UNDER GRADUATE COURSE

SUBJECT : BACHELOR OF PHYSIOTHERAPY

BODOLAND UNIVERSITY

DEBARGAON, KOKRAJHAR (B.T.C)

Bachelor of Physiotherapy

Physiotherapy or Physical Therapy (PT) is a **Movement Science** with an established theoretical and scientific base and widespread clinical applications in the **Prevention, Restoration & Rehabilitation, Maintenance and Promotion of optimal physical function.** Physiotherapists **diagnose and manage movement dysfunction and enhance physical and functional abilities**. This physical dysfunction may be the sequelae of involvement of any of the systems like Musculoskeletal, Neurological, Cardiovascular, Respiratory or other body systems.

Physiotherapy is a branch of modern medical science which includes examination, assessment, interpretation, physical diagnosis, planning and execution of treatment and advice to any person for the purpose of preventing, correcting, alleviating and limiting dysfunction, acute and chronic bodily malfunction including life saving measures via chest physiotherapy in the intensive care unit, curing physical disorders or disability, promoting physical fitness, facilitating healing and pain relief and treatment of physical and psychological disorders through modulating psychological and physical response using physical agents, activities and devices including exercise, mobilization, manipulations, therapeutic ultrasound, electrical and thermal agents and electrotherapy for diagnosis, treatment and prevention.

Learning Objectives: At the completion of this course, the student should be able -

1. To delineate the cognitive, affective and psychomotor skills deemed essential for completion of this program and to perform as a competent physiotherapist who will be able to examine, evaluate, diagnose, plan, execute and document physiotherapy treatment independently or along with the multidisciplinary team.
2. To evaluate patients for impairments and functional limitations and able to execute all routine physiotherapeutic procedures as per the evaluation.
3. To operate and maintain physiotherapy equipment used in treatment of patient, physiotherapy treatment planning (both electrotherapy and exercise therapy) & procedures independently.
4. To provide patient education about various physiotherapeutic interventions to the patient and care givers.

Expectations from the future physiotherapy graduates -

1. Coursework entitles independent physiotherapy assessment and treatment in any healthcare delivery centers in India by the graduates.
2. The coursework is designed to train students to work as independent physiotherapists or in conjunction with a multidisciplinary team to diagnose and treat movement disorders as per red and yellow flags.
3. Course works will skill the graduate's physical/ functional diagnosis, treatment planning, and management, administration of physiotherapy treatment and for patient support.
4. Graduates can find employment opportunities in hospitals/nursing homes/sports teams/fitness centers/Community Rehabilitation /Health planning boards/health promotions services in both private and public sectors as well as in independent physiotherapy clinics.
5. Physiotherapy graduate is encouraged to pursue further qualification to attain senior

position in the professional field and also to keep abreast with the recent advances, new technology and research. The professional should opt for continuous professional education credits offered by national and international institutes.

Terminal Objectives (Expected Outcomes):

6. The graduate will be a competent and reflective physiotherapy practitioner who can function safely and effectively while adhering to legal, ethical and professional standards of practice in a multitude of physiotherapy settings for patients and clients across the lifespan and along the continuum of care from wellness and prevention to rehabilitation of dysfunction.
7. The graduate will utilize critical inquiry and evidence-based practice to make clinical decisions essential for autonomous practice.
8. The graduate will function as an active member of professional and community organizations. The graduate will be a service-oriented advocate dedicated to the promotion and improvement of community health.
9. The graduate will demonstrate lifelong commitment to learning and professional development.

Eligibility for admission:

Selection procedure:

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%) in physics, chemistry and biology (botany & zoology), mathematics, (i.e – Physics, chemistry and biology as mandates requirements).

2. Relaxation of Marks: Candidates for reserved quota (SC/ST) shall be given relaxation up to 5% of the marks. The relaxation will not be applicable to candidates seeking admission in any other reserved quota.
3. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology and English up to 12th Standard level.
4. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.
    a. English, Physics, Chemistry, Botany, Zoology
    b. English, Physics, Chemistry, Biology and any other language
5. He/she has attained the age of 17 years as on - current year
6. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
7. Admission to Bachelor of Physiotherapy course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.
    a. Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme
    b. Successful candidates on the basis of written test will be called for

counseling(s) nominated by the University or the board.

c. During subsequent counseling(s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.
d. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.
e. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course without giving any notice will be governed as per the respective University rules.

Duration of the course

Duration of the course: 4 ½ years (4 years Academic+ 6 months compulsory rotatory internship).

Total of 4185 hours in theory, practical & clinical.

Minimum 960 hours of internship (to be completed in six months duration).

Total hours – 3990 hours

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Semesters:

An academic year consists of two semesters:

Semesters
Odd Semesters 1st, 3rd, 5th, 7th, 9th
Even Semesters 2nd, 4th, 6th ,8th

Credits:

Credit defines the coefficient of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Credits will be assigned in each course on the basis of number of lectures/ practical/tutorial/ laboratory work and other forms of learning required, to complete the course contents in a 15-20 week schedule:

- 1 credit = 1 hour of lecture per week
- 1 credit = 2 hours of instruction/practical per week

Credits will be assigned on the basis of the lectures (L) / Clinical Training (CT) / laboratory work (P) / Research Project (RP) and other forms of learning in a 15-20 week schedule L - One credit for one hour lecture per week

- P - One credit for every two hours of laboratory or practical
- CT - One credit for every two hours of Clinical training/Clinical rotation/posting
- RP - One credit for every two hours of Research Project per week

	Lecture - L	**Tutorial – T**	**Practical – P**	**Clinical Training/ Rotation– CT/CR**	**Research Project– RP**
1 Credit	1 Hour	2 Hours	2 Hours	2 Hours	2 Hours
Maximum Credit 28/ Semester					

Types of Courses:

Courses in the programme are of two kinds:

- Major
- Minor
- Interdisciplinary Course (IDC)
- Ability Enhancement Course (AEC)
- Skill Enhancement Course (SEC)
- Value Added Course (VAC)

Major Course:

A course, which should compulsorily be studied by a candidate as a basic requirement to complete the program, is termed as a Major course. There are Major Theory and Major Practical Courses in every semester.

Minor Course:

A course, which should compulsorily be studied by a candidate as a basic requirement to complete the program, is termed as a Minor course. There are Minor Theory and Minor Practical Courses in every semester.

Assigning Credit Hours per Course:

While there is flexibility for the departments in allocation of credits to various courses offered, the general formula would be:

- All major and minor courses will be restricted to a maximum of 4 credits
- IDC courses will be restricted to a maximum of 3 credits
- AEC will be restricted to a maximum of 2 credits
- SEC will be restricted to a maximum of 3 credits
- VAC will be restricted to a maximum of 4 credits
- Dissertation will be restricted to a maximum of 12 credits

Assigning total Credits for a Program:

The BPT program credits for 4 ½ years duration will be 190 credits in total, inclusive of clinical rotation/clinical training and research project, exclusive of internship.

COURSE EVALUATION

The performance of every student in each course for university examination will be evaluated as follows:

1. Internal evaluation by the course faculty member(s) based on continuous assessment, for 20% of the marks for the course:
   The internal assessment is done based on continuous evaluation method. Every semester, there will be two internal examinations for theory and practical. For the award of internal marks in theory and practical, the average of the two tests shall be considered along with other components like attendance, presentations, assignments and journal submission.
2. Final examination by the university through written paper or practical examination or oral examination by the student of combination of any two or more of these, for 80% of the marks of the course.
   Every student has to score minimum 50 % of marks to pass in the final University Examination of 80 % marks in theory and practical examination.
3. Aggregate:
   Every student has to have an aggregate score of 50 % marks to pass in the final University Examination in theory and practical and the grade will be awarded based on the aggregate marks.
4. GRADING:
   a. The total of the internal evaluation marks and final University examination marks in each course will be converted to a letter grade on a ten-point scale as per the following scheme:

Letter Grade	**Grade Point**
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C Pass (Average)	5
F (Fail)	0
I (Incomplete)	0
W (Withheld due to non-clearance of dues etc.)	--
ABS (Absent)	0

   b. A student obtaining Grade F will be considered fail and will require reappearing in the examination.

c. Grading System - Marks Equivalence Table

Grades, Grade Points & Cumulative Grade Point Average

Letter Grade	**Grade Point**	% **Range of Marks**
O (Outstanding)	10	90 to 100
A+ (Excellent)	9	80 to < 90
A (Very Good)	8	70 to < 80
B+ (Good)	7	60 to < 70
B (Above Average)	6	55 to < 60
C Pass (Average)	5	50 to < 55
F (Fail)	0	Below 50
I (Incomplete)	0	
W (Withheld due to non-clearance of dues etc.)	--	
ABS (Absent)	0	

d. The student's performance in any semester will be assessed by the Semester Grade Point Average (SGPA). Similarly, his performance at the end of two or more consecutive semesters will be denoted by the Cumulative Grade Point Average (CGPA).
The SGPA and CGPA are defined as follows:

i. SGPA (S) = $(\sum C_i \times G_i) / (\sum C_i)$ where C_i is the number of credits of i^{th} course and G_i is the Grade Point scored in the i^{th} course

ii. CGPA = $(\sum C_i \times S_i) / (\sum C_i)$ where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester

Grade 'C' and 'B' are considered 2nd Class

Grades 'B+' and above are considered 1st Class,
Whereas 'A+' and above are considered 1st Class with distinction.

Conversion Formula:
Equivalent Percentage = 10 × CGPA

e. To be eligible for the award of Bachelor's/Master's degree, a student must obtain minimum CGPA of 5.00.

INTERNSHIP:

There shall be six months (minimum 960 hrs) of Internship after the final year examination for candidates declared to have passed the examination in all the subjects. Internship should be done in any hospital recognized by the University.

The Internship should be rotatory and cover clinical branches concerned with Physiotherapy such as Orthopaedics, Cardiothoracic including ICU, Neurology, Paediatrics, General Medicine, General Surgery, Obstetrics and Gynaecology, both in-patient and outpatient services. On completion of the rotatory internship, duly signed completion certificate from the concerned authority of the institution in which internship was sought should be procured and submitted to the Principal/Head of program.

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

Transcript:

The transcript issued to the student at the time of leaving the University will contain a consolidated record of all the courses taken, credits earned, grades obtained, SGPA, CGPA, class obtained, etc.

Framework of BPT Curriculum NEP

First Semester (0-6 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ1014	Human Anatomy I	45	30	75	3+0+2	3+1=4
BPTMJ1024	Human Physiology I	45	30	75	3+0+2	3+1=4
MINOR SUBJECT						
BPTMI1034	Biochemistry	60	-	60	4+0+0	4
BPTMI1044	Psychology and Sociology	60	-	60	4+0+0	4
INTERDISCIPLINARY COURSE (IDC)						
BPTIDC1053	Introduction to Health, Fitness and lifestyle Disease I	45	-	45	3+0+0	3
ABILITY ENHANCEMENT COURSE (AEC - 1)						
		30	-	30	2+0+0	2
SKILL ENHANCEMENT COURSE (SEC – 1)						
BPTSEC1063	Introduction to quality & Patient safety	30	30	60	2+0+2	2+1=3
VALUE ADDED COURSE (VAC)						
BPTVAC1074	Yoga and Stress Management	45	30	75	3+0+2	3+1=4
Total		360	120	480		28

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ1014	Human Anatomy I	20	80	20	80	200
BPTMJ1024	Human Physiology I	20	80	20	80	200
MINOR SUBJECT						
BPTMI1034	Biochemistry	20	80			100
BPTMI1044	Psychology and Sociology	20	80			100
INTERDISCIPLINARY COURSE (IDC)						
BPTIDC1053	Introduction to Health, Fitness and lifestyle Disease I	20	80			100
ABILITY ENHANCEMENT COURSE (AEC - 1)						
			50			50
SKILL ENHANCEMENT COURSE (SEC – 1)						
BPTSEC1063	Introduction to quality & Patient safety	20	80	20	80	200
VALUE ADDED COURSE (VAC)						
BPTVAC1074	Yoga and Stress Management	20	80	20	80	200
						1150

Second Semester (7-12 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ2014	Human Anatomy II	45	30	75	3+0+2	3+1=4
BPTMJ2024	Human Physiology II	45	30	75	3+0+2	3+1=4
MINOR SUBJECT						
BPTMI2034	Pathology & Microbiology	60	-	60	4+0+0	4
BPTMI2044	Biophysics	60	-	60	4+0+0	4
INTERDISCIPLINARY COURSE (IDC)						
BPTIDC2053	Introduction to Health, Fitness and lifestyle Disease II	45	-	45	3+0+0	3
ABILITY ENHANCEMENT COURSE (AEC - 1)						
		30	-	30	2+0+0	2
SKILL ENHANCEMENT COURSE (SEC – 1)						
BPTSEC2063	Introduction to treatment	30	30	60	2+0+2	2+1=3
VALUE ADDED COURSE (VAC)						
BPTVAC2074	Occupational Health and Ergonomics	45	30	75	3+0+2	3+1=4
Total		360	120	480		28

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ2014	Human Anatomy II	20	80	20	80	200
BPTMJ2024	Human Physiology II	20	80	20	80	200
MINOR SUBJECT						
BPTMI2034	Pathology & Microbiology	20	80			100
BPTMI2044	Biophysics	20	80			100
INTERDISCIPLINARY COURSE (IDC)						
BPTIDC2053	Introduction to Health, Fitness and lifestyle Disease II	20	80			100
ABILITY ENHANCEMENT COURSE (AEC - 1)						
			50			50
SKILL ENHANCEMENT COURSE (SEC – 1)						
BPTSEC2063	Introduction to treatment	20	80	20	80	200
VALUE ADDED COURSE (VAC)						
BPTVAC2074	Occupational Health and Ergonomics	20	80	20	80	200
						1150

Third Semester (13-18 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ3014	Basic Principles of Biomechanics	45	30	75	3+0+2	3+1=4
BPTMJ3024	Foundation of Exercise Therapy	45	30	75	3+0+2	3+1=4
BPTMJ3034	Electrotherapy I	45	30	75	3+0+2	3+1=4
MINOR SUBJECT						
BPTMI3044	Pharmacology	60	-	60	4+0+0	4
BPTMI3054	General Medicine	60	-	60	4+0+0	4
INTERDISCIPLINARY COURSE (IDC)						
BPTIDC3063	Medical Terminology	45	-	45	3+0+0	3
ABILITY ENHANCEMENT COURSE (AEC - 1)						
		30	-	30	2+0+0	2
SKILL ENHANCEMENT COURSE (SEC – 1)						
BPTSEC3073	Evaluation Methods & Outcome measures	30	30	60	2+0+2	2+1=3
Total		360	120	480		28

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ3014	Basic Principles of Biomechanics	20	80	20	80	200
BPTMJ3024	Foundation of Exercise Therapy	20	80	20	80	200
BPTMJ3034	Electrotherapy I	20	80	20	80	200
MINOR SUBJECT						
BPTMI3044	Pharmacology	20	80			100
BPTMI3054	General Medicine	20	80			100
INTERDISCIPLINARY COURSE (IDC)						
BPTIDC3063	Medical Terminology	20	80			100
ABILITY ENHANCEMENT COURSE (AEC - 1)						
			50			50
SKILL ENHANCEMENT COURSE (SEC – 1)						
BPTSEC3073	Evaluation Methods & Outcome measures	20	80	20	80	200
						1150

Fourth Semester (19-24 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ4014	Biomechanics and Kinesiology	45	30	75	3+0+2	3+1=4
BPTMJ4024	Exercise Therapy	45	30	75	3+0+2	3+1=4
BPTMJ4034	Electrotherapy II	45	30	75	3+0+2	3+1=4
MINOR SUBJECT						
BPTMI4044	General Surgery	60	-	60	4+0+0	4
BPTMI4054	Clinical Education I	-	120	120	0+0+8	4
ABILITY ENHANCEMENT COURSE (AEC - 1)						
		30	-	30	2+0+0	2
Total		225	210	435		22

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ4014	Biomechanics and Kinesiology	20	80	20	80	200
BPTMJ4024	Exercise Therapy	20	80	20	80	200
BPTMJ4034	Electrotherapy II	20	80	20	80	200
MINOR SUBJECT						
BPTMI4044	General Surgery	20	80			100
BPTMI4054	Clinical Education I			20	80	100
ABILITY ENHANCEMENT COURSE (AEC - 1)						
			50			50
						850

Fifth Semester (25-30 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ5014	Clinical Orthopaedics-Non -Traumatic	60	-	60	4+0+0	4
BPTMJ5024	Clinical Neurology & Neurosurgery I	60	-	60	4+0+0	4
BPTMJ5034	Community Medicine	60	-	60	4+0+0	4
MINOR SUBJECT						
BPTMI5044	Allied Therapeutics	60	-	60	4+0+0	4
BPTMI5054	Clinical Education II	-	120	120	0+0+8	4
Total		240	120	360		20

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ5014	Clinical Orthopaedics-Non -Traumatic	20	80			100
BPTMJ5024	Clinical Neurology & Neurosurgery I	20	80			100
BPTMJ5034	Community Medicine	20	80			100
MINOR SUBJECT						
BPTMI5044	Allied Therapeutics	20	80			100
BPTMI5054	Clinical Education II			20	80	100
						500

Sixth Semester (31-36 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ6014	Clinical Orthopaedics-Traumatic	60	-	60	4+0+0	4
BPTMJ6024	Clinical Neurology & Neurosurgery II	60	-	60	4+0+0	4
BPTMJ6034	Clinical Cardiovascular & Pulmonary	60	-	60	4+0+0	4
MINOR SUBJECT						
BPTMI6044	Medical Physiotherapy Law, Ethics and Administration	60	-	60	4+0+0	4
BPTMI6054	Clinical Education III	-	120	120	0+0+8	4
Total		240	120	360		20

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ6014	Clinical Orthopaedics-Traumatic	20	80			100
BPTMJ6024	Clinical Neurology & Neurosurgery II	20	80			100
BPTMJ6034	Clinical Cardiovascular & Pulmonary	20	80			100
MINOR SUBJECT						
BPTMI6044	Medical Physiotherapy Law, Ethics and Administration	20	80			100
BPTMI6054	Clinical Education III			20	80	100
						500

Seventh Semester (37-42 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ7014	Physiotherapy in Orthopaedics	45	30	75	3+0+2	3+1=4
BPTMJ7024	Physiotherapy in Neurological Conditions	45	30	75	3+0+2	3+1=4
BPTMJ7034	Physiotherapy in Medical, Surgical, Obstetrics and Gynaecological conditions	45	30	75	3+0+2	3+1=4
MINOR SUBJECT						
BPTMI7044	Biostatistics & Research Methodology	60	-	60	4+0+0	4
BPTMI7054	Clinical Education IV	-	120	120	0+0+8	4
		195	210	405		20

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ7014	Physiotherapy in Orthopaedics	20	80	20	80	200
BPTMJ7024	Physiotherapy in Neurological Conditions	20	80	20	80	200
BPTMJ7034	Physiotherapy in Medical, Surgical, Obstetrics and Gynaecological conditions	20	80	20	80	200
MINOR SUBJECT						
BPTMI7044	Biostatistics & Research Methodology	20	80			100
BPTMI7054	Clinical Education IV			20	80	100
						800

Eight Semester (43-48 months)

Course Code	Course Title	Teaching Scheme				
		Theory	Practical	Total	L+T+P	Total Credits
MAJOR SUBJECT						
BPTMJ8014	Physiotherapy in Cardiorespiratory Conditions	45	30	75	3+0+2	3+1=4
BPTMJ8024	Community Based Rehabilitation	45	30	75	3+0+2	3+1=4
MINOR SUBJECT						
BPTMI8044	Clinical Reasoning and Evidence Based Practice	45	30	75	3+0+2	3+1=4
BPTD80512	**DISSERTATION**					12
Total		135	90	225		24

Course Code	Course Title	Examination Scheme				Total Marks
		Theory		Practical		
		Internal	External	Internal	External	
MAJOR SUBJECT						
BPTMJ8014	Physiotherapy in Cardiorespiratory Conditions	20	80	20	80	200
BPTMJ8024	Community Based Rehabilitation	20	80	20	80	200
MINOR SUBJECT						
BPTMI8044	Clinical Reasoning and Evidence Based Practice	20	80	20	80	200
BPTMI7054	Dissertation			20	80	100
						700

Total Contact Hours = 3225
Total Credits = 190
Internship

Course Title	Contact Hours		
	Theory	Practical	Total
Internship		**960**	**960**

University End-Semester Examination

- There will be one final university examination at the end of every semester.
- A student must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each subject to be eligible for appearing the University examination.
- A student shall be eligible to sit for the examination only, if she / he secure a minimum of 50% in internal assessment (individually in theory and practical as applicable). Internal examinations will be conducted at college/ department level.
- If a student fails either in theory or in practical, he/ she have to re-appear for both.

Supplementary examination:

The supplementary examination will be held in the next semester. Eligibility to appear for supplementary examination will be as per carry over.

Carry over benefit:

- A student will be allowed to keep term for Semester II irrespective of number of heads of failure in Semester I.
- A student will be allowed to keep term for Semester IV irrespective of number of heads of failure in Semester III.
- A student will be allowed to keep term for Semester VI irrespective of number of heads of failure in Semester V.
- Student will be allowed to keep term for Semester V, if she/he passes all courses of Semester I.
- Student will be allowed to keep term for Semester VI, if she/he passes all courses of Semester II.
- Student will be allowed to keep term for Semester VII, if she/he passes Semester I, II, III, IV and V.
- A student will not be allowed to appear for the Semester VIII examination unless she/he has cleared all previous examinations.
- Student will be allowed to commence internship if he/she passes Semester VIII examination.
- Student will be allowed to commence internship if he/she passes Semester VIII examination.

General Instructions (Practical)

- All the students have to remain present at the examination Centre 15 minutes before the scheduled time for examination.
- Students have to carry with them laboratory manual, I-card or examination receipt, and other necessary requirements for examination.
- Appropriate dress code to be followed
- Candidate should not leave the practical hall without the permission of examiner.
- Use of mobile phones is strictly prohibited.
- The candidate has to leave the laboratory only after the submission of all the answer sheets of the exercises performed.

Case Evaluation:-

- Presentation of required number of cases to the respective clinical supervisors and documentation in the Log book for each posting is mandatory, failing which the particular posting will be repeated.
- Attendance is mandatory at all clinical postings
- Appropriate dress code to be followed at all the clinical posting areas.

