VEER NARMAD
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BACHELOR OF PHYSIOTHERAPY

(BPT)

Version 3.0

New Syllabus
(Effective from 2011-2012)

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#. BACHELOR OF PHYSIOTHERAPY [BPT]

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A. & B.

Rules & Regulations of Bachelor of Physiotherapy

A. REGULATIONS GOVERNING BPT DEGREE COURSE:

1. These ordinances shall be called "The Ordinances, Syllabus and Scheme of Examination pertaining to the **Bachelor of Physiotherapy course, BPT."**
2. The Bachelor of Physiotherapy program shall be under the Faculty of Medicine.
3. The name of the Degree program shall be **Bachelor of Physiotherapy [BPT].**
4. This revised syllabus will be applicable from academic year 2011-12.

B. AIMS & OBJECTIVES OF BPT DEGREE COURSE:

➢ Aim of the course:

The aim of the course in **"Bachelor of Physiotherapy"** is to qualify students who complete it satisfactorily to work independently as physiotherapists, including working in interdisciplinary teams. The course must train students to plan, execute, evaluate and document physiotherapeutic work within the areas of promotion of good health, prevention of illness, treatment, habilitation, rehabilitation, and development of the profession, so that students acquire professional competence in the field of physiotherapy.

On the **Bachelor of Physiotherapy** course, acquiring professional competence means that the student must be able to:

a) Contribute to developing, supporting, maintaining and restoring people's optimal movement and functional abilities, with the aim of promoting good health and quality of life to prevent restrictions and loss of functionality in individuals

b) Direct physiotherapeutic intervention aim is to focus on individuals and groups of all ages in interaction with their environment, leisure activities, work and taking into account ergonomic factors.

c) Work in cooperation with patients and their relatives, colleagues, and professionals from other disciplines, irrespective of their cultural and linguistic backgrounds.

d) Initiate and participate in professionally-related research and development work.

e) Take further courses in theory and clinical practice after completing the basic education, including diploma, master's degree and special postgraduate degree courses.

Satisfactory completion of the course gives the right to use the title **Bachelor of Physiotherapy (BPT).**

➢ Objective of the Course:

This course shall allow the students:

a) To acquire adequate knowledge of basic medical subjects and to develop skills and techniques of therapeutic exercises and therapeutic modalities so that they can manage various medical surgical conditions of patients.

b) To acquire knowledge so that they can point out by assessing the medical and surgical conditions of the patient.

c) To acquire skills in management, research and teaching as well as guidance and counseling of patients.

d) To acquire proper attitude for compassion and concerns for patients and welfare of physically handicapped in the community.

e) To practice moral and ethical values with regard to physiotherapy.

1. ELIGIBILITY

1.1 Qualifying Examination:

A Candidate seeking admission to first year Bachelor in Physiotherapy (BPT); should have passed the Higher Secondary Examination of XII Standard in Science Stream (10+2 pattern) conducted by the Gujarat Secondary Education Board or its equivalent examination conducted by recognized Board/Council with minimum 35% marks.

OR

As prescribed by the Govt. of Gujarat from time to time.

1.2 Marks:

The selection of students to a course of Physiotherapy shall be based on merit provided that**:**
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 35% marks taken together in Physics, Chemistry and Biology in the qualifying examination.

1.3 Age:

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

1.4 Medical Fitness Certificate:

Every candidate before admission to the course shall furnish to Principal of the Institution a certificate of Medical Fitness from an authorized 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. 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 academic year without fail, under intimation to the University.

5. INTERNAL ASSESSMENT

There should be a minimum of two (2) internal examinations during I, II, III and IV year. The average of the two examination marks should be reduced to **20 or 10 as applicable** for Theory and Practical/Clinical respectively must be sent to the University **twenty days** 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.

Any student who fails in four or more papers of an academic year; may 're-appear' for Internal Assessment Examination of the failed papers again to improve the internal assessment marks. The fresh marks will be submitted to the university.

6. COURSE OF STUDY –SUBJECTS & HOURS DISTRIBUTION:

Table – I: FY BPT

Paper No.	**Papers**	**Weekly Class Hours**	**Total**	**Hours**		**Marks**		**Total Marks**
	Exam Papers			Theory	Practical	Theory (External +Internal)	Practical (External +Internal)	
1.	Human Anatomy*	7-8	250	150	100	80+20	80+20	200
2.	Human Physiology* (Including Exercise Physiology)	6-7	210	150	60	80+20	80+20	200
3.	Exercise Therapy - I & Basic Biomechanics*	5-6	175	75	100	80+20	80+20	200
4.	Psychology & Sociology	2-3	120	60+60	*****	80+20	*****	100
5.	Biomedical Physics	3-4	100	100	*****	80+20	*****	100
6.	English	2-3	80	80	*****	40+10	*****	50
	Non-Exam Papers							
7.	Orientation to Physiotherapy	1-2	30	30	****	****	****	****
8.	First Aid & CPR	1-2	40	20	20	****	****	****
*.	Clinical Observation Posting	2-3	105	105		****	****	****
**	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	--	150	150		****	****	****
	Total Hours in FY		1260 Hours					

Table – II: SY BPT

Paper No.	Papers	Weekly Class Hours	Total	Hours		Marks		Total Marks
	Exam Papers			Theory	Practical	Theory (External +Internal)	Practical (External +Internal)	
1.	Pathology & Microbiology	3-4	60+55	45+40	15+15	80+20	*****	100
2.	Biochemistry & Pharmacology	3-4	60+60	60+60	****	80+20	*****	100
3.	Exercise Therapy – II*	5-6	250	100	150	80+20	80+20	200
4.	Electrotherapy*	5-6	200	100	100	80+20	80+20	200
5.	Kinesiology	2-3	100	100	****	80+20	*****	100
6.	Biostatistics	2-3	50	50	****	40+10	*****	50
	Non-Exam Papers							
7.	ENT & Dermatology	1-2	10+20	10+20	****	****	****	****
8.	Basic Nursing	1-2	40	20	20	****	****	****
9.	Environmental Studies	1-2	64	64	****	****	****	****
*.	Supervised Clinical Practice	2-3	141	141		****	****	
**	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	--	150	150		****	****	****
	Total Hours in SY		1260 Hours					

Table – III: TY BPT

Paper No.	Papers	Weekly Class Hours	Total	Hours		Marks		Total Marks
	Exam Papers			Theory	Practical	Theory (External +Internal)	Practical (External +Internal)	
1.	General Medicine (Including Pediatrics)	2-3	90	90	***	80+20	*****	100
2.	General Surgery (Including O&G and Cardiothoracic Surgery)	2-3	100	100	***	80+20	*****	100
3.	Orthopedics & Traumatology	2-3	80	80	***	80+20	*****	100
4.	Musculoskeletal Physiotherapy*	4-6	140	80	60	80+20	80+20	200
5.	General Medical & Surgical Physiotherapy*	4-6	140	80	60	80+20	80+20	200
6.	Research Methodology	1-2	50	50	*****	40+10	*****	50
	Non-Exam Papers							
7.	Radiology	1-2	20	20	*****	*****	*****	*****
8.	Computer Application	1-2	30	10	20	*****	*****	*****
9.	Psychiatry	1-2	30	30	*****	*****	*****	*****
*.	Clinical Training -I	18	430	430		*****	*****	*****
**	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	--	150	150		****	****	****
	Total Hours in TY		1260 Hours					

Table –IV: FOURTH YEAR BPT

Paper No.	**Papers**	Weekly Class Hours	Total	**Hours**		**Marks**		**Total Marks**
	Exam Papers			Theory	Practical	Theory (External +Internal)	Practical (External +Internal)	
1.	Neurology & Neurosurgery	5-6	80	80	***	80+20	*****	100
2.	Neuromuscular Physiotherapy *	4-6	140	80	60	80+20	80+20	200
3.	Cardiopulmonary Physiotherapy *	4-6	140	80	60	80+20	80+20	200
4.	Physiotherapy in Rehabilitation	4-6	135	80	55	80+20	****	100
5.	Physical & Functional Diagnosis*	3-4	120	80	40	80+20	80+20	200
	Non-Exam Papers							
6.	Administration & Management in Physiotherapy	2-3	45	45	****	****	****	****
7.	Evidence Based Physiotherapy & Ethics	1-2	40	40	****	****	****	****
8.	Allied Therapeutics	1-2	30	30	****	****	****	****
*.	Clinical Training -II	18	430	430		****	****	****
**	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	--	100	100		****	****	****
	Total Hours in Fourth Year		1260 Hours					

Table – V: INTERNSHIP & PROJECT WORK

Serial No.	**Program/Work**	Weekly Hours	Total
1.	**Internship**	42-48	1100
2.	**Project Work**	6	100
	Total:		1200

7. SCHEDULE OF EXAMINATION

- In all academic years two internal examinations will be conducted and marks will be sent to university before Annual Exam.

- There will be two university 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 and of 1st year, 2nd year, 3rd year and 4th year respectively. The particulars of subjects for various examinations and distribution of marks are shown separately in **Tables VI to IX.**

- The examination for main subjects shall be conducted by the University.

8. (a) CRITERIA FOR PASSING

- A candidate is declared to have passed university examination in a main subject if he/she secures **50% of the marks** in theory and practical separately.

- For computation of marks in theory and practical/clinical the marks scored in the internal assessment shall be added to the University conducted written and practical/clinical examination respectively.

(b) ATKT AND SUPPLEMENTARY EXAMINATION

- Those who have failed in three or less than three papers will be allowed to take Supplementary examination [only in those paper(s) in which he/she has failed] to be conducted Three (3) months after the declaration of result.

- Those candidates who have failed in more than three papers are not eligible to take supplementary examination and will be allowed to take next annual examination along with subsequent batch of students only in failed papers and marks of passed papers will be retained as such.

- The student is eligible to take two (2) regular and subsequent two (2) supplementary examinations only. There after he / she is not eligible to continue further.

- Those candidates who have kept the term but could not take annual examination due to ill health, accident or any other extreme reason can appear for supplementary examination provided that candidate has passed in internal examination and has necessary 80% attendance. Above mentioned rules of **ATKT AND SUPPLEMENTARY EXAMINATION WILL BE APPLICABLE TO THEM.**

9. SCHEME OF EXAMINATION:

9.1 **SUBJECTS AND DISTRIBUTION OF MARKS**

Table – VI: BPT - I

Paper. No.	Subject	Theory		Internal Assessment	Practical & Viva Voce	Internal Assessment	Total
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	Human Anatomy	3 Hours	80	20	80	20	200
2.	Human Physiology (Including Exercise Physiology)	3 Hours	80	20	80	20	200
3.	Exercise Therapy – I & Basic Biomechanics	3 Hours	80	20	80	20	200
4.	Psychology & Sociology	3 Hours	80	20	***	***	100
5.	Biomedical Physics	3 Hours	80	20	***	***	100
6.	English	2 Hours	40	10	***	***	50
						Total :	**850**

Table – VII: BPT - II

Paper. No.	Subject	Theory		Internal Assessment	Practical & Viva Voce	Internal Assessment	Total
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	Pathology & Microbiology	3 Hours	80	20	***	***	100
2.	Biochemistry & Pharmacology	3 Hours	80	20	***	***	100
3.	Exercise Therapy –II	3 Hours	80	20	80	20	200
4.	Electrotherapy	3 Hours	80	20	80	20	200
5.	Kinesiology	3 Hours	80	20	***	***	100
6.	Biostatistics	2 Hours	40	10	***	***	50
						Total:	**750**

Table- VIII: BPT – III							
Paper No.	Subject	Theory		Internal Assessment	Practical & Viva Voce	Internal Assessment	Total
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	General Medicine (Including Pediatrics)	3 Hours	80	20	***	***	100
2.	General Surgery (Including O&G and Cardiothoracic Surgery).	3 Hours	80	20	***	***	100
3.	Orthopedics & Traumatology	3 Hours	80	20	***	***	100
4.	Musculoskeletal Physiotherapy	3 Hours	80	20	80	20	200
5.	General Medical & Surgical Physiotherapy	3 Hours	80	20	80	20	200
6.	Research Methodology	2 Hours	40	10	***	***	50
						Total:	**750**

Table – IX: BPT – IV							
Paper No.	Subject	Theory		Internal Assessment	Practical & Viva Voce	Internal Assessment	Total
		Time	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks	Maximum Marks
1.	Neurology & Neurosurgery	3 Hours	80	20	***	***	100
2.	Neuromuscular Physiotherapy	3 Hours	80	20	80	20	200
3.	Cardiopulmonary Physiotherapy	3 Hours	80	20	80	20	200
4.	Physiotherapy in Rehabilitation	3 Hours	80	20	***	***	**100**
5.	Physical & Functional Diagnosis	3 Hours	80	20	80	20	200
						Total:	**800**

9.2 QUESTION PAPER PATTERN FOR BPT EXAMINATION

THEORY

Papers having Maximum: 40 Marks. (Only One section)		
Type of question	Number of Questions	Marks for Each Question
Section – I: 40 Marks		
Long Essay Type	(Any One out of Two)	10x1=10
Short Essay Type	(Any Three out of Four)	5x3=15
Short Answer Type	(Any Five out of Six)	3x5=15

*****

Papers having Maximum: 80 Marks. (Two Sections)		
Type of question	Number of Questions	Marks for Each Question
Section – I: 40 Marks		
Long Essay Type	(Any One out of Two)	10x1=10
Short Essay Type	(Any Three out of Four)	5x3=15
Short Answer Type	(Any Five out of Six)	3x5=15
Section – II: 40 Marks		
Long Essay Type	(Any One out of Two)	10x1=10
Short Essay Type	(Any Three out of Four)	5x3=15
Short Answer Type	(Any Five out of Six)	3x5=15

***** FOR FY BPT PAPER VI – ENGLISH; & TY BPT PAPER-I: GENERAL MEDICINE INCLUDING PAEDIATRICS QUESTION PATTERN IS ILLUSTARTED UNDER GIVEN SUBJECT HEADING.**

9.3 PRACTICAL & VIVA VOCE FORMAT FOR TY & FOURTH YEAR BPT

	One Case with each examiner	Viva voce with each examiner	Marks
External examiner	20	20	40
Internal examiner	20	20	40
		Total:	**80**

***** FOR FY & SY BPT PRACTICAL & VIVA VOCE FORMAT IS ILLUSTRATED UNDER GIVEN SUBJECT HEADING.**

10. DECLARATION OF CLASS

- A candidate having appeared in all the PAPERS 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 in **First Class with Distinction.**

- A candidate having appeared in all PAPERS in the same examination and passed that examination in the first attempt and secures 60% 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 PAPERS in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 60% 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.

11. GRACE MARKS:

The Grace Marks up to a maximum of **five (5) marks** may be awarded by the university to a student, who has failed in any one paper, either theory or Practical; but has passed in all other papers.

12. CARRY OVER SYSTEM

- A candidate can carry over maximum of three papers to next academic year.

- If a candidate passes in one or two paper in supplementary examination of three failed papers of an academic year or fails in all three papers again, he/she can take up the failed paper(s) again along with next academic year examination; that means one can take –
  (a) Maximum three first year paper(s) along with second year annual examination.
  (b) Maximum three second year paper(s) along with third year annual examination.
  (c) Maximum three third year paper(s) along with fourth year annual examination.

- A candidate cannot carry over first year paper(s) to third year; and 2nd year paper(s) to 4th year.

13. INTERNSHIP

- A candidate who will be successful at the final examination shall be required to undergo compulsory rotating internship to develop skill and acquire clinical knowledge with proficiency in managing patients independently for a period of six months in a teaching institute, 100 bedded Multispecialty Hospital, specialized hospital of Heart care, Cancer, Leprosy, etc; and centre for Rehabilitation recognized by the University.
- The Internship should be rotatory and cover Physiotherapy as well as clinical branches concerned with Physiotherapy such as Orthopedics, Cardiothoracic including ICU, Neurology, Pediatrics including NICU, General Medicine, General Surgery, Obstetrics and Gynecology both in Indoor and outdoor patient 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 NICU and ICCU)	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-[Geriatric Homes, Fitness Center, Special schools, PHC etc]	1 month

14. SUCCESSFUL COMPLETION:

- Only after successful completion of Internship a candidate shall be admitted to the degree and will be awarded to him.
- A candidate 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 Internship the duly completed logbook will be submitted to the Principal/ Head of the program to be considered as having successfully completed the Internship.
- During the internship period the student is entitled to six casual leaves.
- If a student wants to do Internship outside Surat in Gujarat or some other state in India, he/she has to obtain **NO OBJECTION CERTIFICATE** from the V.N.S.G. UNIVERSITY, Surat after getting recommendation from the PRINCIPAL of the college and NOC from the hospital or Institute where he/she wants to do Internship.
- **Duly approved 'Project Work' must be submitted to the college office than only Principal can issue letter for <u>Internship Completion Certificate</u> at the end of 6th Month of Internship.**

15. BACHELOR OF PHYSIOTHERAPY – TRANSCRIPT

Serial No.	Subject / Paper	Total Hours
	F.Y. B.P.T.	
	Exam Papers	
1.	Human Anatomy*	250
2.	Human Physiology* including Exercise Physiology	210
3.	Exercise Therapy - I & Basic Biomechanics*	175
4.	Psychology & Sociology	120
5.	Biomedical Physics	100
6.	English	80
	Non-Exam Papers	
7.	Orientation to Physiotherapy	30
8.	First Aid & CPR	40
10.	Clinical Observation Posting	105
11.	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	150
	Total Hours in FY	1260 Hours
	S.Y. B.P.T	
	Exam Papers	
1.	Pathology & Microbiology	115
2.	Biochemistry & Pharmacology	120
3.	Exercise Therapy – II*	250
4.	Electrotherapy*	200
5.	Kinesiology	100
6.	Biostatistics	50
	Non-Exam Papers	
7.	ENT & Dermatology	30
8.	Basic Nursing	40
9.	Environmental Studies	64
10.	Supervised Clinical Practice	141
11.	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	150
	Total Hours in SY	1260 Hours

T.Y. B.P.T.		
Exam Papers		
1.	**General Medicine** including Pediatrics	90
2.	**General Surgery** including O&G and Cardiothoracic Surgery	100
3.	Orthopedics & Traumatology	80
4.	Musculoskeletal Physiotherapy*	140
5.	General Medical & Surgical Physiotherapy*	140
6.	Research Methodology	50
Non-Exam Papers		
7.	Radiology	20
8.	Computer Application	30
9.	Psychiatry	30
10.	Clinical Training –I	430
11.	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	150
	Total Hours in TY	1260 Hours
FOURTH YEAR B.P.T.		
Exam Papers		
1.	Neurology & Neurosurgery	80
2.	Neuromuscular Physiotherapy *	140
3.	Cardiopulmonary Physiotherapy *	140
4.	Physiotherapy in Rehabilitation	135
5.	Physical & Functional Diagnosis*	120
Non-Exam Papers		
6.	Administration & Management in Physiotherapy	45
7.	Evidence Based Physiotherapy & Ethics	40
8.	Allied Therapeutics	30
9.	Clinical Training –II	430
10.	Extra-curricular Activities [Conference, Tours, Seminar, Workshops, Sports and Cultural Activities]	100
	Total Hours in Fourth Year:	1260 Hours

INTERNSHIP & PROJECT WORK		
1.	Internship	1100
2.	Project Work	100
	Total:	1200 Hours
	Grand Total :	**6240 Hours**

C.

