

**THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY  
CHENNAI – 600 032**



**REGULATIONS AND SYLLABUS FOR  
BACHELOR OF PHYSIOTHERAPY (BPT) DEGREE COURSE**

**THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY  
CHENNAI – 600 032**

**THE EMBLEM**



**The University emblem symbolizes various systems of medicine and Para Medical systems. It also depicts the global character of preventive, Promotive and curative medicine. The motto “HEALTH FOR ALL” Reflects all the objectives of this medical university.**

**THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY**  
**CHENNAI**

**REGULATIONS FOR THE BACHELOR OF PHYSIOTHERAPY DEGREE  
COURSES**

In exercise of the powers conferred by section 44 of the Tamil Nadu Dr.M.G.R Medical University, Chennai, Act, 1987(Tamilnadu Act 37 of 1987), the standing Academic Board of the Tamilnadu Dr.M.G.R. Medical University, Chennai here by makes the following regulations.

**1. SHORT TITLE AND COMMENCEMENT**

These regulations shall be called “**REGULATIONS FOR BACHELOR OF PHYSIOTHERAPY” (B.P.T) DEGREE COURSE OF THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY, CHENNAI.**

They shall come into force from the academic year session (2017-2018) onwards.

The regulations and syllabus are as prescribed under these regulations and are subject to modification by the standing academic board from time to time.

**2 .AIMS AND OBJECTIVES**

**AIM:**

An under graduate course in physiotherapy is to impart an in-depth knowledge and skill to a student to become competent in the techniques and develop the proper attitude required for the practice of Physiotherapy and carry out treatment prescribed by the Physician.

**OBJECTIVES:**

- A. To prepare compassionate, competent, and ethical entry-level physiotherapists, with the skills and techniques necessary for the physical diagnosis, prevention and management of various conditions based on current evidence of physiotherapy practice.
- B. Develops skills and physiotherapy techniques such as therapeutic massage and manual therapy, exercise, electrotherapy, specialized techniques in the field of various specialties relevant to physiotherapy practice.
- C. To plan and implement appropriate physiotherapeutic intervention for all clinical conditions related to physiotherapy in acute and chronic phases, critical care, indoor and outdoor institutional care and independent practice.

- D. Ability to crucially appraise published literature, interpret data and to broaden his/her knowledge by keeping abreast with modern developments in the respective physiotherapy and there by enhancing research ability.
- E. Development of proper attitude or compassion and concern for the individual and welfare of the physically handicapped in the institution and community levels.
- F. To develop skills as a self-directed learner, recognize continuous education, select and use appropriate learning resources.
- G. Ability to inculcate appropriate professional relationship in multidisciplinary set up, patient management and co-partnership basis.

### **3. COURSE OUTLINE**

The Bachelor degree in Physiotherapy is a four year full time academic programme with non-semester pattern of examination.

After passing the fourth year of education the student undergoes physiotherapy internship for a period of six months in various departments and scores a minimum of 50% marks in the compulsory scoring system after which he/she is eligible to apply for the convocation.

### **4. ELIGIBILITY**

- A. Candidates belonging to all categories for admission to the B.P.T Degree course should have passed the higher secondary examination-12<sup>th</sup> with the following subjects: Physics, chemistry and Biology/Botany and Zoology.
- B. 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 (Botany/Zoology) and English up to 12<sup>th</sup> standard level.
- C. 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.
  - 1) English, Physics, Chemistry, Botany, Zoology.
  - 2) English, Physics, Chemistry, Biology and any other language.

### **5. AGE LIMIT FOR ADMISSION**

A Candidate should have completed the age of 17 years at the time of Admission or would complete the age on or before 31<sup>st</sup> December on the year of admission to the B.P.T degree course.

### **6. PHYSICAL FITNESS CERTIFICATE**

Every candidate before admission to the course shall submit to the Principal of the institution a certificate of medical fitness from an authorized medical officer that the candidate is physically fit to undergo the academic course.