Project Report:-

BPT student should submit a suitable project report at the end of VIII Semester before final examination.

Evaluation Criteria for Project

Sr. No	Criteria	Rating					Remark
		1	2	3	4	5	
I.	**Statement of the problem**						
	1. Significance of the problem selected						
	2. Framing of title and objectives						
II.	**Literature Review**						
	1. Inclusion of related studies on the topic and its relevance						
	2. Operational definition						

Signature of the Evaluator

First Semester

HUMAN ANATOMY I

SUBJECT 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. In this subject, the student will learn about the identification of all gross anatomical structures. The focus of the course is in-depth study and analysis of the regional and systemic organization of the body. Particular emphasis will be placed on description of musculoskeletal anatomy which includes bones, joints, muscles, cardiovascular system and respiratory system, as these are related to the application of physiotherapy in patients.

THEORY [45 hrs.]

1. General Anatomy [7hrs.]
    - Introduction to Skeleton
    - Joints and Muscles
    - Circulatory system, Lymphatic system, Nervous system
    - Skin & Fascia.
2. Embryology [10 hrs.]
    - Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.
    - Development of skin, Fascia, blood vessels, lymphatic,
    - Development of bones, axial and appendicular skeleton and muscles,
    - Neural tube, brain vessels and spinal cord,
    - Development of brain and brain stem structures
3. Regional Anatomy [15 hrs.]
    - Thorax:
        i. Cardio – Vascular System Mediastinum: Divisions and contents Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.
        ii. Respiratory system - Outline of respiratory passages: Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on Broncho pulmonary segments.
        iii. Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.
        iv. Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action.
    - Abdomen:
        i. Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.
        ii. Large blood vessels of the gut.
        iii. Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver, spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

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

4. Endocrine glands: [13hrs.]
   - 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.

PRACTICAL [30 hrs.]

List of Practical / Demonstrations

- Histology-

  General Histology, study of the basic tissues of the body; Microscope, Cell, Epithelium, Glands, Connective Tissue, Cartilage, Bone, Muscular tissue, Cardiovascular system–large sized artery, medium sized artery, large sized vein, Lymphoid tissue, Skin and its appendages, Nervous Tissue-TS & LS, Respiratory System

- Elementary tissue including surface Anatomy
- Embryology-models, charts & X-rays.
- Demonstration of the muscles of the whole body and organs in thorax and abdomen.
- Thorax including surface anatomy, abdominal muscles, joints.
- Surface making of the lung, pleura, fissures and lobes of lungs, heart, liver, spleen, Kidney, cranial nerves, spinal nerves and important blood vessels.
- Thoracic vertebra, lumbar vertebra, sacrum, ribs, sternum.

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester the student will be able to:

- To understand the level of organization of the human body.
- To understand the topographical and functional anatomy of thorax and abdomen as well as functions of glands.
- To understand its application in practice of physiotherapy.

Recommended Textbook:

- SNELL[RichardS], Clinical Anatomy for Medical students: Ed.5.Little Brown and Company Boston. 1995, p898
- B.D Chaurasia's Human Anatomy– Regional and Applied; Volume I, Volume II and Volume III.
- MOORIE[KeithL], Clinically Oriented Anatomy.Ed.3., Williams and Wilkins, Baltimore,1992, p917
- DATTA[A.K],Essentials of human Anatomy: Thorax and Abdomen Ed2.Vol.I Current Book International, Calcutta 1994, p433
- DATTA[A.K],Essentials of human Head and Neck Ed2.Vol.II,Current Book International, Calcutta 1995, p363
- SINGH [Inderbir], Textbook of Anatomy with color atlas: Introduction, Osteology, Upper Extremity, Lower Extremity. Vol I. P Brothers, NewDelhi1996
- SINGH [Inderbir],Text book of Anatomy with color Atlas: Thorax and Abdomen.

Vol II. JP Brothers, New Delhi 1996

- SINGH [Inderbir], Textbook of Anatomy with color Atlas: Head and Neck Central Nervous System.VolIII.JP Brothers, New Delhi 1996
- SINGH[Inderbir], Human Osteology. JP Brothers, New Delhi 1990, p191
- SINGH [Inderbir], Human Histology. JP Brothers, New Delhi 1990, p191
- SINGH [Inderbir], Human Embryology. JP Brothers, New Delhi 1990, p191

PRACTICALS

- ROMANES [G J], Cunningham manual of practical anatomy: upper and lower limb ed. 15Vol 1 Oxford Medical Publication, Oxford 1996, P263
- ROMANES [G J], Cunningham manual of practical anatomy : Thorax and abdomen ed15 Vol II Oxford Medical Publication, Oxford 1996, P298
- ROMANES [G J], Cunningham manual of practical anatomy: Head and Neck and Brain ed 15 Vol II Oxford Medical Publication, Oxford 1996, P346

HUMANPHYSIOLOGY– I

SUBJECT DESCRIPTION–

In this subject, the student will enhance in the basics of normal human physiology and in-depth knowledge of fundamental reactions of living organisms, particularly in the human body with special emphasis on the functioning Cell, Blood, Nerve-Muscle Physiology, Cardiovascular, Respiratory, Digestive and Endocrine system.

THEORY [45 hrs.]

1. General Physiology[1hr.]
    - Cell: Morphology. Organelles: their structure and functions
    - Transport Mechanisms across the cell membrane
    - Body fluids: Distribution, composition.
2. Blood [7 hrs.]
    - Introduction: Composition and functions of blood.
    - Plasma: Composition, formation, functions. Plasma proteins.
    - RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticulo- endothelial system (in brief) Hemoglobin–structure, function and derivatives Anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.
    - WBC: Classification. Morphology, functions, count, its variation of each Immunity
    - Platelets: Morphology, functions, count, its variations
    - Hemostatic mechanisms: Blood coagulation factors, mechanisms. Their disorders. Anticoagulants.
    - Blood Groups: Landsteiner's law. Types, significance, determination, Erythroblastosis fetalis .
    - Blood Transfusion: Cross matching. Indications and complications.
    - Lymph: Composition, formation, circulation and functions.
    - Blood functions
    - Thalassemia Syndrome, Hemophilia, VWF
    - Anemia, Leukocytosis
    - Bone marrow transplant
3. Nerve Muscle Physiology[7hrs.]
    - Introduction: Resting membrane potential. Action potential–ionic basis and properties.
    - Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibers. Nerve injury–degeneration and regeneration.
    - Neuroglia: Types and functions.
    - Muscle: Classification. Skeletal muscle: Structure. Neuro muscular junction: Structure. Neuro muscular transmission, myasthenia gravis. Excitation-Contraction coupling. Rigor mortis.

4. Cardiovascular System [7 hrs.]
    - Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organization of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties.
    - Conducting system: Components. Impulse conduction Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character. ECG: Definition. Different types of leads. Waves and their causes. P-R interval. Heart block.
    - Cardiac Output: Definition Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation. Their variations
    - Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance. Regulation of BP.
    - Arterial pulse.
    - Shock – Definition, Classification–causes and features.
    - Regional Circulation: Coronary, Cerebral and Cutaneous circulation.
    - Cardiovascular changes during exercise.

      Cardiovascular functions
    - Blood flow through arteries, arterioles, capillaries, veins and venuoles.
    - Circulation of Lymph, Edema
    - Factors affecting cardiac output.
    - Circulatory adjustment in exercise and in postural and gravitational changes,
    - Pathophysiology of fainting and heart failure.
5. Respiratory System-[7hrs.]
    - Introduction: Physiological anatomy–Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system. Respiratory muscles.
    - Mechanics of breathing: Intrapleural and Intra pulmonary pressure changes during respiration. Chest expansion. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions. RDS
    - Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.
    - Dead Space: Types and their definition.
    - Pulmonary Circulation. Ventilation-perfusion ratio and its importance.
    - Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport–Different forms, oxygen-hemoglobin dissociation curve. Factors affecting it.P50 ,Haldane and Bohr Effect. Carbondioxide transport: Different forms, chloride shift.
    - Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation.
    - Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygentherapy. Acclimatization Hypercapnoea. Asphyxia. Cyanosis–types and features. Dysbarism
    - Disorders of Respiration: Dyspnoea. Orthopnoea, Hyperpnoea, hyperventilation,

apnoea, tachypnoea, periodic breathing–types Artificial respiration

- Respiratory changes during exercise.

Pulmonary Functions

- Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
- Respiratory adjustments in exercises.
- Artificial respiration
- Breath sounds.
- Voluntary motor action, clonus, Rigidity, incoordination.
- Special senses- Vision, taste, hearing, vestibular, Olfaction
- Sympathetic and Parasympathetic regulation, Thermoregulation.

6. Digestive System-[6hrs.]
    - Introduction: Physiological anatomy and nerve supply of alimentary canal. Enteric nervous system
    - Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication(in brief)
    - Swallowing: Definition. Different stages. Function.
    - GIT disorders and Dietary fiber
    - Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Physiological basis of Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.
    - Pancreatic Secretion: Composition, production, function. Regulation.
    - Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions, Jaundice
    - Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation.
    - Mechanism of Defecation.
7. Endocrine System-[10 hrs.]
    - Introduction: Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones
    - Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.
    - Pituitary-Hypothalamic Relationship.
    - Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxedema, Cretinism, Grave's disease.
    - Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.
    - Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, and Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome.
    - Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Pheochromocytoma.

- Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.
- Calcitrol, Thymus and Pineal gland (very brief).
- Local Hormones. (Briefly),

PRACTICAL [30 hrs.]

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

1. Hematology: To be done by the students
   i. Study of Microscope and its uses
   ii. Determination of RBC count
   iii. Determination of WBC count
   iv. Differential leukocyte count
   v. Estimation of hemoglobin
   vi. Calculation of blood indices
   vii. Determination of blood groups
   viii. Determination of bleeding time
   ix. Determination of clotting time

Demonstrations only

i. Determination of ESR
ii. Determination of PCV

STUDENTLEARNINGOUTCOMES/ OBJECTIVES:

At the end of the semester the student will be able to:

- Acquire the knowledge of functions of various system of human body.
- Understand the role of various cells, enzymes and hormones of the human body.
- To demonstrate and understand the various hematological findings.
- To enhance the knowledge of various system and applied physiology of it.

Recommended Textbooks:

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

Reference books:

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

BIOCHEMISTRY

SUBJECT DESCRIPTION–

In this course, the student will learn the essentials of biochemistry in nutrition and biochemical reactions.

THEORY [60 hrs.]

1. Nutrition – [6 hrs.]
    - Definition, and its significance Energy requirement of a person-Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food.
    - Physical activities- Energy expenditure for various activities. Calculation of Introduction, Importance of nutrition Calorific values, Respiratory quotient–energy requirement of a person.
    - Balanced diet
        i. Recommended dietary allowances
        ii. Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers
        iii. Role of lipids in diet
        iv. Role of proteins in diet: Quality of proteins-Biological value, net protein utilization, Nutritional aspects of proteins-essential and non- essential amino acids. Nitrogen balance
        v. Nutritional disorders.
2. Carbohydrate Chemistry & Metabolism – [8hrs.]
    - Definition, general classification with examples, Glycosidic bond
    - Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides.
    - Glycosaminoglycan (mucopolysaccharides)
    - Introduction, Glycolysis–Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation.
    - Glycogen metabolism–Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle
    - Hormonal regulation of glucose, Glycosuria, Diabetes mellitus.
3. Lipid Chemistry & Metabolism – [8hrs]
    - Definition, general classification
    - Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol
    - Essential fatty acids and their importance
    - Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies
    - Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids-oxidation of fatty acids,
    - Lipogenesis- Denovo synthesis of fatty acids, chain elongation, desaturation, triacyl glycerol synthesis, fat metabolism in adipose tissues
    - Ketone body metabolism: Ketone body formation(ketogenesis),utilization (ketolysis), ketosis, Rothera's test.
    - Cholesterol metabolism: synthesis, degradation, cholesterol transport

- Hyper cholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterol emic agents, Common hyper lipo proteinemia, Fatty liver

4. Mineral Metabolism-[2 hrs.]
    - Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.
5. Amino-acid Chemistry & its metabolism–[8 hrs.]
    - Amino acid chemistry: Definition, Classification, Peptide bonds
    - Peptides: Definition, Biologically important peptides
    - Protein chemistry: Definition, Classification, Functions of protein
    - Catabolism of amino acids-Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle
    - Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.
6. Enzymes – [2 hrs.]
    - 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)
7. Nucleotide and Nucleic acid Chemistry-[2 hrs.]
    - 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.
8. Digestion and Absorption - [2 hrs.]
    - General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.
9. Vitamins -[4 hrs.]
    - Definition, classification according to solubility,
    - Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.
10. Cell Biology-[3 hrs.]
    - Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton.
11. Muscle Contraction-[2hrs.]
    - Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.
12. Biochemistry of Connective tissue - [2 hrs.]
    - Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.
13. Hormone Action - [2 hrs.]
    - Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.

14. Acid-Base balance - [2 hrs.]
    - 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 - [2 hrs.]
    - Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst center.
16. Electrolyte balance - [2 hrs.]
    - Osmolarity. Distribution of electrolytes.
    - Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF.
17. Clinical Biochemistry - [3 hrs.]
    - 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.

STUDENTLEARNINGOUTCOMES/ OBJECTIVES:

At the end of the semester the student will be able to:

- To acquire knowledge about chemical composition of nutrients and various metabolic reactions in the body.

Recommended Textbooks:

- MURRAY [ROBERT KK], Harper's Bio Chemistry Ed 24, Prentice Hall. 1996, p925,
- RAMAKRISHNA [S], PRASANNA [KG], RAJAN [R], Text Book of Medical Biochemistry, Ed1, orient Langman, Bombay 1980, and p717.
- VASUDEVAN [DM] and SREE KUMARI [S], Text Book of Bio Chemistry for Medical students, Ed 1, Jaypee Brothers, New Delhi, 1995, p637
- DAS [Debajyothi], Biochemistry, Ed. 7, Academic Publishers Calcutta, 1992, p648
- PRASAD RM, RM's Physiotherapy Textbook Series, Text book of Biochemistry for Bachelor of Physiotherapy First Edition, RM Publications, Mangalore

Reference books:

- Textbook of Medical Bio-Chemistry – Dr. M. N. Chatterjee, Latest Edition, Jaypee Publication.
- Fundamental of Bio-Chemistry – DR. A. C. Deb, Latest Edition, Central Publication.
- Bio-Chemistry introduction – Mekee, Latest Edition, McGraw-Hill Publication.

PSYCHOLOGY AND SOCIOLOGY

SUBJECT DESCRIPTION–

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

PSYCHOLOGY

THEORY [30 HRS.]

1. Introduction to Psychology [5 hrs.]
    - Meaning, brief history and school of psychology
    - Development of psychology as a science
    - Scope and branches of psychology
    - Relationship with other subjects
    - Application of psychology in physiotherapy practice
2. Biological Basis of Behavior [2 hrs.]
    - Neurons and synapses, association cortex, behavior and experience, left -right hemisphere function.
3. Personality [4 hrs.]
    - Meaning, types and traits of personality
    - Theories of personality
4. Motivation [4 hrs.]
    - Definition, motivational cycle, types of motives.
    - Theories of motivation
5. Mental mechanisms and mental health [3 hrs.]
    - Defense mechanism
    - Frustration and conflict
    - Mental hygiene
6. Emotions [6 hrs.]
    - Meaning of emotions
    - Theories of emotion
    - Development of emotions
    - Emotions in sickness
    - Handling emotions in self and others
7. Attitudes [4 hrs.]
    - Meaning of attitudes
    - Role of attitudes in health sciences
8. Development psychology [2 hrs.]
    - Infancy, childhood, adolescence, adulthood and old age

SOCIOLOGY

THEORY [30 HRS.]

1. Introduction to Psychology [3 hrs.]
    - Meaning- Definition and scope of sociology
    - Its relation to anthropology, psychology and socio- psychology
    - Importance of sociological studies with special reference to healthcare professionals.
2. Social factors in health and disease situations: [2 hrs.]
    - Meaning of social factors
    - Role of social factors to health and illness
3. Socialization [3hrs.]
    - Meaning and nature of socialization
    - Primary, secondary ad anticipatory socialization
    - Agencies of socialization
4. Social groups [3 hrs.]
    - Concept of social groups, influence of formal and informal groups on health and sickness
    - Role of primary groups and secondary groups in the hospital and rehabilitation settings.
5. Family [4 hr.]
    - Definition, meaning and functions of family
    - Types and changing family patterns
    - Influence of family on the individuals health, family and nutrition, the effects of sickness in the family, psychosomatic disease and their importance to physiotherapy.
6. Community: [2 hrs.]
    - Rural community: Meaning and features
    - Urban community: Meaning and features
7. Culture and Health: [2 hrs.]
    - Concept of Culture, culture and behavior
    - Culture, culture and health disorders
8. Social change: [5 hrs.]
    - Meaning, factors of social changes.
    - Human adaptation and social change
    - Stress, deviance and social change
    - Social change and health programme
    - The role of social planning in the improvement of health and rehabilitation.
9. Social Problems of disabled: [4 hrs.]
    - Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems.
        - Population explosion, Poverty and unemployment
        - Beggary, Juvenile delinquency, Prostitution, Alcoholism
        - Problems of women in employment
10. Social Security: [1 hr.]
    - Social security and social legislation in relation to the disabled.

11. Social worker: [1 hr.]
    - Meaning of social work. The Role of a Medical Social Worker

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester the student will be able to:

- Know about psychology and its importance in the health care delivery system and gain knowledge of psychological maturation during human development, growth and alteration during ageing process.
- Understand the importance of psychological status of the person in the health and diseases, environmental and emotional influence on the mind and personality.
- Know about Sociology and its importance in the health care delivery system.
- Understand the role of family and community in the development of human behavior.
- Understand the social and economic aspect of community that influence the health of the people.
- Know the role of therapist as a member of society, and the interdependence of individuals and society.

Recommended Textbooks:

- Feldman.R.H (1996). Understanding Psychology. New Delhi: Tata McGraw hill.
- Morgan et al (2003). Introduction to Psychology. New Delhi: Tata McGraw hill.
- Lefton ( ). Psychology. Boston: Alwin & Bacot Company.
- Mangal, S.K (2002). Advanced Educational Psychology. New Delhi: prentice hall.
- Atkinson (1996). Dictionary of Psychology.
- Sachdeva and Vidyabushan, Introduction to the study of sociology
- INDRANI T K, Text Books of Sociology for Graduates Nurses and Physiotherapy Students. JP Brothers, New Delhi,10

Reference books:

- Psychology: The study of Human behavior, Mishra B. K. PHL Learning.
- Essentials of Educational Psychology, Skinner Charles E. Surjeet Publication.
- Abnormal Psychology, Page James D, Surjeet Publication.
- Sociology for Physiotherapy students by Divyendunarayana Bid, 1st Edition, Jaypee Publication.
- Textbook of Sociology for Physiotherapy Students by KP Neeraja, 1st Edition, Jaypee Publication.

INTRODUCTION TO HEALTH, FITNESS & LIFESTYLE DISEASE I

SUBJECT DESCRIPTION–

This subject will create consciousness among the students towards health, fitness and wellness and in developing and maintaining a healthy life style.

THEORY [45 HRS.]

1. Concept of Physical Education and Health [10 hrs.]
    - Definition, Aims and Objectives of Physical Education
    - Importance and Scope of Physical Education
    - Modern concept of Health, Physical fitness and Wellness
2. Components of Physical Fitness [17 hrs.]
    - Physical fitness components - Speed, Strength, Endurance, Flexibility and
    - Coordinative Abilities
    - Types of Physical Fitness
      - Health related Physical Fitness
      - Performance Related Physical Fitness
      - Cosmetic fitness
    - Fitness Balance
3. Principles of Exercise Programme [18 hrs.]
    - Activities for developing Physical Fitness Components
    - Exercise and Heart rate Zones
    - Principles of First Aid
    - Nutritional Balance
    - Postural deformities & Correction

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- To learn the fundamental concepts of physical education, & health.
- It will also familiarize the students towards various hypo-kinetic diseases and its management.
- It will also provide practical guidelines and testing of health-related fitness and other health indices.

Reference/Textbook:

- AAPHERD. "Health Related Physical Fitness Test Manual". 1980 Published by Association drive Reston Virginia
- ACSM Fitness Book, Leisure Press Campaign, Illions, 1996, Leisure Press, Canada http://www.pitt.edu./-gsphhome
- ACSM"s "Health Related Physical Fitness Assessment Manual Lippincott Williams Walkins USA, 2005.
- B.C.Rai Health Education and Hygiene Published by Prakashan Kendra, Lucknow
- Bucher.C.A. (1979). Foundation of Physical Education (5th edition Missouri C.V.Mosby co. California: Mayfield Publishing Company
- Corbin.Charles Beetal. C.A., (2004) Concepts of Fitness and Welfare Boston McGraw Hill.
- Frank V.M. (2003). Sports & education CA: ABC- CLIO
- Les Snowdan., Maggie Humphrey's Fitness walking, Maggie Humphery Orient Paper Books 2002 New Delhi.

- Norman Bezzant Help! First Aid for everyday emergencies. Jaico Publishing House Bombay, Delhi
- Principles of Physical Education: Com. Philadelphia: W.B.Sounders
- Puri. K.Chandra.S.S. (2005). Health and Physical Education. New Delhi: Surjeet Publications
- Ralph S. Paffer Barger, Jr. and Eric Leolson, Life fit, 1991 Human Kinetics USA
- Rob James. Graham Thompson . Nesta Wiggins – James complete A-Z Physical Education Hand Book 2nd edition, 2003 Hodder and Stoughton England
- Siedentop.D,(1994) Introduction to Physical Education and Sports (2nd ed.) Sp. Educational Technology
- Ziegler. E .F. (2007). An Introduction to Sports & Phy. Edn. Philosophy Delhi

INTRODUCTION TO QUALITY AND PATIENT SAFETY

SUBJECT DESCRIPTION–

In this course, the student will earn the basic concepts of quality in healthcare and develop skills to implement sustainable quality management program with respect to patient safety.

THEORY [45 Hrs.]

1. Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system. [5 hrs.]
    - Concepts of Quality of Care
    - Quality Improvement Approaches
    - Standards and Norms
    - Quality Improvement Tools
    - Introduction to NABH guidelines
2. Basics of emergency care and life support skills - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows: [8 hrs.]
    - Vital signs and primary assessment
    - Basic emergency care – first aid and triage
    - Ventilations including use of bag-valve-masks (BVMs)
    - Choking, rescue breathing methods
    - One- and Two-rescuer CPR
    - Using an AED (Automated external defibrillator).
    - Managing an emergency including moving a patient

    At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.
3. Bio medical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows: [8 hrs.]
    - Definition of Biomedical Waste
    - Waste minimization
    - BMW – Segregation, collection, transportation, treatment and disposal (including color coding)

- Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
- BMW Management & methods of disinfection
- Modern technology for handling BMW
- Use of Personal protective equipment (PPE)
- Monitoring & controlling of cross infection (Protective devices)

4. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include – [8 hrs.]
    - Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
    - Prevention & control of common healthcare associated infections,
    - Components of an effective infection control program, and
    - Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance- [8 hrs.]
    - History of Antibiotics
    - How Resistance Happens and Spreads
    - Types of resistance- Intrinsic, Acquired, Passive
    - Trends in Drug Resistance
    - Actions to Fight Resistance
    - Bacterial persistence
    - Antibiotic sensitivity
    - Consequences of antibiotic resistance
    - Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include- [8 hrs.]
    - Fundamentals of emergency management,
    - Psychological impact management,
    - Resource management,
    - Preparedness and risk reduction,
    - Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

STUDENT LEARNING OUTCOMES/OBJECTIVES:-

At the end of the semester the student will be able to:

- To understand the basic concepts of quality in health care and patient safety.
- To understand the basics of emergency care and activation of appropriate response system.
- To understand the management of biomedical waste.

- To understand the core areas of infection prevention.
- To understand the principles of on-site disaster management.

Recommended Textbooks:

- Hospital Administration by C.N.Francis, 3rd edition; Jaypee Publications.
- Hospital Administration & Human Resource Management by D.K.Sharma; 5th edition.
- First aid & emergency nursing by N.N.Yalayyaswamy; CBS, CBS Publisher and Distributers.
- Cash's Textbook of Chest, Heart and Vascular Disorders for Physiotherapists by PatriciA.Downie, 4th edition.
- Patient Safety by Charles Vincent, 2ndEdition, Wiley Blackwell Publications.

Reference books:

- Understanding Patient Safety by Robert Wacher, 2nd edition, McGraw-Hill Education Publishers.
- Applying Quality Management in the Healthcare: A Process for improvement by Diane L. Kelly, Neha Publishers and Distributors.

YOGA AND STRESS MANAGEMENT

SUBJECT DESCRIPTION –

To help the students understand the core principles of Yoga and its benefits. It helps to gain the knowledge and skills to implement the use of Yoga principles into current clinical practice. To understand the various Yoga postures for different abilities.

THEORY [45hrs.]

1. Foundations of Yoga [15 hrs.]
   a. Introduction to Yoga and its philosophy
   b. Brief history, development of Yoga
   c. Philosophical foundations of Yoga
   d. Streams & types of Yoga
2. Yoga and Health [15 hrs.]
   a. Concept of body in yoga–Panchakosha theory
   b. Concept of Health and Disease in yoga
   c. Stress management through yoga
   d. Disease prevention and promotion of positive health through yoga
   e. Postural Deformities – Corrective measures
3. Physiological effects of Yoga practices [10 hrs.]
   a. Physiological effects of Shat kriyas
   b. Physiological effects of Asanas
   c. Physiological effects of Pranayamas
   d. Physiological effects of Relaxation techniques and Meditation
4. Stress management and relaxation techniques. [5 hrs.]

PRACTICAL - List of Practical / Demonstrations [30 hrs.]

1. Sukshma Vyayama/Sithilikarna Vyayama and Surya Namaskar: [3 hrs.]
   a. Loosening exercises of each part of the body particularly of the joints
   b. 12 step Surya namaskar with prayer and specific mantras

2. Yogic kriyas [Observation/ demonstration only] [3 hrs.]
   a. Neti (Jala Neti, Sutra Neti)
   b. Dhauti (Vamana Dhauti, Vastra Dhauti)
   c. Trataka
   d. Shankaprakshalana (Laghu & Deergha)

3. Yogasanas
   a. Standing postures [4 hrs.]
      i. Tadasana (Upward stretch posture)
      ii. Ardha Chakrasana (Half wheel posture)
      iii. Ardha Katicakrasana (Half lumber wheel posture)
      iv. Utkatasana (Chair posture)
      v. Pada Hastasana (Hand to toes posture)
      vi. Trikonasana (Triangle posture)
      vii. Parshva Konasana (Side angle posture)
      viii. Garudasana (Eagle posture)
      ix. Vrikshasana (Tree posture)

b. Prone positions [4 hrs.]
   i. Makarasana (Crocodile posture)
   ii. Bhujangasana (Cobra posture)
   iii. Salabhasana (Locust posture)
   iv. Dhanurasana (Bow posture)
   v. Naukasana (Boat posture)
   vi. Marjalasana (Cat posture)

c. Supine postures [4 hrs.]
   i. Ardha halasana/ Uttana Padasana
   ii. Sarvangasana (All limb posture)
   iii. Pawana muktasana (Wind releasing posture)
   iv. Matsyasana (Fish posture)
   v. Halasana (Plough posture)
   vi. Chakrasana (Wheel posture)
   vii. Setu Bandhasana (Bridge posture)
   viii. Shavasana (Corpse posture)

d. Sitting postures [4 hrs.]
   i. Parvatasana (Mountain posture)
   ii. Bhadrasana (Gracious posture)
   iii. Vajrasana (Adamantine posture)
   iv. Paschimottanasana (Back stretching posture)
   v. Janushirasana (Head to knee posture)
   vi. Simhasana (Lion posture)
   vii. Gomukhasana (Cow head posture)
   viii. Ushtrasana (Camel posture)
   ix. Ardha Matsyendrasana (Half matsyendra spine twist posture)
   x. Vakrasana (Spinal twist posture)
   xi. Kurmasana (Turtle posture)
   xii. Shashankasana (Rabbit posture)
   xiii. Mandukasana (Frog Posture)

e. Meditative postures and Meditation techniques [2 hrs.]
   i. Siddhasana (Accomplished pose)
   ii. Padmasana (Lotus posture)
   iii. Samasana
   iv. Swastikasana (Auspicious posture)

4. Pranayamas [4 hrs.]
   a. The practice of correct breathing and Yogic deep breathing
   b. Kapalabhati
   c. Bhastrika
   d. Sitali
   e. Sitkari
   f. Sadanta
   g. Ujjayi
   h. Surya Bhedana

i. Chandra Bhedana
j. Anuloma-Viloma/Nadishodana
k. Bhramari

5. Relaxation Techniques [2 hrs.]
   a. Shavasana
   b. Yoga Nidra

STUDENT LEARNING OUTCOMES/OBJECTIVES:
At the end of the semester the student will be able: ϖ

- To know types of yoga, various types of Asanas, Pranayama and Mudra. ϖ
- To perform, yoga asanas, pranayama, surya namaskar and its application. ϖ
- To understand and apply yoga for various conditions.

RECOMMENDED TEXTBOOKS:

- Asana ,Pranayama, Mudra, Bandha by Swami Satyananda Saraswati

REFERENCE BOOKS:

- Asana, pranayama, mudra bandha by Dr. Nagendra H.R
- Yoga Its Basis and Application by Dr.Nagendra H.R.

Second Semester

HUMAN ANATOMY II

SUBJECT DESCRIPTION:
Studies are concerned with the topographical and functional anatomy of the limbs. Particular attention is paid to the muscles, bones and joints of the regions. The 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 [45 hrs.]

1. Upper Extremity [10 hrs.]
    - Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
    - 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.
    - Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
    - Arches of hand, skin of the palm and dorsum of hand.
2. Lower Extremity [10 hrs.]
    - Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
    - Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.
    - Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.
3. Trunk & Pelvis: [3 hrs.]
    - Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
    - Soft tissue: Pre and Para vertebral muscles, intercostal muscles, anterior abdominal wall muscles, Inter-vertebral disc.
    - Pelvic girdle and muscles of the pelvic floor.
4. Head and Neck: [7 hrs.]
    - Osteology: Mandible and bones of the skull.
    - Soft parts: Muscles of the face and neck and their nerve and blood supply- extra ocular muscles, triangles of the neck.
    - Gross anatomy of eyeball, nose, ears and tongue.
5. Neuro Anatomy - Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system [15 hrs.]
    - Cranial nerves
    - Peripheral nervous system

- Peripheral nerve
- Neuromuscular junction
- Sensory end organs
- Central Nervous System
- Spinal segments and areas
- Brain Stem
- Cerebellum
- Inferior colliculi
- Superior Colliculi
- Thalamus
- Hypothalamus
- Corpus striatum
- Cerebral hemisphere
- Lateral ventricles
- Blood supply to brain
- Basal Ganglia
- The pyramidal system
- Pons, medulla, extra pyramidal systems
- Anatomical integration

PRACTICAL [30hrs.]

List of Practical / Demonstrations *

- Upper extremity including surface Anatomy.
- Lower extremity including surface Anatomy.
- Head & Spinal cord and Neck and Brain including surface Anatomy.
- Histology- Digestive System, Hepatobiliary system, Urinary system, Male reproductive system, Female reproductive system, Endocrine system.

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester, the student will be able to:

- To understand the level of organization of the human body.
- To understand the topographical and functional anatomy of the head and neck.
- To understand the nervous system in detail.
- To understand its application in practice of physiotherapy.

Recommended Text books:

- SNELL [Richard S], Clinical Anatomy for Medical students: Ed. 5. Little Brown and
- Company Boston. 1995, p898
- B.D Chaurasia's Human Anatomy – Regional and Applied; Volume I, Volume II and Volume III.
- MOORIE [Keith L], Clinically Oriented Anatomy. Ed.3., Williams and Wilkins, Baltimore,1992, p917,$30
- DATTA [A.K], Essentials of human Anatomy: Thorax and Abdomen Ed 2. Vol. I

Current Book International, Calcutta 1994, p433

- DATTA [A.K], Essentials of human Head and Neck Ed 2. Vol. II, Current Book International, Calcutta 1995, p363
- SINGH [Inderbir], Text book of Anatomy with color atlas: Introduction, Osteology, Upper Extremity, Lower Extremity. Vol I. P Brothers, New Delhi 1996
- SINGH [Inderbir], Text book of Anatomy with color Atlas: Thorax and Abdomen. Vol II. Brothers, New Delhi 1996
- SINGH [Inderbir], Text book of Anatomy with color Atlas: Head and Neck Central Nervous System. Vol III. JP Brothers, New Delhi 1996
- SINGH [Inderbir], Human Osteology. JP Brothers, New Delhi 1990,p191
- SINGH [Inderbir], Human Histology. JP Brothers, New Delhi 1990,p191
- SINGH [Inderbir], Human Embryology. JP Brothers, New Delhi 1990,p191

Practicals

- ROMANES [G J], Cunningham manual of practical anatomy: upper and lower limb ed 15Vol 1 Oxford Medical Publication, Oxford 1996, P263
- ROMANES [G J], Cunningham manual of practical anatomy : Thorax and abdomen ed15 Vol II Oxford Medical Publication, Oxford 1996, P298
- ROMANES [G J], Cunningham manual of practical anatomy : Head and Neck and Brain ed 15 Vol II Oxford Medical Publication, Oxford 1996, P346

HUMAN PHYSIOLOGY II

SUBJECT DESCRIPTION–

In this course, the student will learn about basics of normal human physiology with special emphasis on the functioning of the special systems, nervous system, renal system, reproductive system and physiology of exercise.

THEORY [45 hrs.]

1. Special Senses-[10 hrs.]
    - Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.
    - Visual Pathway and the effects of lesions.
    - Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.
    - Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation. Color vision – color blindness. Nyctalopia.
    - Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.
    - Taste: Taste buds. Primary tastes. Gustatory pathway.
    - Smell: Olfactory membrane. Olfactory pathway.
    - Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders
2. Nervous System-[10 hrs.]
    - Introduction: Organization of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.
    - Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereo gnosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. Tabes dorsalis, sensory ataxia.
    - Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.
    - Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex– structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL

- Spinal cord Lesions: Complete transection and Hemi section of the spinal cord.
- Cerebellum: Functions. Cerebellar ataxia.
- Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.
- Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome
- Reticular Formation and Limbic System: Components and Functions.
- Basal Ganglia: Structures included and functions. Parkinson's disease.
- Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.
- EEG: Waves and features. Sleep: REM and NREM sleep.
- CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.
- ANS: Features and actions of parasympathetic and sympathetic nervous system.

Nervous System Functions

- Peripheral nervous system, neuromuscular transmission, Types of nerve fibers.
- Action potential, Strength-duration curve, ECG, EMG, VEP, NCV
- Degeneration and regeneration of nerve, Reactions of denervations.
- Synaptic transmission, Stretch reflex- Mechanism and factors affecting it.
- Posture, Balance and Equilibrium/Coordination of voluntary movement.
- Voluntary motor action, clonus, Rigidity, incoordination.

3. Renal System-[10 hrs.]
    - Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxta-glomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.
    - Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.
    - Tubular Reabsorption: Reabsorption of Na+, glucose, HCO3-, urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance: TmG. Renal threshold for glucose.
    - Tubular Secretion: Secretion of H+ and K+. PAH clearance.
    - Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.
    - Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.
    - Acid-Base balance (very brief)
    - Artificial Kidney: Principle of hemodialysis
    - Skin and temperature regulation.
4. Reproductive System-[5hrs.]
    - Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder
    - Male Reproductive System: Functions of testes. Pubertal changes in males.

Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.

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

5. Physiology of exercise – [10hrs.]
    - Effects of acute and chronic exercise on
        i. O2 transport
        ii. Muscle strength/power/endurance
        iii. B.M.R. /R.Q.
        iv. Hormonal and metabolic effect
        v. Cardiovascular system
        vi. Respiratory system
        vii. Body fluids and electrolyte
        viii. Effect of gravity / altitude /acceleration / pressure on physical parameters
        ix. Physiology of Age

PRACTICAL [30 Hrs.]

1. Clinical Examination
    - Examination of Radial pulse.
    - Examination of Radial pulse.
    - Recording of blood pressure
    - Examination of CVS
    - Examination of Respiratory system
    - Examination of Sensory system
    - Examination of Motor System
    - Examination of reflexes
    - Examination of cranial nerves
2. Amphibian Experiments – Demonstration and Dry charts Explanation.
    - Normal cardiogram of amphibian heart.
    - Properties of Cardiac muscle
    - Effect of temperature on cardiogram.
3. Recommended Demonstrations
    - Spirometry
    - Artificial Respiration
    - ECG
    - Perimetry
    - Mosso’s Ergometry

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester, the student will be able to:

- Acquire the knowledge of various system of human body.
- Understand the role of various systems like Reproductive, Renal Cardiovascular, Respiratory and Neurological system
- To demonstrate and learn to measure Blood Pressure, Heart Rate, Respiratory Rate, etc.
- To enhance the knowledge about role of exercises and its effect on various regulatory system in the human body.
- To enhance the knowledge of various system and applied physiology of it.

Recommended Text books:

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

Reference books:

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

PATHOLOGY AND MICROBIOLOGY

SUBJECT DESCRIPTION –

Pathology involves the study of causes and mechanisms of diseases. The knowledge and understanding Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient 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 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- [60 hrs.]

A. General Pathology [8 hrs.]

1. Introduction to Pathology
2. Cell injury - Degeneration, physical and chemical irritants, ionizing radiations, cellulites
3. Inflammation - General morphology, types, phenomenon of acute inflammation
4. Tissue repair – Wound healing, fracture, skin, nerves, muscles
5. Disturbance of circulation – edema, thrombosis, infarction, embolism
6. Necrosis, Gangrene
7. Growth and its disorders – atrophy and hypertrophy (pseudo)
8. Cellular ageing
9. Tumors – definitions, classification, characteristics of being and malignant tumors, etiology and spread of tumors, systemic effects
10. Infection – Acute, chronic, including AIDS
11. Immunity and Hypersensitivity

B. Systemic pathology [20 hrs.]

1. Hematopoietic system: Anemia, definition, classification, etiology, lab investigations, blood picture; Hemorrhagic disorders – causes and classification (hemophilia), leucocyte disorders like leucopenia and leucocytosis.
2. Cardiovascular System: Rheumatic Heart diseases, Myocardial infarction, Atherosclerosis and other disease of blood vessels – TAO, Buerger's diseases, Thrombophlebitis Congenital Heart diseases.
3. Respiratory System: Pneumonia, Bronchitis, Bronchiectesis, Asthma, Emphysema, Tuberculosis and Carcinoma of Lungs Occupational Lung Diseases.
4. Central Nervous System: Meningitis, Encephalitis, Cerebral Hemorrhage, Cerebro Vascular Accident, Brief outline of CNS Tumors.
5. Alimentary System: Peptic Ulcer Ulcerative lesions of intestine.
6. Hepato-Biliary System: Hepatitis, Cirrhosis, Cholecystitis, Cholelithiasis.
7. Lymphatic System: Lymphadenitis, Tumors.
8. Urinary System: Nephritis, Glomerular Nephritis, Nephrotic Syndrome.
9. Skin: Scleroderma, Psoriasis, Autoimmune disorders.
10. Endocrine System: Thyroid – Thyroiditis and Thyroid tumors, Diabetes mellitus.
11. Peripheral Nervous System: Neuritis, Neuralgia, GBS, Neuropathies
12. Musculoskeletal System: Poliomyelitis, Myopathies, Volkman's Ischaemic contracture, Osteomyelitis, Osteoarthritis, Septic, Arthritis, Gout, Osteomalacia, Bone Tumors like Giant Cell tumor, Osteosarcoma, Ewing's, Hemarthrosis.
13. Fluid Examination: CSF, urine ,body fluid (peritoneal, pericardial and pleural)

C. Bacteriology [4 hrs.]

1. General bacteriology : Introduction , historical background , classification of micro-organisms basic of morphology and physiology of bacteria , Staining of bacteria , sterilization and disinfection , Cultivation and culture media
2. Systemic bacteriology
    - Gram-Positive cocci- Streptococci, Pneumococci, Staphylococci
    - Gram-Negative Cocci- Gonococci and Meningococci, Klebsiella
    - Gram-Positive Bacilli
    - Gram-Negative Bacilli- Typhoid, Cholera, Dysentery
    - Aerobic Infections- Diphtheria, T.B., Leprosy
    - Anaerobic Infections- Tetanus, Gas Gangrene, Botulism

D. Fungal and viral infections [5 hrs.]

1. General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mycosel opportunistic infections including Mycotoxins, systemic mycoses.
2. General principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples.
3. General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections.
4. Immunity and prophylaxis of viral diseases.
5. Principles of laboratory diagnosis of viral diseases
6. List of commonly used antiviral agents.

E. Immunology [5 hrs.]

1. Basic principles of immunity immunobiology: lymphoid organs and tissues, Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.
2. Humoral immunity and its role in immunity. Cell mediated immunity and its role in immunity. Immunology of hypersensitivity, Measuring immune functions.

F. Clinical microbiology [9 hrs.]

1. Streptococcal infections: Rheumatic fever and Rheumatic heart disease.
2. Acute –respiratory infections, Tuberculosis
3. Poliomyelitis, Hepatitis, Leprosy
4. Sexually transmitted diseases , HIV infection
5. Central nervous system infections, meningitis
6. Urinary tract infections, pelvic inflammatory disease
7. Wound infections , opportunistic infections
8. Malaria, filariasis, zoonotic disease

G. Cultivation of microbes and control of microbial infections [9 hrs.]

1. Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.
2. Normal flora of the human body.
3. Routes of infection and spread, endogenous and exogenous infections, source at reservoir of infections.
4. Bacterial cell. Morphology limited to recognizing bacteria in clinical samples, Shape, motility and arrangement. Structures, which are virulence, associated.
5. Essentials of bacterial growth requirements.
6. Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.
7. Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester, the student will be able to:

- To know the nature of disease, it's causes, development, and consequences.
- To identify the various pathological conditions for various systems.
- To identify the microorganisms and their activities in various diseases.
- To know the differential diagnosis of various diseases.

Recommended Textbooks

- Text book of pathology: Harsh Mohan
- General systemic pathology: Churchill Livingstone
- Text book of Pathology: Robbins
- Short text book of Medical Microbiology by Sathish Gupta
- Text book of Microbiology by Jayaram Panicker
- Microbiology & Parasitology by Rajeshwar Reddy
- Text book of Microbiology by Anantha Narayanan
- Microbiology by Baveja
- Text book of microbiology by Chakraborty

BIO-PHYSICS

SUBJECT DESCRIPTION - To understand the concept and basic principles to know electrotherapy equipment is given under this topic. The student will be taught about physics related to electrotherapy and application on human body tissues.

THEORY [60 hrs.]

1. Physical principles [30 hrs.]
    a. Structure and properties of matter -solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity.
    b. Structure of atom, molecules, elements and compound
    c. Electricity: Definition and types. Therapeutic uses. Basic physics of construction.
    Working
    d. Importance of currents in treatment.
    e. Static Electricity: Production of electric charge. Characteristic of a charged body.
    f. Characteristics of lines of forces. Potential energy and factors on which it depends. Potential difference and EMF.
    g. Current Electricity: Units of Electricity: farad, Volt, Ampere, Coulomb, Watt
    h. Condensers: Definition, principle, Types- construction and working, capacity & uses.
    i. Magnetism: Definition. Properties of magnets. Electromagnetic induction. Transmission by contact. Magnetic field and magnetic forces. Magnetic effects of an electric field.
    j. Conductors, Insulators, Potential difference, Resistance and intensity
    k. Ohm's law and its application to DC and AC currents. Fuse: construction, working and application.
    l. Transmission of electrical energy through solids, liquids, gases and vacuum.
    m. Rectifying Devices-Thermionic valves, Semiconductors, Transistors, Amplifiers, transducer and Oscillator circuits.
    n. Display devices and indicators-analogue and digital.
    o. Transformer: Definition, Types, Principle, Construction, Eddy current, working uses
    p. Chokes: Principle, Construction and working, Uses
2. Effects of Current Electricity [[10 hrs.]
    a. Chemical effects-lons and electrolytes, lonisation, Production of an EMF by chemical actions.
    b. Ionization: Principles, effects of various technique of medical ionization.
    c. Electromagnetic Induction.
    d. Electromagnetic spectrum.
3. Electrical Supply [10 hrs.]
    a. Brief outline of main supply of electric current
    b. Dangers-short circuit, electric shocks: Micro/ Macro shocks
    c. Precaution-safety devices, earthing, fuses etc.
    d. First aid and initial management of electric shock
    e. Burns: electrical & chemical burns, prevention and management
4. Various agents [10 hrs.]
    a. Thermal agents: Physical Principles of cold, Superficial and deep heat.

b. Ultrasound: Physical Principles of Sound
c. Electro- magnetic Radiation: Physical Principles and their Relevance to Physiotherapy Practice
d. Electric Currents: Physical Principles and their Relevance to Physiotherapy Practice.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- Describe the fundamental of general physics and relate its application in physiotherapy.
- Demonstrate the mechanics related to human body function.
- Describe all the physical agents and their use in electrotherapy modalities.
- Understand basic concepts of electricity and electronics and its application into physiotherapy.