First Year

Bachelor of Physiotherapy

Paper I – HUMAN ANATOMY

Total hours: Theory: Practical:	250 150 100
Total Hours/ Week: Lecture: Practical: Seminars/ Tutorials:	8 hours 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

1. **Histology [in brief only] [3 Hours]:** 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 [in brief only] [3 Hours]:**

    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 [24 Hours]:**

    Thorax: [in detail]

    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, anatomy of arteries, veins, capillaries.

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.

Abdomen: **[in brief only]**

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

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

Pelvis: **[in detail]**

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

Endocrine glands **[in brief only]**

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. Musculoskeletal Anatomy: **[in detail] [60 Hours]**

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: –Oorigin, insertion, nerve supply and actions

f) Upper Extremity :

1. Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
2. 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.
3. Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
4. Arches of hand, skin of the palm and dorsum of hand.

g) Lower Extremity:

1. Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metartarsals and phalanges.
2. 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, , nerve & arterial supply of the lower limb, arches of foot, skin of foot.
3. Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.

h) Trunk & Pelvis:

1. Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
2. Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Inter-vertebral disc.
3. Pelvic girdle and muscles of the pelvic floor

i) Head and Neck:

1. Osteology: Mandible and bones of the skull.
2. Soft parts: Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck,
3. **Gross anatomy of eyeball, nose, ears and tongue (not for exam).**

5. Neuro Anatomy: [**in detail] [30 Hours]**

a) Organization of Nervous system including Brain, Spinal Cord and autonomic nervous system

b) Neuron, Neuroglia

c) Cranial nerves (Origin, Course, Function & Test)

d) Peripheral nervous system

e) Central Nervous System

1. Spinal segments and areas
2. Brain Stem
3. Cerebellum
4. Thalamus
5. Hypothalamus
6. Corpus striatum & Internal Capsule
7. Cerebral hemisphere
8. Ventricles of brain
9. Blood supply to brain
10. Basal Ganglia
11. The pyramidal system
12. Anatomical integration

Applied Anatomy [30 Hours]

Based on Nervous & musculoskeletal system.

PAPER –I: HUMAN ANATOMY

Theory Paper having Maximum: 80 Marks. (Two Sections)		
Type of question	Number of Questions	Marks for Each Question
Section – I: 40 Marks		
Long Essay Type	**(Any One out of Two)** Musculoskeletal Anatomy – U.E. Neuro Anatomy - CNS, Regional Anatomy – CVS & Respiratory System Head & Neck	10x1=10
Short Essay Type	**(Any Three out of Four)** Musculoskeletal Anatomy – U.E. Neuro Anatomy - CNS, Regional Anatomy – CVS & Respiratory System Head & Neck	5x3=15
Short Answer Type	(Any Five out of Six) Musculoskeletal Anatomy – U.E. Neuro Anatomy - CNS, Regional Anatomy – CVS & Respiratory System, Head & Neck Histology	3x5=15
Section – II: 40 Marks		
Long Essay Type	**(Any One out of Two)** Musculoskeletal Anatomy – L.E. Neuro Anatomy – Peripheral & Cranial Nerves, ANS Regional Anatomy – Trunk & Pelvis,	10x1=10
Short Essay Type	**(Any Three out of Four)** Musculoskeletal Anatomy – L.E. Neuro Anatomy – Peripheral & Cranial Nerves, Regional Anatomy – Trunk & Pelvis	5x3=15
Short Answer Type	**(Any Five out of Six)** Musculoskeletal Anatomy – L.E. Neuro Anatomy – Peripheral & Cranial Nerves, Regional Anatomy – Trunk & Pelvis Embryology	3x5=15

PRACTICAL [100 Hours]

List of Practical / Demonstrations

Demonstration of the muscles, organs of thorax and abdomen in a cadaver. Demonstration of movements in important joints. Surface making of the lung, pleura, fissures and lobes of lung, 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.

Topics

1) Upper extremity including surface Anatomy **[25 Hrs]**
2) Lower extremity including surface Anatomy **[25Hrs]**
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]**

Practical Exam Format

Practical 80 Marks; **Internal assessment** 20 marks; TOTAL-**100 Marks**

1] Spots 60 marks (12 x 5)

Based on:

i) 3 bones
ii) 2 organs (1 thorax, 1 abdomen)
iii) 3 Head, Face, Neck, Brain
iv) 1 Supex, Soft
v) 1 Infex, Soft
vi) Radiology

2] Viva [15] & Journal [05]: 20 marks.

Recommended Text books:

1. SNELL[Richard S], Clinical Anatomy for Medical students : Ed. 5. Little Brown andCompany Boston.
2. B.D Chaurasia's Human Anatomy – Regional And Applied; Volume I, Volume Ii And Volume Iii.
3. SINGH [Inderbir],Human Osteology. JP Brothers, New Delhi 1990.
4. SINGH [Inderbir], Text book of Anatomy with colour atlas: Vol I, II, III.
5. SINGH [Inderbir], Essentials of Anatomy JP Brothers, New Delhi

Recommended Text books for Practical:

1. ROMANES [G J], Cunningham manual of practical anatomy: Vol I, II, III

Reference Books :

1. PODAR - Handbook of Osteology : Ed. 11 Scientific book co.
2. Gray's Anatomy
3. TORTORA – Principles of Anatomy & Physiology : Ed. 8 Harper & Row pub.
4. McMinn – McMinn's color atlas of Human Anatomy.

Paper II - HUMAN PHYSIOLOGY

[Including Exercise Physiology]

Total hours: Theory: Practical:	210 150 60
Total Hours/ Week: Lecture: Practicals: Seminars/ Tutorials:	7 hours 4 hours /week 2 hours/ week 1 Hour/ week
Method of assessment:	Written, Oral, Practical

Course Description:

At the end of the course the student will be able to explain the normal functioning of all the organ systems and their interaction for well coordinated total body functions with special reference to musculoskeletal, nervous, cardio-respiratory, female Urogenital system & alteration in functions of organs due to aging, Analyze physiological responses & adaptation to environmental stresses with special emphasis on physical activity & temperature. Acquire the skill of basic clinical examination with special emphasis to peripheral & central nervous system, cardio-vascular & respiratory system, exercise tolerance.

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

THEORY

General Physiology [in brief only] [2 Hours] Cell: Morphology. Organelles: their structure and functions**,** Transport Mechanisms across the cell membrane**,** Body fluids: Distribution, composition. Tissue fluid – formation.

SECTION – I

1. Blood [10 Hours]

a) Introduction: Composition and functions of blood.

b) Plasma: Composition, formation, functions. Plasma proteins.

c) RBC: structure formation, functions, count and its variations. Erythropoiesis- stages, factors regulating. Reticulo-endothelial system **(in brief)** Haemoglobin - Anemia **(in detail)**, types of Jaundice. Blood indices, PCV, ESR.

d) WBC: Classification. Morphology, functions, count, its variation of each. Immunity: Innate and acquired.

e) Platelets: Morphology, functions, count, its variations

f) Haemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders. Anticoagulants.

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

h) Blood Transfusion: Cross matching. Indications and complications.

i) Lymph: Circulation and functions.

2. Nerve Muscle Physiology [15 Hours]

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

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

c) Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction : Structure. Neuromuscular transmission. Excitation- Contraction coupling. Rigor mortis. Motor unit. Properties of skeletal muscles, Length-tension relationship, fatigue, load.

d) Smooth muscle: Structure, types, mechanism of contraction.

3. Nervous System [20 Hours]

a) Introduction: Organisation of CNS – Central and Peripheral nervous system. Functions and properties of nervous system.

b) Sensory Mechanism including Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts –their origin, course, termination and functions. The trigeminal pathway. Somatic sensations: include superficial;, Deep and Cortical Sensation. Types of Pain: mechanism & Gate control theory of pain.

c) Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron.

d) Reflex Action: definition, types and properties of reflexes in brief.

e) Introduction: Spinal cord Lesion, level of injury in brief.

f) Brainstem: function of Pons, midbrain and medulla oblongata.

g) Cerebellum: functional anatomy of cerebellum connection and their parts.

h) Thalamus and Hypothalamus: Nuclei. Functions and connection.

i) Reticular Formation, internal capsule and Limbic System: Components and Functions.

j) Basal Ganglia: Structures included and functions.

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

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

m) Vestibular apparatus: Function of vestibular apparatus.

n) EEG: Waves and features in brief. Sleep: REM and NREM sleep.

o) CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier.

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

4. Special Senses [10 Hours]

a) 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.

b) Visual Pathway and the effects of lesions.

c) Refractive Errors: Myopia, hypermetropia, presbyopia and astigmatism in brief.

d) Visual Reflexes: Accommodation, direct and indirect reflexes. Light adaptation. Dark adaptation. Color vision, color blindness.

e) Audition: Functions of external ear, middle ear and inner ear. Auditory pathway. Tests for hearing.

f) Taste: Taste buds, gustatory pathway.

g) Smell: Olfactory pathway.

5. Renal System [8 Hours]

a) Introduction: Functional anatomy of kidney, Nephrons, juxtamedullary. Juxta- glomerular apparatus. Renal blood flow and its regulation.

b) Mechanism of Urine Formation: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Insulin clearance. Creatinine clearance. Diuretics, dieresis.

c) Tubular Reabsorption: Reabsorption of Na+, glucose, $HCO3^-$, urea and water. Filtered load.

d) Renal tubular transport. Glucose clearance: TmG. Renal threshold for glucose.

e) Tubular Secretion: Secretion of H^+ and K^+. PAH clearance.

f) Introduction and Mechanism of concentrating and diluting the Urine, Regulation of water excretion.

g) Micturation: Mechanism of micturation. Cystometrogram. Atonic bladder, automatic bladder.

h) Acid-Base balance in brief

i) Artificial Kidney: Principle of haemodialysis.

j) Skin and temperature regulation.

6. Physiology of Exercise [10 Hours]

a) Effects of exercise on:

1) Muscle strength/power/endurance
2) Neuro-musculoskeletal system

b) Effect of gravity/ Altitude/ pressure on physical parameters.

SECTION – II

1. Cardiovascular System [20 Hours]

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

b) Conducting system: Components. Cardiac Cycle: Definition. Phases of cardiac cycle. Heart sounds – causes, character.

c) Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation and their variations.

d) Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance. Regulation of BP.

e) Arterial pulse.

f) Shock – Definition. Classification–causes and features

g) Regional Circulation: Coronary, Cerebral and Cutaneous circulation.

2. Respiratory System [15 Hours]

a) Function of respiratory system: Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Respiratory muscles.

b) Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions.

c) Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.

d) Dead Space: Types and their definition.

e) Pulmonary Circulation. Ventilation-perfusion ratio and its importance.

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

g) Neural Regulation of Respiration. Hering-breuer's reflex. Voluntary control. Chemical Regulation.

h) Hypoxia: Effects of hypoxia. Types of hypoxia. Asphyxia. Cyanosis – types and features.

i) Periodic breathing – definition and types.

j) Artificial respiration

3. Reproductive System [5 Hours]

a) Introduction: Physiological anatomy, reproductive organs. Sex determination and Sex differentiation.

b) Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Seminal vesicles, seman.

c) Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: oestrogen and progesterone-action. Regulation and function of secretion. Mentrual Cycle: Phases. Ovarian cycle. Uterine cycle. ovulation. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods

4. Endocrine System [10 Hours]

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

b) Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: action, regulation of secretion of each hormone. Physiology of growth and development.

c) Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, action, function and regulation of secretion.

d) Parathyroid hormones: action, function and regulation of secretion.

e) Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, And Androgens. Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline.

f) Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin. Glucose metabolism and its regulation.

g) Calcitrol, Thymus and Pineal gland in brief.

h) Local Hormones in brief.

5. Digestive System (in brief) [5 Hours]

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

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

c) Swallowing: Definition. Different stages. Functions.

d) Stomach: Functions. Gastric juice: function. Gastrin: function. Gastric motility. Gastric emptying. Vomiting.

e) Pancreatic Secretion: production, function. Regulation.

f) Liver: Functions of liver. Bile secretion: functions and regulation. Gall bladder: Functions.

g) Intestine: Succus entericus: function and regulation of secretion. Intestinal motility and its function.

h) Mechanism of Defecation.

6. Physiology of Exercise [10 Hours]

a) Effects of exercise on:

1) Hormonal and metabolic effect
2) Cardiovascular system
3) Respiratory system

b) Physiology of Aging.

Applied Physiology [10 Hours] [not for exam]

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. Muscles and Nervous System Functions

1. Hypotonicity, hypertonicity, myotonia, myasthenia gravis.
2. Pathological reflexes. UMN & LMN disease.
3. Spinal cord disorder: syringomyelia, tabes dorsalis and etc.
4. Ataxia, involuntary movements, involuntary movements.
5. Cerebellar disorders.
6. Parkinson's disease, Wilson's disease.
7. Special senses disease- Vision, taste, hearing, vestibular, Olfaction

B. Blood functions

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

C. Renal system disorders

1. Renal failure: acute and chronic.

D. Pulmonary Functions

1. Brief introduction of respiratory disease including obstructive and restrictive.
2. Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea, tachypnoea.
3. Artificial respiration
4. Breath sounds.

E. Cardio vascular Functions

1. Arrhythmia.
2. Hypertension, hypotension.

3. Myocardial infarction, angina pectoris..
4. PDA. Varicose vein.

F. Metabolic Functions & digestive system

1. Diabetes Mellitus, Physiological basis of Peptic Ulcer, Jaundice, GIT disorder
2. Thyroid dysfunctions, Vitamins deficiency.

Paper –II: Human Physiology including Exercise Physiology

Theory Paper having Maximum: 80 Marks. (Two Sections)		
Type of question	Number of Questions	Marks for Each Question
Section – I: 40 Marks		
Long Essay Type	**(Any One out of Two)** Blood Nerve muscle Physiology Nervous system Special senses	10x1=10
Short Essay Type	**(Any Three out of Four)** Blood Nerve muscle Physiology Nervous system Special senses Renal System Physiology of Exercise	5x3=15
Short Answer Type	**(Any Five out of Six)** General Physiology Blood Nerve muscle Physiology Nervous system Physiology of Exercise	3x5=15
Section – II: 40 Marks		
Long Essay Type	**(Any One out of Two)** Cardiovascular System Respiratory system Reproductive system Endocrine System	10x1=10
Short Essay Type	**(Any Three out of Four)** Cardiovascular System Respiratory system Reproductive system Endocrine System. Digestive System. Physiology of Exercise.	5x3=15
Short Answer Type	**(Any Five out of Six)** General Physiology Cardiovascular System Respiratory system Reproductive system Physiology of Exercise. Endocrine System	3x5=15

PRACTICAL [60 HOURS]

1. **Hematology-[demonstration only] [10 hours]:** RBC Count, WBC Count, Differential WBC Count, Bleeding & Clotting Time, Hb Estimation, ABO & Rh Blood Group, PCV, ESR, platelet count.
2. **Graphs [8 hours]:** i] Skeletal muscle-properties ii] ECG: definition, different types of leads, waves
3. **Physical fitness [8 hours]:** Breathe holding time ii] mercury column test (40 mm Hg test) iii] Cardiac efficiency test-Harward's step test, Master's step test, treadmill test, six minute walk test.
4. **Blood pressure– palpatory and auscultatory method [6 hours]:** Variation of blood pressure in posture and exercises.
5. **Stethography [2 hours]:** Auscultation of breath sound & heart sound;-(Normal , Abnormal)
6. **Spirometry [2 hours]:** Recording of Lung volumes & capacities.
7. **Mosso's finger ergography [2 hours]**
8. **Clinical examination [22 hours]:** Respi/cvs/nervous system including higher functions, reflexes, motor & sensory System.

Practical Exam Format

Practical- 80 Marks**; Internal Assessment -** 20 Marks**; Total** - 100 Marks

A] Spots-based on 1 to 8 mentioned in practical syllabus [3x5=15 marks]

B] Viva- based on 1 to 8 mentioned in practical syllabus [20 marks]

C] Clinical Physiology based on CVS, Respiratory system, Nervous system, Abdomen [4x10= 40 marks]

D] Journal [05 marks]

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
8. Exercise Physiology – McArdle, Katch & Katch

Reference:

1. Review of Medical Physiology – Ganong William F.
2. Physiological basis of Medical practice – Best & Taylor

Paper-III: EXERCISE THERAPY – I & BASIC BIOMECHANICS

Subject Title: Total hours: Theory: Practical:	Exercise Therapy – I 175 75 100
Total Hours/ Week: Lecture: Practical: Seminars/ Tutorials:	6 hours 2 hours /week 3 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

Course Description:

In this course, the students will learn the basic principles and effects of exercise as a therapeutic modality and will learn the techniques in the restoration of physical functions and basic biomechanics involves the study of basic concepts of human movements .

THEORY

SECTION - I

1. **History of Physiotherapy [1 hour]**: Origin, Definition (IAP, American, Canadian, etc.), Scope of profession, Different branches of Physiotherapy.
2. **Introduction to Exercise therapy [2 hours]**: Aims, Techniques, Approach to the patient's problem, Assessment of the patient's condition, planning treatment management (briefly), Physiological effects and uses of exercise, Psychological aspects of exercise.
3. **Terminologies and Basic Biomechanics [3 hours]**: Introduction to movements, Types of muscle contraction, Types of muscle work, Group action of muscle, closed chain and open chain kinematics, Active and passive insufficiency, swing and shunt muscle.
4. **Nervous control of movement[1 hour]**:
5. **Kinematics of movement [1 hour]**: Joint movements, axis and plane. Direction of motion, Magnitude of motion, rate of motion.
6. **Kinetics of movement [3 hours]**: Force- analysis of force (parallelogram law only), tension, gravity, center of gravity, line of gravity, base of support, Friction- types, Importance, effects and uses, Equilibrium, Fixation and stabilization, Potential energy, kinetic energy, work, power, speed, velocity, acceleration, mass, momentum, inertia, moment arm, torque.

7. **Simple machines [4 hours]**: Lever- Definition, types and uses, anatomical levers, functional levers in physiotherapy, pulley- types and uses, mechanical advantage, anatomical pulley- Angle of pull, pendulum, Elasticity, springs—properties of springs, springs in series and parallel, Hooke's law .

8. **Therapeutic gymnasium [2 hours]**: Orientation to various equipments used in exercise therapy department with its principles, effect and uses – pulleys, springs, axillary crutches, elbow crutches, walker, finger ladder, theraband, dumbbells, weights, weight cuff, sand bags, therapeutic balls, parallel bars, shoulder wheel, shoulder ladder, pronator - supinator instrument, static cycle, rowing machine, ankle exerciser, balancing boards, springs etc and their biomechanical principles.

9. **Group, home and individual exercise [2 hours]**: - advantages, disadvantages, criteria of selection of patients.

10. **Soft tissue manipulation [14 hours]**:

a) Introduction, brief history, definition, classification
b) Physiological effects and therapeutic uses, indications and contraindications.
c) Preparation of patient, basic points to be considered prior, during and after the treatment procedure.
d) Techniques, effects and uses, indications and contraindications of each. Specific effects of the techniques
e) Massage for arm, leg, neck, back and face.
f) Massage for Oedema, scar, tendinitis, and fibrosis.