## **7. ELIGIBILITY CERTIFICATE**

Candidates who have passed any qualifying examination other than Higher Secondary course examination conducted by government of Tamilnadu Shall obtain an eligibility certificate from the university by remitting the prescribed fee along with the application form.

## **8. REGISTRATION**

A candidate admitted to the Bachelor of Physiotherapy degree course in any of the affiliated Physiotherapy College shall register with this university by remitting the prescribed fee along with the application form for registration duly filled in and forwarded to this university through the Principal of the Institution before 7<sup>th</sup> October of each year of admission.

## **9. DURATION OF THE COURSE**

Four academic years and Six months of Physiotherapy internship.

## **10. MEDIUM OF INSTRUCTION**

English shall be the medium of instruction for the subjects of study and for the examination of the Bachelor of Physiotherapy degree course.

## **11. CURRICULUM**

The curriculum and the syllabi for the course shall be as prescribed by the standing academic board from time to time.

## **12. COMMENCEMENT OF THE COURSE**

The course will commence from July 1<sup>st</sup> of every year.

## **13. CUT OFF DATE FOR ADMISSION**

Last date of admission to Bachelor of Physiotherapy is 30<sup>th</sup> September of each year.

## **14. WORKING DAYS IN AN ACADEMIC YEAR**

Each academic year shall consist of not less than 240 working days.

## **15. ATTENDANCE REQUIREMENT FOR ADMISSION TO EXAM**

85 % of attendance during his/her study and training in the affiliated institutions recognized by this university and produces the necessary certificate of study attendance and progress from the Principal of the institution.

A candidate lacking in the prescribed attendance and progress in any one subject in theory and practical in the first appearance shall not be permitted for admission to the entire examination.

## **16. INTERNAL ASSESSMENT MARKS**

A minimum of three written examinations shall be conducted in each subject during a year and the average marks of the three performances shall be taken in to consideration for the award of assessment marks.

A minimum of three practical examinations shall be conducted in each subject during a year and the average marks of the three performances shall be taken in to consideration for the award of assessment marks.

A failed candidate in any subject shall be provided an opportunity to improve his/her assessment marks by conducting a minimum of two examinations in theory and practical separately.

If a failed candidate does not appear for an improvement mark examinations in the failed subjects the internal marks awarded in the previous examination shall be carried over for his/her subsequent appearance.

The internal assessment marks should be submitted to the university endorsed by the Principal of the Institution 15 days prior to the commencement of the theory examination, along with attendance sheet.

## **17. CONDONATION OF LACK OF ATTENDANCE**

No condonation of shortage of attendance shall be permitted.

For the Participation in NCC/NSS and other co-curricular activities represent the Institution or University, the Principal shall instruct the concerned officers in-charge of the student activities in their Institution to endorse the leave.

## **18. COMMENCEMENT OF EXAMINATION**

Feb 1<sup>st</sup> / Aug 1<sup>st</sup>

If date of commencement of examination falls on Saturday, Sunday and declared public Holidays the examination shall begin on the next working day.

## **19. MARKS QUALIFYING FOR PASS**

50% of marks in theory subjects where university examination are conducted and aggregate of 50% marks in university theory examination and internal evaluation taken together in the subject.

50% of marks in theory subjects where university examination are conducted and aggregate of 50% marks in university theory, oral and internal evaluation marks taken together in the subject.

50% of marks in theory subjects where university examination are conducted and 50% marks in university practical examination and 50% aggregate in theory, practical and internal evaluation marks taken together in the subject.

## **20. CLASSIFICATION OF SUCCESSFUL CANDIDATES**

A candidate who obtains not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in the first class, provided they pass all the examinations prescribed for the course within a period of four academic years from the year of admission to the course.

A candidate who secures less than 60% of the aggregate marks in the whole Examination shall be declared to be passed the examination in the second class, provided they pass all the examinations prescribed for the course with in a period of four academic years from the year of admission to the course.

Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed examination in first class with distinction provided they pass all the examinations Prescribed for the course at first appearance.

Candidates who pass all the examinations prescribed for the course in the first appearance only eligible for ranking.

## **21. CARRY OVER OF FAILED SUBJECTS**

The candidate should pass all the I, II, and III year subjects before entering to IV year.

## **22. REVIEW OF ANSWER PAPERS OF FAILED SUBJECTS**

As per the regulations prescribed for review of answer papers by the university.

## **23. RE-ADMISSION AFTER BREAK OF STUDY**

As per recent university regulations

## **25. MIGRATION/TRANSFER OF CANDIDATE**

Migration/ Transfer of candidates from one recognized institution to another Institution of this University or from another University will not be generally considered.

However, under extraordinary circumstances, the Vice-Chancellor shall have the power to place any migration/ transfer that he deems fit in the Governing Council and get approval for grant of permission for migration/transfer to candidates undergoing course of study in affiliated institution of this University.

## **26. VACATION**

The Principals shall declare 6 weeks vacation in an academic year to the students. The period(s) of vacation can be decided by the Principals of the Institution.

## 27. PHYSIOTHERAPY INTERNSHIP (PI)

All candidates admitted to Bachelor of Physiotherapy Degree Course shall undergo Six (6) months of Physiotherapy internship in the Institution he/she has studied after successful completion of the final examination in the following clinical areas.

1. Department of orthopedics & Traumatology – 30 days
2. Department of Cardio pulmonary Sciences including ICCU – 30 days
3. Department of Medicine and Neurology – 30 days
4. Obstetrics and Gynaecology – 2 weeks
5. Paediatrics – 2 weeks
6. IMCU – 2 weeks
7. Post-operative ward and SICU – 2 weeks
8. Physical Medicine and Rehabilitation - 30 days

## 28. AWARD OF DEGREE

The degree will be awarded by the university only after the completion of the physiotherapy internship for a period of not less than six months.

## 29. AUTHORITY FOR ISSUE OF INTERNSHIP COMPLETION CERTIFICATE

The Principals of the Institutions shall issue a certificate of successful completion of internship to each candidate after satisfying that the candidate has completed the training programme and has acquired the skills to function independently. Scoring sheets of each candidate inclusive of attendance must be attached.

## 30. AUTHORITY TO ISSUE “CONSOLIDATED STATEMENT OF MARKS”

The University shall be the Authority for issuing consolidated statement of marks after remitting the prescribed fee to the university.

### **BACHELOR OF PHYSIOTHERAPY**

#### **FOUR YEARS & SIX Months INTERNSHIP (NON-SEMESTER PATTERN)**

#### **SCHEME OF EXAMINATIONS & CLOCK HOURS OF**

#### **INSTRUCTION**

YEAR	SUBJECT	HOURS	E/NE	MARKS			
				SM PR	T	O	
I YEAR	1. PSYCHOLOGY&SOCIOLOGY	100	E	50	100	--	--
	2. ANATOMY	200	E	50	100	50	--