Recommended textbooks:

- Physics - Foundation & frontiers by George Cramow & John M. Cleveland
- Fundamentals of Biomedical Physics by Akil Saiyed & Babita Saiyed.

Reference books:

- Physics of the life sciences by Jay Newman. 2008.
- University physics for the physical and life sciences by Philip R. Kesten and David L First Edition, W. H. Freeman and Company. 2012.
- Physics for the biological sciences by Fredrick Ross Halett, Harcourt Canada. 2001.
- Text book of Sound – Brijlal and Subramanian

INTRODUCTION TO HEALTH, FITNESS & LIFESTYLE DISEASE II

SUBJECT DESCRIPTION–
This subject will create consciousness among the students towards health, fitness and wellness and in developing and maintaining a healthy life style.

THEORY [45 HRS.]

1. Lifestyle Disease and its Management [15 hrs.]
   Lifestyle/Hypo-kinetic Diseases and its Management
   - Diabetes
   - Hypertension
   - Obesity
   - Osteoporosis
   - CHD
   - Back pain
2. Health related Physical Fitness and Assessment [15 hrs.]
3. Body mass Index/Skin fold Measurement, BMR, Pulse Rate, Blood Pressure [15 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:
At the end of the semester the student will be able:

- It will also familiarize the students towards various hypo-kinetic diseases and its management.
- It will also provide practical guidelines and testing of health-related fitness and other health indices.

Reference/Textbook:

- AAPHERD. "Health Related Physical Fitness Test Manual". 1980 Published by Association drive Reston Virginia
- ACSM Fitness Book, Leisure Press Campaign, Illions, 1996, Leisure Press, Canada http://www.pitt.edu./-gsphhome
- ACSM"s "Health Related Physical Fitness Assessment Manual Lippincott Williams Walkins USA, 2005.
- B.C.Rai Health Education and Hygiene Published by Prakashan Kendra, Lucknow
- Bucher.C.A. (1979). Foundation of Physical Education (5th edition Missouri C.V.Mosby co. California: Mayfield Publishing Company
- Corbin.Charles Beetal. C.A., (2004) Concepts of Fitness and Welfare Boston McGraw Hill.
- Frank V.M. (2003). Sports & education CA: ABC- CLIO
- Les Snowdan., Maggie Humphrey's Fitness walking, Maggie Humphery Orient Paper Books 2002 New Delhi.
- Norman Bezzant Help! First Aid for everyday emergencies. Jaico Publishing House Bombay, Delhi
- Principles of Physical Education: Com. Philadelphia: W.B.Sounders
- Puri. K.Chandra.S.S. (2005). Health and Physical Education. New Delhi: Surjeet Publications
- Ralph S. Paffer Barger, Jr. and Eric Leolson, Life fit, 1991 Human Kinetics USA
- Rob James. Graham Thompson . Nesta Wiggins – James complete A-Z Physical Education Hand Book 2nd edition, 2003 Hodder and Stoughton England
- Siedentop.D,(1994) Introduction to Physical Education and Sports (2nd ed.) Sp. Educational Technology
- Ziegler. E .F. (2007). An Introduction to Sports & Phy. Edn. Philosophy Delhi

INTRODUCTION TO TREATMENT

SUBJECT DESCRIPTION–

In this course, the students will learn the basic principles of treatment, modality and techniques in the restoration of physical functions.

THEORY [45 HRS.]

1. General information regarding Hospital wards, Patients hospital records and functioning of department in patient management and department clinical units. [10 hrs.]]
    a) Physiotherapy OPD
    b) Neurological Physiotherapy
    c) Orthopaedic Physiotherapy
    d) Developmental Pediatric Physiotherapy
    e) Cardio Pulmonary Physiotherapy (ICU, NICU and Post-Op ICU, Wards)
    f) Health Fitness Physiotherapy
    g) Geriatric Physiotherapy
    h) Industrial Physiotherapy
    i) Community Physiotherapy
    j) Women's Health Physiotherapy, Incontinence Clinic
2. History taking, assessment tests, Patient Communication, documentation of Findings, treatment Organization and Pringel execution for intervention. [10 hrs.]
3. Record Keeping and Information retrieval. [5 hrs.]
4. Techniques of use of electrotherapy equipment's on patients, monitoring of dosages and winding up procedure. [10 hrs.]
5. Introduction about standardized tests and scales used in various types of cases for assessment and interpretation. [5 hrs.]
6. Exercise therapy treatment organizations and methods of application on various types of cases. [5 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES: -

At the end of the semester, the student will be able to:

- To acquire knowledge about the techniques and assessment taking.

INTRODUCTION TO OCCUPATIONAL HEALTH & ERGONOMICS

SUBJECT DESCRIPTION: This course provides an overview of the important issues in Occupational Safety and Health. Ergonomics is the study of people in their workplace and is the process in which workplaces, products and systems are designed or rearranged so that they fit the people who use them. Ergonomics is a science-based discipline. It brings together knowledge from anatomy and physiology, psychology, engineering and statistics and ensures that the designs complement the strengths and abilities of people who use it.

THEORY [45 HRS.]

1. Occupational health [9hrs.]
    - Introduction.
    - Objective & basic concepts of Occupational health.
    - Reorganization of health hazards.
    - Early detection of Occupational diseases.
2. Ergonomics [9hrs.]
    - Definitions of terms: Ergonomics, Ergonomists. Social significance of ergonomics.
    - Biomechanical, Physiological & Anthropometric factors related to ergonomics.
    - Ergonomical aspects of Postures like Sitting, Standing, Hand & arm postures.
    - Ergonomical aspects of movements like Pushing, Pulling, Lifting & carrying.
3. Environmental factors & ergonomics [9 hrs.]
    - Noise, Light, Vibration, Climate & Chemical substances.
4. Occupational ergonomics [9 hrs.]
    - Work environment and control measures in work place.
    - Prevention of occupational diseases and accidents.
    - Effects of lifestyle and behavior on health.
    - Health education in the workplace.
5. Occupational ergonomics in special areas [9 hrs.]
    - Industrial worker.
    - Agriculture and rural areas.
    - Working women.
    - IT – BPO industries.

PRACTICAL [30 HRS.]

- Ergonomic evaluation
- Risk assessment
- Manual handling

STUDENT LEARNING OUTCOMES/OBJECTIVES: -

At the end of the semester, the student will be able to:

- Discuss theoretical and practical concept of posture assessment and anthropometric measurements of human body.
- Describe body mechanics to be used for lifting, reaching, pushing, pulling and carrying objects while sitting, standing, and moving from one place to other.
- Describe how work environment be related to ergonomics and reduction of risks.

- Detect work hazardous assessment as related to occupation and its environment
- Evaluate work hazardous practice for various industries

Reference Books:

- Waldemar Karwowski & William S. Marras: Occupational Ergonomics – Design and management of Work System; CRC Press, Boca Raton, FL, 1999
- Occupational Health: A manual for primary health care workers; WHOEM/OCH/85/E/L.

Recommended Textbooks:

- Benjamin O. ALLI, Fundamental Principles of Occupational Health and Safety, Second edition, ILO International Labour Organization 2008
- M. Rabiul & Ahasan: Occupational Health, Safety and Ergonomic issues in small and medium- sized Enterprises in a Developing Country. OULU 2002

Third Semester

BASIC PRINCIPLES OF BIOMECHANICS

SUBJECT DESCRIPTION –

Biomechanics involves the study of basic concepts of human movement, and application of various biomechanical principles in the evaluation and treatment of disorders of musculoskeletal system.

THEORY [45 hrs.]

1. Basic Concepts in Biomechanics: Kinematics and Kinetics [8 hrs.]
    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 system
    m. Work
    n. Moment arm of force
    o. Force components
    p. Equilibrium of levers
2. Joint structure and Function – [8 hrs.]
    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
    g. General effects of disease, injury and immobilization.
3. Muscle structure and function – [7 hrs.]
    a. Mobility and stability functions of muscles
    b. Elements of muscle structure
    c. Muscle function
    d. Effects of immobilization, injury and aging
4. Biomechanics of the Thorax and Chest wall – [7 hrs]
    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- [5 hrs.]
    a. General features, structure, function and dysfunction
6. Biomechanics of the vertebral column [10hrs.]

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

PRACTICAL [30 hrs.]

- Demonstration of cardinal planes and axes.
- Movement analysis of Thorax and Chest wall.
- Movement analysis of Temporomandibular joint.
- Movement analysis of vertebral column.

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester, the student will be able to:

- To acquire knowledge about kinetics & kinematics.
- To analyze musculoskeletal movement in terms of biomechanics and will be able to apply such biomechanical principles to evaluation methods & treatment modes.

Recommended Text books:

- Joint Structure and Function – A comprehensive Analysis, JP Bros Medical Publishers, New Delhi.
- Brunnstrom, Clinical Kinesiology, JP Bros Medical Publishers, Bangalore, 5th Ed 1996,1stIndian Ed 1998
- Clinical Kinesiology for Physical Therapist Assistants, JP Bros Medical Publishers, Bangalore, 1st Indian Ed 1997

Reference books:

- Kinesiology by K Wells, 6th Edition; Saunders Publication
- Biomechanical basis of human movement, Joseph Hamil & Kathleen M. Knutzen, 3rd Edition, LWW Publications.
- Bio-mechanics of Musculoskeletal System by Nigg, 2nd Edition, John Wiley Publication.
- Basic Bio-mechanics of musculoskeletal system by Frenkle, 3rd edition, Lippincott Williams & Wilkins.

FOUNDATION OF EXERCISE THERAPY

SUBJECT 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 [45 Hrs.]

1. Introduction to Exercise Therapy [5 hrs.]
    - The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment
2. Methods of Testing [15 hrs.]
    - Functional tests
    - Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints
    - Tests for neuromuscular efficiency
        i. Electrical tests
        ii. Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group & individual: Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine.
        iii. Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf
        iv. Static power Test
        v. Dynamic power Test
        vi. Endurance test
        vii. Speed test
    - Tests for Co-ordination
    - Tests for sensation
    - Pulmonary Function tests
    - Measurement of Limb Length: true limb length, apparent limb length, segmental limb length
    - Measurement of the angle of Pelvic Inclination
3. Relaxation [4 hrs.]
    - Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation-Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.
4. Passive Movements [2 hrs.]
    - Causes of immobility, Classification of Passive movements, and Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses, Techniques of giving passive movements.
5. Active Movements [9 hrs.]

- Definition of strength, power & work, endurance, muscle actions.
- Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction &relaxation, muscle fiber type, motor unit, force gradation.
- Causes of decreased muscle performance
- Physiologic adaptation to training: Strength & Power, Endurance.
- Types of active movements
- Free exercise: Classification, principles, techniques, indications, contraindications, effects and uses
- Active Assisted Exercise: Principles, techniques, indications, contraindications, effects and uses Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses
- Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

6. Specific exercise regimens [2 hrs.]
    - Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training
    - Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle Isometrics Isokinetic regimens
7. Aerobic Exercise [3 hrs.]
    - 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.
8. Stretching [3 hrs.]
    - 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
9. Individual and Group Exercises [2 hrs.]
    - Advantages and Disadvantages, Organization of Group exercises, Recreational Activities and Sports

THERAPEUTIC MASSAGE

SUBJECT DESCRIPTION- The students will be able to understand the concepts, different types and application of massage on patients during clinical practice.

THEORY [4 Hrs.]

1. History and Classification of Massage Technique
2. Principles, Indications and Contraindications
3. Technique of Massage Manipulations
4. Physiological and Therapeutic Uses of Specific Manipulations

PRACTICAL [30 HRS.]

- Different test methods
- Demonstrate the technique of measuring using goniometry
- Demonstrate muscle strength using the principles and technique of MMT
- Demonstrate the techniques for muscle strengthening based on MMT grading
- Demonstrate techniques of strengthening muscles using resisted exercises
- Demonstrate the techniques for muscle stretching
- Demonstrate relaxation techniques.
- Demonstrate to apply the technique of passive movements
- Demonstrate various techniques of Active movements
- Demonstrate massage technique application according to body parts.

STUDENT LEARNING OUTCOMES/ OBJECTIVES:

At the end of the semester, the student will be able to:

- To describe the basic effects of exercise.
- To measure the joint range of motion using goniometer.
- To describe the physiological and therapeutic effects of various movements.
- To acquire the skills of application of various massage manipulations and its physiological effects, therapeutic uses and merits-demerits of the same.

Recommended Textbooks

- Therapeutic exercise by Barbara Bandy
- Therapeutic exercise by Carolyn Kisner
- Principles of exercise therapy by M.Dena Gardiner
- Practical Exercise therapy by Hollis Margaret
- Therapeutic exercise by Sydney Litch
- Therapeutic exercise by Hall & Brody
- Therapeutic exercise by Basmajjian
- Physical Rehabilitation by O'Sullivan.
- Therapeutic massage by Sinha
- Principles of muscle testing by Hislop.

ELECTROTHERAPY I

SUBJECT 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 [45 hrs.]

Section I A - Low frequency Currents

1. Basic types of current [3 hrs.]
    a. Direct Current: types, physiological &therapeutic effects.
    b. Alternating Current
2. Types of Current used in Therapeutics [3 hrs.]
    a. Modified D.C
        i. Faradic Current
        ii. Galvanic Current
    b. Modified A.C
        i. Sinusoidal Current
        ii. Diadynamic Current.
3. Faradic Current: [2 hrs.]
    - 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: [2 hrs.]
    - 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 hr]
6. HVPGS – Parameters & its uses [2 hrs.]
7. Ionization / Iontophoresis: Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, would healing. [2 hrs.]
8. Cathodal / Anodal galvanism. [1 hr]
9. Micro Current & Macro Current [1 hr]
10. Types of Electrical Stimulators [2 hrs.]
    a. NMES- Construction component.
    b. Neuro muscular diagnostic stimulator- construction component.
    c. Components and working Principles
11. Principles of Application: [3 hrs.]
    - Electrode tissue interface, Tissue Impedance, Types of Electrodes, Size & Placement of Electrode – Water bath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.
12. Nerve Muscle Physiology: [3 hrs.]

- Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, and Stimulation for Tissue Repair.

13. TENS: [3 hrs.]
    - 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.
14. Pain: [2 hrs.]
    - Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail.

Section I B - Electro-diagnosis

1. FG Test [2 hrs.]
2. SD Curve: [2 hrs.]
    - 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 hrs.]
4. EMG: Construction of EMG equipment. [2 hrs.]
5. Bio-feedback. [2 hrs.]

Section I C - Medium Frequency

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

PRACTICAL [30 hrs.]

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 method using IFT for various regions
10. Winding up procedure after any electrotherapy treatment method.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- To identify the modalities required for treating various conditions.
- To know various methods of application of different modalities and care for patients.

Reference books:

- Electrotherapy Evidence based practice by Sheila Kitchen
- Physical agents by Michele Cameroon
- Principles of Electrotherapy by Michele Cameroon
- Thermal agents by Susan Michlovitz.

Recommended Textbooks:

- **C**laytons Electrotherapy by Forster & Plastangs
- Electrotherapy Explained by Low & Reed
- Clinical Electrotherapy by Nelson
- Textbook of Electrotherapy by Jagmohan Singh

PHARMACOLOGY –

SUBJECT DESCRIPTION –

This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy.

THEORY [60 hrs.]

1. General Pharmacology – [6 hrs.]
    - 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 – [6 hrs.]
    - 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 – [9 hrs.]
    - Drugs used in the treatment of heart failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators
    - Antiarrhythmic Drugs
    - Drugs used in the treatment of vascular disease and tissue ischemia : Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotic, Anticoagulants and Thrombolytic Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers, Cerebral Ischemia Peripheral Vascular Disease.
4. Neuropharmacology – [10 hrs.]
    - Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines
    - Antianxiety Drugs: Benzodiazepines, Other Anxiolytics
    - Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium
    - Antipsychotic drugs
5. Disorders of Movement –[6 hrs.]
    - Drugs used in Treatment of Parkinson ’s disease
    - Antiepileptic Drugs
    - Spasticity and Skeletal Muscle Relaxants
6. Inflammatory/Immune Diseases –[15 hrs.]
    - Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactins with NSAIDs

- Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids
- Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout
- Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematous, Scleroderma, Demyelinating Disease
- Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis

7. Digestion and Metabolism – [4 hrs.]
    - Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemic
8. Geriatrics – [4 hrs.]
    - Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension.

STUDENT LEARNING OUTCOMES/ OBJECTIVES: -

At the end of the semester, the student will be able to:

- To have an idea about the basics of medicines.
- To know the mechanism of action of drugs for various common diseases.
- To know the therapeutic effects of various drugs.
- To know the adverse effects of various drugs.
- Identify whether the pharmacological effect of the drug interferes with the therapeutic response of physiotherapy and vice-versa.

Recommended Textbooks

- Lippincott's Pharmacology.
- Essential of Medical Pharmacology by Tripathi
- Text book of Medical Pharmacology by Padmaja Udaykumar
- Pharmacology by N.Murugesh
- Pharmacology& Pharmacotherapeutics by Sadowskar

Reference Textbooks

- Pharmacology for Physical Therapist by Panus.
- Handbook of Pharmacology, 1st edition, Dr. UN Panda, AITBS Publication.

GENERAL MEDICINE -

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about relevant aspects of general medicine. The student will have a general understanding of the diseases the therapist would encounter in their practice.

THEORY [60 hrs.]

1. Infection: Effects of Infection on the body – Pathology – source and spread of infection –
   vaccinations – generalized infections – rashes and infection – food poisoning and gastroenteritis sexually transmitted diseases – HIV infections and Aids. [6 hrs.]
2. Poisoning: Clinical features – general management – common agents in poisoning pharmaceutical agents – drugs of misuse – chemical pesticides – Envenomation. [5 hrs.]
3. Food and Nutrition: Assessment – Nutritional and Energy requirements; Deficiency diseases – clinical features and treatment; Protein – Energy Malnutrition: Clinical features and treatment; Obesity and its related disorders: Causes – Complications – benefits of weight loss – management of Obesity – diet, exercise and medications.[4 hrs.]
4. Endocrine diseases: Common presenting symptoms of Endocrine disease – common classical disease presentations, clinical features and its management; Diabetes Mellitus: Etiology and pathogenesis of diabetes – clinical manifestations of the disease – management of the disease – Complications of diabetes. [4 hrs.]
5. Diseases of the blood: Examinations of blood disorders – Clinical manifestations of blood disease; Anemia – signs and symptoms – types and management; Hemophilia - Cause – clinical features severity of disease – management – complications due to repeated hemorrhages – complications due to therapy. [5 hrs.]
6. Diseases of the digestive system : Clinical manifestations of gastrointestinal disease – Etiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achlasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Infections of Alimentary Tract ; Clinical manifestations of liver diseases - Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Viral Hepatitis, Wilson's Disease, Alpha-antitrypsin deficiency, Tumors of the Liver, Gall stones, Cholecystitis. [10 hrs.]
7. Skin: Examination and clinical manifestations of skin diseases; Causes, clinical features and management of the following skin conditions: Leprosy, Psoriasis, Pigmentary Anomalies, Vasomotor disorders, Dermatitis, Coccal and Fungal Parasitic and Viral infections. [6 hrs.]
8. Pediatrics : Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy
   – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ; Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural

problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child. [10 hrs.]

9. Psychiatric Disorders: Classifications, Causes, Clinical manifestations and treatment methods used in Psychiatry. Modalities of psychiatric treatment, Psychiatric illness and physiotherapy, Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illnesses -. Anxiety neurosis, Depression, Obsessive compulsive neurosis, Psychosis, Maniac-depressive psychosis, Post-traumatic stress disorder, Psychosomatic reactions: Stress and Health, theories of Stress – Illness. [10 hrs.]

   Etio-pathogenesis, manifestations, and management of psychiatric illness

   a. Drug dependence and alcoholism,
   b. Somatoform and Dissociate Disorders – conversion reactions, Somatization, Dissociate Amnesia, and Dissociate Fugue,
   c. Personality disorders
   d. Child psychiatry - manifestations, and management of childhood disorders - attention deficit syndrome and behavioral disorders.
   e. Geriatric psychiatry.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

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

- List the etiology, pathology, clinical features and treatment methods for various medical conditions.
- Gain knowledge regarding assessment of various General Medical conditions, with emphasis on 'Cardio respiratory' assessment & various diagnostic procedures used.
- Gain knowledge regarding Aetiology, Pathology, and Clinical Features & Treatment of various diseases & their Resultant Functional Disabilities.
- Understand the limitations imposed by the diseases on any Therapy that may be prescribed.
- Understand about the goals of Pharmacological & Surgical Therapy imparted in the diseases in which Physical or Occupational Therapy will be important component of overall treatment.

Reference books:

- Harrison's Internal Medicine
- Practical medicine by – P J Mehta
- Preparatory Manual of Medicine by – Sandip Chatwal, 1st Edition, Jaypee Publications

Recommended Textbooks:

- Davidson's Principles and Practice of Medicine
- Textbook of medicine by Golwala
- Essential pediatrics 5th edition – O.P. Ghai Mehta publications.
- A hand book of pediatrics, Complied by Avinash G. Desai.
- A Handbook of Pediatrics- Dr AG Desai, Dr Usha Desai

MEDICAL TERMINOLOGY

SUBJECT DESCRIPTION –

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.

