervention in Cochlear Implantation

### Alternative Medicine

1. Accupuncture : Definitions, Principles, Techniques, Physiological and Therapeutic effects, Indications and Contra indications.
2. Introduction to Naturotherapy – Principles of application ,Indications and Uses.
3. Magnetotherapy - Principles of application, Indications and Uses.
4. Yogasanas and their scientific studies.
5. Role of the above Alternative Medicine approaches including Yoga in comprehensive rehabilitation of patients.

## CLINICAL TRAINING - I

Duration Total Hours	: 25 - 36 Months : 540
Method of Assessment	: Oral, Practical

Students will be posted in rotation in the following areas/wards. The students will be clinically trained to provide physiotherapy care for the patients. They will be trained on bed side approach, patient assessment, performing special tests, identifying indications for treatment, ruling out contraindications, decision on treatment parameters, dosage and use relevant outcome measures under supervision.

1. Physiotherapy OPD
2. General Medicine & MICU
3. General Surgery & CTS-ICU
4. Burns & Plastic Surgery
5. Orthopedics
6. Neurology
7. Pediatrics, PICU, NICU
8. OBG
9. Community –PHC
10. Prosthetic & Orthotic Unit ( Artificial Limb Center)



**SECTION – 2**  
**Fourth Year**

**NEUROLOGY & NEUROSURGERY**

**Subject Description**

This subject follows the basic science subjects to provide the knowledge about relevant aspects of neurology & neurosurgery. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various neurological conditions.

Subject Title Duration Total Hours Theory / Lecture	: NEUROLOGY & NEUROSURGERY : 25 – 36 Months : 60 : 2 Hours / Week
Method of Assessment	: Written

1. Disorders of function in the context of Pathophysiology, Anatomy in Neurology and Cortical Mapping. [1 hour]
2. Classification of neurological involvement depending on level of lesion.[1 hour]
3. Neurological assessment: Principles of clinical diagnosis, higher mental function, assessment of brain & spinal cord function, evaluation of cranial nerves and evaluation of autonomic nervous system. [3 hours]
4. Investigations: principles, methods, views, normal/abnormal values/features, types of following investigative procedures- skull x-ray, CT, MRI, evoked potentials, lumbar puncture, CSF examination, EMG, NCV. [3 hours]
5. Neuro-ophthalmology: Assessment of visual function – acuity, field, colour vision, Pupillary reflex, accommodation reflex, abnormalities of optic disc, disorders of optic nerve, tract, radiation, occipital pole, disorders of higher visual processing, disorders of pupil, disorders of eye movements, central disorders of eye movement. [1 hour]
6. Deafness, vertigo, and imbalance: Physiology of hearing, disorders of hearing, examination & investigations of hearing, tests of vestibular function, vertigo, peripheral vestibular disorders, central vestibular vertigo. [2 hours]
7. Lower cranial nerve paralysis – Etiology, clinical features, investigations, and management of following disorders - lesions in trigeminal nerve, trigeminal neuralgia, trigeminal sensory neuropathy, lesions in facial nerve, facial palsy, bell's palsy, hemi facial spasm, Glossopharangeal neuralgia, lesions of Vagus nerve, lesions of spinal accessory nerve, lesions of hypoglossal nerve. Dysphagia – swallowing mechanisms, causes of dysphagia, symptoms, examination, and management of dysphagia. [3 hours]