11. **Yoga [4 Hours]:** – Principles of yoga, basic yogic postures and their physiological effects.

SECTION - II

1. **Starting and derived positions [5 hours]**: All fundamental and derived positions with effect, uses and muscle work.

2. **Active movements [10 hours]**:

   a) Free exercise-Definition, classification, principles, technique, indication, contraindication, effects and uses.

   b) Active assisted exercise: definition, principles, technique, indication, contraindication, effects and uses.

c) Assisted- resisted exercise: definition, principles, technique, indication, contraindication, effects and uses.

d) Resisted exercise: Definition, classification, principles, technique, indication, contraindication, effects and uses. Difference of manual and mechanical resistance, Specific regimes- delormes, oxford, macqeen, circuit weight training, Types of isometrics.

3. **Passive movements [3 hours]:** Definition, classification, principles, technique, indication, contraindication, effects and uses.

4. **Goniometry [5 hours]:** Definition, uses, R.O.M.- 0-180 ,180-0, 0- 360 system, active R.O.M., passive R.O.M., Types of Goniometer, principles, techniques, limitations, Technique of measurement for all peripheral joints, spine and TMJ, causes of restriction of motion, normal and abnormal end feel, distinguish between Skin, Muscle and capsular contractures.

5. **Trick movements and its types [1 hour]:**

6. **Suspension therapy [2 hours]:** Definition, point of suspension, types, uses for increase joint R.O.M. and muscle power in upper limb and lower limb, indication, contraindication, limitations and benefits.

7. **Posture [2 hours]:** Definition, types, factors affecting posture, postural training.

8. **Ambulatory devices/Walking Aids [10 hours]:**- Types – crutches, canes & frames, measurement of different devices, uses. Gait : Definition, stages of normal gait, limb length (Lower limb only- apparent, true, supratrochantric) and girth measurement, pelvic tilt, pathological gait (brief introduction), uses of parallel bar in pre crutch training phase, gait training with the help of different types of ambulatory assistive devices, progression, group of muscle responsible, walking on even surface, slope, climbing up and down stairs.

PRACTICAL: (100 Hours)

Skills required for above topics of the subject to be practiced on self and models.

Practical Exam Format

PRACTICAL-80 marks**, INT. ASSESSMENT-**20 marks**, TOTAL-**100 MARKS

A] Long case-based on Techniques of application of Massage/Goniometry/Suspension Therapy etc. [35 marks]

i] Principles, Indications, Contra-indications, Documentation Of findings etc [20 marks]

ii] Psychomotor & affective-skills [15 marks]

B] a] Short Case – Any one of the following [20 marks]

Passive movements / Limb length / Girth Measurement / Yoga / Posture / Group Exercises / Chest Expansion/ Starting OR Derived position/ Walking Aids etc.

b] Spots-Based on Therapeutic Gymnasium [Four] [5x4= 20 marks]

c] Journal [5 marks]

Recommended books:

1. Principles of exercise therapy- Dena Gardiner
2. Practical exercise therapy- Margaret Hollis
3. Guide line for goniometry-Cynthia Norkin & Joyce White
4. Principals of therapeutic soft tissue manipulation – A. G. Sinha

Reference Books:

1. Therapeutic exercise – Carolyn Kisner and Colby
2. Clinical Kinesiology – Brunnstrom
3. Massage for Therapist- Margaret Hollis
4. Physical Rehabilitation- Susan B. O'Sullivan
5. Physiotherapy in Orthopaedic conditions-by Jayant Joshi [for the study of Basic Yogic postures]
6. Yoga for Health & Peace - S. Nimbalkar

Paper-IV: 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.

SECTION I - PSYCHOLOGY

Subject Title:	PSYCHOLOGY
Total hours:	60
Theory:	60
Lecture:	2 hours/ week
Method of assessment:	Written

THEORY

1. Introduction to Psychology [5 Hours]:

Definition, application, schools of psychology, methods of psychology, scope of psychology.

2. Growth and Development [5 Hours]:

a) Life span: Different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age) , Psychology need.

b) Heredity and environment: role of heredity and environment in physical and psychological development, “Nature v/s Nurture controversy”

3. Sensation, attention and perception [5 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]:

Definition, motivational cycle, types of motives, theories of motivation.

5. Frustration and conflict [3 Hours]:

a) Frustration: sources of frustration.

b) Conflict: types of conflict.

c) Management of frustration and conflict

6. Emotions [4 Hours]:

a) Definition,

b) Psychological and physiological changes during emotion

c) Theories of emotion

d) Stress and management of stress.

7. Intelligence [5 Hours]:

a) Definition , theories of intelligence

b) Distribution of intelligence.

c) Assessment of intelligence– intelligence tests

8. Thinking [4 Hours]:

a) Definition , types- , concept formation , 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 [7 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 [7 Hours]

a) Definition, personality development , 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 [5 Hours]:

a) Definition , nature and scope of social psychology

b) Leadership: Different types of leaders. Different theoretical approaches to leadership.

c) Attitude: development of attitude. Change of attitude

12. Communication [2 Hours]

a) Types,

b) Effective ways of communication / teaching

13. Pain psychology (briefly) [2 Hours]

a) Define pain, physiology of pain

b) psycho – social factors of pain

c) pain management (Psychological methods)

14. Abnormal psychology : **[2 Hours]**

a) Definition,

b) Classify psychological disorders **(in brief)** psycho somatic disorders

c) Psycho therapy and counseling.

Recommended text books:

1. Ramalingam & Bid (2009). **Psychology for Physiotherapists**. Jaypee Brothers, New Delhi.
2. Morgan et al (2003). Introduction to Psychology. New Delhi: Tata McGraw hill.
3. Feldman. R. H. (1996). Understanding Psychology. New Delhi: Tata McGraw hill.
4. Atkinson(1996). Dictionary of Psychology.

SECTION II - SOCIOLOGY

Subject Title: Total hours: Theory: Lecture:	SOCIOLOGY 60 60 2 hours/ week
Method of assessment:	Written

THEORY

1. **Introduction [4 Hours]:**
   a) Meaning- Definition and scope of sociology
   b) Its relation to Anthropology, Psychology, Social Psychology.
   c) Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.
   d) Importance of its study with special reference to Health Care Professionals.
2. **Social Factors in Health and disease situations [4 Hours]:**
   a) Meaning of social factors
   b) Role of social factors in health and illness
3. **Socialization [4 Hours]:**
   a) Meaning and nature of socialization
   b) Primary, Secondary and Anticipatory socialization.
   c) Agencies of socialization
4. **Social Groups [5 Hours]:** 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 [6 Hours]:**
   a) The family, meaning and definitions.
   b) Functions of types of family
   c) Changing family patterns
   d) 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 [4 Hours]:

a) Rural community: Meaning and features –Health hazards of ruralities, health hazards to tribal community.

b) Urban community: Meaning and features- Health hazards of urbanities.

7. Culture and Health [6 Hours]:

a) Concept of Health

b) Concept of Culture

c) Culture and Health

d) Culture and Health Disorders

8. Social change: [8 Hours]

a) Meaning of social change.

b) Factors of social change.

c) Human adaptation and social change

d) Social change and stress.

e) Social change and deviance.

f) Social change and health programme

g) The role of social planning in the improvement of health and rehabilitation.

9. Social Problems [10 Hours]: Consequences of the following social problems & remedies to prevent these problems:

a) Population explosion
b) Poverty and unemployment
c) Beggary
d) Juvenile delinquency
e) Prostitution
f) Alcoholism
g) Problems of women in employment
h) Geriatric problems (Old age Problem)
i) Problems of underprivileged.

10. Social Security [5 Hours]: Social security and social legislation in relation to the disabled.

11. Social worker [4 Hours]:

a) Meaning of Social Work

b) The role of a Medical Social Worker

Recommended Books:

1. Bid D. (2006). **Sociology for Physiotherapists**. Jaypee Brothers, New Delhi.
2. Sachdeva and Vidyabushan: Introduction to the study of Sociology.
3. K. Parks Textbook of Preventive & Social Medicine.
4. Textbook of Preventive & Social Medicine – P.K. Mahajan & M.C. Gupta

Paper-V: BIOMEDICAL PHYSICS

Subject Title: Total hours: Theory: Lecture:	Biomedical Physics 100 100 3-4 hours/ week
Method of assessment:	Written

Course Description:

At the end of the course the candidate will be able to Describe the fundamentals of general physics and able to relate its application in Physiotherapy, Understand basic physical principles of sound, light and heat and their application in Physiotherapy, Understand basic aspects of electricity and electronics as related to its application in electrotherapy instruments, Describe in brief certain common electrical components such as capacitors, transformers, valves and transistors; and will be able to identify such components.

THEORY

SECTION – I

1. **General physics and properties of matter [15 Hours]:**

   a) **Force:** Definition, unit, resolution of forces, Newton's law of motion, types of motion, force of gravity and centre of gravity, reaction forces, equilibrium, determination of equilibrium of body, work, power, energy, torque.

   b) **Friction:** Force of friction, laws of static and dynamic friction, limits of friction, friction a necessity and evil.

   c) **Simple machines:** Definition, principle of work, mechanical advantage, velocity ratio and efficiency, lever, pulley and three systems of pulley, wheel and axel.

   d) **Fluid Mechanics and Hydrodynamics:** Physical properties of water, Viscosity, definition and co-efficient of viscosity, stream line and turbulent flow, effect of temperature and pressure on viscosity, surface tension, buoyancy, principle of Archimedes, laws of floatation, hydrostatic pressure.

   e) **Elasticity:** Definition

2. **Heat [15 Hours]:**

   a) Heat transfer, emissive and absorptive power-properties of thermal radiation of a perfectly black body, Kirchoff's law.
   b) Specific heat, thermal capacity, water equivalent, Newton's law of cooling and specific heat by cooling specific heat of gases, Joule's law of heat production.

c) Energy conservation, 1 and 2 laws of thermodynamics.
d) Grothus' law.
e) Physical effects of heat-expansion, evaporation, thermionic emission etc., concept of heat and temperature, measurement of heat thermometry.
f) Human body temperature and its measurement.
g) Biophysics of superficial heat and cold.

3. Sound [15 Hours]:

a) Origin of sound, Definition-Wavelength, frequency, amplitude, time period, vibration, phases, relation between frequency and wavelength.
b) Newton's formula for velocity of sound.
c) Lap lace's correction
d) Effect of temperature, pressure density of media, humidity and wind, loudness, pitch.
e) Interference of sound waves, velocity of sound in water, resonance and velocity of sound in air by resonance method,
f) Doppler Effect, echo.
g) Ultrasonic – Production and its application, recording and reproduction of sound.

SECTION - II

1. Light [10 Hours]:

a) Absorptions and emission spectra, classification of emission spectra sole spectrum and Fraunhofer lines.
b) Electromagnetic spectrum-infrared and UV spectrum
c) Laws of transmission, reflection, refraction, absorption, interference of light
d) LASER and its application, fiber optics

2. Electricity [15 Hours]:

a) Conductors and insulators, fundamentals of electricity.
b) Different types of capacitors, biological cell as a capacitor.
c) Principal laws of electricity-Ohm's law, variable, rheostat and potentiometer.
d) Effect of electric current, thermal, chemical and magnetic .
e) Electromagnetic induction – mutual – Lenz's law, Faraday's law, Fleming's right hand rule, self induction, mutual induction, induction coil, induction of EMF in a coil, rotating within the magnetic field, Eddy currents.
f) Transformer step up – step down, long distance transmission.
g) Production of electricity and mains supply, measurement of AC/DC, modified current, millimeter, voltmeter,

3. Modern Physics [15 Hours]:

a) Structure of atom (Bohr model)
b) X-rays – Production, properties and application.
c) IR rays and UV rays – Short wave and microwave diathermy.
d) Electric shock – Causes and prevention
e) Therapeutic currents –Iimpulses, definition and types, pulse duration and depletion times.
f) Galvanic current, Faradic currents, Surging current, exponentially progressive current, biphasic current.
g) Types of electrodes of elector diagnostic and therapeutic application.

4. Electronics [15 Hours]:

a) Thermionic valves, semi conductor, diode characteristics, diode as rectifier, Zener diode single stage transistor, advantage of semiconductor over thermionic valves.
b) Rectifier, transistors, photo diode, light dependent resistors, light emitting diodes, integrated circuits.
c) Amplifier – Production of high frequency currents (microwave) by Klystron magnetron, amplifier C.R.O., triode as amplifier and oscillator, thyratron.
d) Electronic circuit – Oscillating circuit, production of shaped pulses, amplification of electrical pulses.

Recommended Books:

1. Biophysical Bases of Electrotherapy: by Alex Ward, 1st Edition
2. Physical Principles Explained: Low & Reed
3. Biophysics: An Introduction [Paperback] Roland Glaser
4. Principal of Electronics By. V. K. Mehta
5. Fundamentals of Physics By Robert Resnik

Paper-VI: ENGLISH

Subject Title: Total hours: Theory: Lecture:	ENGLISH 80 80 3 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. The student at the end of training is able to Read and comprehend English language, Speak and write grammatically correct English, Appreciates the value of English literature in personal and professional life.

THEORY

Unit –I: [14 Hours]

a) Introduction:
b) Study Techniques
c) Organization of effective note taking and logical processes of analysis and synthesis
d) The use of the dictionary Enlargement of vocabulary
e) Effective diction

Unit - II: [14 Hours]

a) Applied Grammar
b) Correct usage
c) The structure of sentences,
d) The structure of paragraphs
e) Enlargements of Vocabulary

Unit - III: [14 Hours]

a) Written Composition:
b) Précis writing and summarizing, Writing of bibliography, Enlargement of Vocabulary

Unit - IV: [12 Hours]

a) Reading and comprehension
b) Review of selected materials and express oneself in one's words.
c) Enlargement of Vocabulary.

Unit - V: [12 Hours]

a) The Study of Various Forms of Composition Paragraph,
b) Essay, Letter, Summary, Practice in writing

Unit - VI: [14 Hours]

a) Verbal Communication:
b) Discussions and Summarization, Debates, Oral reports, use in teaching

Paper-VI: ENGLISH - QUESTION PATTERN

Theory Paper having Maximum: 40 Marks.	
Type of question	**Marks for Each Question**
Basic Grammar: (a) Sentence structure (b) Paragraph structure (c) Correct usage	6
Paragraph writing: Either on some subject, person, things in daily use	5
Letter writing: - Formal – official, application - Informal	5
Summary or Précis writing	5
Dialogue framing on the bases of Debate	5
Expand the Idea	4
Essay writing	5
Note making	5

Recommended books:

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 Occasions: 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.
9. Word Power Made Easy. Norman Lewis.
10. TOEFL & IELTS preparatory guide books.

Paper VII: ORIENTATION TO PHYSIOTHERAPY

Subject Title: Total hours: Theory :	Orientation to Physiotherapy 30 30
Lecture:	1 hour / week

Course Description:

This course is designed to help the student acquire the geographical orientation of the various concern section of the education department and clinical training areas. To get the overall idea about the graduate programme and its scope in the professional practice.

THEORY

1. **Patterns of Health Care Delivery: [10 hours]**
    a) National Trends and resources
    b) Local trends and resources
    c) Overview of Health Science Professions
    d) Introduction of health care.
2. **Components of Physiotherapy Profession: [10 hours]**
    a) History of Medical therapeutics.
    b) Information of education department, training and course detail.
    c) Information for new student commencing physiotherapy.
    d) Why to select physiotherapy?
3. **Role of Physiotherapy in meeting Health Care Needs in India. [10 hours]**
    a) Needs versus Demands
    b) Physiotherapist as 'Educator'
    c) Educational resources.
    d) Common problems and solutions

Paper VIII - FIRST AID AND CPR

Subject Title: Total hours: Theory: Practical:	First Aid & CPR 40 20 20
Lecture: Practical:	1 hour/ week 1 Hour/Week

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.

THEORY

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

PRACTICAL: 20 Hours

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.

CLINICAL OBSERVATION POSTING

Total Hours: 105

Students will be posted in rotation in the following areas/wards. The students will be observing and assisting physiotherapists to provide physiotherapy care for the patients.

1. General Physiotherapy OPD
2. Orthopedic Physiotherapy OPD
3. Neuro Physiotherapy OPD

D.

Second Year

Bachelor of Physiotherapy

Paper I - PATHOLOGY & MICROBIOLOGY

SECTION – I: PATHOLOGY

Subject Title: Total hours: Theory: Practical:	Pathology 60 45 15
Total Hours/ Week:	2-3 hours
Method of Assessment:	Written

Course 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.

THEORY

A. General Pathology

a) **Introduction to Pathology [1 Hour]**: Subdivisions of Pathology, Key terms used in pathology viz. etiology, morphological changes, lesions, primary & secondary, acute & chronic

b) **Cellular Injuries [1 Hour]**: Causes & mechanism of cell injury, reversible & irreversible cellular injuries

c) **Cell Death & Cell Necrosis [1 Hour]** : Different types of cell necrosis, its gross & microscopic appearances, gangrene & its different types; Apoptosis

d) **Cellular Adaptations [1 Hour]** : Hypertrophy, hyperplasia, atrophy, Metaplasia, cellular dysplasia

e) **Cellular Changes & Information [1 Hour]**: Cloudy swelling, hydropic change, fatty change, mucoid change, pathological calcification

f) **Amyloidosis [1 Hour]**: Definition, classification, nature of amyloid, clinical significance

g) **Pathology of Diabetes Mellitus [1 Hour]**: Definition, classification of diabetes, Pathology of - renal, cardiovascular, ophthalmic & neurological complications.

h) **Inflammation [3 Hours]**: Acute inflammation - definition, causes, vascular events, exudates formation, chemical mediators of inflammation , Chronic inflammation - general feature, Granulomatous inflammation, examples of Granulomatous inflammation

i) **Wound Healing [2 Hours]**: Regeneration, repair, healing by primary & secondary union, factors affecting healing, healing of bone fracture.

j) **Hemodynamic changes [4 Hours]** : Oedema, hyperaemia & congestion, thrombosis, embolism, infarction, shock.

k) **Tumor Pathology [2 Hours]** : Definition, classification, characteristics of benign & malignant tumors, pathogenesis & spread of tumors. **Systemic Pathology**

1. **Gastrointestinal tract [2 Hours]**: Peptic ulcer, benign & malignant tumors of intestine, infective & inflammatory bowel diseases, typhoid ulcer, intestinal tuberculosis, 'Crohn's disease, ulcerative colitis.