THEORY [45 hrs.]

1. Derivation of medical terms. [5 hrs.]
2. Define word roots, prefixes, and suffixes. [5 hrs.]
3. Conventions for combined morphemes and the formation of plurals. [5 hrs.]
4. Basic medical terms in health care and physiotherapy. [5 hrs.]
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots. [5 hrs.]
6. Interpret basic medical abbreviations/symbols. [5 hrs.]
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system. [5 hrs.]
8. Interpret medical records/reports. [5 hrs.]
9. Data entry and management on electronic health record system. [5 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES: -

At the end of the semester the student will be able to:

- To describe and analyze the component parts of medical terms.
- To relate the terminology to the names, locations, and functions of the major organs of the body systems.
- To use common terms and abbreviations in documenting medical records related to the major systems of the body.
- To use information technology to access, evaluate and interpret healthcare/public health data.

Recommended textbooks:

- Medical terminology, an illustrated guide: Barbara Janson Cohen
- Record keeping in psychotherapy and counselling. Protecting the confidentiality and professional relationship: Ellen T Luepker
- Electronic Health Records: Understanding and Using Computerized Medical Records by R. Gartee.

Reference books:

- An introduction to medical terminology for health care: A self –teaching package: Andrew R Hutton.
- Electronic Health Records a practical guide for professionals and organizations: Margaret K. Amatayakul.

EVALUATION METHODS AND OUTCOME MEASURES

SUBJECT DESCRIPTION –

THEORY [30 Hrs.]

8. Introduction to evaluation and outcome measures [5 hrs.]
    - Definition of Evaluation and methods of it.
    - The use of outcome measures in practice, Attitudes and barriers to the use of Standard Outcome Measure (SOM).
    - International classification of functioning and health, disability and health (ICF): clinical implication of ICF in evaluating patient.
9. Criteria for selecting an outcome measure [10 hrs.]
    - Purpose of evaluation and Types of measures.
    - Reliability description and its analysis in studies, percentage agreement and kappa coefficient, Intra-class correlation, Bland and Altman method, Internal consistency and Error reported in the units of outcome measure.
    - Validity description and its methodology: Face and content validity, Criterion validity, Construct validity, Factor analysis: content and construct validity, Sensitivity and specificity, positive and negative predictive values, likelihood ratios, Group differences, discriminant validity.
    - Measuring change: Appropriateness, Responsiveness, Interpretability, and Clinical utility.
10. Common outcome measures in physiotherapy [15 hrs.]

    Description, contents, uses, limitations and score interpretation of following measures:
    - Evaluation of Patient: Patient History & Interview, Opening and Closing questions, General & Specific Medical history, Social history And Occupational, Recreational and Functional Status.
    - Measuring vital signs: Temperature, Blood Pressure, Respiratory rate, Pulse rate, SPO2.
    - Measuring Pain: Pain History and Pain Assessment Tools – Multivariate & Univariate, Grades of Tenderness and Trigger points.
    - Measuring Functions: Range of motion, Muscle strength, Joint Mobility, Resisted isometrics, End Feel, Muscle Tone, Voluntary Control Grading, Sensory Integration, Reflex Evaluation, Cranial nerve assessment, Chest shape, Chest symmetry.
    - Measuring Gait: Quantitative and Qualitative Assessment.
    - Health related Quality of Life (HRQOL): SF 36, WHO quality of life, Measuring Physical activity: Barthel Index, Functional Independence Measure, Gross Motor Function Classification System (GMFCS), Berg Balance Scale (BBS), Timed Up and Go test (TUG). PAR-Q, New York Heart Association (NYHA) Functional Classification.
    - Measuring Fatigue: Brief Fatigue Inventory, Fatigue Severity Scale (FSS), Multidimensional Fatigue Inventory (MFI-20).
    - Activity and Participation measures: Stroke Impact Scale, Community integration questionnaire, Neck Disability Index (NDI), DASH, WOMAC, SPADI, KOOS (Knee Injury & Osteoarthritis Outcome), Oswestry Disability Questionnaire, Roland Morris Disability Questionnaire.

PRACTICAL [30 HRS.]

- Simulation of various tests and outcome measures.

STUDENT LEARNING OUTCOMES/OBJECTIVES: -

At the end of the semester the student will be able to:

- Describe the importance and need of standardized tests and measures in physiotherapy.
- Describe the criteria for the choice of outcome measure.
- Assess patients using common outcome measures.
- Justify selection of Outcome measure based on evidence.

Reference books:

- Finch E, Brooks D, Stratford P, Mayo N. Physical Rehabilitation Outcome Measures: A Guide to Enhanced Clinical Decision Making. Lippincott Williams and Wilkins; 2nd revised **edition.**
- Fitzpatrick R, Davey C, Buxton MJ, Jones DR. Evaluating patient-based outcome measures for use in clinical trials. Health Technol Assessment 1998; 2(14).
- www.rehabmeasures.org
- http://www.ebrsr.com/evidence-review/21-outcome-measures
- http://www.orthopaedicscores.com

Recommended textbooks:

- Rehabilitation Outcome Measures, Emma K. Stokes
- Physical Rehabilitation, Susan B. O'Sullivan

Fourth Semester

BIOMECHANICS AND KINESIOLOGY -

SUBJECT DESCRIPTION –

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

THEORY [45 hrs.]

1. Biomechanics of the peripheral joints

   Upper Extremity Joint complexes
   - The shoulder complex: Structure and components of the shoulder complex and their integrated function. [5 hrs.]
   - 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. [5 hrs.]
   - The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; functional position of the wrist and hand. [6 hrs.]

   Lower Extremity Joint Complexes
   - The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur: [6 hrs.]
   - The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease. [6 hrs.]
   - 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. [6 hrs.]
2. Analysis of Posture [5 hrs.]
   - 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.
3. Gait [6 hrs.]
   - 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, assistive devices, disease, 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.

PRACTICAL [30 hrs.]

- Shall be conducted for various joint movements and analysis of the same.

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

STUDENT LEARNING OUTCOMES/ OBJECTIVES: -

At the end of the semester, the student will be able to:

- To acquire knowledge about kinetics & kinematics.
- To analyze musculoskeletal movement in terms of biomechanics and will be able to apply such biomechanical principles to evaluation methods & treatment modes.

Reference books:

- Kinesiology by K Wells, 6th Edition; Saunders Publication
- Biomechanical basis of human movement, Joseph Hamil & Kathleen M. Knutzen, 3rd Edition, LWW Publications.
- Bio-mechanics of Musculoskeletal System by Nigg, 2nd Edition, John Wiley Publication.
- Basic Bio-mechanics of musculoskeletal system by Frenkle, 3rd edition, Lippincott Williams & Wilkins.

Recommended Text books:

- Joint Structure and Function – A comprehensive Analysis, JP Bros Medical Publishers, New Delhi.
- Brunnstrom, Clinical Kinesiology, JP Bros Medical Publishers, Bangalore, 5th Ed 1996,1stIndian Ed 1998
- Clinical Kinesiology for Physical Therapist Assistants, JP Bros Medical Publishers, Bangalore, 1st Indian Ed 1997

EXERCISE THERAPY

SUBJECT DESCRIPTION- After the course on exercise therapy student will be able to understand the different types of exercise for the benefit of patient in different situations and conditions both in health and disease or disorder.

THEORY [45 hrs.]

1. Proprioceptive Neuromuscular Facilitation [5 hrs.]
    a. Definitions & goals
    b. Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb
    c. Procedure: components of PNF
    d. Techniques of facilitation
    e. Mobility: Contract relax, Hold relax, Rhythmic initiation
    f. Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization Stability: Alternating isometric, rhythmic stabilization
    g. Skill: timing for emphasis, resisted progression Endurance: slow reversals, agonist reversal
2. Suspension Therapy [3 hrs.]
    a. Definition, principles, equipments & accessories, Indications & contraindications,
    Benefits of suspension therapy
    b. Types of suspension therapy: axial, vertical, pendular Techniques of suspension therapy for upper limb Techniques of suspension therapy for lower limb
3. Functional Re-education [3 hrs.]
    a. Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lower limb and Upper limb activities.
4. Balance – Definition [3 hrs.]
    a. Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output
    b. Components of balance (sensory, musculoskeletal, biomechanical)
    c. Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types Balance retraining.
5. Co-ordination Exercise [2 hrs.]
    a. Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination,
    Inco-ordination
    b. Causes for Inco-ordination, Test for co-ordination: equilibrium test, non-equilibrium test Principles of co-ordination exercise.
    c. Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise,
    progression, home exercise.
6. Posture [4 hrs.]
    a. Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.
7. Walking Aids [2 hrs]

a. Types: Crutches, Canes, Frames; Principles and training with walking aids

8. Basics in Manual Therapy & Applications with Clinical reasoning [14 hrs.]
    a. Examination of joint integrity
        i. Contractile tissues
        ii. Non contractile tissues
    b. Mobility - assessment of accessory movement & End feel
    c. Assessment of articular & extra-articular soft tissue status
        i. Myofascial assessment
        ii. Acute & Chronic muscle hold
        iii. Tightness
        iv. Pain-original & referred
    d. Basic principles, Grades, Indications, Contra-Indications, Effects and Uses of mobilization.
        i. Maitland
        ii. Mulligan
        iii. Mckenzie
        iv. Muscle Energy Technique
        v. Myofascial stretching
        vi. Cyriax
        vii. Neuro Dynamic Testing
9. Hydrotherapy [4 hrs.]
    a. Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipment, techniques, Effects and uses, merits and demerits
10. Individual and Group Exercises [5 hrs.]
    a. Advantages and Disadvantages, Organization of Group exercises, Recreational Activities and Sports

PRACTICAL [30 hrs.]

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

1. Demonstrate the PNF techniques
2. Demonstrate exercises for training co-ordination – Frenkel's exercise
3. Demonstrate techniques for functional re-education
4. Assess and train for using walking aids
5. Demonstrate mobilization of individual joint regions
6. Demonstrate to use the technique of suspension therapy for mobilizing and strengthening joints and muscles
7. Assess and evaluate posture and gait
8. Demonstrate techniques of strengthening muscles using resisted exercises
9. Demonstrate techniques for measuring limb length and body circumference.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- Acquire the skill of assessment of isolated and group muscle strength subjectively and objectively.

- Analyse normal human posture and its associated problems, its management.
- Analyse the various normal musculoskeletal movements during gait and daily living and daily living activities and in terms of biomechanical and physiological principles.
- To plan the exercises for various conditions and do the advanced intervention.
- To perform various manual therapy techniques.

Reference books:

- Therapeutic exercise by Hall & Brody
- Therapeutic exercise by Basmajjian
- Physical Rehabilitation by O'Sullivan.
- Therapeutic massage by Sinha
- Principles of muscle testing by Hislop
- Manual Therapy NAGS, SNAGS, MWMS etc. by Brian R Mulligan, 6^{th} Edition, Plane view services.
- Peripheral Manipulation by G D Maitland, 3^{rd} Edition.

Recommended Textbooks

- Therapeutic exercise by Carolyn Kisner
- Principles of exercise therapy by M.Dena Gardiner
- Practical Exercise therapy by Hollis Margaret
- Therapeutic exercise by Sydney Litch

ELECTROTHERAPY II

SUBJECT 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 [45 hrs.]

Section II - Thermo & Actinotherapy (High Frequency Currents)

1. Electro Magnetic Spectrum. [3 hrs.]
2. SWD: [5 hrs.]
    - 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.
3. Pulsed Electro Magnetic Energy: [2 hrs.]
    - Principles, Production & Parameters of PEME, Uses of PEME.
4. Micro Wave Diathermy: [2 hrs.]
    - Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD.
5. Ultrasound: [5 hrs.]
    - 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 hrs.]
    - Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
7. UVR: [5 hrs.]
    - 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: [5 hrs.]
    - Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of

LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density

Section III – Superficial heating Modalities

1. Wax Therapy: [2 hrs.]
    - Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.
2. Contrast Bath: [2 hrs.]
    - Methods of application, Therapeutic uses, Indications & Contraindications.
3. Moist Heat Therapy: [2 hrs.]
    - Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications.
4. Cyclotherm: [2 hrs.]
    - Principles of production, Therapeutic uses, Indications & Contraindications.
5. Fluidotherapy: [2 hrs.]
    - Construction, Method of application, Therapeutic uses, Indications & Contraindications.
6. Whirl Pool Bath: [2 hrs.]
    - Construction, Method of Application, Therapeutic Uses, Indications & Contraindications.
7. Magnetic Stimulation: [2 hrs.]
    - Principles, Therapeutic uses, Indications & contraindication.
8. Cryotherapy: [2 hrs.]
    - Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages.

PRACTICAL [30 hr.]

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 treatment techniques using SWD, IRR and Microwave diathermy
2. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
3. Calculation of dosage and technique of application of LASER
4. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
5. Demonstrate the treatment method using whirl pool bath
6. Winding up procedure after any electrotherapy treatment method.

Equipment care –Checking of equipment

1. Arrangement of exercise therapy and electro therapy equipment.
2. Calibration of equipment
3. Purchase, billing, document of equipment.
4. Safety handling of equipment.
5. Research lab equipment maintenance.
6. Stock register, movement register maintenance

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- To identify the modalities required for treating various conditions.
- To know various methods of application of different modalities and care for patients.

Reference books:

- Electrotherapy Evidence based practice by Sheila Kitchen
- Physical agents by Michele Cameroon
- Principles of Electrotherapy by Michele Cameroon
- Thermal agents by Susan Michlovitz.

Recommended Textbooks:

- **C**laytons Electrotherapy by Forster & Palastanga
- Electrotherapy Explained by Low & Reed
- Clinical Electrotherapy by Nelson
- Textbook of Electrotherapy by Jagmohan Singh

GENERAL SURGERY

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about relevant aspects of general surgery. The student will have a general understanding of the surgical conditions the therapist would encounter in their practice.

THEORY [60 HRS.]

1. Fluid, Electrolyte and Acid-Base disturbances – diagnosis and management; Nutrition in the surgical patient; Wound healing – basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, Scars – types and treatment. Hemostasis – components, hemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion; Surgical Infections; General Post – Operative Complications and its management. [4 hrs.]
2. Reasons for Surgery; Types of anesthesia and its effects on the patient; Types of Incisions; Clips Ligatures and Sutures; General Thoracic Procedures – Radiologic Diagnostic procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery. [4 hrs.]
3. Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pneumothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions. [3 hrs.]
4. Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer. [4 hrs.]
5. Disorders of the Chest Wall, Lung and Mediastinum [3 hrs.]
6. Thoracic surgeries – Thoracotomy – Definition, Types of Incisions with emphasis to the site of incision, muscles cut and complications. Lung surgeries: Pneumonectomy, Lobectomy, segmentectomy – Indications, Physiological changes and Complications; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung. Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extracardiac Operations, Closed Heart surgery, Open Heart surgery. Transplant Surgery – Heart, Lung and Kidney – Indications, Physiological changes and Complications. [4 hrs.]
7. Diseases of the Arteries and Veins: Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases: Arteriosclerosis, Atherosclerosis, Aneurysm, Buerger's disease, Raynaud's Disease, Thrombophlebitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins. [3 hrs.]
8. Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Nephrectomy, Prostectomy. [3 hrs.]
9. Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft; Flaps – Types and uses of Flaps. [2 hrs.]
10. ENT: Common problems of ear, otitis media, Otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of

lower motor neuron type of facial palsy. [2 hrs.]

11. Ophthalmology: Ophthalmologic surgical conditions, refraction's, conjunctivitis, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra-ocular muscles- surgical management. [2 hrs.]
12. Anatomy and physiology of the female reproductive organs. Puberty dynamics [1 hr.]
13. Physiology of menstrual cycle –[2 hrs.]
    - ovulation cycle,
    - uterine cycle,
    - Cx cycle,
    - duration,
    - amount
    - Hormonal regulation of menstruation,
14. Hormonal disorders of females-obesity and female hormones [1 hr.]
15. Pregnancy [4 hrs.]
    a. Diagnosis of pregnancy
    b. Abortion
    c. Physiological changes during pregnancy
    d. Importance of antenatal care exercise
    e. High risk pregnancy, prenatal common complications – investigation and Management
    f. Musculoskeletal disorders during pregnancy
    g. Multiple child birth
    h. Normal labor
16. Child birth complications, investigation and management [1 hr.]
17. Normal puerperium, lactation and importance of post-natal exercises [2 hrs.]
18. Family planning. [2 hr.]
19. Medical termination of pregnancy [1 hr.]
20. Infection of female genital tract including sexually transmitted diseases, low backache [2 hrs.]
21. Prolapse of uterus and vagina [1 hr.]
22. Principle of common gynecological operations – hysterectomy, D&C, D&E, Pop smear [2 hrs.]
23. Menopause: Its effect on emotions and musculoskeletal system [1 hr.]
24. Urogenital dysfunction – pre- and post-natal condition [1 hr.]
25. Sterility: Pathophysiology, investigations, management, Malnutrition and deficiencies in females. [2 hrs.]
26. Surgical procedures involving child birth. [2 hrs.]
    - Definition, Indications and Management of the following surgical procedures – pelvic repair, caesarian section, nephrectomy, Hysterosalphyngography, Dilatation and Curettage, Laproscopy, Colposopy, Hysterectomy.
27. Carcinoma of female reproductive organs – surgical management in brief Mastectomy – Simple, radical. Hysterectomy. [2 hrs.]
28. Incontinence – Types, Causes, Assessment and Management. [2 hr.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:

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

- Gain knowledge regarding various Surgeries; with emphasis on Cardio-Thoracic Surgeries, events accompanying Surgeries, Anaesthesia, Blood Transfusion etc.
- Gain knowledge regarding the Indication of various Surgeries, their outcome, post-operative Complications and Treatment.
- Gain knowledge regarding Management of Sequelae of various conditions like Head Injury and Spinal Cord Injury; Management of Complication of following Immobilization and Bed Rest.
- Describe the normal and abnormal physiological events during the puberty, labor, puerperium, post – natal stage and menopause.
- Discuss the various complications during pregnancy, labour, puerperium and post – natal stage, pre and post-menopausal stage and various aspects of urogenital dysfunction and their management in brief.
- Acquire the skill of clinical examination of pelvic floor
- Acquire the skill of clinical examination of pregnant woman.
- Evaluation and assessment of pelvic muscles.
- The etiology, pathophysiology, signs and symptoms, clinical evaluation, management of the various gynecological condition and important surgical procedures.
- Detection of pregnancy various stages of labour its complications.
- Termination of pregnancy and family planning.
- Importance of physiotherapy in antenatal and post-natal period.
- Evaluation and assessment of child.
- Etiology, signs and symptoms, management of various child disorders.

Reference Textbooks:

- General Surgical Operations – by Kirk / Williamson
- Surgery by Nan
- Bailey and Love's – Short Practice of Surgery
- Chest Disease by Crofton and Douglas.
- Patrica A Downie, Text book of Heart, Chest Vascular Disease for physiotherapists, JP Bros.
- Obstetrics & gynecology by – Polden
- Role of Physiotherapist in Obstetric & Gynecological conditions, Purvi K C h angela.

Recommended Textbooks:

- Gynecology: five teachers by R. Latif Khan
- Women's health. Sapsfond, Saxton, Markwell, WB Saunders.
- Physiotherapy in Obstetrics & Gynecology, Margaret Polden and Jill Mantle, Jaypee Brothers.

CLINICAL EDUCATION I

SUBJECT DESCRIPTION: Clinical education is the application of knowledge and skills in the clinical environment. This will comprise of 3 hours of clinical exposure 4 days a week, where the students shall be sent in groups in rotation. The student will be supervised by one Faculty member. The clinical education will be from 4th semester to 7th semester. In each semester, they will be posted in the departments related to their courses being learned in respective semesters. The student will be formally evaluated at the end of semester through Viva-voce examinations by internal and external examiners.

PRACTICAL [120 HRS.]

1. History taking
2. Blood Pressure
3. Pulse Rate
4. Respiratory rate
5. Range of Motion
6. Breathing Exercise
7. Massage
8. Crepe bandage application technique
9. Posture assessment
10. Gait assessment
11. BMI measurement and calculation
12. Complications of immobilization
13. Posture
14. Applied anatomy and physiology

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the course, the students will be able to:

- Take brief history of various clinical conditions affecting human being
- Communicate with patient and care givers.
- Identify the chief complaints and major problems affecting patients

Fifth Semester

CLINICAL ORTHOPEDICS – NON TRAUMATIC

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about Orthopedic conditions the therapist would encounter in their practice. The objective of this course is that after completion of the 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 [60 hrs.]

1. Introduction [6 hrs.]
    a. Introduction to orthopedics.
    b. Clinical examination in an orthopedic patient.
    c. Common investigative procedures.
    d. Radiological and Imaging techniques in Orthopedics.
    e. Inflammation and repair, Soft tissue healing.
2. Deformities - clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities. [9 hrs.]
    a. Congenital Deformities –
        i. CTEV.
        ii. CDH.
        iii. Torticollis.
        iv. Scoliosis.
        v. Flat foot.
        vi. Vertical talus.
        vii. Hand anomalies- syndactyly, polydactyly and ectrodactly. Arthrogryposis multiplex congenita (amyoplasia congenita).
        viii. Limb deficiencies- Amelia and Phocomelia. Klippel feil syndrome. Osteogenesis imperfecta(fragile ossium).
        ix. Cervical rib.
    b. Acquired Deformities –
        i. Acquired Torticollis.
        ii. Scoliosis.
        iii. Kyphosis.
        iv. Lordosis.
        v. Genu varum.
        vi. Genu valgum.
        vii. Genu recurvatum
        viii. Coxa vara.
        ix. Pes cavus.
        x. Hallux rigidus.
        xi. Hallux valgus.
        xii. Hammer toe.
        xiii. Metatarsalgia.

3. Disease of Bones and Joints: Causes, Clinical features, Complications, Management-

medical and surgical of the following conditions: [8 hrs.]

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.