8. Cerebro-vascular diseases: Define stroke, TIA, RIA, stroke in evolution, multi infarct dementia and Lacunar infarct. Classification of stroke – Ischemic, hemorrhagic, venous infarcts. Risk factors, cause of ischemic stroke, causes of hemorrhagic stroke. Classification of hemorrhagic stroke, classification of stroke based on symptoms, stroke syndrome, investigations, differential diagnosis, medical and surgical management. [4 hours]
9. Head injury: Etiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications. [3 hours]
10. Higher cortical, neuro psychological and neurobehavioral disorders: Causes of blackouts, physiological nature of Epilepsy, classification, clinical features, investigations, medical & surgical management of following disorders – Non-epileptic attacks of childhood, Epilepsy in childhood, Seizures, and Epilepsy syndromes in adult. Classification and clinical features of Dyssomnias, Parasomnias, Dementia, Obsessive-compulsive disorders. Neural basis of consciousness, causes & investigations of Coma, criteria for diagnosis of Brain death. Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Perceptual disorders and Speech disorders. [3 hours]
11. Movement disorders: Definition, etiology, risk factors, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson's disease, Dystonia, Chorea, Ballism, Athetosis, Tics, Myoclonus and Wilson's disease. [3 hours]
12. Cerebellar and coordination disorders: Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich's ataxia, Ataxia telangiectasia, Metabolic ataxia, Hereditary cerebellar ataxia, Tabes dorsalis and Syphilis. [3 hours]
13. Spinal cord disorders: Functions of tracts, definition, etiology, risk factors, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Spinal cord injury, Compression by IVD prolapse, Spinal epidural abscess, Transverse myelitis, Viral myelitis, Syringomyelia, Spina bifida, Sub acute combined degeneration of the cord, Hereditary spastic paraplegia, Radiation myelopathy, Progressive encephalomyelitis, Conus medullaris syndrome, Bladder & bowel dysfunction, and Sarcoidosis. [3 hours]
14. Brain tumors and spinal tumors: Classification, clinical features, investigations, medical and surgical management. [3 hours]
15. Infections of brain and spinal cord: Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Meningitis, Encephalitis, Poliomyelitis and Post-polio syndrome. Complications of systemic infections on nervous system – Septic encephalopathy, AIDS, Rheumatic fever, Brucellosis, Tetanus, and Pertussis. [2 hours]
16. Motor neuron diseases: - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications of following disorders - Amyotrophic lateral sclerosis, Spinal muscular atrophy, Hereditary bulbar palsy, Neuromyotonia and Post-irradiation lumbosacral polyradiculopathy. [2 hours]
17. Multiple sclerosis - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications. [2 hours]

18. Disorders of neuromuscular junction – Etiology, classification, signs & symptoms, investigations, management, of following disorders Myasthenia gravis, Eaton-Lambert syndrome, and Botulism. [2 hours]
19. Muscle diseases: Classification, investigations, imaging methods, Muscle biopsy, management of muscle diseases, genetic counselling. Classification, etiology, signs & symptoms of following disorders – Muscular dystrophy, Myotonic dystrophy, myopathy, Non-dystrophic myotonia. [3 hours]
20. Polyneuropathy – Classification of Polyneuropathies, Hereditary motor sensory neuropathy, Hereditary sensory and Autonomic neuropathies, Amyloid neuropathy, Acute idiopathic Polyneuropathies. Guillain-Barre syndrome – Causes, clinical features, management of GBS, Chronic Idiopathic Polyneuropathies, diagnosis of polyneuropathy, nerve biopsy. [2 hours]
21. Focal peripheral neuropathy: Clinical diagnosis of focal neuropathy, neurotmesis, Axonotmesis, Neuropraxia. Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – RSD, Nerve tumors, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & Intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, Sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, Pudental nerve palsy. [3 hours]
22. Paediatric neurology: Neural development, Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders - Cerebral palsy, Hydrocephalus, Arnold-chiari malformation, Basilar impression, Klippel-Feil syndrome, Achondroplasia, Cerebral malformations, Autism, Dandy walker syndrome and Down's syndrome. [3 hours]
23. Toxic, metabolic and environmental disorders: Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – Encephalopathy, Alcohol toxicity, Recreational drug abuse, Toxic gases & Asphyxia, Therapeutic & diagnostic agent toxicity, Metal toxicity, Pesticide poisoning, Environmental & physical insults, Pant & Fungal poisoning, Animal poisons, & Complications of organ transplantation. [3 hours]
24. Introduction, Indications and Complications of following Neuro surgeries: Craniotomy, Cranioplasty, Stereotactic surgery, Deep brain stimulation, Burr-hole, Shunting, Laminectomy, Hemilaminectomy, Rhizotomy, Microvascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery - Thalamotomy and Pallidotomy, Coiling of aneurysm, Clipping of aneurysm, and Neural implantation. [2 hours]

Recommended books:

7. Davidson's Principles and Practice of Medicine
8. Textbook of Neurology- Victor Adams
9. Brains Clinical Neurology.
10. Illustrated Neurology & Neurosurgery
11. Brains Diseases of Nervous System

# NEURO-PHYSIOTHERAPY

## Subject Description

The subject serves to integrate the knowledge gained by the students in neurology and neurosurgery with skills to apply these in clinical situations of dysfunction and neurological pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to neurological dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore neurological function.