II YEAR	3. PHYSIOLOGY, APPLIED PHYSIOLOGY	150	E	50	100	50	--	I s t Y E A R	
	4. BASIC AND APPLIED PHYSICS FOR PHYSIOTHERAPY	80	E	50	100	--	--		
	5. BASIC NURSING & FIRST AID	30	NE	--	---	--	--		
	6. ORIENTATION TO PHYSIOTHERAPY & COMPUTER APPLICATIONS	60	NE	--	---	--	--		
	1. GENERAL MEDICINE/GENERAL SURGERY/PAEDIATRICS/GERIATRICS	150	E	50	100	--	--		I I n d Y E A R
	2. BIO-MECHANICS, APPLIED ANATOMY & KINESIOLOGY	130	E	50	100	--	--		
3. EXERCISE THERAPY-I	175	E	50	100	25	75			
4. EXERCISE THERAPY - II	175	E	50	100	25	75			
5. MICROBIOLOGY AND PATHOLOGY	100	E	50	100					
1. ELECTROTHERAPY-I (LOW & MEDIUM FREQUENCY)	150	E	50	100	25	75			
III YEAR	2. ELECTROTHERAPY-II (HIGH FREQ & ACTINOTHERAPY)	200	E	50	100	25	75	I I r d Y E A R	
	3. COMMUNITY MEDICINE	55	E	50	100	--	--		
	4. CLINICAL ORTHOPAEDICS	55	E	50	100	50	--		
	5. CLINICAL NEUROLOGY	55	E	50	100	50	--		
	6. CLINICAL CARDIO-RESPIRATORY DISEASES	55	E	50	100	50	--		
	7. BIO STATISTICS & RESEARCH METHODOLOGY	20	NE	--	---	--	--		
	8. PHYSICAL MODALITIES MAINTANENCE	30	NE	--	---	--	--		
	1. PT IN ORTHOPAEDICS	200	E	50	100	25	75		
IV YEAR	2. PT IN NEUROLOGY	150	E	50	100	25	75	I v t h Y E A	
	3. PT IN CARDIO RESPIRATORY CONDITIONS	100	E	50	100	25	75		

4. REHABILITATION MEDICINE	100	E	50	100	50	--
5. PHYSICAL EDUCATION	40	NE	--	--	--	--

### **TOTAL CLOCK HOURS**

Examination/NON Examination papers – 2710 Hours

Clinical (Course Teaching)-1450 Hours.

Clinical (Physiotherapy Internship)-1152 Hours.

Total clock hours – /5312Hours.

### **SCHEME OF THEORY EXAMINATION**

**Duration:** 3 Hours

**Question pattern:**

1. 10 Two mark question.(short answer)
2. 2 Fifteen mark question. (essay)
3. 10 Five mark question. (short notes)

This mark pattern is same for all the subjects in BPT curriculum except the following subjects:

#### **FOR PHYSIOLOGY ,APPLIED PHYSIOLOGY**

##### **Section A: PHYSIOLOGY – 100 Marks**

1. 2 Fifteen mark question (Essay)
2. 10 Five mark question (Short notes)
3. 10 Two mark question (Short answers)

#### **FOR GEN.MED, GEN.SUR, PAEDIATRICS, Geriatrics**

##### **Gen.Med (45 MARKS)**

- 1 Fifteen mark question (Essay)
- 4 Five mark question (Short notes)
- 5 Two mark question (Short answers)

##### **Pediatrics (35 marks)**

- 1 Fifteen mark question (Essay)
- 2 Five mark question (Short notes)
- 5 Two mark question (Short answers)

##### **Gen.Surgery – 10 Marks**

- 2 Five mark question (Short notes)

##### **Geriatrics – 10**

- 2 five mark questions (Short notes)

**FOR MICROBIOLOGY & PATHOLOGY – 100 MARKS****Section A: MICROBIOLOGY - 50 Marks**

1. 1 fifteen mark question (Essay)
2. 5 five mark question (Short notes)
3. 5 two mark question (Short answer)

**Section B: PATHOLOGY - 50 Marks**

5. 1 fifteen mark question (Essay)
6. 5 five mark question (Short notes)
7. 5 two mark question (Short answer)