2. **Liver disease [2 Hours]**: Viral hepatitis A, viral hepatitis B, viral hepatitis c, cirrhosis of liver, portal hypertension, pathology of jaundice

3. **Genitourinary tract [2 Hours]** : Acute &chronic renal failure, definition &classification of glomerulonephrotis, hydronephrosis, urinary calculi, classification of testicular & ovarian tumors**.**

4. **Musculoskeletal system [2 Hours]**:

   a) Osteomyelitis, osteoporosis, osteoarthritis, rheumatoid arthritis, gout, psoriasis **[1 hour]**

   b) Muscle disease – myopathic and Neurogenic disorders, inflammatory myopathy, muscular dystrophies

5. **Respiratory system [4 hours]** : Bronchitis, pulmonary hypertension, pulmonary tuberculosis, pneumonia, emphysema, Bronchiectasis, neonatal respiratory syndrome, adult respiratory syndrome

6. **Cardiovascular system**

   a) Blood Vessels: Atherosclerosis, aneurysm, phelebothrombosis, thrombophelebitis**[2 Hours]**

   b) Heart Disease: Rheumatic heart disease, bacterial endocarditis, hypertensive heart disease, coronary heart disease, congenital heart diseases **[4 Hours]**

7. **Central nervous system [2 Hours]**: Meningitis, encephalitis, hydrocephalus, cerebrovascular disease, poliomyelitis, epidural & subdural hematoma

B. Hematology

1. **Anaemias**: Definition, classification, Fe deficiency ananemia, B12 deficiency ananemia, hemolytic ananemias, thalassemia, sickle cell ananemia, G6PD deficiency ananemia, aplastic ananemia. **[3 Hours]**

2. **Leukemias**: Definition & classification, acute myeloblastic leukemia, acute lymphoblastic leukemia, chronic myeloid leukemia, chronic lymphocytic leukemia **[1 Hour]**

3. **Haemorrhagic disorders**: Haemophilia, purpura, prothrombin time **[1 Hour]**

4. **Blood Banking**: Blood groups, cross matching, blood transfusion reaction, selection of blood donor, blood components **[2 Hour]**

PRACTICAL [15 Hours]

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

Recommended Textbooks

1. Text book of pathology: Harshmohan
2. General Systemic pathology: Churchill Livingstone
3. Text book of Pathology: Robbins
4. Textbook of Pathology. : S. G. Deodhare
5. Pathology. Anderson (reference).

Section – II - MICROBIOLOGY

Subject Title: Total hours: Theory: Practical:	Microbiology 55 40 15
Total Hours/ Week:	2 hours
Method of Assessment:	Written

THEORY

1. General Microbiology [10 Hours]

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

b) Normal flora of the human body.

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

d) Morphology of bacteria – Size, Shape, motility and arrangement. Structures, which are virulence – pili, cell wall, capsule, flagella.

e) Sterilization, disinfection, aseptic measures and universal precautions in relation to patient care and disease prevention.

f) Culture media.

2. Immunology [7 Hours]: Basic principles of immunity & immunobiology: lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions – agglutination, precipitation, innate immunity, ELISA,RIA, fluroscenceAb techniques.Humoral immunity, Cell mediated immunity , hypersensitivity.

3. **Bacteriology [11 Hours]**

   a) Morphology, mode of transmission, prevention, pathogenesis, collection and transport of samples for laboratory diagnosis, treatment.

   b) Staphylococci, Streptococci and Pneumococci,

   c) Mycobacteria: M. Tuberculosis, M. leprae,

   d) Salmonella, shigella.

   e) Vibrio cholera.

   f) Sporing and non-sporing anaerobes: Clostridia. Cl. Perfringens, cl. Tetani

   g) Syphilis- treponema pellidium

4. **General Virology [6 Hours]**: General properties: Basic structure, 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. Poliommyelitis, HIV, Hepatitis.

5. **Mycology [6 Hours]**: General properties of fungi. fungal diagnosis. Rapid diagnosis. Method of collection of samples. Antifungal agents. Pathogenesis. Mycetoma. Aspergillosis. Candidiasis.

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 Gram Stain, ZN Stain
5. Demonstration of Serological test: ELISA
6. Demonstration of Fungus

Recommended Textbooks:

1. Short textbook of Medical Microbiology by Sathish Gupta
2. Microbiology & Parasitology by Rajeshwar Reddy
3. Text book of Microbiology by Anantha Narayanan and Jayaram Panicker
4. Microbiology by Baveja
5. Text book of Microbiology by Chakraborthy

Paper II - BIOCHEMISTRY & PHARMACOLOGY

SECTION – I BIOCHEMISTRY

Subject Title: Total hours: Theory:	Biochemistry 60 60
Total Hours/ Week:	2 hours
Method of Assessment:	Written

THEORY

1. **Nutrition [7 Hours]**
   a) Introduction, Importance of nutrition, Calorific values,
   b) Respiratory quotient – Definition, and its significance
   c) Energy requirement of a person -
   d) Basal metabolic rate: Definition, Normal values, factor affecting BMR
   e) Special dynamic action of food
   f) Physical activities - Energy expenditure for various activities.
   g) Calculation of energy requirement of a person
   h) Balanced diet, Recommended dietary allowances
   i) Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers
   j) Role of lipids in diet.
   k) 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
   l) 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]**
   a) Definition, general classification
   b) Definition, classification, properties and functions of Fatty acids, Triglycerol, Phospholipids, Cholesterol, Essential fatty acids and their importance
   c) 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. Replication, Transcription & Translation.

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 [in brief only] [5 Hours]**

   a) Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation

   b) Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle

   c) Hormonal regulation of glucose, Glycosuria, Diabetes mellitus,

9. **Lipid Metabolism [in brief only] [5 Hours]**

   a) 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

   b) Cholesterol metabolism: synthesis, degradation, cholesterol transport

   c) Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver

10. **Amino acid and Protein Metabolism [in brief only][3 Hours]**

    a) Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle

    b) Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.

11. **Vitamins [7 Hours]**

    a) Definition, classification according to solubility,

    b) Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity

12. **Mineral Metabolism [in brief only] [2 Hours]:** Definition, Sources, RDA, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail

13. **Hormone [4 Hours]:** Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function, Hormones of Pitutary gland, Hypothalamus, Thyroid gland, Adrenal gland, Ovary & Testes.

14. **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

15. **Water balance [1 Hour]:** Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre

16. **Electrolyte balance[1 Hour]**

    a) Osmolarity. Distribution of electrolytes

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

17. **Clinical Biochemistry [4 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 **Instumentation**, Spectrophotometry, Electrophoresis, Elisa and RIA

18. **Biochemistry of cancer & tumour markers [1 Hour]**

19. **Advance molecular biological technique PCR [1 Hour]**

Recommended Textbooks:

1. Fundamentals of Biochemistry by U. Satyanarayana, U Chakrapani.
2. Manipal manual of Clinical Biochemistry.

Reference Books:-

1. Fundamentals of Biochemistry by A.C. Deb Publisher : New central book agency
2. T.B. of Medical Biochemistry by MN Chatterjee, Rana Shinde.
3. T.B. of Biochemistry by DM Vasudevan, shreekumari S.
4. MURRAY [ROBERT KK], Harper's Bio Chemistry Ed 24, Prentice Hall. 1996
5. RAMAKRISHNA [S], PRASANNA [KG], RAJAN [R], Text Book of Medical Biochemistry.
6. VASUDEVAN [DM] and SREE KUMARI [S], Text Book of BioChemistry for Medical students.
7. DAS [Debajyothi], Biochemistry.
8. LEHININGER [Albert] et. al., Principles of Biochemistry.
9. ORTEN [James M] and NEUHAUS [OHO.W]. Human Biochemistry.
10. Strayer [LUBERT], Biochemistry.
11. DEVLIN [Thomas M], Biochemistry with Clinical Correlation.

SECTION – II PHARMACOLOGY

Subject Title: Total hours: Theory:	Pharmacology 60 60
Total Hours/ Week:	2 hours/Week
Method of Assessment:	Written

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.

THEORY

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]**

    a) Drugs Used in the Treatment of Heart Failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors

    b) Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators, Antiarrhythmic Drugs

    c) 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

    d) Cerebral Ischemia

    e) Peripheral Vascular Disease

4. **Neuropharmacology [8 Hours]:** Introduction, Alcohols, Sedatives and Hypnotics, Anti-convulsants, Analgesics and Antipyretics, General anesthetic, Local anesthetic, Antianxiety Drugs: Benzodiazepines, Other Anxiolytics**,** Very brief introduction of Psycho Therapeutics: Treatment of Mood Disorders (Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium, Antipsychotic drugs).

5. **Disorders of Movement [4 Hours]:** Drugs used in Treatment of Parkinson's Disease Antiepileptic Drugs**,** Spasticity and Skeletal Muscle Relaxants

6. Inflammatory/Immune Diseases [14 Hours]

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

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

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

d) Drugs Used in the Treatment of Neuromuscular Immune/Inflmmatory Diseases: Myasthena gravis, Haematinics, Vitamin B, Iron.

e) Very brief introduction of: idiopathic Inflammatory Myopathies, systemic lupus Erythmatosus, Scleroderma, Demyelinating Disease. Haematinics, Vitamin B, Iron.

f) Respiratory Pharmacology : Upper Respiratory Tract infections-sinusitis, Laryngitis, Pharyngitis, Bronchial Asthma, COPD- effects of prolonged drug administration, Cough suppressant

7. Digestion and Metabolism [8 Hours]

a) Gastrointestinal Pharmacology: Vomiting, Peptic Ulcer Disease, Constipation, Diarrhea

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

c) Disorder of thyroid hormone: drugs for hypo and hyperthyroid

d) Very brief introduction of sex hormone and hormonal contraceptive

8. Geriatrics [3 Hours]: Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension

9. Antibiotics [3 hours]: Definition, choice of agents, resistance, prophylactic groups**,** Very brief introduction of drugs name, mechanism, uses and specific toxicity

Recommended Textbooks

1. Essential of Medical Pharmacology by K. D. Tripathi
2. Text book of Medical Pharmacology by Padmaja Udaykumar
3. Pharmacology by N. Murugesh
4. Pharmacology & Pharmacotherapeutics by Satoskar.

Reference Books:

1. Clinical Pharmacology – D.R Laurence, Pn Ben net, MJ Brown
2. Goodman's & Gilman's the Pharmacological basis of therapeutics

Paper III - EXERCISE THERAPY – II

Total hours: Theory: Practical:	250 100 150
Total Hours/ Week: Lecture: Practicals: Seminars/ Tutorials:	6 hours 3 hours /week 2 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

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.

THEORY

SECTION - I

1. **Introduction to Exercise Therapy [5 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, Planning of Treatment.

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

   a) Functional tests

   b) 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

   c) Measurement of Limb Length: true limb length, apparent limb length, segmental limb length

   d) Measurement of the angle of Pelvic Inclination

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, Mitchell's, additional methods.

4. **Aerobic Exercise [7 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.

5. **Balance [7 Hours]:** Definition, Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output Components of balance (sensory, musculoskeletal and biomechanical) Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types Balance retraining

6. **Co-ordination Exercise [6 Hours]:** Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination, Inco-ordination, Causes for Inco-ordination, And 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.

7. **Proprioceptive Neuromuscular Facilitation [10 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, Stability: Alternating isometric, rhythmic stabilization , Skill: timing for emphasis, resisted progression, Endurance: slow reversals, agonist reversal.

8. **Functional Re-education [7 hours]:** Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lower limb and Upper limb activities.

SECTION – II

1. **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.

2. **Manual Therapy: Spinal & Peripheral Joint Mobilization [15 Hours]:** Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan, Biomechanical basis for mobilization, Effects of joint mobilsation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

3. **Resisted Movements [9 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 resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise. Specific exercise regimens, Isotonic: de Lorme's, Oxford, Mac Queen, Circuit weight training, Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle Isometrics Isokinetic regimens, Plyometrics.

4. **Stretching [6 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.

5. **Posture [5 Hours]**: Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.

PRACTICAL [150 Hours]

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

Practical Exam Format

PRACTICAL-80 marks + INT. ASSESSMENT-20 marks: TOTAL-100 MARKS

A] Long case-based on techniques of application of MMT/ Mobilization/ Stretching/ PNF/ Posture & Gait [35 marks]

a) Principles, Indications, Contra-indications, Documentation of findings etc [20 marks]
b) Psychomotor & affective-skills [15 marks]

B] Short Case – Any one of the following [20 marks]

a) Passive movements /Strengthening/ Relaxation / Functional Reeducation/ Mat Exercises/ General Fitness / Group Exercises / Balance/ Coordination etc.
b) Spots-Based on Therapeutic Gymnasium [Four] [5x4= 20 marks]
c) Journal [5 marks]

Recommended Textbooks:

1. Therapeutic Exercise: Foundations and Techniques : Carolyn Kisner, Lynn Allen Colby
2. Principles of exercise therapy: M. Dena Gardiner
3. Practical Exercise therapy by Hollis Margaret
4. PNF in Practice: An Illustrated Guide: Susan S. Adler , Dominiek Beckers, Math Buck

Reference Books:

1. Principles of muscle testing by Hislop.
2. Proprioceptive Neuromuscular Facilitation: Patterns and Techniques Voss , Ionta & Myers
3. Facilitated Stretching -Robert McAtee , Jeff Charland
4. Relaxation Techniques: A Practical Handbook for the Health Care Professional , Marie Donaghy , Rosemary A. Payne & Keith Bellamy
5. Water Exercise : 78 Safe and Effective Exercises for Fitness and Therapy Martha White
6. Yoga as Therapeutic Exercise: A Practical Guide for Manual Therapists Luise Worle , Erik Pfeiff
7. Proven Therapeutic Exercise Techniques: Best Practices for Therapists and Trainers R. Eric Oestmann
8. Therapeutic Exercise in Developmental Disabilities Barbara H. Connolly, Patricia Montgomery
9. Therapeutic Exercise: Moving Toward Function - Lori Thein Brody, Carrie M. Hall
10. Therapeutic Exercises Using the Swiss Ball: Caroline Corning Creager , Caryl Riedel , Mike Berry
11. Ultimate Core Ball Workout: Strengthening and Sculpting Exercises Jeanine Detz
12. Therapeutic Exercises Using Foam Rollers[Paperback] Caroline Corning Creager
13. Therapeutic Exercises Using Resistive Bands[Paperback] Caroline Corning Creager
14. Therapeutic Exercise: Techniques for Intervention : William D. Bandy, Barbara Sanders
15. Advanced Fitness Assessment and Exercise Prescription : Vivian H. Heyward
16. Progressive Exercise Therapy in Rehabilitation and Physical Education: John H. Colson
17. New Directions in Progressive Relaxation Training: A Guidebook for Helping Professionals: Douglas A. Bernstein , Thomas D. Borkovec

Paper IV - ELECTROTHERAPY

Total hours: Theory: Practical:	200 100 100
Total Hours/ Week: Lecture: Practicals: Seminars/ Tutorials:	6 hours 2 hours /week 3 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

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.

THEORY

Introductory Physics [Not for Exam]

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 [1Hour]:** Definition, properties, electro-magnetic induction, electro- magnetic spectrum.

5. **Valves, transformers, types, principles, construction and working. [1 Hour]**

6. **Ionization [1 Hour]:** Principles, effects of various technique of medical ionization.

7. **Nerve Muscle Physiology [4 Hours] :** 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.
8. **Pain [3 Hours]:** Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detai**l.**

SECTION- I

A - <u>Low frequency Currents:</u>

1. **Basic types of current [1 Hour]**
   a) Direct Current: types, physiological &therapeutic effects.
   b) Alternating Current

2. **Types of Current used in Therapeutics [2 Hour]**
   a) Modified D.C
      - Faradic Current
      - Galvanic Current
   b) Modified A.C
      - Sinusoidal Current
      - Diadynamic Current.

3. **Faradic Current. [3 Hours]**: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.

4. **Galvanic Current [3 Hours]:** 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.

5. **Sinusoidal Current & Diadynamic Current in Brief. [1 Hour]**

6. **HVPGS [1 Hour]:** Parameters & its uses

7. **Ionization / Iontophoresis [1 Hour]:** Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, would healing.

8. **Cathodal / Anodal galvanism. [1 Hour]**

9. **Micro Current & Macro Current [1 Hour]**

10. Types of Electrical Stimulators [1 Hour]

a) NMES- Construction component.

b) Neuro muscular diagnostic stimulator- construction component.

c) Components and working Principles

11. Principles of Application [2 Hours]: 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**.**

12. TENS [5 Hours]: 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.

B - <u>Electro-diagnosis:</u>

1. FG Test [1 Hour]

2. SD Curve [2 Hours]: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.

3. Nerve conduction velocity studies [2 Hour]

4. EMG: Construction of EMG equipment. [1 Hour]

5. Bio-feed back. [2 Hour]

C - <u>Medium Frequency:</u>

1. Interferential Therapy [3 Hour]: 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. Russian Current.

2. Rebox type Current [1 Hour]

SECTION - II

A - <u>High Frequency Currents [Thermo & Actinotherapy]:</u>

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 **[7 Hours]**

3. Pulsed Electro Magnetic Energy [1 Hour]: Principles, Production & Parameters of PEME, Uses of PEME.

4. **Micro Wave Diathermy [3 Hours]**: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD.

5. **Ultrasound [8 Hours]:** 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.

6. **IRR [2 Hours]:** Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication**.**

7. **UVR [7 Hours]**: 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. **LASER [7 Hours]:** Classification, Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. . Energy density & power density

B – <u>Superficial heating Modalities:</u>

1. **Heat and Cold** – Physiological and therapeutic effects, indications/contraindications. **[2 Hours]**

2. **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. **[3 Hours]**

3. **Contrast Bath**: Methods of application, Therapeutic uses, Indications & Contraindications**.[1 Hour]**

4. **Moist Heat Therapy**: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications**.[1 Hour]**

5. **Hydrotherapy**: Whirl Pool Bath and Hubbard tank -Construction, Method of Application, Therapeutic Uses, Indications & Contraindications. **[2 Hours]**

6. **Cryotherapy:** Define- Cryotherapy, Principle - Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages**. [3 Hours]**

PRACTICAL: [100 Hours]

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

Practical Exam Format

PRACTICAL-80 MARKS + I.A.-20 MARKS: TOTAL = 100 MARKS

A. Long case - based on Techniques of application of Electrical Modalities/ superficial thermal agents/ Cryotherapy – **[35 marks]**: [Cognitive–Medical electronics, Physiological /Biophysical principles, Therapeutic effects, Indications & Contraindications] [20 marks] + [Psychomotor + Affective- skills] [15 marks]

B. Spots and equipment testing [40 marks]

a] Spots [Six] –5 Minutes per Spot-Identification of Electronic Equipment / Component & Panel Diagram of any Two Equipments [5 x 6] [30 marks]

b] Testing of Equipment — SWD / Ultra Sonic / IFT / Stimulator, TENS Machine [10 minutes] [10 marks]

C. Journal [5 marks]

Recommended Textbooks:

1. Claytons Electrotherapy by Forster & Plastanga
2. Electrotherapy Explained by Low & Reed
3. Clinical Electrotherapy by Nelson
4. Principles and Practice of Electrotherapy: Joseph Kahn

Reference Books:

1. Electrotherapy: Clinical Procedures Manual: Theresa Nalty, Mohammed A. Sabbahi
2. Electrotherapy in Rehabilitation : Meryl Roth Gersh
3. Electrotherapy and light therapy : Richard Kovács
4. Handbook of Electrotherapy for Practitioners and Students : Burton Baker Grover
5. Physical Agents in Rehabilitation: From Research to Practice: Michelle H. Cameron
6. Physical Agents: Theory And Practice: Barbara J. Behrens, Susan L. Michlovitz
7. Ultrasound and Laser Light Handbook Package: From Research to Practice: Michelle H. Cameron
8. Laboratory Manual for Physical Agents Theory and Practice PT, Barbara J. Behrens MS
9. Manual for Physical Agents : Karen W. Hayes, Roger M. Nelson
10. Evidence-Based Guide to Therapeutic Physical Agents : Alain Yvan Belanger
11. Therapeutic Electrophysical Agents: Evidence Behind Practice Alain Yvan Belanger
12. Therapeutic Modalities in Rehabilitation. William Prentice
13. Electrotherapy Evidence based practice by Sheila Kitchen

Paper V - KINESIOLOGY

Total hours: Theory: Lecture:	100 100 3 hours/ week
Method of assessment:	Written

Course Description:

Kinesiology 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

SECTION -I

1. **Basic Concepts in Biomechanics: Kinematics and Kinetics [5 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) Work
   n) Moment arm of force
   o) Force components
   p) Equilibrium of levers

2. **Joint structure and Function [4 Hours]:**

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

3. Muscle structure and function [3 Hours]:

a) Mobility and stability functions of muscles
b) Elements of muscle structure
c) Muscle function
d) Effects of immobilization, and aging

4. Biomechanics of the Thorax and Chest wall [5 Hours]:

a) General structure and function
b) Rib cage and the muscles associated with the rib cage
c) Ventilatory motions: its coordination and integration
d) Developmental aspects of structure and function
e) Changes in normal structure and function I relation to pregnancy, scoliosis and COPD

5. The Temporomandibular Joint [4 Hours]:

General features, structure, function and dysfunction

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) General effects of injury and aging

SECTION - II

1. Biomechanics of the peripheral joints [54 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; the effects of immobilization and injury.

c) The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; prehension; functional position of the wrist and hand.

d) The hip complex: Structure and function of the hip joint; hip joint pathology - arthrosis, fracture, bony abnormalities of the femur.

e) The knee complex: Structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease.