Subject Title Duration Total Hours Theory Practical	: NEURO-PHYSIOTHERAPY : 25 – 36 Months : 150 : 90 Hours : 60 Hours
Total Hours / Week Lecture Practicals	: 5 Hrs : 3 Hours / Week : 2 Hours / Week
Method of Assessment	: Written, Oral, Practical

1. Neurological Assessment: Required materials for examination, Chief complaints, History taking – Present, Past, medical, familial, personal histories, Observation, Palpation, Higher mental function – Consciousness, Orientation, Wakefulness, memory, Speech, Reading, Language, Writing, Calculations, Perception, Left right confusion, Reasoning, and Judgment, Motor Examination – Muscle power, Muscle tone, Spasticity, Flaccidity, Reflexes – Developmental reflexes, deep tendon reflexes, Superficial reflexes, Sensory examination – Superficial, Deep and Cortical sensations, Special tests – Romberg's, Kernig's sign, Brudzki sign, Tinels's sign, Slum test, Lehermitte's sign, Bells Phenomenon, Gower's sign, Sun set sign, Battle's sign, Glabellar tap sign, etc, Balance examination, coordination examination, Gait analysis – Kinetics & Kinematics (Quantitative & Qualitative analysis), Functional Analysis, Assessment tools & Scales – Modified Ashworth scale, Berg balance scale, FIM, Barthel index, Glasgow coma scale, Mini mental state examination, Rancho Los Amigos Scale for Head injury, APGAR score, ASIA scale, Reflex Grading. Differential diagnosis. [10 hours]
2. Neuro physiological Techniques – Concepts, Principles, Techniques, Effects of following Neurophysiological techniques: NDT, PNF, Vojta therapy, Rood's Sensory motor Approach, Sensory Integration Approach, Brunnstorm movement therapy, Motor relearning program, Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy. [14 hours]
3. Paediatric Neurology: Paediatric Examination, Developmental milestones, developmental reflexes, Neuro developmental screening tests. Evaluation & Management - History, Observation, Palpation, Milestone Examination, developmental reflex Examination, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various

Neurophysiological approaches & Modalities in Risk babies, Minimum brain damage, Developmental disorders, Cerebral palsy, Autism, Down's Syndrome, Hydrocephalus, Chorea, Spina bifida, and syringomyelia. [14 hours]

4. Evaluation and Management of Brain and Spinal Cord Disorders : History, Observation, Palpation, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Cerebro vascular Accident, Meningitis, Encephalitis, Head Injury, Brain Tumors, Perceptual disorders, Amyotrophic lateral sclerosis, and Multiple sclerosis. [10 hours]
5. Evaluation and Management of Cerebellar, Spinal Cord and Muscle Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Ataxia, Sensory Ataxia, Parkinson's disease, Muscular dystrophy (DMD), Myasthenia Gravis, Eaton-Lambert Syndrome, Spinal tumors, Spinal cord injury, Transverse myelitis, Bladder & Bowel Dysfunction, Spinal muscular atrophies, Poliomyelitis, Post Polio Syndrome [10 hours]
6. Evaluation and Management of Peripheral Nerve Injuries and Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Hereditary motor sensory neuropathy, Guillain-Barre syndrome, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, and Pudental nerve palsy. [10 hours]
7. Assessment and management of Neurological gaits: Quantitative and Qualitative (Kinetic & Kinematics) analysis, List of Problems, short & Long Term goals, Management of following Neurological Gaits - Hemiplegic gait, Parkinson gait, High step gait, Hyperkinetic gait, Hypokinetic gait, Waddling gait, Scissoring gait, Spastic gait, Choreaform Gait, Diplegic Gait, and Myopathic Gait [10 hours]
8. Pre and Post surgical assessment and treatment following conditions - Spinal disc herniation, Spinal stenosis, Spinal cord trauma, Head trauma, Brain tumors, Tumors of the spine, Spinal cord and peripheral nerves, Cerebral aneurysms, Subarachnoid hemorrhages, epilepsy, Parkinson's disease, Chorea, Hemiballism, Psychiatric disorders, Malformations of the nervous system, Carotid artery stenosis , Arteriovenous malformations, and Spina bifida [9 hours]
9. Applied Yoga in Neurological conditions [3 Hours]

Practical: 60 Hours

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

3. Bedside case presentations and case discussions
4. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

Recommended books:

1. Tidy's physiotherapy.
2. Cash's Textbook of Neurology for Physiotherapists
3. Neurological Rehabilitation by D Umphred
4. Physical Rehabilitation Assessment and Treatment – O'Sullivan Schmitz
5. Elements of Pediatric Physiotherapy-Eckersley

## COMMUNITY MEDICINE

### Subject Description

This subject follows the basic science subjects to provide the knowledge about conditions the therapist would encounter in their practice in the community. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to demonstrate an understanding of various aspects of health and disease list the methods of health administration, health education and disease preventive measures.