4. Inflammatory and Degenerative Conditions: causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions: [7 hrs.]
   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)
5. Syndromes: Causes, Clinical features, complications, management- conservative and surgical of the following: [6 hrs.]
   a. Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costo clavicular syndrome. Levator scapulae syndrome. Piriformis syndrome.
6. Neuromuscular Disorders: Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions: [6 hrs.]
   a. Cerebral palsy.
   b. Poliomyelitis.
   c. Spinal Dysraphism.
   d. Leprosy.
7. Cervical and Lumbar Pathology: Causes, clinical feature, patho-physiology, investigations, management-Medical and surgical for the following: [8 hrs.]
   a. Prolapsed interverbral disc (PID),
   b. Spinal Canal Stenosis.
   c. Spondylosis (cervical and lumbar)
   d. Spondylolysis.
   e. Spondylolisthesis.
   f. Lumbago/ Lumbosacral strain.
   g. Sacralisation.
   h. Lumbarisation.
   i. Coccydynia.
   j. Hemivertebra.
8. Regional Conditions: Definition, Clinical features and management of the following regional conditions. [10 hrs.]
   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.

STUDENT LEARNING OUTCOMES/OBJECTIVES:-

At the end of the semester the student will be able:

- To understand causes, mechanism of injuries for non- traumatic conditions and also the intervention for those conditions.
- To identify the problems and their clinical signs and correlate with the other findings.

Recommended Textbooks:

- Outline of Orthopedics— John Crawford Adams.
- Text book of Orthopedics—Maheswari.
- Apley's Orthopedics.
- Textbook of Orthopedics and Traumatology— M.N.Natarajan
- Essentials of Orthopaedics for Physiotherapists - John Ebnezer & Rakesh John

CLINICAL NEUROLOGY & NEUROSURGERY I

SUBJECT DESCRIPTION-This subject follows the basic science subjects to provide the knowledge about relevant aspects of neurology & neurosurgery. The student will have a general understanding of the diseases the therapist would encounter in their practice.

THEORY [60 HRS.]

1. Disorders of function in the context of Pathophysiology, Anatomy in Neurology and Cortical Mapping. [4 hr.]
2. Classification of neurological involvement depending on level of lesion. [3 hrs.]
3. Neurological assessment: Principles of clinical diagnosis, higher mental function, assessment of brain & spinal cord function, evaluation of cranial nerves and evaluation of autonomic nervous system. [4 hrs.]
4. Investigations: principles, methods, views, normal/abnormal values/features, types of following investigative procedures- skull x-ray, CT, MRI, evoked potentials, lumbar puncture, CSF examination, EMG, NCV. [4 hrs.]
5. Neuro-ophthalmology: Assessment of visual function – acuity, field, colour vision, Pupillary reflex, accommodation reflex, abnormalities of optic disc, disorders of optic nerve, tract, radiation, occipital pole, disorders of higher visual processing, disorders of pupil, disorders of eye movements, central disorders of eye movement. [4 hrs.]
6. Deafness, vertigo, and imbalance: Physiology of hearing, disorders of hearing, examination & investigations of hearing, tests of vestibular function, vertigo, peripheral vestibular disorders, central vestibular vertigo. [6 hrs.]
7. Lower cranial nerve paralysis – Etiology, clinical features, investigations, and management of following disorders - lesions in trigeminal nerve, trigeminal neuralgia, trigeminal sensory neuropathy, lesions in facial nerve, facial palsy, bell's palsy, hemi facial spasm, Glossopharyngeal neuralgia, lesions of Vagus nerve, lesions of spinal accessory nerve, lesions of hypoglossal nerve. Dysphagia – swallowing mechanisms, causes of dysphagia, symptoms, examination, and management of dysphagia. [6 hrs.]
8. Cerebro-vascular diseases: Define stroke, TIA, RIA, stroke in evolution, multi-infarct dementia and Lacunar infarct. Classification of stroke – Ischemic, hemorrhagic, venous infarcts. Risk factors, cause of ischemic stroke, causes of hemorrhagic stroke. Classification of hemorrhagic stroke, classification of stroke based on symptoms, stroke syndrome, investigations, differential diagnosis, medical and surgical management. [4 hrs.]
9. Head injury: Etiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications. [4 hrs.]
10. Higher cortical, neuro psychological and neurobehavioral disorders: Causes of blackouts, physiological nature of Epilepsy, classification, clinical features, investigations, medical& surgical management of following disorders – non-epileptic attacks of childhood, Epilepsy in childhood, Seizure, and Epilepsy syndromes in adult. Classification and clinical features of Dyssomnias, Parasomnias, Dementia, Obsessive-compulsive disorders. Neural basis of consciousness, causes &investigations of Coma, criteria for diagnosis of Brain death. Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Perceptual disorders. [7 hrs.]

11. Movement disorders: Definition, etiology, risk factors, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson's disease, Dystonia, Chorea, Ballism, Athetosis, Tics, Myoclonus and Wilson's disease. [6 hrs.]
12. Cerebellar and coordination disorders: Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich's ataxia, Ataxia talengiectasia, Metabolic ataxia, Hereditary cerebellar ataxia, Tabes dorsalis and Syphilis. [8 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:

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

- Do evaluation and assessment of various neurological conditions with interpretation of haematological investigations, chest X-ray, C.T. and MRI scans done for neurological conditions with NCV/EMG findings.
- Describe the aetiology, pathophysiology, signs and symptoms, clinical evaluation, their differential diagnosis, and management of the various neurological conditions.
- Describe functional disabilities caused by various neurological conditions

Reference books:

- Textbook of Neurology- Victor Adams
- Brains Clinical Neurology.
- Illustrated Neurology & Neurosurgery
- Brains Diseases of Nervous System

Recommended Textbooks:

- Davidson's Principles and Practice of Medicine
- Neurology and neurosurgery illustrated Kenneth w Lindsay. 4th edition
- Neurological examination by Fuller. 3rd edition. Churchill Livingstone.
- Clinical neurology by David. 5th edition McGraw hill.

COMMUNITY MEDICINE

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about conditions the therapist would encounter in their practice in the community.

THEORY [60 Hrs.]

1. Health and Disease: Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, The role of socio-economic and cultural environment in health and disease. [4 hrs.]
2. Epidemiology, definition and scope. Principles of Epidemiology and Epidemiological methods: Components and Aims, Basic measurements, Methods, Uses of Epidemiology, Infectious disease epidemiology, Dynamics and modes of disease transmission, Host defenses and Immunizing agents, Hazards of Immunization, Disease prevention and control, Disinfection. Screening for Disease: Concept of screening, Aims and Objectives, Uses and types of screening. [5 hrs.]
3. Epidemiology of communicable disease: Respiratory infections, Intestinal infections, Arthropod-borne infections, Zoonoses, Surface infections, Hospital acquired infections Epidemiology of chronic non-communicable diseases and conditions: Cardio vascular diseases: Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, Obesity, Blindness, Accidents and Injuries. [5 hrs.]
4. Public health administration- an overview of the health administration set up at Central and state levels. The national health programmes-highlighting the role of social, economic and cultural factors in the implementation of the national programmes. Health problems of vulnerable groups- pregnant and lactating women, infants and pre-school children, occupational groups. [4 hrs.]
5. Health programmes in India: Vector borne disease control programmes, National leprosy eradication programmes, National tuberculosis programmes, National AIDS control programmes, National programmes for control of blindness, Iodine deficiency disorders (IDD) programmes, Universal Immunization programmes, Reproductive and child health programmes, National cancer control programmes, National mental health programmes. National diabetes control programmes, National family welfare programmes, National sanitation and water supply programmes, Minimum needs programmes. [8 hrs.]
6. Demography and Family Planning: Demographic cycle, Fertility, Family planning-objectives of national family planning programmes and family planning methods, A general idea of advantage and disadvantages of the methods. [4 hrs.]
7. Preventive Medicine in Obstetrics, Pediatrics and Geriatrics: MCH problems, Antenatal, Intra-natal and post-natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, social welfare programmes for women and children, Preventive medicine and geriatrics. [4 hrs.]
8. Nutrition and Health: Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition programmes. [4 hrs.]
9. Environment and Health: Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, medical entomology. [4 hrs.]

10. Hospital waste management: Sources of hospital waste, Health hazards, Waste management. [2 hrs.]
11. Disaster Management: Natural and man-made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness. [4 hrs.]
12. Occupational Health: Occupational environment, Occupational hazards, Occupational diseases, Prevention of occupational diseases. Social security and other measures for the protection from occupational hazard accidents and diseases. Details of compensation acts. [4 hrs.]
13. Mental Health: Characteristics of a mentally healthy person, Types of mental illness, Causes of mental ill health, Prevention, Mental health services, Alcohol and drug dependence. Emphasis on community aspects of mental health. Role of Physiotherapist in mental health problems such as mental retardation. [4 hrs.]
14. Health Education: Concepts, aims and objectives, Approaches to health education, Models of health education, Contents of health education, Principles of health education, Practice of health education. [4 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:

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

- Gain knowledge regarding concept of Health and Diseases prevailing in the Society.
- Demonstrate an understanding of the influence of Social and Environmental factors on Health of the Individual and Society.
- Understand the role of various medical professionals in the Rehabilitation of patients in Community

Recommended Textbooks:

- Textbook of Preventive & Social Medicine, Dr. J E Park
- Principles of Community Medicine by Rao, 4th Edition, AITBS publications
- Textbook of Preventive and Social Medicine by Gupta, 3rd Edition, Jaypee
- Synopsis in Preventive & Social Medicine by Vijaya, 4th Edition, National Book Depot

ALLIED THERAPIES

SUBJECT DESCRIPTION-

The subject is designed to provide an overview in the basics of Occupational Therapy, Speech & 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 [60 HRS.]

1. Basic Occupational Therapy [20 Hrs]
    a. Introduction to occupational therapy
    b. Principles of occupational therapy
    c. Human structure and function in occupational therapy
    d. Therapeutic modalities in occupational therapy
    e. Health care management in occupational therapy
    f. Pathophysiology in occupational therapy
    g. Mental Health in occupational therapy
    h. Physical function in occupational therapy
2. Basic Speech Therapy [20 Hrs]
    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, articular disorders, deafness
    f. Dyslexia and Dysgraphia
    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 alternation
    l. Technology applied to speech processing
    m. Speech therapy intervention in cochlear implantation
3. Alternative medicine [20 Hrs]
    a. Acupuncture: Definition, Principles, Techniques, Physiological and Therapeutic effects, Indications and Contraindications
    b. Introduction to Naturopathy – Principles of application, indications and uses
    c. Magnetotherapy – Principles of application, indications and uses
    d. Colour therapy
    e. Clay therapy
    f. Acupressure
    g. Hydrotherapy

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- Describe basic concepts of occupational therapy.
- Describe basic concepts of speech therapy, various disorders and interventions.
- Identify and understand the nature of various allied therapies and its application for various conditions.

Recommended Textbooks:

- Fundamentals of Occupational Therapy by Bernadette Hattjar
- Speech and Language Therapy by Louise Cummings
- Acupuncture/Acupressure Basics and Treatment by Easwarabala Subramanian
- Handbook of Acupressure by Dr. A.K Saxena and Dr. Preeti Pai
- Acupressure by Dr. Dhiren Gala
- The Healing Clay by Michel Abserra
- Magneto Therapy by Dr. H.L.Bansal
- Color Therapy by R.S Amber

Reference books:

- Advanced techniques in Physiotherapy and Occupational Therapy by Krishna N Sharma
- Introducing Speech and Language Processing by Lohn Coleman
- Practical approach to Acupuncture by Dr. Prabha Barwankar
- Speaking of nature cure by K. Lashkmana Sarma, K Swaminathan
- Our Earth and Cure by Raymond Dextroit
- Rational Hydrotherapy by Dr. J.H.Kellog
- Magnetic Cure For Common Disease by Dr.R.S.Bansal, Dr. H.L.Bansal

CLINICAL EDUCATION II

SUBJECT DESCRIPTION: Clinical education is the application of knowledge and skills in the clinical environment. This will comprise of 3 hours of clinical exposure 4 days a week, where the students shall be sent in groups in rotation. The student will be supervised by one Faculty member. The clinical education will be from 4th semester to 7th semester. In each semester, they will be posted in the departments related to their courses being learned in respective semesters. The student will be formally evaluated at the end of semester through Viva-voce examinations by internal and external examiners.

PRACTICAL [120 HRS.]

1. Exercise therapy procedure
    - Flexibility testing and stretching
    - Mobilization
    - Resisted Exercise
    - MMT
    - Coordination test
    - Frenkel's Exercise
    - PNF
    - Limb length measurement
    - Limb girth measurement
2. Electrotherapy procedure
    - Manual traction
    - UST LASER
    - Wax
    - Moist heat
    - SWD
    - IRR
    - Cryotherapy
    - SD curve
    - FG test

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- Perform assessment procedures affecting cardiovascular, pulmonary, neurological, musculoskeletal system.
- Identify the type of exercise and electro therapeutic modalities based on the conditions.
- Conduct appropriate medical chart review independently.

Sixth Semester

CLINICAL ORTHOPEDICS – TRAUMATIC -

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about Orthopedic conditions the therapist would encounter in their practice. The objective of this course is that after completion of the 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 [60 hrs.]

1. Traumatology [6 hr.]
    a. Fracture: definition, types, signs and symptoms.
    b. Fracture healing.
    c. Complications of fractures.
    d. Conservative and surgical approaches.
    e. Principles of management – reduction (open/closed, immobilization etc.).
    f. Subluxation/ dislocations – definition, signs and symptoms, management (conservative and operative).
2. Fractures and Dislocations of Upper Limb [12 hrs.]
    a. Fractures of Upper Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:
        i. Fractures of clavicle and scapula.
        ii. Fractures of greater tuberosity and neck of humerus.
        iii. Fracture shaft of humerus.
        iv. Supracondylar fracture of humerus.
        v. Fractures of capitulum, radial head, olecranon, coronoid, and epicondyles.
        vi. Side swipe injury of elbow.
        vii. Both bone fractures of ulna and radius.
        viii. Fracture of forearm – monteggia, galaezzi fracture –dislocation.
        ix. Chauffer's fracture.
        x. Colle's fracture.
        xi. Smith's fracture.
        xii. Scaphoid fracture.
        xiii. Fracture of the metacarpals.
        xiv. Bennett's fracture.
        xv. Fracture of the phalanges. (Proximal and middle.)
    b. Dislocations of Upper Limb –
        i. Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher's and Hippocrates maneuver), surgical management (putti plat, bankart's) etc.
        ii. Recurrent dislocation of shoulder.
        iii. Posterior dislocation of shoulder – mechanism of injury, clinical features and management.

iv. Posterior dislocation of elbow– mechanism of injury, clinical feature, complications & management.

3. Fracture of Spine [6 hrs.]
    a. Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications (quadriplegia); Management- immobilization (collar, cast, brace, traction); Management for stabilization, management of complication (bladder and bowel, quadriplegia).
        i. Clay shoveller's fracture.
        ii. Hangman's fracture.
        iii. Fracture odontoid.
        iv. Fracture of atlas.
    b. Fracture of Thoracic and Lumbar Regions - Mechanism of injury, clinical features, and management— conservative and surgical of common fractures around thoracic and lumbar regions.
    c. Fracture of coccyx.
    d. Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum.
4. Fractures and Dislocations of Lower Limb [12 hrs.]
    a. Fracture of Pelvis and Lower Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:
        i. Fracture of pelvis.
        ii. Fracture neck of femur– classification, clinical features, complications, management - conservative and surgical.
        iii. Fractures of trochanters.
        iv. Fracture shaft femur—clinical features, mechanism of injury, complications, management-conservative and surgical.
        v. Supracondylar fracture of femur.
        vi. Fractures of the condyles of femur.
        vii. Fracture patella.
        viii. Fractures of tibial condyles.
        ix. Both bones fracture of tibia and fibula.
        x. Dupuytren's fracture
        xi. Maisonneuve's fracture.
        xii. Pott's fracture – mechanism of injury, management.
        xiii. Bimalleolar fracture
        xiv. Trimalleolar fracture
        xv. Fracture calcaneum – mechanism of injury, complications and management.
        xvi. Fracture of talus.
        xvii. Fracture of metatarsals—stress fractures jone's fracture.
        xviii. Fracture of phalanges.

    b. Dislocations of Lower Limb - mechanism of injury, clinical features, complications, management of the following dislocations of lower limb.
        i. Anterior dislocation of hip.
        ii. Posterior dislocation of hip.
        iii. Central dislocation of hip.

iv. Dislocation of patella.
v. Recurrent dislocation of patella.

5. Soft Tissue Injuries - Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis. [6 hrs.]
    a. Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries:
        i. Meniscal injuries of knee.
        ii. Cruciate injuries of knee.
        iii. Medial and lateral collateral injuries of knee.
        iv. Lateral ligament of ankle.
        v. Wrist sprains.
        vi. Strains- quadriceps, hamstrings, calf, biceps, triceps etc.
        vii. Contusions- quadriceps, gluteal, calf, deltoid etc.
        viii. Tendon ruptures-Achilles, rotator cuff muscles, biceps, pectorals etc.
6. Hand Injuries - mechanism of injury, clinical features, and management of the following – [3 hrs.]
    a. Crush injuries.
    b. Flexor and extensor injuries.
    c. Burn injuries of hand.
7. Amputations - Definition, levels of amputation of both lower and upper limbs, indications, complications. [4 hrs.]
8. Traumatic Spinal Cord Injuries - Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia. [4 hrs.]
9. Orthopedic Surgeries: Indications, Classification, Types, Principles of management of the following Surgeries: [7 hrs.]
    a. Arthrodesis.
    b. Arthroplasty (partial and total replacement).
    c. Osteotomy,
    d. External fixators.
    e. Spinal stabilization surgeries (Harrington's, Luque's, Steffi plating) etc.
    f. Limb re-attachments.

STUDENT LEARNING OUTCOMES/OBJECTIVES:-

At the end of the semester the student will be able:

- To understand causes, mechanism of injuries for non- traumatic conditions and also the intervention for those conditions.
- To identify the problems and their clinical signs and correlate with the other findings.

Recommended Textbooks:

- Outline of Orthopedics— John Crawford Adams.
- Text book of Orthopedics—Maheswari.
- Apley's Orthopedics.
- Textbook of Orthopedics and Traumatology— M.N.Natarajan
- Essentials of Orthopaedics for Physiotherapists - John Ebnezer & Rakesh John

CLINICAL NEUROLOGY & NEUROSURGERY II

SUBJECT DESCRIPTION-This subject follows the basic science subjects to provide the knowledge about relevant aspects of neurology & neurosurgery. The student will have a general understanding of the diseases the therapist would encounter in their practice.

THEORY [60 HRS.]

1. Spinal cord disorders: Functions of tracts, definition, etiology, risk factors, patho physiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Spinal cord injury, Compression by IVD prolapse, Spinal epidural abscess, Transverse myelitis, Viral myelitis, Syringomyelia, Spina bifida, Sub acute combined degeneration of the cord, Hereditary spastic paraplegia, Radiation myelopathy, Progressive encephalomyelitis, Conus medullaris syndrome, Bladder & bowel dysfunction, and Sarcoidosis. [6 hrs.]
2. Brain tumors and spinal tumors: Classification, clinical features, investigations, medical and surgical management. [4 hrs.]
3. Infections of brain and spinal cord: Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Meningitis, Encephalitis, Poliomyelitis and Postpolio syndrome. Complications of systemic infections on nervous system – Septic encephalopathy, AIDS, Rheumatic fever, Brucellosis, Tetanus, and Pertussis. [5 hrs.]
4. Motor neuron diseases: - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications of following disorders - Amyotrophic lateral sclerosis, Spinal muscular atrophy, Hereditary bulbar palsy, Neuromyotonia and Post-irradiation lumbosacral polyradiculopathy. [6 hrs.]
5. Multiple sclerosis - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications. [4 hrs.]
6. Disorders of neuromuscular junction – Etiology, classification, signs & symptoms, investigations, management, of following disorders Myasthenia gravis, Eaton-Lambert syndrome, and Botulism. [3 hrs.]
7. Muscle diseases: Classification, investigations, imaging methods, Muscle biopsy, management of muscle diseases, genetic counselling. Classification, etiology, signs & symptoms of following disorders – Muscular dystrophy, Myotonic dystrophy, myopathy, Non-dystrophic myotonia. [3 hrs.]
8. Polyneuropathy – Classification of Polyneuropathies, Hereditary motor sensory neuropathy, hereditary sensory and Autonomic neuropathies, Amyloid neuropathy, acute idiopathic Polyneuropathies. Guillain-Barre syndrome – Causes, clinical features, management of GBS, Chronic Idiopathic Polyneuropathies, diagnosis of polyneuropathy, nerve biopsy. [6 hrs.]
9. Focal peripheral neuropathy: Clinical diagnosis of focal neuropathy, neurotmesis, Axonotmesis, Neuropraxia. Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – RSD, Nerve tumors, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & Intercostal nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, Sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, Pudendal nerve palsy. [8 hrs.]

10. Paediatric neurology: Neural development, Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders - Cerebral palsy, Hydrocephalus, Arnold-chiari malformation, Cerebral malformations, Autism, Dandy walker syndrome and Down's syndrome. [6 hrs.]
11. Toxic, metabolic and environmental disorders: Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – Encephalopathy, Alcohol toxicity, Recreational drug abuse, Toxic gases & Asphyxia, Therapeutic & diagnostic agent toxicity, Metal toxicity, Pesticide poisoning, Environmental & physical insults, Pant & Fungal poisoning, Animal poisons, & Complications of organ transplantation. [6 hrs.]
12. Introduction, Indications and Complications of following Neuro surgeries: Craniotomy, Cranioplasty, Stereotactic surgery, Deep brain stimulation, Burr-hole, Shunting, Laminectomy, Hemilaminectomy, Rhizotomy, Microvascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery - Thalamotomy and Pallidotomy, Coiling of aneurysm, Clipping of aneurysm, and Neural implantation. [3hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:

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

- Do evaluation and assessment of various neurological conditions with interpretation of haematological investigations, chest X-ray, C.T. and MRI scans done for neurological conditions with NCV/EMG findings.
- Describe the aetiology, pathophysiology, signs and symptoms, clinical evaluation, their differential diagnosis, and management of the various neurological conditions.
- Describe functional disabilities caused by various neurological conditions

Recommended Textbooks:

- Davidson's Principles and Practice of Medicine
- Neurology and neurosurgery illustrated Kenneth w Lindsay. 4th edition
- Neurological examination by Fuller. 3rd edition. Churchill Livingstone.
- Clinical neurology by David. 5th edition McGraw hill.