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, deviations from normal structure and function – Pes Planus and Pes Cavus

2. **Analysis of Posture and Gait [15 Hours] :** Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; 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, effects of age, gender, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait; Movement Analysis; ADL activities like sitting – to standing, lifting, various grips , pinches.

Recommended Text Books:

1. Joint Structure and Function – A comprehensive Analysis by Cynthia Norkin.
2. Brunnstrom's Clinical Kinesiology by Laura Smith, Elizabeth Beth Weiss, and Don Lehmkuhl.

Recommended Reference Books:

1. Clinical Kinesiology for Physical Therapist Assistants by Lippert
2. Applied Kinesiology: A Training Manual and Reference Book of Basic Principles and Practices by Robert Frost (Mar 28, 2002)
3. Kinesiology: The Mechanics and Pathomechanics of Human Movement by Carol A. Oatis
4. Kinesiology by K. Wells; Sauder’s Publications.
5. Basic Biomechanics of the Musculoskeletal System by Margareta Nordin and Victor H. Frankel

Paper VI - BIOSTATISTICS

Subject Title: Total hours: Theory:	Biostatistics 50 50
Lecture:	2-3 hours/ week
Method of assessment:	Written

Course Description:

This course will introduce to the student to understand and apply basic statistics in research.

THEORY

1. **Introduction [5 Hours**]: 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 [5 Hours]:** 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 [10 Hours]:** 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. **Measures of Dispersion [5 Hours]:** Meaning, requisites, various methods of dispersion – range, inter quartile range, quartile deviation, mean deviation, standard deviation, coefficient deviation.

5. **Correlation [5 Hours] :** Correlation – meaning, types of correlation, Scatter diagram, Karl Pearson's coefficient of correlation (ungrouped data only), Spearman's rank correlation, Coefficient (ungrouped data only).

6. **Regression [5 Hours]:** Logistic Regression – Linear regression – lines of regression – estimation using limes of regression (using deviation for mean) (ungrouped data only).

7. **Sampling techniques [5 Hours]:** 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.

8. **Concept of Z and t – tests [5 Hours].**

9. **Analysis of variance & covariance [5 Hours] :** Analysis of variance (ANOVA), Basic principle of ANOVA, ANOVA technique; Analysis of Covariance (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 6th Edn. 1997: B.K. Mahajan
4. Biostatistics: A manual of Statistics Methods: K. Visweswara Rao
5. Elementary Statistics 1st Edn, 1990. in Medical Workers: Inderbir Singh
6. Statistics in Psychology and education: Great and Henry
7. Biostatistics: Ramakrishnan

Paper VII - ENT & DERMATOLOGY

E.N.T.

Total hours: Theory:	10 10
Lecture:	1 hour / week

Course Description:

This course will introduce to the student to acquire knowledge to describe pathophysiology, signs & symptoms, clinical features, examination & management of diseases of ENT & skin conditions.

THEORY

1. Anatomy and physiology of hearing and the use of audiometer in assessment of hearing - outline only. **[2 Hours]**
2. General introduction to diseases of E.N.T., emphasis on otitis media, facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy, sinusitis, rhinitis. **[3 Hours]**
3. Mastoid surgery**.[1 Hour]:**
4. Larynx and associated functional paralysis with tracheostomy and care of tracheostomy.**[2 Hours]**
5. Causes of hearing loss, Conservative and surgery intervention including types and availability of hearing aids**. [2 Hours]**

DERMATOLOGY

Total hours: Theory:	20 20
Lecture:	1 hour / week

THEORY

1. Structure and functions of normal skin, primary and secondary skin lesions. **[2 Hours]**
2. Scabies and pediculosis**. [1 Hour]**
3. Fungal infections of skin: Dermatophytos; Tinea versicolor. & Candidiasis**.[2 Hours]**
4. Bacterial infections of skin- Impetigo / Boil. **[2 Hours]**
5. Viral infections of skin- Herpes zoster. **[2 Hours]**
6. Eczema / Dermatitis / Allergies. **[3 Hours]**
7. Psoriasis / Acne / Alopecia / Vitiligo and Leucoderma**. [3 Hours]**
8. Leprosy / Lepra-reaction / Physiotherapy in leprosy. **[3 Hours]**
9. Sexually transmitted diseases.- Syphilis - primary & secondary.; Gonorrhea.; AIDS. **[2 Hours]**

Recommended Books:

1. Maqbool: TB of Nose Throat & Ear: 11/e 2007
2. Tuli: TB of Nose Throat & Ear: 2005
3. Pasricha: Illustrated TB of Dermatology4/e 2006.
4. Sehgal: TB of Clinical dermatology 4/e, 2004.

Paper VIII - BASIC NURSING

Subject Title: Total hours: Theory: Practical:	BASIC NURSING 40 Hours 20 Hours 20 Hours
Lecture + Practical:	1-2 hour / week

Course Description:

At the end of the course student will be able to know the role and importance of nursing in patient care, position of patient, transfer of patient, basic knowledge of handling emergencies and hygiene.

THEORY

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

PRACTICAL [20 Hours]:

For all the topics discuss in theory.

Recommended Books:

1. Basavanthappa: Fundamentals of Nursing; 2004.
2. Sharma: Principles and Practice of Nursing 1/e.
3. Thresyamma: Fundamentals of Nursing, 2002.

Paper IX - ENVIRONMENTAL STUDIES

Subject Title: Total hours: Theory:	ENVIRONMENTAL STUDIES 64 Hours 64 Hours
Lecture :	1-2 hour / week

Course Description:

This course follows the basic principles of environmental sciences and makes the students ready for the upcoming problems the planet earth is facing and going to face in future i.e. waste disposal, deforestation, global warming, ozone depletion and biodiversity. At the end of the course the student will have basic knowledge on natural resources, pollution, ecosystem, biodiversity.

THEORY

1. **The Multidisciplinary nature of environmental studies [5 hours]**
   a) Definition, scope and importance
   b) Need for public awareness.
2. **Renewable and non-renewable resources: [10 hours]**
   a) Natural resources and associated problems.
   b) Forest resources: Use and over- exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
   c) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.
   d) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
   e) Food resources: World food problems, change caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
   f) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies.
   g) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
   h) Role of an individual in conservation of natural resources.
   i) Equitable use of resources for sustainable lifestyles.
3. **Ecosystems[9 hours]**
   a) Concept of an ecosystem
   b) Structure and function of an ecosystem
   c) Procedures, consumers and decomposers
   d) Energy flow in the ecosystem
   e) Ecological succession
   f) Food chains, food webs and ecological pyramids.

g) Introduction, types, characteristic features, structure and function of the following ecosystem:-
   - Forest ecosystem
   - Grassland ecosystem
   - Desert ecosystem
   - Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

4. Biodiversity and its conservation [8 hours]

a) Introduction- Definition: genetic, species and ecosystem diversity.
b) Biogeographical classification of India.
c) Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
d) Biodiversity at global, national and local levels.
e) India as a mega-diversity nation.
f) Hot-spots of biodiversity.
g) Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts.
h) Endangered and endemic species of India.
i) Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

5. Environmental Pollution [8 hours]

Definition, Causes, effects and control measures of :-

a) Air pollution;
b) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear hazards
h) Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
i) Role of an individual in prevention of pollution.
j) Pollution case studies.
k) Disaster management: floods, earthquake, cyclone and landslides.

6. Social Issues and the Environment [8 hours]

a) From unsustainable to sustainable development
b) Urban problems related to energy
c) Water conservation, rain water harvesting, watershed management.
d) Resettlement and rehabilitation of people: its problems and concerns. Case studies.
e) Environmental ethics; Issues and possible solutions.
f) Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
g) Wasteland reclamation
h) Consumerism and waste products.
i) Environment Protection Act.
j) Air (Prevention and Control of Pollution) Act.

k) Water (Prevention and control of Pollution) Act.
l) Wildlife Protection Act.
m) Forest Conservation Act.
n) Issues involved in enforcement of environmental legislation, Public awareness.

7. Human Population and the Environment [8 hours]

a) Population growth, variation among nations.
b) Population explosion- Family Welfare Programme.
c) Environment and human health.
d) Human rights.
e) Value Education.
f) HIV/AIDS
g) Women and Child welfare.
h) Role of information technology in environment and human health.
i) Case studies.

8. Field Work [8 hours]

a) Visit to a local to document environmental assets river/forest/grassland/hill/mountain.
b) Visit to a local polluted site- Urban/Rural/Industrial/Agricultural
c) Study of common plants, insects, birds.
d) Study of simple ecosystems-pond, river, hill slopes,etc.

Recommended Books:

1. Agarwal, K.C.2001 Environmental Biology, Nidhi Publications Ltd. Bikaner
2. Clark R.S.Marine Pollution, Clanderson Press Oxford
3. Miller T G.Jr Environmental Science, Wadsworth Publishing Co
4. Odum, EP.1971 Fundamentals of Ecology. W B Saunders Co.
5. Townsend C, Harper J and Michael Begon, Essentials of ecology , Blackwell Science.

SUPERVISED CLINICAL PRACTICE

Total Hours: **141**

Method of Assessment: Oral, Practical

Students will be posted in rotation in the following areas/wards. The students will be assisting physiotherapists to provide physiotherapy care for the patients.

1. Physiotherapy OPD
2. Orthopedic Physiotherapy OPD
3. Neuro-Physiotherapy OPD

E.

Third Year

Bachelor of Physiotherapy

Paper -I: GENERAL MEDICINE

[INCLUDING PAEDIATRICS]

Total hours: Theory:	90 90
Total Hours/ Week:	3 hours
Method of Assessment:	Written

Course Description:

This subject follows the basic science subjects to provide the knowledge about relevant aspects of 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 90 hrs of lectures and discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various medical conditions.

THEORY

SECTION – I : GENERAL MEDICINE [65 hours]

1. **Infections [5 hours]:** 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 – Syphilis, Gonorrhea, HIV infections and Aids.

2. **Endocrine diseases [6 hours]:** Common presenting symptoms of Endocrine disease – common classical disease presentations. Diabetes Mellitus: Etiology, pathogenesis, clinical features, Complications and its management. Hypothyroidism. Hyperthyroidism. Thyrotoxicosis.

3. **Diseases of the blood [6 hours]:** Examinations of blood disorders. Cause, Clinical manifestations, types and management of Anemia, Hemophilia, hemorrhages.

4. **Diseases of the digestive system[5 hours]:** Clinical manifestations of gastrointestinal disease – Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, GI bleeding, Peptic Ulcer disease, Pancreatitis, 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, Cirrhosis of the Liver, Gall stones, Cholycystitis.

5. **Infectious Disease [3 hours]:** Tuberculosis, malaria, typhoid, infective hepatitis, tetanus.

6. **Nutritional disorder [6 Hours]:** Causes, Clinical features, Complications and treatment of: Vitamins and its deficiencies, disorders including rickets and osteomalacia, anemia.

7. **Cardiovascular Disease [14 hours]**: Anatomy & Physiology & Examination of the Cardiovascular System. 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, valve disorders, Myocardial infection , Angina , Congestive cardiac failure, Cardiomyopathy , Ischemic Heart Disease, Coronary Valve disease, Fetal circulation , Congenital disorders of the Heart, Cardiac Arrest, diseases of arteries and veins, Hypertension.

8. **Respiratory Disease [15 hours]:** Examination of the Respiratory System. Clinical manifestations 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, Lung abscess & Empyma , Upper Respiratory Tract Infections, Pneumonia, Tuberculosis, Diseases of the pleura, diaphragm and chest wall, Respiratory failure.

9. **Urogenital disease: [5 hours]**: Structure and functions of kidney, Physiology of micturation. Upper and lower urinary tract infection and acute renal failure.

SECTION – II: PEDIATRICS [25 hours]

1. **Growth and development [3 hours]** of a child from birth to 12 years, including physical, social, adaptive development.

2. **The maternal and neonatal factors [6 hours]** contributing to high risk pregnancy to the neonate, inherited diseases, maternal infections- viral and bacterial maternal diseases, pregnancy induced hypertension, chronic maternal diseases such as heart diseases, renal failure tuberculosis, diabetes, epilepsy, bleeding in the mother at any trimester.

3. **Normal diet of newborn and child [6 hours]:** List dietary calories, carbohydrate fat, protein, mineral and vitamin requirement in a normal child and in a child with malnutrition, Etiology, findings and treatment of rickets. Vitamin D deficiency and resistant rickets.

4. **Problems and management of [10 hours]** LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy – causes classification, complications, clinical manifestations, treatment. Spin bifida, Mental Retardation. Orthopedic and Neuromuscular disorders in childhood. Sensory disorders – problems resulting from loss of vision and hearing. Learning and behavioural problems – Hyperactivity, Autism. Down's syndrome.

PAPER – I : GENERAL MEDICINE INCLUDING PAEDIATRICS: QUESTION PATTERN

Theory Paper having Maximum: 80 Marks. (Two Sections)		
Type of question	Number of Questions	Marks for Each Question
Section – I: 50 Marks		
Long Essay Type	(Any Two out of Four)	10x2=20
Short Essay Type	(Any Three out of Four)	5x3=15
Short Answer Type	(Any Five out of Six)	3x5=15
Section – II: 30 Marks		
Short Essay Type	(Any Three out of Four)	5x3=15
Short Answer Type	(Any Five out of Six)	3x5=15

Recommended Text Books:

1. Davidson's Essentials of Medicine by Stanley Davidson (2009)
2. Medicine for Students: Golwala

Reference books:

1. Harrison's Principles of Internal Medicine, 17th Edition by Anthony S. Fauci,
2. Braunwald Text of Cardiology
3. Text Book of Cardiology by Hurst
4. Davidson's Principles and Practice of Medicine by Nicki R. Colledge (Ed), Brian R. Walker (Ed), and Stuart H. Ralston MD (2010)

PAPER-II: GENERAL SURGERY

[INCLUDING O. & G. AND CARDIOTHORACIC SURGERY]

Total hours: Theory:	100 100
Total Hours/ Week:	3 hours
Method of Assessment:	Written

Course Description:

This subject follows the basic science subjects to provide the knowledge about relevant aspects of 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 100 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.

THEORY

SECTION– I: GENERAL SURGERY & CARDIOTHORESIC SURGERY [60 Hours]

1. **Fluid, Electrolyte and Acid-Base disturbances – diagnosis and management; Nutrition in the surgical patient. [1 Hours].**

2. **Wound healing [2 Hours]:** Basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, Scars – types and treatment.

3. **Hemostasis [1 Hours]:** Components, hemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion; Surgical Infections **[2 Hours].**

4. **Acute infections [6 Hours]:** Inflammatory fever- bacteriemia, septicemia, pyemia, toxemia. Specific types: Cellulitis- sites, lymphadinitis, abscess with special reference to hand infection, carbuncle, Tetanus, gas gangrene, hospital infection, cross infection with modes of spread and prevention. General Post – Operative Complications and its management.

6. **Reasons for Surgery [4 Hours]:** Types of anaesthesia and Incisons ; Clips Ligatures and Sutures ; Overview of Drainage systems and tubes used in Surgery.

7. **Surgical Oncology [2 Hours]** Cancer – definition, types, clinical manifestations of cancer, Stages of Cancer, name of surgical procedures involved in the management of cancer

8. **Thoracic surgeries [12 hours]** Physiology and mechanics of breathing. Use of mechanical breathing Ventilators in brief. Pulmonary function tests. investigation of lung disease. Causes, clinical presentation, Diagnosis and treatment of Chest injury. Definition, Indications, Physiological changes, procedure and Complication of Lung surgeries: Thoracotomy, Pnumonectomy, Lobectomy, segmentectomy, Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung.

9. **Cardiac surgeries [12 hours]** basic anatomy and physiology of heart and great vessels.Investigation of patient undergoing cardiac surgery. Indications, Physiological changes, procedure and Complications of heart surgeries: Extra cardiac Operations, Closed Heart surgery, Open Heart Surgery, great vessels surgery, surgery for congenital heart disease. Transplant Surgery: Heart, Lung. Cardiac arrest and its management. Introduction of Cardio-Pulmonary Bypass Machine in brief.

10. **Diseases of the Arteries and Veins [6 Hours]**: 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.

11. Definition, Indication, Incision, Physiological changes and Complications following Common operations , Abdominal incision , Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy, oesophegeal disorder, Neprectomy, Prostectomy. **[8 Hours]**

12. **Burns [4 Hours]:** 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**.**

SECTION – II OBSTETRICS & GYNECOLOGY [40 Hours]

1. Anatomy and physiology of the female reproductive organs.

2. **Puberty:** Dynamics.

3. **Menstrual Cycle**: Physiology, Hormonal regulation, abnormalities, disorders and common problems of menstruation.

4. **Pregnancy**: Diagnosis, fertilization, development of the fetus,. Normal, abnormal and multiple gestation , Physiological changes , common complication- PIH, eclampcia, diabetes , hepatitis, german measles , TORCH infection , abortion, antenatal care.

5. **Labour:** Normal events of Ist ,IInd and IIrd stages of labour. Complication during labour & management. Assisted delivery: Episiotomy, Forceps delivery, caesarian section

6. **Postnatal phase:** Puerperium, Common complications & Management, Lactation, Complications of repeated child bearing with small gaps.