Subject Title	: COMMUNITY MEDICINE
Duration	: 25 – 36 Months
Total Hours	: 60
Theory / Lecture	: 2 Hours / Week
Method of Assessment	: Written

1. Health and Disease: Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, The role of socio-economic and cultural environment in health and disease. [5 hours]
2. Epidemiology, definition and scope. Principles of Epidemiology and Epidemiological methods: Components and Aims, Basic measurements, Methods, Uses of Epidemiology, Infectious disease epidemiology, Dynamics and modes of disease transmission, Host defenses and Immunizing agents, Hazards of Immunization, Disease prevention and control, Disinfection. Screening for Disease: Concept of screening, Aims and Objectives, Uses and types of screening. [7 hours]
3. Epidemiology of communicable disease: Respiratory infections, Intestinal infections, Arthropod-borne infections, Zoonoses, Surface infections, Hospital acquired infections Epidemiology of chronic non-communicable diseases and conditions: Cardio vascular diseases: Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, Obesity, Blindness, Accidents and Injuries. [7 hours]
4. Public health administration- an overview of the health administration set up at Central and state levels. The national health programme-highlighting the role of social, economic and cultural factors in the implementation of the national programmes. Health problems of vulnerable groups- pregnant and lactating women, infants and pre-school children, occupational groups [4 hours]
5. Health programmes in India: Vector borne disease control programme, National leprosy eradication programme, National tuberculosis programme, National AIDS control programme, National programme for control of blindness, Iodine deficiency disorders (IDD) programme, Universal Immunisation programme, Reproductive and child health programme, National cancer control programme, National mental health programme. National diabetes control programme, National family welfare programme, National sanitation and water supply programme, Minimum needs programme [4 hours]

6. Demography and Family Planning: Demographic cycle, Fertility, Family planning-objectives of national family planning programme and family planning methods, A general idea of advantage and disadvantages of the methods. [3 hours]
7. Preventive Medicine in Obstetrics, Paediatrics and Geriatrics: MCH problems, Antenatal, Intranatal and post natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare programmes for women and children, Preventive medicine and geriatrics. [6 hours]
8. Nutrition and Health: Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition programmes [4 hours]
9. Environment and Health: Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, Medical entomology. [3 hours]
10. Hospital waste management: Sources of hospital waste, Health hazards, Waste management [3 hours]
11. Disaster Management: Natural and man made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness [4 hours]
12. Occupational Health: Occupational environment, Occupational hazards, Occupational diseases, Prevention of occupational diseases. Social security and other measures for the protection from occupational hazard accidents and diseases. Details of compensation acts. [4 hours]
13. Mental Health: Characteristics of a mentally healthy person, Types of mental illness, Causes of mental ill health, Prevention, Mental health services, Alcohol and drug dependence. Emphasis on community aspects of mental health. Role of Physiotherapist in mental health problems such as mental retardation. [3 hours]
14. Health Education: Concepts, aims and objectives, Approaches to health education, Models of health education, Contents of health education, Principles of health education, Practice of health education [3 hours]

Recommended books:

1. Textbook of Preventive & Social Medicine, Dr. J E Park



## COMMUNITY PHYSIOTHERAPY

### Subject Description

The subject serves to integrate the knowledge gained by the students in community medicine and other areas with skills to apply these in clinical situations of health and disease and its prevention. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify rehabilitation methods to prevent disabilities and dysfunctions due to various disease conditions and plan and set treatment goals and apply the skills gained in rehabilitating and restoring functions.

Subject Title	: COMMUNITY PHYSIOTHERAPY
Duration	: 25 – 36 Months
Total Hours	: 150
Theory	: 90 Hours
Practical	: 60 Hours
Total Hours / Week	: 5 Hrs
Lecture	: 3 Hours / Week
Practicals	: 2 Hours / Week
Method of Assessment	: Written, Oral, Practical

1. Rehabilitation: Definition, Types [1 hour]
2. Community: Definition of Community, Multiplicity of Communities, The Community based approach, Community Entry strategies, CBR and Community development, Community initiated versus community oriented programme, Community participation and mobilization [5 hours]
3. Introduction to Community Based Rehabilitation: Definition, Historical review, Concept of CBR, Need for CBR, Difference between Institution based and Community based Rehabilitation, Objectives of CBR, Scope of CBR, Members of CBR team, Models of CBR [6 hours]
4. Principles of Community based Rehabilitation. W.H.O.'s policies-about rural health care-concept of primary /tertiary health centers-district hospitals etc-Role of P.T.-Principles of a team work of Medical person/P.T./O.T. audiologist/speech therapist /P.&O./vocational guide in C.B.R. of physically handicapped person , Agencies involved in rehabilitation of physical handicapped - Legislation for physically handicapped. Concept of multipurpose health worker. Role of family members in the rehabilitation of a physically handicapped. [10 hours]
5. Planning and management of CBR Programmes, CBR Programmed planning and management, Ownership and Governance, Decentralization and CBR, Management of CBR, Programmed sustainability, Communication and Coordination, Community participation, mobilization and awareness, CBR programme influence on promoting and developing public policies [6 hours]
6. Disability: Definition of Impairment, Handicap and Disability, Difference between impairment, handicap and disability, Causes of disability, Types of disability, Prevention of disability, Disability in developed countries, Disability in developing countries.Disability Surveys: Demography. Screening: Early detection of disabilities and developmental disorders, Prevention

of disabilities- Types and levels [6 hours]