Reference books:

- Textbook of Neurology- Victor Adams
- Brains Clinical Neurology.
- Illustrated Neurology & Neurosurgery
- Brains Diseases of Nervous System

CLINICAL CARDIOVASCULAR AND PULMONARY

SUBJECT DESCRIPTION - Following the basic science and clinical science course, this course introduces the student in cardio-thoracic conditions which commonly cause disability.

THEORY [60 HRS.]

1. Anatomy and Physiology
    a. Respiratory system [8 hrs.]
        i. Upper respiratory tract
        ii. Lower respiratory tract – Trachea, Bronchial tree, Bronchopulmonary segments
        iii. Respiratory unit, hilum of lung.
        iv. Muscles of respiration
        v. Pleura, intra pleural space, intra pleural pressure, surfactant
        vi. Mechanics of respiration – Chest wall movements, lung & chest wall compliance
        vii. V/Q relationship, airway resistance
        viii. Respiratory centre, Neural & chemical regulation of respiration
        ix. Lung volumes and lung capacities, Spiro meter, lung function test
        x. Pulmonary circulation, Lung sounds, cough reflex b.
    b. Cardiovascular systems [4 hrs.]
        i. Chambers of heart, semi lunar and atria ventricular valves
        ii. Coronary circulation, conductive system of heart
        iii. Cardiac cycle, ECG, Heart sounds
        iv. Blood pressure, pulse, cardiac output 2.
2. Cardio Vascular system
    a. Define, etiology, pathogenesis, clinical features, complications [2 hrs.]
    b. Conservative and surgical management of the following conditions [12 hrs.]
        i. Ischemia heart disease
        ii. Myocardial infarction
        iii. Heart failure
        iv. Cardiac arrest
        v. Rheumatic fever
        vi. Hypertension
        vii. Infective endocarditis
        viii. Myocarditis & cardiomyopathy c.
    c. Cardiovascular Disease : Examination of the Cardiovascular System Investigations : ECG, Exercise Stress Testing, Radiology ; Clinical manifestations of Cardiovascular disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases and disorders of the heart : Pericarditis, Myocarditis, Endocarditis, Rheumatic Fever – resulting in valve disorders, Ischemic Heart Disease, Coronary Valve Disease, Congenital disorders of the Heart, Cardiac Arrest ; Examination and Investigations of diseases of arteries and veins ; Hypertension : Definition, causes, classification, types, assessment, investigations and management. [9 hrs.]
    d. Disorders of the Heart – Definition, Clinical features, diagnosis and choice of management for the following disorders : Congenital Heart diseases – Acyanotic congenital heart disease & Cyanotic congenital heart disease : Patent Ductus Arteriosus, Coarctation of Aorta, Atrial Septal Defect, Ventricular Septal Defect, Tetralogy of Fallot, Transposition of Great Vessels ; Acquired Heart Disease – Mitral Stenosis & Insufficiency, Aortic Stenosis and Insufficiency, Ischemic Heart Disease – Coronary Artery Disease, Cardiac tumors. [9 hrs.]

3. Respiratory System
    a. Respiratory Disease : Examination of the Respiratory System – Investigations : Chest Radiographs, Pulmonary Function Testing, Arterial Blood Gas Analysis ; Clinical manifestations of Lung disease ; Patterns of lung disease – Chronic Obstructive Lung Disease and Restrictive Lung Disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following lung diseases : Chronic Bronchitis, Emphysema, Asthma, Bronchiectasis, Cystic Fibrosis, Upper Respiratory Tract Infections, Pneumonia, Tuberculosis, Fungal Diseases, Interstitial Lung Diseases, Diseases of the pleura, diaphragm and chest wall ; Respiratory failure – Definition, types, causes, clinical features, diagnosis and management. [8 hrs.]
    b. Chest wall disorders- Definition, Clinical features, diagnosis and choice of management for the following disorders – chest wall deformities, chest wall tumors, Spontaneous Pneumothorax, Pleural Effusion, Empyema Thoracis, Lung abscess, Bronchiectasis, Tuberculosis, Bronchogenic Carcinoma, Bronchial Adenomas, Metastatic tumors of the Lung, tracheal Stenosis, Congenital tracheomalacia, Neoplasms of the trachea, Lesions of the Mediastinum. Carcinoma of the female breast. [8 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- Do evaluation and assessment of various neurological conditions with interpretation of hematological investigations, chest X-ray, C.T. and MRI scans done for cardio respiratory conditions with PFT findings.
- Describe the aetiology, pathophysiology, signs and symptoms, clinical evaluation, management of the various cardio vascular and respiratory conditions, their differential diagnosis. •
- To evaluate and management of various emergency conditions.

Recommended textbooks:

- Manual of Clinical Surgery, S. Das, 6th Edition, S.B. Publications
- Principles and practice of medicine by – Davidson, 20th Edition, Churchill Livingston
- Medicine for students, Golwalla

Reference books:

- Practical medicine by – P J Mehta, 16th Edition
- Textbook of Surgery by Bailey & Love, 25th Edition, Butterworth & Heinmann

ETHICS, ADMINISTRATION & TEACHING SKILLS

SUBJECT DESCRIPTION –

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical/ Physiotherapy ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole.

In this subject, the student will learn about administration and its application in the field of Physiotherapy as well as will be skilled with various teaching methods.

THEORY [60 Hrs.]

1. Medical ethics versus medical law - Definition - Goal - Scope [3 hrs.]
2. Introduction to Code of conduct [3 hrs.]
3. Basic principles of medical ethics – Confidentiality [3 hrs.]
4. Malpractice and negligence - Rational and irrational drug therapy [3 hrs.]
5. Autonomy and informed consent - Right of patients [3 hrs.]
6. Care of the terminally ill- Euthanasia [3 hrs.]
7. Organ transplantation [3 hrs.]
8. Medical diagnosis versus physiotherapy diagnosis. [3 hrs.]
9. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects. [4 hrs.]
10. Professional Indemnity insurance policy [3 hrs.]
11. Development of standardized protocol to avoid near miss or sentinel events [3 hrs.]
12. Obtaining an informed consent. [3 hrs.]
13. Biomedical ethical principles [2 hrs.]
14. Code of ethics for physiotherapists [2 hrs.]
15. Ethics documents for physiotherapists [2 hrs.]
16. Laws affecting physiotherapy practice [2 hrs.]
17. Introduction to administration: [10 hrs.]
    - **a.** 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.
    - **b.** Principles of hospital administration and its applications to physiotherapy.
    - **c.** Planning and organization: Planning cycle, Principles of organizational charts, Resource and quality management, planning change -innovation
    - **d.** Financial issues including budget and income generation
    - **e.** Hospital administration: Organization, Staffing, Information, Communication, Coordination, Cost of services, Monitoring and evaluation.

f. Organization of physiotherapy department: Planning, Space, Manpower, Other basic resources.
g. Organizing meetings, committees, and negotiations
h. Personnel management: Personnel performance appraisal system, Quality care delivery from the staff.
i. Administration in clinical setting

18. Aims of physiotherapy education [5 hrs.]
a. Concepts of teaching and learning
b. Curriculum development
c. Principles and methods of academic and clinical teaching
d. Measurement and evaluation
e. Guidance and counseling
f. Faculty development program
g. Administration in clinical setting
h. Use of A-V aids in teaching
i. Taxonomy of education

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able to:

- Acquire the knowledge of ethical code of professional practice as well as its moral and legal aspects and its role WHO and WCPT.
- Understand the moral values and meaning of ethics.
- Acquire Hospital Discipline and communication skills in relation with patients, peers, seniors and other Professionals.
- To know the basics in managerial and management skills and use of information technology in professional practice.

Recommended Textbooks:

- George V Lobo – Current Problems in Medical Ethics
- Consumer Protection Act – 1986, Government of India, New Delhi.
- Davies, R and Macaulay, BMC – Hospital Planning and Administration
- Health Services Management, Analysis& Application , Wadsworth Publishing Company, Belmont 100

Reference books:

- Hospital administration and human resource management by R. C. Goyal, 4 th Edition.
- Medical Ethics by C M Francis.
- Francis C M – Hospital Administration

CLINICAL EDUCATION III

SUBJECT DESCRIPTION: Clinical education is the application of knowledge and skills in the clinical environment. This will comprise of 3 hours of clinical exposure 4 days a week, where the students shall be sent in groups in rotation. The student will be supervised by one Faculty member. The clinical education will be from 4th semester to 7th semester. In each semester, they will be posted in the departments related to their courses being learned in respective semesters. The student will be formally evaluated at the end of semester through Viva-voce examinations by internal and external examiners.

PRACTICAL [120 HRS.]

1. Examination: Orthopedic, neurologic and cardio-respiratory conditions
    - Activities of daily living
    - Gait
    - Posture
    - Pain assessment
    - End feel
    - Joint Play
    - Muscle tone
    - MMT
    - ROM
    - Dermatome
    - Myotome
    - Limb length
    - Limb girth
    - Anthropometric measures
    - Superficial reflex
    - Deep tendon reflex
    - Musculo-skeletal (special) tests
    - Higher mental function
    - Cranial nerve examination
    - Sensory examination.
    - Coordination tests (equilibrium and non-equilibrium test)
    - Balance / fall risk assessment
    - Primitive reflexes
    - Developmental milestones
    - Auscultation
    - Chest wall symmetry palpation & expansion measurement
    - Vocal resonance assessment
    - Assessment of dyspnea, cough, sputum, chest pain and clubbing
    - Bruce protocol
    - Six minute walk test
2. Orthopedics: clinical features (signs & symptoms) of common conditions
3. Neurology: clinical features (signs & symptoms) of common conditions
4. Cardio-respiratory conditions: clinical features (signs & symptoms) of common conditions.
5. Electrotherapy procedure
    - TENS
    - IFT
    - NMES
    - UST

- LASER
- Wax
- Moist heat
- SWD
- Cryotherapy
- SD curve
- FG test.

6. Treatment procedure: Orthopedic, neurologic conditions & cardiorespiratory conditions
    - Gait Training
    - Balance training / fall prevention program
    - Functional training
    - Transfer activities
    - Mobilization
    - Aerobic training
    - Pain management using electro therapy modalities
    - Flexibility & Mobility exercises
    - Coordination Exercise

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- Communicate effectively with patients, family/carers, multidisciplinary team and colleagues.
- Assess pain, joint integrity, mobility, ligament laxity and accessory movement.
- Determine treatment dosage appropriate for an individual patient.
- Modify elements of the plan of care and goals in response to changing patient status, as needed.
- Measure and monitor patient response to intervention.
- Provide patient and caregiver clear and concise home program instruction at their levels of learning and ensure the patient’s understanding of home program.
- Apply the exercises to patients in various settings i.e., community, In-patient, outpatient.
- Monitor the current status using different outcome measure and determine the consequent change in response to treatment.
- Educate the patient and caregiver about the patient's current health condition/examination findings, plan of care and expected outcomes, utilizing their feedback to modify the plan of care and expected outcomes as needed.
- Demonstrate professional behavior and respectful communication with patients in all clinical activities

Seventh Semester-

PHYSIOTHERAPY IN ORTHOPEDICS & SPORTS

SUBJECT DESCRIPTION -The subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology.

THEORY [45 HRS.]

1. PT assessment for Orthopedic conditions - SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment- intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental , girth measurement, muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination- dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follow up. [2 hrs.]
2. Fractures - types, classification, signs and symptoms, complications. Fracture healing - factors affecting fracture healing. Principles of fracture management - reduction - open and closed, immobilization - sling, cast, brace, slab, traction - manual, mechanical, skin, skeletal, lumbar and Cervical traction, external fixation, functional cast bracing. PT management in complications - early and late - shock, compartment syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short- and long-term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period. [2 hrs.]
3. Specific fractures and dislocations: PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvis. PT assessment and management spinal fractures. [2 hrs.]
4. Selection and application of physiotherapeutic techniques, maneuver's, modalities for preventive, curative and rehabilitative means in all conditions. [1 hr.]
5. Principles of various schools of thought in manual therapy. (Briefly Maitland and Mc kenzie). [2 hrs.]
6. Degenerative and inflammatory conditions: Definition, signs and symptoms, clinical features, path physiology, radiological features, deformities, medical, surgical management. 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. [2 hrs.]

7. Infective conditions: Definition, signs and symptoms, clinical features, pathophysiology, radiological features, medical, surgical management. Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, pyogenic arthritis, TB spine and major joints - knee and hip. [3 hrs.]
8. Define, review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program. [2 hrs.]
9. Deformities: Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions: Congenital: CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum. [2 hrs.]
10. Cerebral palsy: Definition, etiology, classification, clinical features, complications, deformities, medical and surgical management and home program with special emphasis on carrying techniques. PT management after surgical corrections. [1 hrs.]
11. Poliomyelitis: Definition, etiology, types, pathophysiology, clinical features, deformities, medical and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program. [2 hrs.]
12. Leprosy: Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively. [2 hrs.]
13. Amputations: Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management. [2 hrs.]
14. Spinal conditions: Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis, Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta. [2 hrs.]
15. Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction. [1 hrs.]
16. Osteoporosis- causes, predisposing factors, investigations and treatment. [1 hr.]
17. Orthopedic surgeries: Pre and post-operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplasty-partial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy. [2 hrs.]
18. Shoulder joint: Shoulder instabilities, TOS, RSD, Impingement syndrome - conservative and post-operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears-conservative and surgical repair. Subacromial

decompression - Post operative PT management. [3 hrs.]

19. Elbow and forearm: Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management. [1 hr.]
20. Wrist and Hand: Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management. [1 hrs.]
21. Hip: Joint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - Management. [2 hr.]
22. Knee: Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome-conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy- rehabilitation. [2 hrs.]
23. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management. [1hr.]
24. Introduction to Bio-Engineering; Classification of Orthoses and prostheses; Biomechanical principles of orthotic and prosthetic application; Designing of upper extremity, lower extremity and spinal orthosis, indications and check out; Designing of upper extremity and lower extremity prostheses, indications and check out; Psychological aspects of orthotic and prosthetic application; prescription and designing of footwear and modifications; Designing and construction of adaptive devises. [1 hrs.]
25. Sports Physiotherapy: Physical fitness. Stages of soft tissue healing. Treatment guidelines for soft tissue injuries- Acute, Sub acute and chronic stages. Repair of soft tissues- rupture of muscle, tendon and Ligamentous tears. Soft tissue injuries-prevention and rehabilitation of, Lateral ligament sprain of ankle. Rotator cuff injuries. Collateral and Cruciate injuries of knee. Meniscal injuries of knee. Supraspinatus and Bicipital tendonitis. Pre patellar and Sub-acromial bursitis. Tennis and Golfer's elbow. Hamstring strains, Quadriceps contusion, TA rupture. Dequervain's tenosynovitis. Trigger and Mallet finger. Plantar fasciitis. Wrist sprains. [2 hrs.]
26. Applied Yoga in orthopedic conditions. [1 hrs.]

PRACTICAL [30 HRS.]- 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.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the candidate 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.
- Identify, analyse & discuss various traumatic & non traumatic orthopaedic conditions & will be able to correlate them with provisional diagnosis & other investigations.

• Describe short term & long term goals & give treatment with help of various electrotherapy modalities & manual therapy techniques.

Recommended Textbooks

- Textbook of orthopedics- Cash.
- Orthopedic physiotherapy - Jayant Joshi.

Reference books:

- Clinical orthopedic rehabilitation- Brotzman.
- Tidy's physiotherapy.
- Physical Rehabilitation Assessment and Treatment – O'Sullivan Schmitz
- Sports physiotherapy- Maria Zuluaga

PHYSIOTHERAPY IN NEUROLOGICAL CONDITIONS

SUBJECT DESCRIPTION – The subject serves to integrate the knowledge gained by the students in neurology and neurosurgery with skills to apply these in clinical situations of dysfunction and neurological pathology.

THEORY [45 HRS.]

1. Neurological Assessment: Required materials for examination, Chief complaints, History taking – Present, Past, medical, familial, personal histories, Observation, Palpation, Higher mental function – Consciousness, Orientation, Wakefulness, memory, Speech, Reading, Language, Writing, Calculations, Perception, Left right confusion, Reasoning, and Judgment, Motor Examination – Muscle power, Muscle tone, Spasticity, Flaccidity, Reflexes – Developmental reflexes, deep tendon reflexes, Superficial reflexes, Sensory examination – Superficial, Deep and Cortical sensations, Special tests – Romberg's, Kernig's sign, Brudzinski sign, Tinel's sign, Slum test, Lhermitte's sign, Bells Phenomenon, Gower's sign, Sun set sign, Battle's sign, Glabellar tap sign, etc, Balance examination, coordination examination, Gait analysis – Kinetics & Kinematics (Quantitative & Qualitative analysis), Functional Analysis, Assessment tools & Scales – Modified Ashworth scale, Berg balance scale, FIM, Barthel index, Glasgow coma scale, Mini mental state examination, Rancho Los Amigos Scale for Head injury, APGAR score, ASIA scale, Reflex Grading. Differential diagnosis. [5 hrs.]
2. Neuro physiological Techniques – Concepts, Principles, Techniques, Effects of following Neurophysiological techniques: NDT, PNF, Vojta therapy, Rood's Sensory motor Approach, Sensory Integration Approach, Brunnstorm movement therapy, Motor relearning program, Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy. [4 hrs.]
3. Paediatric Neurology: Paediatric Examination, Developmental milestones, developmental reflexes, Neuro developmental screening tests. Evaluation & Management - History, Observation, Palpation, Milestone Examination, developmental reflex Examination, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches & Modalities in Risk babies, Minimum brain damage, Developmental disorders, Cerebral palsy, Autism, Down's Syndrome, Hydrocephalus, Chorea, Spina bifida, and syringomyelia. [7 hrs.]
4. Evaluation and Management of Brain and Spinal Cord Disorders : History, Observation, Palpation, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Cerebro vascular Accident, Meningitis, Encephalitis, Head Injury, Brain Tumors, Perceptual disorders, Amyotrophic lateral sclerosis, and Multiple sclerosis. [8 hrs.]
5. Evaluation and Management of Cerebellar, Spinal Cord and Muscle Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Ataxia, Sensory Ataxia, Parkinson's disease, Muscular dystrophy (DMD), Myasthenia Gravis, Eaton-Lambert Syndrome, Spinal tumors, Spinal cord injury, Transverse myelitis, Bladder & Bowel Dysfunction, Spinal muscular atrophies, Poliomyelitis, Post-Polio Syndrome. [6 hrs.]
6. Evaluation and Management of Peripheral Nerve Injuries and Disorders : History,

Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Hereditary motor sensory neuropathy, Guillain-Barre syndrome, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, and Pudendal nerve palsy. [6 hrs.]

7. Assessment and management of Neurological gaits: Quantitative and Qualitative (Kinetic & Kinematics) analysis, List of Problems, short & Long Term goals, Management of following Neurological Gaits - Hemiplegic gait, Parkinson gait, High step gait, Hyperkinetic gait, Hypokinetic gait, Waddling gait, Scissoring gait, Spastic gait, Choreiform Gait, Diplegic Gait, and Myopathic Gait. [3 hrs.]
8. Pre and post-surgical assessment and treatment following conditions - Spinal disc herniation, Spinal stenosis, Spinal cord trauma, Head trauma, Brain tumors, Tumors of the spine, Spinal cord and peripheral nerves, Cerebral aneurysms, Subarachnoid hemorrhages, epilepsy, Parkinson's disease, Chorea, Hemiballismus, Psychiatric disorders, Malformations of the nervous system, Carotid artery stenosis, Arteriovenous malformations, and Spina bifida. [3 hrs.]
9. Applied Yoga in Neurological conditions. [3hrs.]

PRACTICAL: [30 HRS.]

- 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.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- To apply basic treatment evaluation and intervention outcome processes appropriate for neurological physiotherapy practice
- To understand and apply basic clinical reasoning skills and an evidence-based approach to decision making in neurological physiotherapy practice.
- 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

Recommended Textbooks:

- Tidy's physiotherapy.
- Cash’s Textbook of Neurology for Physiotherapists
- Neurological Rehabilitation by D Umphred
- Physical Rehabilitation Assessment and Treatment – O’Sullivan Schmitz
- Elements of Pediatric Physiotherapy-Eckersley
- Physical therapy for children by Suzann K. Campbell, Robert J. Palisano, Darl W. Vander Linden, 5th edition.

Reference books:

- Motor Control: Theory and practical applications by Anne Shumway-Cook, Marjorie H. Woollacott, 3rd edition.
- Movement Science: Foundations for physical therapy in rehabilitation by Janet H. Carr and Roberta B. Shepherd.

PHYSIOTHERAPY IN MEDICAL, SURGICAL, OBSTETRICS AND GYNAECOLOGICAL CONDITIONS

SUBJECT DESCRIPTION –
In this subject, the student will learn about the concept of evidence-based physiotherapy, various steps involved in it, critically appraising the research articles and its practical applications in the management of individual patient care.

THEORY [45 HRS.]

1. Physiotherapy in mother and child care – ante and post-natal management, early intervention and stimulation therapy in child care (movement therapy) [6 hrs.]
2. Applied Yoga in Obstetric and Gynecological conditions [2 hrs.]
3. Geriatrics – handling of old patients and their problems. [2 hrs.]
4. Complication common to all operations [2 hrs.]
5. Abdominal incisions. [2 hrs.]
6. Physiotherapy in pre- and post-operative stages. [4 hrs.]
7. Operations on upper G.I.T.- esophagus, stomach, duodenum [2 hrs.]
8. Operations on large and small intestine – Appendicectomy, cholecystectomy, partial colectomy, ileostomy, hernia and herniotomy, herniorrhaphy, hernioplasty. [6 hrs.]
9. Physiotherapy in dentistry [2 hrs.]
10. Burns and its treatment – physiotherapy in burns, skin grafts, and reconstructive surgeries. [2 hrs.]
11. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars- U.V. R and other electro therapeutics for healing of wounds, prevention of Hyper-granulated Scars Keloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues. [4 hrs.]
12. Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases. [2 hrs.]
13. Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhidrosis. Massage maneuvers for cosmetic purpose of skin; use of specific oil as medium; Care of anesthetic hand and foot; Evaluation, planning and management of leprosy-prescription, fitting and training with prosthetic and orthotic devices. [6 hrs.]
14. ENT – sinusitis, non-suppurative and chronic suppurative otitis media, osteosclerosis, labyrinthitis, mastoidectomy, chronic rhinitis, laryngectomy, pharyngeo – laryngectomy, facial palsy. [3 hrs.]