7. **Family planning** : Method of Contraception, Medical Termination of pregnancy (MTP)

8. **Dysfunctions & Disease:** Prolapse & displacement - Uterine prolapse, Cystocoele, Rectocoele, Enterocoele ,Incontinence -types, causes , assessment, management. Infections of female genital tract including sexually transmitted Diseases & PID.

9. **Gynaecological Surgeries :** Definition, Indications and Management of the following surgical

   a) procedures – Hysterectomy, Hysterosalpingography, Dilatation and Curettage, Laproscopy,

   b) Colposopy

10. **Pre, Peri & Post Menopause:** Physiology, Consequence, complications & management of Menopause. Neoplasm of Female reproductive organs & its management.

Clinical:

1. Examination of patients as regards chest & heart diseases, O& G conditions.

2. Demonstration – Acquaintances with C.T. Surgery, Equipments, I.C.C.U. O.T, O & G ward.

Recommended Text books:

1. Textbook of surgery- das
2. Bailey and Love's – Short Practice of Surgery
3. Obstetrics & Gynecology- Dutta

Reference books:

1. General Surgical Operations – by Kirk / Williamson
2. Surgery by Nan
3. Chest Disease by Crofton and Douglas.
4. Surgery – S. Basu

Paper – III: ORTHOPEDICS AND TRAUMATOLOGY

Subject Title: Total hours: Theory:	Orthopedics & Traumatology 80 80
Total Hours/ Week:	3 hours
Method of Assessment:	Written

Course 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 80 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.

THEORY

SECTION – I [43 Hours]

1. **Introduction [3 Hours]:** Introduction to orthopedics. Clinical examination in an orthopedic patient. Common investigative procedures. Radiological and Imaging techniques in Orthopedics.

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 [10 Hours]:**

    a) 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, galaezzi fracture –dislocation. Chauffer's fracture.Colle's fracture. Smith's fracture. Scaphoid fracture. Fracture of the metacarpals. Bennett's fracture. Fracture of the phalanges. (Proximal and middle.)

    b) Dislocations of Upper Limb - Anterior and posterior 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.

    c) Posterior dislocation of elbow – Mechanism of injury, clinical feature, complications & management.

4. Fracture of Spine [6 Hours]:

a) Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications, Management- immobilization(brief introduction of 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.

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

c) Fracture of coccyx.

d) Fracture of Rib Cage - Mechanism of injury, clinical features, complication and management for Fracture Ribs, Fracture of sternum.

5. Fractures and Dislocations of Lower Limb [10 Hours]:

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

b) Fracture of pelvis. Fracture neck of femur ,Fractures of trochanters. Fracture shaft femur, 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. Bimalleolar fracture, Trimalleolar fracture, Fracture calcaneum. Fracture of talus. Fracture of metatarsals. stress fractures Jone's fracture. Fracture of phalanges.

c) 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 [5 Hours]:

a) Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis.

b) 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.

c) Strains- quadriceps, hamstrings, calf, biceps, triceps etc.

d) 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 [4 Hours]:** Definition, levels of amputation of both lower and upper limbs, indications, complications.

SECTION– II [37 Hours]

1. **Deformities [6 Hours]:** Clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.

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

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

2. **Disease of Bones and Joints [5 Hours]:** Causes, Clinical features, Complications, Management- medical and surgical of the following conditions:

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

   b) Arthritic conditions: Pyogenic arthritis. Septic arthritis. Syphilytic infection of joints.

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

   d) Perthes disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis.

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

3. **Inflammatory and Degenerative Conditions [6 Hours]:** causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions :

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

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

4. **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.

5. **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.

6. **Cervical and Lumbar Pathology [5 Hours]:** Causes, clinical feature, patho-physiology, investigations, management-Medical and surgical for the following :

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

7. **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.

8. **Regional Conditions [6 Hours]:** Definition, Clinical features and management of the following regional conditions

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

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

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

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

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

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

Recommended Books:

1. Apley's System of Orthopaedics and Fractures by Louis Solomon, David Warwick, and Selvadurai Nayagam (2010)
2. Text book of Orthopedics.—Maheswari.
3. Orthopedic Principles - A Resident's Guide by David Ip (2005)
4. Campbell's Operative Orthopaedics by S. Terry Canale and James H. Beaty (2007)
5. Outline of Orthopedics. — John Crawford Adams.

Paper – IV: MUSCULOSKELETAL PHYSIOTHERAPY

Total hours: Theory: Practical:	140 80 60
Total Hours/ Week: Lecture: Practical: Seminars/ Tutorials:	6 hours 3 hours /week 2 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

Course 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.

THEORY

SECTION – I [40 Hours]

1. **PT assessment for Orthopedic conditions [6 Hours]:**

   a) SOAP , ICIDH2, ICF 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.

   b) 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.

   c) 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

2. **Fractures [5 Hours]:**

   a) Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short and long term goals.

   b) Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period

3. **Specific fractures and dislocations [5 Hours]:** 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.

4. **Principles & techniques of manual therapy [5 Hours]:** Briefly Maitland, McKenzie and Mulligan.

5. **Degenerative and Inflammatory conditions [3 Hours]:** Definition, signs and symptoms, clinical features, radiological features, deformities, medical, surgical management [Briefly]. Describe the 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.

6. **Infective conditions[2 Hours**]: Definition, signs and symptoms, clinical features, radiological features, medical, surgical management **[Briefly].** Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, pyogenic arthritis, TB spine and major joints - knee and hip.

7. **Postural abnormalities of spinal column [3 Hours]:** Definition, clinical features, and deformities, medical and surgical management. Describe PT assessment and management and home program**.**

8. **Deformities [3 Hours]:** Review the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT assessment and management of the following conditions:
   a) **Congenital**: CTEV, CDH, Torticollis, pes planus, pes cavus deformities.
   b) **Acquired:** scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum.

9. **Cerebral palsy [2 Hours]:** Deformities and PT management after surgical corrections.

10. **Poliomyelitis [2 Hours]:** Deformities PT assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program

11. **Amputations [4 Hours]:** 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.

SECTION – II [40 Hours]

1. **Spinal conditions [5 Hours]: Review** briefly 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, Sacroiliac joint dysfunction, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta.

2. **Traction [2 Hours] :** Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction.

3. **Osteoporosis [1 Hour]:** causes, predisposing factors, investigations and treatment.

4. **Orthopedic surgeries [5 Hours]:** 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.

5. **Shoulder joint [4 Hours]:** 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.

6. **Elbow and forearm [2 Hours]:** Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management.

7. **Wrist and Hand [3 Hours]:** Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.

8. **Hip Joint surgeries [3 Hours]:** Hemi and total hip replacement - Post operative PT management. Tendonitis and bursitis. - management.

9. **Knee joint [5 Hours]:** 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

10. **Ankle and foot [2 Hour]:** Ankle instability. Ligamentous tears- Post operative management.

11. **Sports Physiotherapy [5 Hours]:** 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. Wrist sprains.

12. **Application of various taping and wrapping methods for support and relief of pain. [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 – Porter
2. Physical Therapies in Sport and Exercise by Gregory Kolt and Lynn Snyder-Mackler, 2007.
3. Clinical orthopedic rehabilitation- Brotzman.
4. Orthopedic physiotherapy - Jayant Joshi.
5. Physical Rehabilitation Assessment and Treatment – O'Sullivan Schmitz
6. Sports Injuries: Diagnosis and Management for Physiotherapists by Christopher M. Norris (1992)
7. Orthopedic Physical Therapy – Donatelli & Wooden
8. Management of Common Musculoskeletal Disorders – Hertling & Kessler
9. Treatment and Rehabilitation of Fractures by Stanley Hoppenfeld and Vasantha L Murthy
10. Physiotherapy In Orthopaedics: A Problem-Solving Approach by Karen Atkinson, Fiona Coutts, and Anne-Marie Hassenkamp
11. Principles of Neuromusculoskeletal Treatment and Management by Nicola J. Petty (2004)
12. Therapy for Amputees by Barbara Engstrom and Catherine Van de Ven Z
13. Pocketbook of Taping Techniques by Rose Macdonald
14. Orthopedic Physical Assessment by David J. Magee (2007)
15. Orthopaedic Physiotherapy (Cash's Textbook) by Marian Tidswell
16. Rehabilitation for the Postsurgical Orthopedic Patient by Lisa Maxey MS PT and Jim Magnusson
17. Orthopedic and Sports Physical Therapy by Terry Malone, Thomas McPoil and Arthur J. Nitz
18. Differential Diagnosis for the Orthopedic Physical Therapist by James Meadows (1999)
19. In-Patient Physiotherapy: Management of Orthopaedic Surgergy by Lucy S. Chipchase, Scott A.
20. Pocket Guide to Musculoskeletal Assessment by Richard Baxter .
21. Sports physiotherapy- Maria Zuluaga

Paper V: GENERAL MEDICAL AND SURGICAL PHYSIOTHERAPY

Total hours: Theory: Practical:	140 80 60
Total Hours/ Week: Lecture: Practicals: Seminars/ Tutorials:	6 hours 2 hours /week 3 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

Course Description:

At the end of the course the candidate will be able to:

1. Identify discuss and analyze various dysfunctions based on Pathophysiological principles and arrive at the appropriate functional diagnosis.
2. Acquire knowledge of rational of basic investigative approaches in medical system and surgical intervention, regimes in general surgeries (special emphasis on abdominal surgeries)
3. Execute effective physiotherapeutic measures (with appropriate clinical reasoning) and exercise, conditioning in general medical and surgical conditions.
4. Acquire knowledge of the overview of patient's care in the I.C.U. for bronchial hygiene and continuous monitoring of the patient in I.C.U.
5. Select strategies for cure, care and prevention; adopt restorative and rehabilitative measures for maximum possible functional independence of a patient at home, work and in community.
6. Acquire the knowledge of evaluation and physiotherapeutic treatment for obstetrics and gynecological conditions.
7. Acquire the knowledge of various conditions where physiotherapy plays a vital role in the rehabilitation (psychiatry, dermatology, geriatric and ENT conditions)

   Evaluate, grade and treat non-healing wounds.

THEORY

SECTION – I [40 Hours]

1. **Woman's Health: [20 Hours]**
   - **A. Adolescent phase –**
     a) Obesity
     b) Menstrual disorders like PCOD(poly cystic ovarian disorder), pre-menstrual syndrome and dysmenorhea with its PT management

B. Child-bearing phase –

a) Complications during pregnancy and its PT management according to specific conditions/complications.
b) Antenatal Phase– specific breathing exercise, relaxation, postural training, pelvic floor exercise and strengthening exercise.
c) Physiotherapy during labor.
d) Postnatal Phase – complication and its physiotherapy management. Postnatal exercise after normal labour and labour with invasive procedures like: Episiotomy, Forceps delivery, Caesarian section

C. Climacteric Phase -

a) Menopause, Osteoporosis & Physiotherapy management
b) Gynecological conditions like Incontinence & its types, Prolapse & displacement along with its PT management
c) Gynecological operations - hysterectomy, prostatectomy, Mastectomy- Simple and Radical, pelvic repair and other operations with PT management.

2. **Management of vascular disease [8 Hours]**: thrombosis, phlebitis and phlebothrombosis, burger's disease, varicose veins, DVT, venous ulcers, lymphoedema & its PT management

3. **Skin conditions & Venereal diseases [5 Hours]:** Acne, Psoriasis, Alopecia, Vitiligo, Hyperhidrosis, And STD's: AIDS, syphilis, and gonorrhea along with PT management. Wounds, local infection, ulcers, pressure sore-UVR and other electrotherapeutic modalities for healing of wounds, hypergranulated scars, relief of pain and modality.

4. **Role of Physiotherapy [7 Hours] :** in diabetes Mellitus, Hypertension, Vertigo, Leprosy, Myofascial Pain, Acute and Chronic Pain Syndromes, Obesity, and Hemophilia.

SECTION – II [40 Hours]

1. **Psychiatry - physiotherapy in psychiatric conditions. [6 Hours]**

a) Introduction to Psychiatry in Physiotherapy.
b) Substance related disorders-alcohol, opium, hallucinogens, etc.
c) Sleep disorders.
d) Anxiety disorders - GAD, phobias, panic disorder, ASD, PTSD, and OCD.

2. **Complication common to all operations. [2 Hours]**

3. **Abdominal incisions [2 Hours]**

4. **Physiotherapy in pre and post operative stages. [4 Hours]**

5. **Operations of upper G.I. Tract - esophagus, stomach, duodenum. [4 Hours]**

6. **Operations of large and small intestine [6 Hours]**: Appendicectomy, cholecystectomy, partial colectomy, colostomy, ileostomy, hernia and herniotomy, hernioraphy, hernioplasty.

7. **Burns and its treatment [5 Hours]:** physiotherapy in burns, skin graft, and reconstructive surgeries.

8. **ENT [3 Hours]**: sinusitis, non suppurative and chronic suppurative otitis media, otosclerosis, labrynthitis, mastoidectomy, chronic rhinitis, laryngectomy, pharyngeo-laryngectomy, facial palsy.

9. **Oncology [8 Hours]**: Etiology, stages and types of cancer developments; Clinical manifestations, Diagnosis of cancer; Physiotherapy examination and treatment of specific representative cancers: Breast and lung cancer.

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 (Physiotherapy Essentials) by Stuart Porter (2008)
2. Physiotherapy in Obstetrics and Gynaecology by Jill Mantle; Jeanette Haslam and Sue Barton
3. Women's Health: A Textbook for Physiotherapists by Ruth Sapsford, Joanne Bullock-Saxton, and Sue Markwell.
4. Burn Care and Rehabilitation: Principles and Practice (Contemporary Perspectives in Rehabilitation) by Reginald L. Richard and Marlys J. Stanley (1994).
5. Cash's Textbook of Medical and Surgical conditions for Physiotherapists by Joan E. Cash and Patricia A. Downie (1993)

Reference Books:

1. Obstetric and Gynecologic Care in Physical Therapy, by Rebecca G. Stephenson and O'Connor
2. Rehabilitation and palliation of cancer patients by Herrmann Delbrück
3. Physiotherapy in Psychiatry by Mary Hare
4. Physiotherapy in Mental Health: A Practical Approach by Tina Everett, Dennis, and Eirian Ricketts.
5. Health Promotion Throughout the Life Span by Carole Lium Edelman and Carol Lynn Mandle
6. Geriatric Physical Therapy by Andrew A., Ph.D. Guccione.
7. Essentials of Geriatric Physical Therapy by Jennifer M., Bottomley
8. Saunders Manual of Physical Therapy Practice by Rose Sgarlat Myers; W. B. Saunders Company

Paper-VI: RESEARCH METHODOLOGY

Subject Title: Total hours: Theory:	Research Methodology 50 50
Lecture:	2-3 hours/ week
Method of assessment:	Written

Course Description:

This course will introduce to the student the basic research methodology to acquire skills to review literature selection of research strategy, formulate problems, research writing and publishing.

THEORY

1. **Introduction to Research methodology [2 hours]:** 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 [4 hours]**: Statement of research problem., Statement of purpose and objectives of research problem, Necessity of defining the problem.

3. **Review of Literature. [4 hours]**

4. **Research Proposal & Ethics. [4 hours]**

5. **Research design [2 hours]:** Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design.

6. **Sampling Design [2 hours]:** Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design.

7. **Measurement & scaling techniques [2 hours]:** Measurement in research, Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification., Important scaling techniques.

8. **Methods of data collection [2 hours]:** Collection of primary data, collection data through Questionnaires & schedules, Difference between questionnaires & schedules.

9. **Non- experimental and Experimental Research. [5 hours]**

10. **Sampling fundamentals [2 hours]**: Need for sampling & some fundamental definitions, Important sampling distributions

11. **Processing & analysis of data**. **[3 hours]**: Processing operations, problems in processing , Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship

12. **Testing of hypothesis [5 hours]:** 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 .

13. **Parametric and Nonparametric Tests. [5 hours]**

14. **Reporting Research. [4 hours]**

15. **How and what to read from journals? [4 hours]**

Recommended Textbooks:

1. Research Methods for Clinical Therapists -- Applied Project Design and Analysis by Carolyn M. Hicks.
2. Research Methodology By Kothari.
3. Elements of Research in Physical Therapy: Dean P. Currier
4. First Steps in Research: A Pocketbook for Healthcare Students by Stuart B. Porter.
5. Practical Research: A Guide for Therapists by Sally French, Frances Reynolds, and John Swain, 2001.
6. The Researching Therapist: A Practical Guide to Planning, Performing and Communicating Research by Sue Jenkins, Connie J. Price, and Leon Straker
7. Physical Therapy Research: Principles and Applications by Elizabeth Domholdt.
8. Evaluating Research: Methodology for People Who Need to Read Research by Francis C. Dare (2010)
9. How to Read a Paper: The Basics of Evidence-Based Medicine by Trisha Greenhalgh (2010).
10. How to Write a Great Research Paper, New Edition by Leland Graham and Isabelle McCoy (2007)
11. How to Write a Paper : George M. Hall (2008)

Paper – VII: RADIOLOGY

Subject Title: Total hours: Theory:	Radiology 20 20
Lecture:	1 hour/ week

Course Description:

This course will introduce to the student to acquire skills to read & interpret salient features of the x-ray of the spine & extremities and to co-relate the radiological findings with the clinical findings.

THEORY

1. **Basic outlines of X-rays, CT scan, MRI and Ultra sonography. [4 hours]**
2. **Basic radiology of:**
   a) Musculoskeletal System: [8 hours]
      - Upper extremities
      - Lower extremities
      - Spine
   b) Respiratory System [2 hours]
   c) Cardiac System [2 hours]
   d) Reproductive & Genitourinary System [1 hour]
   e) Nervous System [3 hour]

Recommended books:

1. James Swain & Kenneth W. Bush. Diagnostic Imaging for Physiotherapists.
2. Lynn N. McKinnis. Fundamentals of Musculoskeletal Imaging; F.A. Davis
3. L.C. Gupta & A. Gupta. X-ray Diagnosis and Imaging.

Paper – VIII: COMPUTER APPLICATION

Subject Title: Total hours: Theory: Practical:	Computer Application 30 10 20
Lecture: Practical:	1 hour/ week 1 Hour/Week

Course Description:

The scope of Computer Application has expanded enormously in the recent years. It can be offered as a course to undergraduate physiotherapy students due to easy availability of infrastructure and hardware. The usual lecture, Tutorial and Assignments will be supplemented with supervised reading and problem sessions, online lessons, websites, and computer software aided learning.

1. **Computer Hardware [2 hours] :** System Unit, Monitor, Keyboard, Mouse, USB Drive, Hard Disk, DVD & CD ROMs, Hardware Connections: Printer, Scanner, Web Cams etc.
2. **Computer Software [2 hours]:** Operating System – Win XP, Windows Vista , Internet Explorer and the World Wide Web, Applications Software- MS Office, SPSS, Graph Pad etc.
3. **Windows Explorer [2 hours]:** My Documents. My Computer. Recycle Bin, Open, Close, Resize, Minimize, Move and Customize Windows , The Start Menu, Searching for Files, Move, Copy, Save, Name, Delete and Backup files and folders, Windows Help: Search, Index. Help Online
4. **Internet Explorer and the WWW [2 hours]:** Connecting to the Internet Hardware, Software & ISPs Search Engines, Web Portals, Email: Compose and send a message. Reply to a message, Working with email attachments.
5. **Working with Applications [2 hours]:** Understanding Windows Accessories. Use MS Word, MS Excel, MS Power point etc. Principles in scientific research, work processing, medicine, libraries, education, information system.