7. Disability Evaluation: Introduction, What, Why and How to evaluate, Quantitative versus Qualitative data, Uses of evaluation findings [5 hours]
8. Role of Government in CBR: Laws, Policies, Programmes, Human Rights Policy, Present rehabilitation services, Legal aspects of rehabilitation [5 hours]
9. Role of Social work in CBR: Definition of social work, Methods of social work, History of social work, Role of social worker in rehabilitation [4 hours]
10. Role of voluntary Organizations in CBR: Charitable Organizations, Voluntary health agencies – National level and International NGO's, Multilateral and Bilateral agencies. International Health Organizations: WHO, UNICEF, UNDP, UNFPA, FAO, ILO, World bank, USAID, SIDA, DANIDA, Rockefeller, Ford foundation, CARE, RED CROSS. [4 hours]
11. National District Level Rehabilitation Programme: Primary rehabilitation unit, Regional training center, District rehabilitation center, Primary Health center, Village rehabilitation worker, Anganwadi worker [5 hours]
12. Role of Physiotherapy in CBR: Screening for disabilities, Prescribing exercise programme, Prescribing and devising low cost locally available assistive aids, Modifications physical and architectural barriers for disabled, Disability prevention, Strategies to improve ADL, Rehabilitation programmes for various neuromusculoskeletal and cardiothoracic disabilities. [5 hours]
13. Screening and rehabilitation of paediatric disorders in the community: Early detection of high risk babies, Maternal nutrition and education, Rehabilitation of Cerebral Palsy, Polio, Downs Syndrome, Muscular Dystrophies etc., Prevention and rehabilitation of mental retardation and Behavioural disorders, Immunization programmes, Early intervention in high risk babies, Genetic counselling [5 hours]
14. Extension services and mobile units: Introduction, Need, Camp approach [2 hours]
15. Vocational training in rehabilitation: Introduction, Need, Vocational evaluation, Vocational rehabilitation services [2 hours]

## **PREVENTION- PHYSIOTHERAPY ROLE**

16. Geriatrics - Physiology of Aging /degenerative changes-Musculoskeletal /Neuromotor /cardio – respiratory-/Metabolic, Endocrine, Cognitive, Immune systems. Role of Physio Therapy in Hospital based care, Half-way homes, Residential homes, Meals on wheels etc. Home for the aged, Institution based Geriatric Rehabilitation. Few conditions:- Alzheimer's disease, Dementia, Parkinson's Disease, Incontinence, Iatrogenic drug reactions, etc. Ethics of Geriatric Rehabilitation. [9 hours]
17. Industrial Health & Ergonomics [10 hours] - Occupational Hazards in the industrial area -- Accidents due to
  1. Physical agents-e.g.-Heat/cold, light, noise, Vibration, U.V. radiation, Ionizing radiation,
  2. Chemical agents-Inhalation, local action, ingestion,
  3. Mechanical hazards-overuse/fatigue injuries due to ergonomic alteration & ergonomic evaluation of work place-mechanical stresses per hierarchy –
    - i. sedentary table work –executives, clerk,
    - ii. inappropriate seating arrangement- vehicle drivers
    - iii. constant standing- watchman- Defense forces, surgeons,
    - iv. Over-exertion in laborers,-common accidents –Role of P.T.-Stress management.

4. Psychological hazards- e.g.-executives, monotonicity & dissatisfaction in job, anxiety of work completion with quality, Role of P.T. in Industrial setup & Stress management-relaxation modes.
5. Biological Hazards

#### 18. Lifestyle disorders:

Physiotherapy role in planning , execution of lifestyle diseases like hypertension, obesity and diabetes mellitus. Role in developing awareness programs.

#### Practical: 60 Hours

This will consist of Field visits to urban and rural PHC's., Visits to regional rehabilitation training center, Regular mobile camps, Disability surveys in villages, Disability screening, Demonstration of Evaluation and Physiotherapy prescription techniques for musculoskeletal, neuromuscular, cardio-respiratory, paediatric, gynecological and geriatric problems in community, Demonstration of evaluation and prescription techniques for ambulatory and assistive devices, Fabrication of low cost assistive devices with locally available materials.