PRACTICAL – [30 HRS.]

- 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.

STUDENT LEARNING OUTCOMES/OBJECTIVES: -

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

- Identify discuss and analyze cardiovascular and pulmonary dysfunctions based on pathophysiological principles and arrive at appropriate functional diagnosis.
- Acquire knowledge of rationales of basic investigative approaches in the medical system and surgical intervention, regimes in general surgeries (special emphasis on abdominal surgeries)
- Execute effective physiotherapeutic measures (with appropriate clinical reasoning) and exercise, conditioning in general medical and surgical conditions.
- 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.
- 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.
- Acquire the knowledge of evaluation and physiotherapeutic treatment for obstetric and gynecological conditions
- 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

Reference books:

- Elements in Pediatric Physiotherapy – Pamela M Eckersley
- Essentials of Cardio Pulmonary Physical Therapy by Hillegass and Sadowsky
- Cardio pulmonary Symptoms in physical Therapy practice Cohen and Michel
- Chest Physiotherapy in Intensive Care Unit by Mackenzie
- Physiotherapy in Psychiatry
- Physical Therapy for the Cancer patient by M.C Garvey
- Physiotherapy in Obstetrics and Gynecology by Polden

Recommended Textbooks:

- Tidy's physiotherapy.
- Physiotherapy in Obstetrics and Gynaecology by Mantle. B & H Publications.
- Physical Rehabilitation Assessment and Treatment – O'Sullivan Schmitz
- Cash's Text book of General Medicine and Surgical conditions for Physiotherapists
- Cash's Text book of General Medicine and Surgical conditions for Physiotherapists

BIOSTATISTICS & RESEARCH METHODOLOGY

SUBJECT DESCRIPTION –

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

THEORY [60 HRS.]

RESEARCH METHODOLOGY [30 HRS.]

1. Introduction to Research methodology: Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by researchers in India. [3 hrs.]
2. Research problem: Statement of research problem., Statement of purpose and objectives of research problem, Necessity of defining the problem [3 hrs.]
3. Research design: Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design [3 hrs.]
4. Sampling Design: Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design [3 hrs.]
5. Measurement & scaling techniques: Measurement in research- Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification. Important scaling techniques. [3 hrs.]
6. Methods of data collection: collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules. [3 hrs.]
7. Sampling fundamentals, need for sampling & some fundamental definitions, important sampling distributions. [3 hrs.]
8. Processing & analysis of data: Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship. [3 hrs.]
9. Testing of hypothesis: What is hypothesis? Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis [3 hrs.]
10. Computer technology: Introduction to Computers, computer application in research, computers & researcher. [3 hrs.]

BIOSTATISTICS [30 HRS.]

1. Introduction: Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales. [5 hrs.]
2. Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.[4 hrs.]
3. Measure of Central Tendency: Need for measures of central Tendency, Definition and calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped., Meaning and calculation of mode, Comparison of the mean, median and mode, Guidelines for the use of various measures of central tendency. [4 hrs.]
4. Probability and Standard Distributions: Meaning of probability of standard distribution, the binominal distribution, the normal distribution, Divergence from normality – skew ness, kurtosis. [4 hrs.]
5. Sampling techniques: Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors, Sampling

variation and tests of significance. [3 hrs.]

6. Analysis of variance & covariance: Analysis of variance (ANOVA), what is ANOVA? Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANACOVA). [5 hrs.]
7. Format of scientific documents. (Structure of protocols, formats reporting in scientific journals, systematic reviews and meta-analysis). [5 hrs.]

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- To know the basics of research and various research designs.
- To do the literature review for their project
- To prepare a research proposal.
- To know the basics of biostatistics in the application of research.
- To know the various tools, software and its usage towards research.

Reference books:

- Darlene – Documenting functional outcomes in physical therapy
- Diana-Research for health professionals.
- Statistics in Psychology and education: Great and Henry
- An Introduction to Gupta C.B. Statistical Methods, 1972: Ram Prasad & Sons
- Basic Statistics, 3rd Edition: Simpsory G. Kaftha. P
- Research; Principles and Methods: L Denise F. Poli & Hungler
- Fundamentals of Research, 4th Edition.: David J. Fox

Recommended Textbooks:

- Rehabilitation research – Elizabeth Domholt.
- Carolin Hicks – Research for physiotherapist.
- Methods in Biostatistics- B.K. Mahajan
- Elements of Health Statistics: Rao. N.S.N
- An introduction of Biostatistics: Sunder Rao. P.S.S.
- Methods in Bio-Statistics 6th Edition. 1997: B.K. Mahajan
- Biostatistics: A manual of Statistics Methods: K. Visweswara Rao
- Elementary Statistics 1st Edition, 1990. In Medical Workers: Inderbir Singh

CLINICAL EDUCATION IV

SUBJECT DESCRIPTION: Clinical education is the application of knowledge and skills in the clinical environment. This will comprise of 3 hours of clinical exposure 4 days a week, where the students shall be sent in groups in rotation. The student will be supervised by one Faculty member. The clinical education will be from 4th semester to 7th semester. In each semester, they will be posted in the departments related to their courses being learned in respective semesters. The student will be formally evaluated at the end of semester through Viva-voce examinations by internal and external examiners.

PRACTICAL [120 HRS.]

1. Examination: Orthopedic, neurologic and cardio-respiratory conditions
    - Activities of daily living
    - Gait
    - Posture
    - Pain assessment
    - End feel
    - Joint Play
    - Muscle tone
    - MMT
    - ROM
    - Dermatome
    - Myotome
    - Limb length
    - Limb girth
    - Anthropometric measures
    - Superficial reflex
    - Deep tendon reflex
    - Musculo-skeletal (special) tests
    - Higher mental function
    - Cranial nerve examination
    - Sensory examination.
    - Coordination tests (equilibrium and non-equilibrium test)
    - Balance / fall risk assessment
    - Primitive reflexes
    - Developmental milestones
    - Auscultation
    - Chest wall symmetry palpation & expansion measurement
    - Vocal resonance assessment
    - Assessment of dyspnea, cough, sputum, chest pain and clubbing
    - Bruce protocol
    - Six minute walk test
2. Orthopedics: clinical features (signs & symptoms) of common conditions
3. Neurology : clinical features (signs & symptoms) of common conditions
4. Cardio-respiratory conditions: clinical features (signs & symptoms) of common conditions.
5. OBG and pediatric conditions : clinical features (signs & symptoms) of common conditions
6. Electrotherapy procedure
    - TENS
    - IFT
    - NMES

- UST
- LASER
- Wax
- Moist heat
- SWD
- Cryotherapy
- SD curve
- FG test.

7. Treatment procedure: Orthopedic, neurologic conditions & cardiorespiratory conditions
    - Gait Training
    - Balance training / fall prevention program
    - Functional training
    - Transfer activities
    - Mobilization
    - Aerobic training
    - Pain management using electro therapy modalities
    - Flexibility & Mobility exercises
    - Coordination Exercise

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- Communicate effectively with patients, family/carers, multidisciplinary team and colleagues.
- Assess pain, joint integrity, mobility, ligament laxity and accessory movement.
- Determine treatment dosage appropriate for an individual patient.
- Modify elements of the plan of care and goals in response to changing patient status, as needed.
- Measure and monitor patient response to intervention.
- Provide patient and caregiver clear and concise home program instruction at their levels of learning and ensure the patient’s understanding of home program.
- Apply the exercises to patients in various settings i.e., community, In-patient, outpatient.
- Monitor the current status using different outcome measure and determine the consequent change in response to treatment.
- Educate the patient and caregiver about the patient's current health condition/examination findings, plan of care and expected outcomes, utilizing their feedback to modify the plan of care and expected outcomes as needed.
- Demonstrate professional behavior and respectful communication with patients in all clinical activities

Eight Semester-

PHYSIOTHERAPY IN CARDIORESPIRATORY CONDITIONS

SUBJECT DESCRIPTION –

The subject is designed to provide knowledge in assessing and planning physiotherapy interventions for various General, Medical and Surgical conditions.

THEORY – [45 HRS.]

1. Anatomical and Physiological differences between the Adult and Pediatric lung. [1 hr.]
2. Bedside assessment of the patient-Adult & Pediatric. [1 hr.]
3. Investigations and tests – Exercise tolerance Testing – Cardiac & Pulmonary, Radiographs, PFT, ABG, ECG, Hematological and Biochemical Tests. [2 hrs.]
4. Physiotherapy techniques to increase lung volume – controlled mobilization, positioning, breathing exercises, Neurophysiological Facilitation of Respiration, Mechanical aids - Incentive Spirometry, CPAP, IPPB. [2 hrs.]
5. Physiotherapy techniques to decrease the work of breathing – Measures to optimize the balance between energy supply and demand, positioning, breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP. [2 hrs.]
6. Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercises, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning. [3 hrs.]
7. Drug therapy – Drugs to prevent and treat inflammation, Drugs to treat Bronchospasm, Drugs to treat Breathlessness, Drugs to help sputum clearance, Drugs to inhibit coughing, Drugs to improve ventilation, Drugs to reduce pulmonary hypertension, Drug delivery doses, Inhalers and Nebulisers. [2 hr.]
8. Neonatal and Pediatric Physiotherapy – Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit. [2 hrs.]
9. Physiotherapy in Obstructive lung conditions. [2 hrs.]
10. Physiotherapy in Restrictive lung conditions. [2hrs.]
11. Management of breathlessness. [2 hrs.]
12. Pulmonary Rehabilitation. [2 hrs.]
13. Physiotherapy following Lung surgeries. [2 hrs.]
14. Respiratory failure – Oxygen Therapy and Mechanical Ventilation. [2 hrs.]
15. Introduction to ICU : ICU monitoring –Apparatus, Airways and Tubes used in the ICU - Physiotherapy in the ICU – Common conditions in the ICU – Tetanus, Head Injury, Lung Disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock; Dealing with an Emergency Situation in the ICU. [2 hrs.]
16. Physiotherapy management following cardiac surgeries. [2 hrs.]
17. Cardiac Rehabilitation. [2 hrs.]
18. Physiotherapy management following PVD. [2hrs.]
19. Abdominal Surgeries - Management of Pulmonary Restorative Dysfunction following surgical procedures on Abdomen and Thorax. [2 hrs.]
20. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes. [2 hrs.]
21. Home program and education of family members in patient care. [2 hrs.]
22. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity. [2 hrs.]
23. Applied Yoga in Cardio-respiratory conditions [2 hrs.]

PRACTICAL: [30 HRS.]

- Practical shall be conducted for all the relevant topics discussed in theory in the following forms: 1.
    1. Bedside case presentations and case discussions
    2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- To identify, discuss & analyze cardio-vascular & pulmonary dysfunction, based on patho-physiological principles, & arrive at the appropriate functional diagnosis
- To select strategies for cure care & prevention; adopt restorative & rehabilitative measures for maximum possible functional independence of a patient.
- To execute the effective Physio Therapeutic measures (with appropriate clinical reasoning) with special emphases to Breathing retraining, nebulization humidification, bronchial hygiene, General Mobilization & Exercise conditioning.
- To acquire Knowledge of the overview of patients care at the Intensive care area, artificial ventilation suctioning, positioning for bronchial hygiene & continuous monitoring of the patient at the Intensive care area.
- To acquire the skill of basic Cardio-pulmonary resuscitation.

Recommended Textbooks:

- Tidy's physiotherapy.
- Cash’s text book for Physiotherapists in Chest, Heart & Vascular disease
- Cash’s text book in General Medicine & Surgical conditions for Physiotherapists.
- Physiotherapy for Respiratory and Cardiac problems by Jennifer A Pryor
- The Brampton Guide to chest physiotherapy DU Gasket [Completed]
- Physical Rehabilitation Assessment and Treatment – O’Sullivan Schmitz
- Essentials of Cardio Pulmonary Physical Therapy by Hillegass and Sadowsky

Reference books:

- Physiotherapy in respiratory care by Alexandra Hough.
- Cardiopulmonary Physical Therapy by Irwin Scott.
- Chest Physical therapy & pulmonary rehabilitation by Donna Frown filter.
- ECG by P.J. Mehta.

COMMUNITY BASED REHABILITATION

SUBJECT DESCRIPTION - The subject serves to integrate the knowledge gained by the students in community medicine and other areas with skills to apply these in clinical situations of health and disease and its prevention.

THEORY – [45 HRS.]

1. Rehabilitation: Definition, Types. [1 hr.]
2. Community: Definition of Community, Multiplicity of Communities, The Community based approach, Community Entry strategies, CBR and Community development, Community initiated versus community-oriented programmes, Community participation and mobilization. [2 hrs.]
3. Introduction to Community Based Rehabilitation: Definition, Historical review, Concept of CBR, Need for CBR, Difference between Institution based and Community based Rehabilitation, Objectives of CBR, Scope of CBR, Members of CBR team, Models of CBR. [3 hrs.]
4. Principles of Community based Rehabilitation. W.H.O.`s policies-about rural health care concept of primary /tertiary health centers-district hospitals etc.-Role of P.T.-Principles of a team work of medical person/P.T./O.T. audiologist/speech therapist /P.&O./vocational guide in C.B.R. of physically handicapped person, Agencies involved in rehabilitation of physical handicapped - Legislation for physically handicapped. Concept of multipurpose health worker. Role of family members in the rehabilitation of a physically handicapped. [4 hrs.]
5. Planning and management of CBR Programmes, CBR Programmed planning and management, Ownership and Governance, Decentralization and CBR, Management of CBR, Programmed sustainability, Communication and Coordination, Community participation, mobilization and awareness, CBR programmes influence on promoting and developing public policies. [2 hrs.]
6. Disability: Definition of Impairment, Handicap and Disability, Difference between impairment, handicap and disability, Causes of disability, Types of disability, Prevention of disability, Disability in developed countries, Disability in developing countries. Disability Surveys: Demography. Screening: Early detection of disabilities and developmental disorders, Prevention of disabilities- Types and levels. [4 hrs.]
7. Disability Evaluation: Introduction, what, Why and How to evaluate, Quantitative versus Qualitative data, Uses of evaluation findings. [1 hr.]
8. Role of Government in CBR: Laws, Policies, Programmes, Human Rights Policy, Present rehabilitation services, Legal aspects of rehabilitation. [1 hr.]
9. Role of Social work in CBR: Definition of social work, Methods of social work, History of social work, Role of social worker in rehabilitation. [2 hrs.]
10. Role of voluntary Organizations in CBR: Charitable Organizations, Voluntary health agencies – National level and International NGO's, Multilateral and Bilateral agencies. International Health Organizations: WHO, UNICEF, UNDP, UNFPA, FAO, ILO, World bank, USAID, SIDA, DANIDA, Rockefeller, Ford foundation, CARE, RED CROSS. [4 hrs.]
11. National District Level Rehabilitation Program me: Primary rehabilitation unit, regional training center, District rehabilitation center, Primary Health center, Village rehabilitation worker, Anganwadi worker. [2 hrs.]
12. Role of Physiotherapy in CBR: Screening for disabilities, Prescribing exercise programmes, 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. [3 hrs.]
13. Screening and rehabilitation of pediatric disorders in the community: Early detection of

high-risk babies, Maternal nutrition and education, Rehabilitation of Cerebral Palsy, Polio, Downs Syndrome, Muscular Dystrophies etc., Prevention and rehabilitation of mental retardation and Behavioral disorders, Immunization programmes, Early intervention in high-risk babies, Genetic counselling. [4 hrs.]

14. Extension services and mobile units: Introduction, Need, Camp approach. [1 hr.]
15. Vocational training in rehabilitation: Introduction, Need, Vocational evaluation, Vocational rehabilitation services. [2 hrs.]
16. Geriatrics- Physiology of Aging /degenerative changes-Musculoskeletal /Neuromotor /cardio – respiratory-/Metabolic, Endocrine, Cognitive, Immune systems. Role of Physio Therapy in Hospital based care, Half-way homes, Residential homes, Meals on wheels etc. Home for the aged, Institution based Geriatric Rehabilitation. Few conditions: - Alzheimer's disease, Dementia, Parkinson's Disease, Incontinence, Iatrogenic drug reactions, etc. Ethics of Geriatric Rehabilitation. [3 hrs.]
17. Industrial Health & Ergonomics [10 hours] - Occupational Hazards in the industrial area - - Accidents due to [6 hrs.]
    - **a.** Physical agents-e.g.-Heat/cold, light, noise, Vibration, U.V. radiation, Ionizing radiation,
    - **b.** Chemical agents-Inhalation, local action, ingestion,
    - **c.** Mechanical hazards-overuse/fatigue injuries due to ergonomic alteration & ergonomic evaluation of work place-mechanical stresses per hierarchy – i.
        - **i.** sedentary table work –executives, clerk,
        - **ii.** inappropriate seating arrangement- vehicle drivers
        - **iii.** constant standing- watchman- Defense forces, surgeons,
        - **iv.** Over-exertion in laborers, common accidents –Role of P.T.-Stress management.
    - **d.** Psychological hazards- e.g.-executives, monotonicity & dissatisfaction in job, anxiety of work completion with quality, Role of P.T. in Industrial setup & Stress management relaxation modes.
    - **e.** Biological Hazards

PRACTICAL: **[30 HRS.]**

- 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 and Disability screening.
- Demonstration of Evaluation and Physiotherapy prescription techniques for musculoskeletal, neuromuscular, cardiorespiratory, pediatric, 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.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- To understand the role of rehabilitation team.
- To understand the community-based rehabilitation at patient's doorstep.

Recommended Textbooks:

- Rehabilitation Medicine by Howard A Rusk.
- Rehabilitation Medicine by Joel A De Lisa
- Physiotherapy in Community Health and Rehabilitation by Waqar Naqvi
- Essentials of Community- based Rehabilitation by Satya Bhushan Nagar

Reference books:

- Community Based Rehabilitation of Persons with Disabilities by S Pruthvish

CLINICAL REASONING AND EVIDENCE BASED PRACTICE –

SUBJECT DESCRIPTION –

In this subject, the student will learn about the concept of evidence-based physiotherapy, various steps involved in it, critically appraising the research articles and its practical applications in the management of individual patient care

THEORY – [45 HRS.]

1. Introduction to Evidence Based Practice: Definitions, Evidence Based Practice. [3 hrs.]
2. Concepts of Evidence based Physiotherapy: Awareness, Consultation, Judgement, and Creativity [3 hrs.]
3. Development of Evidence based knowledge, The Individual Professional, Professionals within a discipline, and Professionals across disciplines [3 hrs.]
4. Evidence Based Practitioner: The Reflective Practitioner, The E Model, Using the E Model [3 hrs.]
5. Finding the Evidence: Measuring outcomes in Evidence Based Practice, Measuring Health Outcomes, Measuring clinical outcomes, Inferential statistics and Causation [4 hrs.]
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 [4 hrs.]
7. Assessing the Evidence: Evaluating the evidence; Levels of evidence in research using quantitative methods, Levels of evidence classification system, Outcome Measurement, Biostatistics, The critical review of research using qualitative methods [4 hrs.]
8. Systematically reviewing the evidence: Stages of systematic reviews, Meta-analysis, The Cochrane collaboration [3 hrs.]
9. Economic evaluation of the evidence: Types of economic evaluation, conducting economic evaluation, critically reviewing economic evaluation, locating economic evaluation in the literature. [4 hrs.]
10. Using the evidence: Building evidence in practice; Critically Appraised Topics (CATs), CAT format, Using CATs, Drawbacks of CATs [3 hrs.]
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 [4 hrs.]
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 [4 hrs.]
13. Research dissemination and transfer of knowledge: Models of research transfer, Concrete research transfer strategies, Evidence based policy [3 hrs.]

PRACTICAL: **[30 HRS.]**

- Long and short case presentations.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- To understand the concept of evidence-based physiotherapy.
- To search the various medical literature databases and acquire relevant research articles.
- To critically appraise the research with respect to its relevance to physiotherapy practice.
- To apply the findings of the research in the management of individual patients.

Recommended Textbooks:

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

DISSERTATION- [HRS.]

The assignment of project is designed to develop the aptitude among students to reading, selecting reference; review of literature, collection of data, analysis, to present. It can be an original research, case study or a case series in a selective group of patients and normal subjects. Each student will receive guidance from the physiotherapy teacher towards referring relevant literature/collect required data and discuss them with the project guide periodically. After obtaining approval from the project guide, the student will complete his/her study work into a manual form for submission to the institute. The students will do their project work in the 8th semester and have to submit before 15 days of the university Exam. The student will be formally evaluated at the end of semester through viva-voce examinations by internal and external examiners.

The project may be a case study or of recent technique or literature reviews and etc. to make the student to have research mind and to facilitate for higher studies.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

At the end of the semester the student will be able:

- Identify and utilize relevant previous work that supports their research.
- Articulate a timely and important research question or creative objective.
- Identify and utilize appropriate methodologies to address the research question or creative objective.
- Meet the standards for the responsible conduct of research, and effectively navigate challenges that arise in the research process.
- Work collaboratively with other researchers, demonstrating effective communication and problem-solving skills.
- Present the research effectively in a conference setting or a written publication

INTERNSHIP –

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning, intermediate, and advanced procedures in both areas. Students will participate in advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 8 hours per day.

1. **Initial Assessment Documentation:** Clinical staff must document the following information: a.
    - **a.** Initial assessment documented based on SOAP format.
    - **b.** Subjective examination (symptomatic).
    - **c.** Objective examination (measurable, observable).
    - **d.** Action/Analysis (interpretation of current condition/intervention provided).
    - **e.** Plan of action.
    - **f.** Written or verbal feedback to the client or other relevant careers.
    - **g.** Discharge plan documented.
    - **h.** Agreement to treatment plan by patient or "person responsible".

2. **Progress Documentation:** Progress documentation may include the following information:
    - **a.** Any individual intervention should be documented in SOAP format (including response to intervention/s using outcome measures)
    - **b.** Oral consent obtained and documented when there is a significant change in treatment/ treatment options/ status of patient's health.
    - **c.** Written consent obtained for designated invasive procedures
    - **d.** Change in status or events that may affect discharge plans/goals
    - **e.** Documented consultation with key clinical team members