Recommended Books:

1. V. Rajaraman: Fundamentals of Computers, Prentice Hall of India, 2002
2. R. Hunt, J. Shelley: Computers and Commonsense, Prentice Hall of India, 2002
3. A. Leon, M. Leon, Fundamentals of Information Technology, Leon Vikas, 2002
4. MS Office 2007.
5. Ajay Gaur : SPSS

Paper-IX: PSYCHIATRY

Subject Title: Total hours: Theory:	Psychiatry 30 30 Hours
Lecture :	1 hour / week

Course Description:

The course provides a basic understanding of the normal and abnormal human behavior and the principles of psychiatry and also helps the student to manage patients with behavioral changes and psychiatric disease condition in the hospital and the community.

THEORY

1. **Introduction: [3 hours]**: History and present trends of psychiatry.Scope and role of mental health care.Concepts and views on normal, abnormal human behavior

2. **Psychodynamics of Abnormal Human Behaviour [3 hours]:** Causes of abnormal behavior. Psychiatric disorders and their classification

3. **Psycho-neurotic disorders:[3 hours]:** Anxiety neurosis, phobic neurosis, hysterical neurosis, obsessive compulsive disorders, hyperchondriac neurosis, post traumatic disorder

4. **Psychotic disorders:[3 hours]:** Organic psychosis, Functional psychosis – Schizophrenia, Major affective disorders – depression, mania, maniac depressive psychosis

5. **Psycho physiological disorders: [3 hours]** Concepts of psychosomatic conditions and anorexia nervosa, bulimia, obesity

6. **Personality disorders[3 hours]:** Paranoid personality disorders, Antisocial personality disorders, Borderline personality disorders

7. **Substance abuse disorders[2 hours]:** Alcoholic abuse, dependence, Drug abuse, dependence

8. **Psychiatric emergencies: [2 hours]:** Suicidal & Aggressive behavior, Hallucinations, alcohol withdrawal

9. **Child Psychology: [4 hours]:** Habit disorders, Childhood schizophrenia ,Autism ,Bedwetting, encopresis, hyperkinetic disorder. Stammering / Stuttering, Juvenile delinquency, Psychiatric problems in mental retardation , Child guidance clinic

10. COMMUNITY MENTAL HEALTH: [4 hours]

a) Identification of psychological crisis situation and intervention
b) Promotion of mental health.
c) Prevention of potential problems of mental health in community.
d) Rehabilitation of mentally ill in the community.
e) Approaches to community mental health in India.
f) Psychological care of geriatric patients.

RECOMMENDED Text Books:

1. Clinical Psychiatry, Mayol – gloss; 3rd Edition, AITBS
2. Psychiatry, James Scully, 4th Edition, Lippincott Williams & Wilkins
3. A short textbook of Psychiatry, Ahuja; 5th Edition – Jaypee
4. Handbook of Psychiatry, Dr. L.P. Shah, 3rd Edition, Uni U.C.B. Pvt. Ltd.

CLINICAL TRAINING - I

Total Hours: **430**

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. O&G
9. Community –PHC
10. Prosthetic & Orthotic Unit (Artificial Limb Center)

F.

Fourth Year

Bachelor of Physiotherapy

PAPER-I: NEUROLOGY & NEUROSURGERY

Total hours: Theory:	80 80
Total Hours/ Week:	5-6 hours
Method of Assessment:	Written

Course 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 and therapist would encounter in their practice. The objective of this course is that after 80 hours of lectures and discussion the student will be able to list the etiology, patho physiology, clinical features, assessment, investigation and treatment methods for various neurological conditions.

THEORY

SECTION – I

1. **Disorders of function in the context of Pathophysiology and Anatomy in Neurology [2 hour]**
2. **Classification of neurological involvement depending on level of lesion. [2 hour]**
3. **Neurological assessment[4 hours]**: Principles of clinical diagnosis, higher mental function, assessment of brain & spinal cord function, evaluation of cranial nerves and evaluation of autonomic nervous system.
4. **Investigations [3 hours]**: principles, methods, views, normal/abnormal values/features, types of following investigative procedures in brief- skull x-ray, CT, MRI, evoked potentials, lumbar puncture, EMG, NCV.
5. **Lower cranial nerve paralysis[6 hours]:** Etiology, clinical features, investigations, and management of following disorders - lesions in trigeminal nerve, trigeminal neuralgia, lesions in facial nerve, facial palsy, bell's palsy, hemi facial spasm, lesions of Vagus nerve, lesions of spinal accessory nerve, lesions of hypoglossal nerve. Causes, symptoms, examination, and management of dysphagia.
6. **Cerebro-vascular diseases [7 hours]**: Define stroke, TIA, stroke in evolution, Lacunar infarct. Classification of stroke – Ischemic, hemorrhagic, venous infarcts. Early warning Sign & Prevention. 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.
7. **Head injury [4 hours]**: Etiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications.

8. **Higher cortical, neuro psychological and neurobehavioral disorders [3 hours]**: Causes of blackouts, Epilepsy- classification, clinical features, investigations, medical& surgical management of epilepsy in children and adult. Neural basis of consciousness, causes & investigations of Coma. Perceptual disorders and Speech disorders.

9. **Movement disorders [6 hours]:** 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, Athetosis, Myoclonus and Wilson's disease.

10. **Cerebellar and coordination disorders [3 hours]:** Etiology, Pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich's ataxia, Tabes dorsalis and Syphilis**.**

SECTION – II

1. **Spinal cord disorders [4 hours]:** Functions of tracts, definition, etiology, risk factors, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Spinal cord injury, IVD prolapse, Spinal epidural abscess, Transverse myelitis, Syringomyelia, Spina bifida, Sub acute combined degeneration of the cord, Hereditary spastic paraplegia, Conus medullaris syndrome, Bladder & bowel dysfunction.

2. **Brain tumors and spinal tumors [3 hours]:** Classification, clinical features, investigations, medical and surgical management.

3. **Infections of brain and spinal cord [2 hours]:** 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.

4. **Motor neuron diseases [4 hours]:** 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.

5. **Multiple sclerosis [2 hours]:** Etiology, Pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications.

6. **Disorders of neuromuscular junction [2 hours]:** Etiology, classification, signs & symptoms, investigations, management, of following disorders Myasthenia gravis, Eaton-Lambert syndrome.

7. **Muscle diseases [3 hours]:** Classification, investigations, imaging methods, Muscle biopsy, management of muscle diseases, genetic counseling. Classification, etiology, signs & symptoms of following disorders – Muscular dystrophy: Myotonic and non myotonic dystrophy.

8. **Polyneuropathy [2 hours]:** Classification of Polyneuropathies. Causes, clinical features, diagnosis and management of: Guillain-Barre syndrome, Chronic Idiopathic Polyneuropathies, and Hereditary motor sensory neuropathy.

9. **Focal peripheral neuropathy [3 hours]:** Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – RSD, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic 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.

10. **Pediatric neurology [10 hours]:** 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, Autism, Dandy walker syndrome and Down's syndrome.

11. **Introduction, Indications and Complications of following Neuro-surgeries in brief [5 hours]:** Craniotomy, Cranioplasty, Stereotactic surgery, Deep brain stimulation, Burr-hole, Shunting, Laminectomy, Hemilaminectomy, Rhizotomy, Micro vascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery - Thalamotomy and Pallidotomy, Coiling of aneurysm, Clipping of aneurysm, and Neural implantation.

Recommended books:

Text books:

1. Davidson's Principles and Practice of Medicine
2. Brains Clinical Neurology.
3. Bailey and Love's – Short Practice of Surgery
4. Textbook of Surgery By Das

Reference books:

1. Illustrated Neurology & Neurosurgery
2. Brain's Diseases of Nervous System
3. Textbook of Neurology- Victor Adams
4. Neurology & Neuro surgery By Lindsay

PAPER-II: NEUROMUSCULAR PHYSIOTHERAPY

Total hours: Theory: Practical:	140 80 60
Total Hours/ Week: Lecture: Practicals: Seminars/ Tutorials:	6 hours 3 hours /week 2 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

Course 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.

THEORY

SECTION – I

1. **Neurological Assessment [8 hours]:** Required materials for examination, Chief complaints, History taking – Observation, Palpation, Higher mental function, Motor Examination, Reflexes, Sensory examination, Special tests for neurological disorder, coordination examination, Gait analysis, Functional Analysis, Assessment tools & Scales, Differential diagnosis.

2. **Neuro physiological Techniques in brief [10 hours]:** Concepts, Principles, Techniques, Effects of following Neurophysiological techniques: NDT, PNF, Vojta therapy, Rood's Sensory motor Approach, Sensory Integration Approach, Brunnstorm movement therapy, Motor Control, Motor relearning program, Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy.

3. **Paediatric Neurology [12 hours]:** Paediatric Examination, Developmental milestones, developmental reflexes, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Use of various Neurophysiological approaches & Modalities in Risk babies, Minimum brain damage, Developmental disorders, Cerebral palsy, Autism, Down's Syndrome, Hydrocephalus, Spina bifida.

4. **Evaluation and Management of Brain and Spinal Cord Disorders [10 hours]**: 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, TIA, Lacunar Stroke, Meningitis, Encephalitis, Head Injury, Brain Tumors, Perceptual disorders, Amyotrophic lateral sclerosis, Spinal muscular atrophy and Multiple sclerosis, SACD. Extrapyramidal disorder: Parkinson's diseases, chorea, athetoid.

SECTION – II

1. **Evaluation and Management of Cerebellar, Spinal Cord and Muscle Disorders [10 hours]**: 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 Cerebellar Ataxia, Sensory Ataxia, extra pyramidal tract disorders Parkinson's disease, Muscular dystrophy (DMD), Myasthenia Gravis, Eaton-Lambert Syndrome, Spinal tumors, Spinal cord injury, Transverse myelitis, Bladder & Bowel Dysfunction, Poliomyelitis, Post Polio Syndrome

2. **Evaluation and Management of Peripheral Nerve Injuries and Disorders [10 hours]**: 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 , Alcoholic and Diabitic Neuropathy, 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. **Assessment and management of Neurological gaits [8 hours]:** 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, Chorea form Gait, Diplegic Gait, and Myopathic Gait , Frontal lobe disorder Gait

4. **Pre and Post surgical assessment and treatment following conditions [9 hours]:** 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, Arteriovenous malformations, and Spina bifida

5. **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:

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:

Text books:

1. Cash's Textbook of Neurology for Physiotherapists
2. Physical Rehabilitation Assessment and Treatment – Susan O'Sullivan Schmitz
3. Neurological Rehabilitation By Darcy Umphred.

Reference books:

1. Neurological Rehabilitation: Optimizing Motor Performance by Janet H. Carr and Roberta B. Shepherd
2. Treatment of Cerebral Palsy and Motor Delay by Sophie Levitt
3. Tetraplegia and Paraplegia: A Guide for Physiotherapists by Ida Bromley Elements of Pediatric Physiotherapy- Eckersley
4. Physical Management in Neurological Rehabilitation by Maria Stokes
5. Neurological Physiotherapy: A Problem-Solving Approach by Susan Edwards and Susan Edwards
6. Steps to follow By Patricia M. Davies
7. Right in the Middle By Patricia M. Davies
8. Neurological Examination made easy By Fuller.
9. Physical Rehabilitation By Braddom.

Paper-III - CARDIOPULMONARY PHYSIOTHERAPY

Total hours: Theory: Practical:	140 80 60
Total Hours/ Week: Lecture: Practical: Seminars/ Tutorials:	6 hours 2 hours /week 3 hours/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

Course Description:

At the end of the course the candidate will be able to: Identify, discuss and analyze cardiovascular and pulmonary dysfunction based on Pathophysiological principles and arrive at the appropriate function diagnosis. Acquire the knowledge of rationale of basic investigation in the medical system and surgical intervention, regimes related to cardiovascular and pulmonary impairments. Execute effective physiotherapeutic measures (with clinical reasoning) and special emphasis on the breathing retraining, nebulization, humidification, bronchial hygiene, general mobilization and exercise conditioning. Acquired knowledge of overview of patient's care at I.C.U., artificial ventilation, suctioning, positioning for bronchial hygiene and continuous monitoring of patient in I.C.U. Acquired the skill of evaluation and interpretation of functional capacity, using simple exercise tolerance test such as 6 minute walk test, symptom limited test. Select strategies for cure, care and prevention; adopt restorative and rehabilitative measures for maximum possible functional independence of patient at home, work and in community. Acquire the skill of basic CPR.

THEORY

Cardiopulmonary evaluation, which includes:

1. Pulmonary function test & its interpretation
2. Chest imaging & neck imaging.
3. ECG interpretation and Echocardiograph in brief.
4. Blood gas analysis & its interpretation.
5. Special tests- stress test , exercise tolerance test
6. Interpretation of the procedures performed-open heart surgery, angiogram, nuclear test catheterization in brief.
7. Analysis of current impairments, functional limitation & disability.

SECTION – I

1. **Review of [6 Hours]:** Cardio respiratory anatomy and physiology, mechanism of normal respiration, relaxation and maintenance of bronchial hygiene in respiratory diseases. Anatomical differences between adult & pediatric lungs, aging in cardiovascular system and respiratory system.

2. **Respiratory and cardiac rehabilitation for cardio respiratory disorders** [**8 Hours]:** definition, aims and objective, Pathophysiology of diseases, physiotherapy assessment and principles of rehabilitation. Fitness programs.

3. **Principle and techniques of physiotherapy in diseases of respiratory and cardiopulmonary system [12 Hours]:** Body positioning, P.D., breathing exercises and thoracic mobility exercises, PNF techniques of respiration, chest clearance techniques- PEP mask, flutters, ACBT, autogenic drainage, cough-assisted techniques ,techniques of facilitations of accessory muscles, MECANICAL AIDS-INCENTIVE SPIROMETRY,CPAP,IPPB .

4. **Clinical examination of cardiovascular disorders, principles and techniques of PT in cardiovascular disease [7 Hours]:** CCF, myocardial infarction, endocarditis, myocarditis, pericarditis, valvular disease of heart, congenital heart disease.

5. **Clinical examination of respiratory disease, principles and techniques of PT [7 Hours]:** Chronic bronchitis, emphysema, asthma, cystic fibrosis, Bronchiectasis, pulmonary embolism, pulmonary TB, pleurisy, emphyema, atelectesis, pneumothorax**.**

SECTION – II

1. **Evaluation, principles and techniques of physiotherapy management in traumatic and surgical conditions of chest, lung, vessels, pleura and mediastinum. [10 Hours]**

2. **Pre and post operative physiotherapy assessment and management in [14 Hours]**: Lobectomy, pneumonectomy, decortications, Thoracoplasty, Tracheostomy, angioplasty, mitral valvotomy (mitral stenosis), valve replacement, PDA, Coarctation of aorta, Septal defect, Fallot's tetralogy, bypass surgery, open heart surgery and heart transplant

3. **Principles of chest physiotherapy in [10 Hours]:** I.C.U., I.C.C.U. along with effect of anesthesia on cardiopulmonary system. Knowledge of equipments in CPU, I.C.U. and I.C.C.U. Ventilators-Modes, classification criteria for initiating mechanical ventilation, suction apparatus. IABP, Pulse oxymeter, nebulizers, humidifiers, O2 therapy, aerosol therapy, drugs used in ICU.

4. **Cardiopulmonary resustications - demonstrations. And on-call physiotherapy [3-Hours].**

5. **Different diagnostic techniques to be used in cardiopulmonary conditions in brief [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:

Text Book:

1. Tidy's Physiotherapy by Stuart Porter (2008)
2. Cash's Textbook of Chest, Heart and Vascular Disorders for Physiotherapists by Joan E. Cash and Patricia A. Downie (1993)
3. Physiotherapy for Respiratory and Cardiac Problems: Adults and Paediatrics by Ammani S Prasad and Jennifer A. Pryor (2008)
4. Principles and Practice of Cardiopulmonary Physical Therapy by Elizabeth, Ph.D. Dean, Donna Frownfelter, Donna L. Frownfelter, and Elizabeth Dean 1996.

Reference Books:

1. The Brompton Hospital Guide to Chest Physiotherapy by GASKELL.
2. Cardiopulmonary Physiotherapy by M. Jones and F. Moffatt .
3. Clinical Management Notes and Case Histories in Cardiopulmonary Physical Therapy by W. Darlene Reid and Frank Chung
4. Cardiopulmonary Rehabilitation: Basic Theory and Application by Margaret Wiley Foley, Julie Ann Starr, Lauren M. Saul, and Frances J. Brannon
5. Essentials of Cardiopulmonary Physical Therapy by H. Steven Sadowsky and Ellen A. Hillegass.
6. Cardiopulmonary Physical Therapy: A Clinical Manual by Joanne Watchie.
7. Cardiovascular and Pulmonary Physical Therapy : An Evidence-based Approach by William DeTurk and Lawrence Cahalin.
8. Physiotherapy in Respiratory Care: An Evidence-Based Approach to Respiratory and Cardiac Management by Alexandra Hough by Jonathan Corne and Kate Pointon (Paperback - Sept. 22, 2009).
9. ECG Made Easy. John R. Hampton, Churchill Livingsone.

Paper – IV: PHYSIOTHERAPY IN REHABILITATION

Total hours: Theory: Practical:	135 80 55
Total Hours/ Week: Lecture: Practical: Seminars/ Tutorials:	5 hours 3 hours /week 1 hour/ week 1 Hour/ week
Method of Assessment:	Written, Oral, Practical

Course Description:

The subject serves to integrate the knowledge gained by the students in community medicine/physiotherapy 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 by various aids and appliances including splints, orthosis and prosthesis.

THEORY

SECTION – I [40 Hours]

1. **General Rehabilitation [5 hours]:** Conceptual framework of rehabilitation, definitions, various models of Rehab, Rehab team including Medical person/P.T./O.T. audiologist/speech therapist /P.&O./ rehab nurse/ psychologist/ vocational guide. WHO definition of Health & disease, Health care delivery system, National Policies of Rehab, National health care programs, Community awareness, Participation, Preventive aspects & demands of PT devices

2. **Disability [5 hours]**: Definition of Impairment, Handicap and Disability, Difference between impairment, handicap and disability, Causes, Types and Prevention and rehabilitation of disability.

3. **Disability Evaluation In Brief [5 hours]**: Introduction, What, Why and How to evaluate, Quantitative versus Qualitative data.

4. **Introduction to Community Based Rehabilitation [4 hours]:** Definition, Concept of CBR, Need for CBR, Objectives of CBR, Scope of CBR, Members of CBR team, Models of CBR, Difference between Institution based and Community based Rehabilitation.

5. **Principles of Community based Rehabilitation [8 hours]**: W.H.O.`s policies-about rural health care-concept of primary /tertiary health centers-district hospitals etc., Principles of a team work 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.

6. **Role of Social work in CBR [3 hours]**: Definition and Methods of social work. Role of social worker in rehabilitation.