#### Recommended books:

1. Rehabilitation Medicine by Howard A Rusk.
2. Rehabilitation Medicine by Joel A De lisa

## RESEARCH METHODOLOGY AND BIOSTATISTICS

### Course Description

This course will introduce to the student the basic research methodology, statistical concepts: methods of statistical analysis: and interpretation of data.

Subject Title	: RESEARCH METHODOLOGY & BIOSTATISTICS
Duration	: 13 – 24 Months
Total Hours	: 60
Theory	: 60
Lecture	: 2 Hours / Week
Method of Assessment	: Written

### RESEARCH METHODOLOGY [30 Hours]

1. 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.
2. Research problem: Statement of research problem., Statement of purpose and objectives of research problem, Necessity of defining the problem
3. Research design: Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design
4. 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
5. 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.
6. Methods of data collection: collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.
7. Sampling fundamentals, need for sampling & some fundamental definitions, Important sampling distributions
8. Processing & analysis of data: Processing operations, problems in processing , Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.

9. Testing of hypothesis: What is 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
10. Computer technology: Introduction to Computers, computer application in research, computers & researcher.

#### BIOSTATISTICS [30 Hours]

1. 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.
2. Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve,. Normal probability curve.
3. Measure of Central Tendency: Need for measures of central Tendency, Definition and 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.
4. Probability and Standard Distributions: Meaning of probability of standard distribution, The binominal distribution, The normal distribution, Divergence from normality – skew ness, kurtosis.
5. 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.
6. Analysis of variance & covariance: Analysis of variance (ANOVA), what is ANOVA? Basic principle of ANOVA, ANOVA technique, Analysis of Co variance(ANACOVA)

#### *Recommended Textbooks:*

1. *Elements of Health Statistics: Rao.N.S.N*
2. *An introduction of Biostatistics: Sunder Rao.P.S.S.*
3. *Methods in Bio-Statistics 6<sup>th</sup> Edn. 1997: B.K. Mahajan*
4. *Biostatistics : A manual of Statistics Methods: K. Visweswara Rao*
5. *Elementary Statistics 1<sup>st</sup> Edn, 1990. in Medical Workers: Inderbir Singh*
6. *Statistics in Psychology and education: Great and Henry*
7. *An Introduction to Gupta C.B. Statistical Methods, 1972: Ram Prasad & Sons*
8. *Basic Statistics, 3<sup>rd</sup> Edn.: Simpsory G. Kaftha. P*
9. *Research; Principles and Methods:L Denise F. Poli & Hungler*
10. *Fundamentals of Research, 4<sup>th</sup> Edn.: David J. fox*

## EVIDENCE BASED PHYSIOTHERAPY

Subject Title	: EVIDENCE BASED PHYSIOTHERAPY
Duration	: 25 – 36 Months
Total Hours	: 30
Theory / Lecture	: 1 Hour / Week
Method of Assessment	: Written, Oral

1. Introduction to Evidence Based Practice: Definitions, Evidence Based Practice, Evidence Based Physiotherapy Practice [3 hours]
2. Concepts of Evidence based Physiotherapy: Awareness, Consultation, Judgement, Creativity [1 hours]
3. Development of Evidence based knowledge, The Individual Professional, Professionals within a discipline, Professionals across disciplines [2 hours]
4. Evidence Based Practitioner: The Reflective Practitioner, The E Model, Using the E Model [1 hours]
5. Finding the Evidence: Measuring outcomes in Evidence Based Practice, Measuring Health Outcomes, Measuring clinical outcomes, Inferential statistics and Causation [3 hours]
6. Searching for the Evidence: Asking Questions, Identifying different sources of evidence, Electronic Bibliographic databases and World Wide Web, Conducting a literature search. Step-by-step search for evidence [2 hours]
7. Assessing the Evidence: Evaluating the evidence; Levels of evidence in research using quantitative methods, Levels of evidence classification system, Outcome Measurements, Biostatistics, The critical review of research using qualitative methods [4 hours]
8. Systematically reviewing the evidence: Stages of systematic reviews, Meta analysis, The Cochrane collaboration [3 hours]
9. Economic evaluation of the evidence: Types of economic evaluation, Conducting economic evaluation, Critically reviewing economic evaluation, Locating economic evaluation in the literature [2 hours]
10. Using the evidence: Building evidence in practice; Critically Appraised Topics (CATs), CAT format, Using CATs, Drawbacks of CATs [2 hours]
11. Practice guidelines, algorithms, and clinical pathways: Recent trends in health care, Clinical Practice Guidelines (CPG), Algorithms, Clinical pathways, Legal implications in clinical pathways and CPG, Comparison of CPGs, Algorithms and Clinical Pathways [3 hours]
12. Communicating evidence to clients, managers and funders: Effectively communicating evidence, Evidence based communication in the face of uncertainty, Evidence based

communication opportunities in everyday practice [2 hours]

13. Research dissemination and transfer of knowledge: Models of research transfer, Concrete research transfer strategies, Evidence based policy [2 hours]

Recommended books:

1. Evidence-Based Practice in Nursing and Health Care: A Guide to Best Practice ,by [Bernadette Melnyk](#) (Editor), [Ellen Fineout-Overholt](#) (Editor)
2. Evidence-Based Rehabilitation: A Guide to Practice,by Mary Law
3. Achieving Evidence-Based Practice, by Susan Hamer, BA, MA, RGN, FETC(DIST),
4. [The Evidence-Based Practice](#) by Stout, Randy A Hayes

## PROJECT

Subject Title	: PROJECT
Duration	: 25 – 36 Months
Total Hours	: 60
Method of Assessment	: Oral, Practical

Project will be a clinical assignment on given topic or condition. This may be done in the form of a literature review. This will give the student a background on research methods and recent advances.

## CLINICAL TRAINING - II

Duration	: 25 - 36 Months
Total Hours	: 540
Method of Assessment	: Oral, Practical

Students will be posted in rotation in the following areas/wards. The students will be clinically trained to provide physiotherapy care for the patients under supervision. They will be trained on bed side approach, patient assessment, performing special tests, identifying indications for treatment, ruling out contraindications, decision on treatment parameters, dosage and use relevant outcome measures under supervision. Evidence based practice will be part of training.

1. Physiotherapy OPD
2. Neurology, Neurosurgery & Neuro ICU
3. Community-PHC
4. Orthopedics
5. General Medicine & MICU

6. General Surgery & CTS ICU
7. Developmental Pediatrics & Child Guidance Clinic
8. OBG
9. Geriatric – Old Age Homes
10. Industrial Visits - Ergonomics

**APPENDIX – I - SPECIFICATIONS FOR ANATOMY THEORY AND PRACTICALS**

		MAXIMUM MARKS	NUMBER OF QUESTIONS		MAXIMUM MARKS FOR EACH QUESTION	
A	<b>THEORY</b>			CHAPTER / TOPIC		
1	WRITTEN PAPER	100	ESSAY	MUSCULOSKELETAL ANATOMY	2	10
				NEURO ANATOMY		
				REGIONAL ANATOMY – CVS, RESPIRATORY SYSTEM		
			SHORT ESSAY	MUSCULOSKELETAL ANATOMY	12	5
				NEURO ANATOMY		
				REGIONAL ANATOMY		
			SHORT ANSWER	MUSCULOSKELETAL ANATOMY	10	2
				NEURO ANATOMY		
				REGIONAL ANATOMY		
				EMBRYOLOGY		
2	VIVA VOCE	30	OSTEOLOGY		15	
			SOFT PARTS		15	
3	INTERNAL ASSESSMENT THEORY	20				
TOTAL THEORY						
		150				

B	<b>PRACTICAL</b>	MAXIMUM MARKS	NUMBER OF QUESTIONS	MAXIMUM MARKS FOR EACH QUESTION
1	PRACTICAL			
	HISTOLOGY SPOTTERS	10	10	1
	GROSS SPOTTERS: IDENTIFICATION OF STRUCTURES IN A GIVEN SPECIMEN,	10	5	2
	DISCUSSION ON ANY TWO DISSECTED SPECIMENS- a) ABOVE DIAPHRAGM b) BELOW DIAPHRAGM	15	1	8
			1	7
SURFACE ANATOMY	5	1	5	
2	INTERNAL ASSESSMENT PRACTICAL	10		
3	TOTAL PRACTICAL	50		



**APPENDIX – II - SPECIFICATIONS FOR PHYSIOLOGY THEORY AND PRACTICALS**

		MAXIMUM MARKS	NUMBER OF QUESTIONS		MAXIMUM MARKS FOR EACH QUESTION	
A	<b>THEORY</b>			CHAPTER / TOPIC		
1	WRITTEN PAPER	100	ESSAY	NERVE MUSCLE PHYSIOLOGY	2	10
				CARDIO VASCULAR SYSTEM		
				RESPIRATORY SYSTEM		
			SHORT ESSAY	NERVOUS SYSTEM	12	5
				BLOOD		
				NERVE MUSCLE PHYSIOLOGY		
				CARDIO VASCULAR SYSTEM		
				RESPIRATORY SYSTEM		
				DIGESTIVE SYSTEM		
				RENAL SYSTEM		
				ENDOCRINE SYSTEM		
			REPRODUCTIVE SYSTEM			
			SHORT ANSWER	SPECIAL SENSES	10	2
				NERVOUS SYSTEM		
				GENERAL PHYSIOLOGY		
BLOOD						
DIGESTIVE SYSTEM						
RENAL SYSTEM						
ENDOCRINE SYSTEM						
REPRODUCTIVE SYSTEM						
SPECIAL SENSES						
2	VIVA VOCE	30				
3	INTERNAL ASSESSMENT THEORY	20				
	TOTAL THEORY	150				