7. **Health Promotion [5 hours]:** Physiological changes with aerobic exercises in various systems of the body, Clinical applications of aerobic exercise, Obesity; criteria for overweight & obese patients screening and weight reductions programmes, Measurement of Body Mass Composition.

8. **Geriatrics [5 hours]:** Definition gerontology, geriatrics, aging, senior citizen in India, NGO's, legal right's and benefits. Institutional community based elderly. Old age homes. Physiology of aging: changes in various systems: musculoskeletal, cardio-pulmonary, neurological, special senses. Theories of aging. Clinical implication , strategies for improvement. Compensatory approaches and physiotherapy management.

SECTION – II [40 Hours]

1. Occupational Health [12 hours]

a) **Occupational health diseases:** Prevention, diagnosis and management.
b) **Occupational & Environmental Hazards**: Accidents due to :
   - Physical agents: e.g. heat/cold, light, noise, vibration, UVR. Ionizing radiation.
   - Chemical agents: inhalation, local action & ingestion.
   - Mechanical Hazards: overuse / fatigue, injuries due to ergonomics alteration & ergonomic evaluation of work place.
   - Psychological Hazards: monotocity job dissatisfaction, work anxiety, quality control, interpersonal relationships, work hours.
c) Role of Physiotherapy.
d) Industrial health: Job analysis, job description, job demand analysis, task analysis, Employee fitness, job modification
e) Management: Acute care, concept of functional capacity assessment, work hardening and work conditioning.
f) Employment acts [briefly]:
   - Employee state insurance scheme.
   - Workman's compensation act.
   - Legal aspects of disability in terms of compensation for PWD, benefits & rights.
g) Vocational Rehabilitation: Introduction, evaluation & management.

2. Prosthetics & Orthotics [20 hours]:

a) Definition and Biomechanical principles in designing of appliances & assessment **[1 hours]**

b) Classification of Aids & appliances**[1 hours]**

c) Differences between prosthesis and orthoses**[1 hours]**

d) Prostheses – For Lower limb and upper limb indications and checkout.**[3 hours]**

e) Introduction to Splints / Orthoses – For spine, upper & lower limb**[3 hours]**

f) Upper Limb Orthoses: - Knuckle Bender splint, Cock Up Splint, Opponens splint, finger splints, aero plane splint, wrist hand orthoses**[3 hours]**

g) Spinal Orthoses: Head Cervical Orthoses, Cervical, Thoraco-lumbar, Lumbo – sacral Orthoses (Knight brace, Taylors's Brace, Milwawkee Brace, Collars) **[3 hours]**

h) Lower Limb Orthoses: HKAFO, KAFO, AFO, Foot Orthoses (Shoe Modification) **[3 hours]**

i) Wheel Chair – Parts and prescription**[2 hours]**

3. Role of Physiotherapy in ARCHITECTURAL BARRIERS & POSSIBLE MODIFICATIONS [8 hours]

a) 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 neuro-musculoskeletal and cardiothoracic disabilities.

b) Keeping in mind conditions like RA, Hemiplegia, Paraplegia, Cerebral palsy, Polio, severe OA, Amputation; sensory loss—vision, hearing, speech impairment, Degenerative, geriatric patients, Other disabling conditions.

Practical: 55 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. A textbook on physical medicine and rehabilitation by Howard A Rusk (1964)
2. Community Based Rehabilitation of Persons with Disabilities by Pruthvish; Jaypee Brothers.
3. Ergonomics for Beginners: A Quick Reference Guide, Third Edition by Jan Dul and Bernard
4. Ergonomics for Therapists by Karen Jacobs
5. Ergonomic Living : How to Create a User-Friendly Home & Office: Gordon Inkeles and Iris Schencke
6. Textbook of Rehabilitation by Sunder, Jaypee Publications
7. Physical Medicine and Rehabilitation: Principles and Practice (2 Volume Set) by Joel A DeLisa, Bruce M Gans, Nicolas E Walsh, and William L Bockenek
8. Essentials of Physical Medicine and Rehabilitation: Walter R. Frontera MD PhD, Julie K. Silver MD, and Thomas D. Rizzo Jr. MD (2008)
9. Community Based Rehabilitation by Peat (Paperback - July 1997)
10. Physical Medicine & Rehabilitation Secrets by Bryan J. O'Young MD, Mark A Young MD, and Steven A. Stiens MD MS (2007)
11. Physical Rehabilitation by Susan B. O'Sullivan and Thomas J. Schmitz (2006)
12. Orthotics and Prosthetics in Rehabilitation by Michelle M. Lusardi and Caroline C. Nielsen (2006)
13. Preventive & social medicine by Park & Park
14. Textbook of community medicine & community health by Bhaskara Rao.
15. Legal rights of disabled in India by Gautam Bannerjee
16. Geriatric Physiotherapy by Andrew Guccione.
17. Industrial Therapy by Glenda Key
18. Atlas of Orthotic & Prosthetic devices.

Paper –V : PHYSICAL & FUNCTIONAL DIAGNOSIS

Total hours: Theory: Practical:	120 80 40
Total Hours/ Week: Lecture: Practicals:	4 hours 3 hours /week 1 hours/ week
Method of Assessment:	Written, Oral, Practical

Course description:

This course serves to integrate knowledge gained by the students in basic and clinical medical science with the skills gained by basic physiotherapy subject. Thus enabling them to apply this in evaluation of functions and measurements in clinical situations of dysfunction of different system.

THEORY

SECTION – I [40 Hours]

Introduction and general consideration of evaluation and measurement of:

1. **Cardio – pulmonary system: [20 hours]**
   a) Physical evaluation of cardio pulmonary, normal and pathological conditions.
   b) Posture: Recumbent, erect and orthopnea
   c) Breathing Pattern and breath hold (rate, rhythm, use of accessory muscles), chest deformities, cough, sputum, tactile and vocal fremitus, mobility of thoracic spine and rib cage, percussion, breath sounds. Chest expansion measurements.
   d) Measurements of lung volumes and lung capacities, blood gas level, exercise tolerance test, etc.
   e) Heart rate, blood pressure, heart sounds, pulse rate (volume and pressure), exercise tolerance test.
   f) Pulmonary function test, spirometry, gas analysis
   g) Cardiac efficiency tests : Stress ECG, treadmill and ergometry

2. Musculoskeletal system: [20 hours]

Goniometry, manual muscle assessment , Posture and postural disorder evaluation ,Physical examination of joints in normal and patho – mechanical conditions.Muscle strength and endurance Range of motion of joints, flexibility Measurement of girth, leg length, pelvic inclination, Measurement of body parts, femur, tibia, etc, Angle of scoliotic curve, etc, Gait analysis in pathological conditions and measurement of gait parameters.

Functional Evaluation

- Mobility in bed, transfers, ambulation
- Personal care – eating, dressing, washing, bathing etc
- Household jobs
- Work and recreation.

Section – II [40 Hours]

1. Nervous System:[20 hours]

a) Evaluation of function and measurement in general and with reference to upper motor and lower motor neuron lesions.
b) Myotomes and Dermatomes
c) Nerve Entrapments
d) Muscle tone, voluntary movement and voluntary control tests (isolated and skilled)
e) Higher Motor Functions
f) Tests for disorder of cerebellum, and basal ganglia, etc and coordination tests.
g) Abnormal movements – clonus, tremors, chorea, athetosis.
h) Reflexes (superficial and deep, Cortical & Neonatal reflexes, etc)
i) Neural control of bladder

2. Electro – Diagnosis [15 Hours]

a) Review of electro physiology
b) Surface and needle electromyography
c) Nerve conduction velocity test (motor and sensory)
d) Reflex study
e) H and F wave
f) Cerebral evoked potential. SD curve and EMG [in brief]
g) Analysis of normal and pathological conditions with EEG, MRI, CT Scan etc. [in brief]

3. Biofeedback: [5 Hours]

Introduction, principles of biofeedback, therapeutic effects, indications and contraindications, techniques of treatment

Recommended Books:

1. Textbook of Physical Diagnosis with DVD: History and Examination Mark H. Swartz
2. Physical Diagnosis Secrets: Salvatore Mangione MD
3. Bates' Guide to Physical Examination and History Taking, 10th Edition Lynn S. Bickley
4. Differential Diagnosis for Physical Therapists: Screening for Referral Catherine C. Goodman ,Teresa Kelly Snyder
5. Pocket Guide to Musculoskeletal Diagnosis [Paperback] Grant Cooper
6. Differential Diagnosis for the Orthopedic Physical Therapist [Paperback] James Meadows
7. Electro-Diagnosis and Electro-Therapeutics: A Guide for Practitioners and Students Toby Cohn
8. Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice [Hardcover] Jun Kimura M.D.
9. Biofeedback, Third Edition: A Practitioner's Guide [Paperback] Mark S. Schwartz PhD (Editor), Frank Andrasik PhD (Editor)
10. ACSM's Guidelines for Exercise Testing and Prescription. American College of Sports Medicine
11. Principles of Exercise Testing and Interpretation: Including Pathophysiology and Clinical Applications. Karlman Wasserman, James E. Hansen, Darryl Y. Sue, William W. Stringer , Brian J. Whipp
12. The Physiotherapist's Pocket Guide to Exercise: Assessment, Prescription and Training. Angela Jane Glynn, Helen Fiddler
13. Neuromusculoskeletal Examination and Assessment: A Handbook for Therapists. Nicola J. Petty
14. Physiotherapy Assessment [Paperback] Anne Parry .
15. Neurological Disabilities: Assessment and Treatment Susan E. Bennett , James L. Karnes .
16. Clinical Orthopedic Assessment Guide - 2nd Edition Janice Loudon, Marcie Swift, Stephania Bell
17. Pocket Guide to Musculoskeletal Assessment Richard E. Baxter

Paper-VI: ADMINISTRATION & MANAGEMENT IN PHYSIOTHERAPY

Total hours: Theory:	45 45
Lecture:	1-2 hours / week

Course description:

This course serves to integrate knowledge gained by the students in basic management knowledge and skills essential for effective functioning and to be conversant with planning organization, work scheduling, and cost & control of quality in relation to physiotherapy care & service.

THEORY

1. Administration, Management and Supervision [20 Hours]:

a) 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. [3 hours]
b) Principles of hospital administration and its applications to physiotherapy. [2 hours]
c) Hospital administration: Organization, Staffing, Information, Communication, Coordination, Cost of services, Monitoring and evaluation. [3 hours]
d) Organization of physiotherapy department: Planning, Space, Manpower, Other basic Resources. [5 hours]
e) Organizing meetings, committees, and negotiations [2 hour]
f) Personnel management: Personnel performance appraisal system, Quality care delivery from the staff [2 hours]
g) Public relations in hospital and human resource management. [3 hours]

2. Standards of Practice [5 Hours]:

a) IAP
b) American Physical Therapy Association
c) EUROPEAN CORE STANDARDS OF PHYSIOTHERAPY PRACTICE OF WCPT.

3. Clinical Audit [5 Hours].

4. Documentation [4 Hours].

5. Clinical Decision Making [5 Hours].

6. Outcome Measures in Physiotherapy [6 Hours].

Recommended books:

1. Consumer Protection Act – 1986, Government of India, New Delhi.
2. Francis C M – Hospital Administration
3. Davies, R and Macaulay, BMC – Hospital Planning and Administration
4. Prescription Writing by Frederic Henry Gerrish
5. Innovations in Rehabilitation Sciences Education: Preparing Leaders for the Future by Patricia Solomon and Sue Baptiste
6. Management in Physical Therapy Practice by Catherine G. Page
7. Physical Therapy Management by Ronald W. Scott and Christopher L Petrosino
8. Management in Physiotherapy by Jones
9. Clinical Decision Making and Outcomes In Sports Rehabilitation by Dinesh A. Kumbhare and John V. Basmajian
10. Ethical Decision Making in Therapy Practice (Skills for Practice Series) by Julius Sim
11. Documentation for Rehabilitation: A Guide to Clinical Decision Making by Lori Quinn EdD PT and James Gordon EdD PT
12. Expertise in Physical Therapy Practice by Gail M. Jensen, Jan M. Gwyer , Laurita M. Hack, and Katherine F. Shepard .
13. Legal Aspects of Physiotherapy by Bridgit Dimond
14. Therapy Outcome Measures Manual: Physiotherapy, Occupational Therapy, Rehabilitation Nursing by Pam Enderby, Alexandra John, and Brian Petheram
15. Therapy Outcome Measures for Rehabilitation Professionals: Speech and Language Therapy, Physiotherapy, Occupational Therapy by Pamela Enderby, Alexandra John, and Brian Petheram
16. Evidence-Based Rehabilitation: A Guide to Practice by Mary C. Law PhD and Joy MacDermid PhD
17. Writing Soap Notes: With Patient/Client Management Formats by Ginge Kettenbach
18. Writing Patient/ Client Notes: Ensuring Accuracy in Documentation by Ginge Kettenbach

Paper-VII: EVIDENCE BASED PHYSIOTHERAPY AND ETHICS

Total hours: Theory:	40 40
Lecture:	1-2 hours/ week

Course description:

This course serves to acquire knowledge gained by the students that how to integrate individual clinical expertise and the best external evidence in making decisions about the care of individual patients & to improve standards of health care in the public interest.

THEORY

SECTION – I EVIDENCE BASED PHYSIOTHERAPY [30 Hours]

1. Introduction to Evidence Based Practice: Definitions, Evidence Based Practice, Evidence Based Physiotherapy Practice **[3 hours]**
2. Concepts of Evidence based Physiotherapy: Awareness, Consultation, Judgment, Creativity **[1hours]**
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 **[1hours]**
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. Practical Evidence Based Physiotherapy: Robert Herbert, Gro Jamtvedt, Judy Mead, and Kare Birger Hagen; Elsevier.
2. Evidence-Based Physiotherapy Practice; Mary Ann O'Brien
3. Guide to Evidence-Based Physical Therapy Practice by Dianne V. Jewell (2007)
4. Evidence-Based Rehabilitation: A Guide to Practice by Mary C. Law PhD and Joy MacDermid PhD (2007)
5. Evidence-Based Healthcare: A Practical Guide for Therapists by Tracy J. Bury and Judy M. Mead (1998)
6. Principles of Assessment and Outcome Measurement for Occupational Therapists and Physiotherapists: Theory, Skills and Application by Alison J. Laver Fawcett (2007)

SECTION – II: ETHICS [10 Hours]

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]**

   (a) Physiotherapy as a profession
   (b) Relationship with patients
   (c) Relationship with health care institutions
   (d) Relationship with colleagues and peers
   (e) 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 **[3 hours]**

4. IAP - Memorandum of Association; & Rules and Regulations **[2 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. Physical Therapy Ethics by Donald L. Gabard and Mike W. Martin
5. Educating For Moral Action: A Sourcebook In Health And Rehabilitation Ethics by Ruth B. Purtilo, Gail M. Jensen, and Charlotte Brasic Royeen
6. Legal and Ethical Issues in Physical Therapy by Laura Lee, Ph.D. Swisher and Carol Krueger-Brophy

Paper-VIII: ALLIED THERAPEUTICS

Total hours: Theory: Lecture:	30 30 1-2 hours/ week

Course 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.

THEORY

1. **Basic Occupational Therapy [12 Hours]**

    a) Introduction to Occupational Therapy

    b) Principles of Occupational Therapy

    c) Human Structure and Function in Occupational Therapy

    d) Therapeutic Media in Occupational Therapy

    e) Therapeutic Modalities in Occupational Therapy

    f) Health Care Management in Occupational Therapy

    g) Pathophysiology in Occupational Therapy

    h) Mental Health in Occupational Therapy

    i) Physical Function in Occupational Therapy

2. **Basic Speech Therapy [12 Hours]**

    a) Anatomy and Physiology of the Organs of Language

    b) Introduction to Audiology

    c) Neurological Basis of Language, Linguistics, Phonetics and Phonology

    d) Introduction to Language Disorders

    e) Speech Therapy Intervention in Language Development Disorders, Aphasia, Speech Articulation Disorders, Deafness.

    f) Dyslexias and dysgraphias

    g) Stuttering

    h) Alternative Systems of Communication

    i) Intervention in autism and Psychopathological Disorders

    j) Intervention in Basic Language, Psychomotor Development

k) New Educational Methodologies for Children with Auditory Alterations

l) Technology Applied to Speech Processing

m) Speech Therapy Intervention in Cochlear Implantation

3. Alternative Medicine [6 Hours]

a) Acupuncture: Definitions, Principles, Techniques, Physiological and Therapeutic effects, Indications and Contra indications.

b) Introduction to Naturotherapy – Principles of application, Indications and Uses.

c) Magnetotherapy - Principles of application, Indications and Uses.

d) Role of the above Alternative Medicine approaches in comprehensive rehabilitation of patients.

Recommended Books:

1. Occupational Therapy for Physical Dysfunction by Radomski and Catherine A Trombly
2. Introduction to Occupational Therapy by Susan Hussey, Barbara and Jane Clifford O'Brien
3. Pedretti's Occupational Therapy: Practice Skills for Physical Dysfunction by Pendleton and -krohn
4. Super Star Speech: Speech Therapy Made Simple by Deborah Lott and Katie Lott
5. Here's How to Do Therapy: Hands-On Core Skills in Speech Language Pathology by Debra M. Dwight
6. Hegde's Pocket Guide to Assessment in Speech-Language Pathology by M.N. Hegde
7. Acupuncture in Physiotherapy: Key Concepts and Evidence-Based Practice by Val Hopwood
8. Acupuncture and Related Techniques in Physical Therapy by Val Hopwood, Lovesey, and Mokone
9. Acupuncture: Treatments of Musculoskeletal Conditions by Christopher M. Norris
10. Magnetotherapy: The art of healing through magnets by H. L. Bansal
11. Naturopathy: A Practical guide to understanding the healing power of nature by Stewart Mitchell
12. An Introduction to Principles & Practices of Naturopathic Medicine by Fraser Smith
13. Mosby's Complementary & Alternative Medicine: A Research-Based Approach by Lyn W. Freeman
14. Complementary Therapies in Rehabilitation: Evidence for Efficacy in Therapy, Prevention, and Wellness by Carol M. Davis

CLINICAL TRAINING – II

Total Hours: **430**

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. Neuro Physiotherapy OPD
2. Neurology, Neurosurgery & Neuro ICU
3. Community-PHC
4. Cardiopulmonary Physiotherapy IPD & OPD

G.

Internship & Project Work

PROJECT WORK

Total Hours: 100

Method of Assessment: Oral, Power point Presentation

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

This will be done during internship and will be done as a **group work** of 4-5 students on a given research title.

Research Proposal for this project should be approved before fourth year B. Physiotherapy University Examination.

Project Guide will be assigned by Principal to students.

A Research Advisory Committee [RAC] will be formed in every college having three senior-most faculty members of PHYSIOTHERAPY. This RAC will decide whether the **Project** is accepted / rejected or it requires corrections.

Interns will be allotted 1 Hour daily for doing their 'Project Work' in their internship schedule till 100 Hours are completed.

Students will make a power point presentation of their project on an allotted date in the sixth month of their Internship.

Only after successful submission of '**Project Work'** Internship completion letter will be issued.