B	<b>PRACTICAL</b>	MAXIMUM MARKS	NUMBER OF QUESTIONS	MAXIMUM MARKS FOR EACH QUESTION
1	PRACTICAL HEMATOLOGY	10	1	10
	CLINICAL EXAMINATION	15	1	15
	AMPHIBIAN CHARTS	10	1	10
	INTERPRETATION OF CALCULATION OF A GIVEN PROBLEM	5	1	5
2	INTERNAL ASSESSMENT PRACTICAL	10		
3	TOTAL PRACTICAL	50		

**APPENDIX – III - SPECIFICATIONS FOR BIOMECHANICS THEORY AND PRACTICALS**

		MAXIMUM MARKS	NUMBER OF QUESTIONS		MAXIMUM MARKS FOR EACH QUESTION	
A	<b>THEORY</b>			CHAPTER / TOPIC		
1	WRITTEN PAPER	100	ESSAY	ANALYSIS OF POSTURE AND GAIT	2	10
				BIOMECHANICS OF PERIPHERAL JOINTS		
				BIOMECHANICS OF THE VERTEBRAL COLOMN		
			SHORT ESSAY	JOINT STRUCTURE AND FUNCTION	12	5
				MUSCLE STRUCTURE AND FUNCTION		
				BIOMECHANICS OF THE THORAX AND CHEST WALL		
				THE TEMPEROMANDIBULAR JOINT		
				BIOMECHANICS OF THE VERTEBRAL COLOMN		
				BIOMECHANICS OF THE PERIPHERAL JOINTS		
				ANALYSIS OF POSTURE AND GAIT		
			SHORT ANSWER	BASIC CONCEPTS IN BIOMECHANICS	10	2
				JOINT STRUCTURE AND FUNCTION		
				MUSCLE STRUCTURE AND FUNCTION		
				BIOMECHANICS OF THE THORAX AND CHEST WALL		
THE TEMPEROMANDIBULAR JOINT						
BIOMECHANICS OF THE VERTEBRAL COLOMN						
BIOMECHANICS OF THE PERIPHERAL JOINTS						
ANALYSIS OF POSTURE AND GAIT						
2	VIVA VOCE	30				
3	INTERNAL ASSESSMENT THEORY	20				
	TOTAL THEORY	150				

B	<b>PRACTICAL</b>	MAXIMUM MARKS	NUMBER OF QUESTIONS	MAXIMUM MARKS FOR EACH QUESTION
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1	PRACTICAL			
	ANALYSIS OF POSTURE AND GAIT. MOVEMENT ANALYSIS: ANALYSIS FOR ACTIVITIES OF DAILY LIVING – ADL – (like sitting to standing, throwing, lifting etc.)	20	MAJOR : 1	20
	BIMECHANICS OF THORAX AND CHEST WALL, BIOMECHANICS OF VERTEBRAL COLUMN, BIOMECHANICS OF PERIPHERAL JOINTS: WRIST AND HAND COMPLEX, ANKLE AND FOOT COMPLEX	20	MINOR: 2	10
2	INTERNAL ASSESSMENT PRACTICAL	10		
3	TOTAL PRACTICAL	50		

**Please Note: Biomechanics Practicals:** Practicals shall be conducted for various joint movements and analysis of the same. The

student shall be asked to analysis or demonstrate for activities of daily living – ADL – (like sitting to standing, throwing, lifting etc.) The student should be able to explain and demonstrate the movements occurring at the joints, the muscles involved, the movements or muscle action produced, and mention the axis and planes through which the movements occur. The demonstrations may be done on models or skeleton

#### **APPENDIX – IV - SUBSIDIARY SUBJECTS - DISTRIBUTION OF MARKS**

Sl.No.	Subject	Theory	Viva-Voce	Practicals	Total
		Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	English	80	20	-	100
2.	Kannada	80	20	-	100
3.	Basic Nursing	40	10	-	50
4.	Orientation to Physiotherapy	40	10	-	50
5.	First Aid & CPR	40	10	50	100
6.	Constitution of India	50	-	-	50
7.	Introduction to Treatment	80	20	-	100
8.	Allied Therapies	80	20	-	100
9.	Ethics and Administration	100	-	-	100
10.	Evidence Based Physiotherapy Practice	80	20	-	100
11.	Project	-	50	50	100