**ELIGIBILITY FOR QUESTION PAPER SETTERS****THEORY EXAMINATIONS**

YEAR	SUBJECT	EXAMINER	
	1. PSYCHOLOGY&SOCIOLOGY	Psychologist/ Sociologist	PG with 3 yrs teaching experience
	2. ANATOMY	Asst. Prof of Anatomy	PG with 3 yrs teaching experience
	3. PHYSIOLOGY, APPLIED PHYSIOLOGY & <del>BIO-</del> CHEMISTRY	Asst. Prof of Physiology	PG with 3 yrs teaching experience
	BASIC AND APPLIED PHYSICS FOR PHYSIOTHERAPY	Asst. Prof of Physics	PG with 3 yrs teaching experience
	BASIC NURSING & FIRST AID	-- --- -- --	
	ORIENTATION TO PHYSIOTHERAPY& COMPUTER APPLICATIONS	-- --- -- --	
	1. GENERAL MEDICINE/GENERAL SURGERY/PAEDIATRICS/GERI ATRICS	Asst. Prof of Gen. Medicine	PG with 3 yrs teaching experience
	2. BIO-MECHANICS, APPLIED ANATOMY & KINESIOLOGY	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	3. EXERCISE THERAPY -i	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience

	4. EXERCISE THERAPY - ii	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	5. MICROBIOLOGY/PATHOLOGY	Asst.Prof in Microbiology or Pathology.	PG with 3 yrs teaching experience
	1. ELECTROTHERAPY-I (LOW & MEDIUM FREQUENCY)	Physiotherapist	MPT with 5 years or BPT with 10 Teaching experience

	2. ELECTROTHERAPY-II (HIGH FREQ & ACTINOTHERAPY)	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	3. COMMUNITY MEDICINE	Asst. Prof of com.medicine	PG with 3 yrs teaching experience
	4. CLINICAL ORTHOPAEDICS	Asst.Prof of Orthopedics	PG with 3 yrs teaching experience
	5. CLINICAL NEUROLOGY	Asst. Prof of Neurology	PG with 3 yrs teaching experience
	6. CLINICAL CARDIO-RESPIRATORY DISEASES	Asst.Prof in Cardiology or Cardiovascular Surgeon	PG with 3 yrs teaching experience
	8. BIO STATISTICS & RESEARCH METHODOLOGY	-- --- -- --	
	9. PHYSICAL MODALITIES MAINTANENCE	-- --- -- --	
	1. PT IN ORTHOPAEDICS	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	2. PT IN NEUROLOGY	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	3. PT IN CARDIO RESPIRATORY CONDITIONS	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching

			experience
	4. PHYSICAL MEDICINE AND REHABILITATION	Asst. Professor in Physical Medicine and Rehabilitation	PG with 3 yrs teaching experience
	5. PROJECT/CASE STUDY	Physiotherapist	MPT with 5 years or BPT with 10 years teaching experience MPT with 5 years Or BPT with 10 years of teaching experience

For each question, the question paper setter must prepare the relevant answer key with the main content of the answer and split up mark for each and every content of the answer with appropriate reference as per the curriculum.

### ELIGIBILITY FOR EXAMINERS

#### PRACTICAL/ORAL EXAMINATION

YEAR	SUBJECT	EXAMINER	
	1. PSYCHOLOGY & SOCIOLOGY	Psychologist , Sociologist	PG with 3 yrs teaching experience
	2. ANATOMY	Asst. Prof of Anatomy	PG with 3 yrs teaching experience
	3. PHYSIOLOGY, APPLIED PHYSIOLOGY & <del>BIO</del> CHEMISTRY	Asst. Prof of Physiology	PG with 3 yrs teaching experience
	BASIC AND APPLIED PHYSICS FOR PHYSIOTHERAPY	Asst. Prof of Physics	PG with 3 yrs teaching experience
	BASIC NURSING & FIRST AID	-- --- -- --	
	ORIENTATION TO PHYSIOTHERAPY & COMPUTER APPLICATIONS	-- --- -- --	
	1. GENERAL MEDICINE/GENERAL SURGERY/PAEDIATRICS/GERIATRICS	Asst. Prof of Gen. Medicine	PG with 3 yrs teaching experience
	2. BIO-MECHANICS, APPLIED ANATOMY & KINESIOLOGY	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching

			experience
	3. EXERCISE THERAPY-I	Physiotherapist	MPT with 5 years or BPT with 10 years of

			Teaching Experience
	4. EXERCISE THERAPY - II	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	5. MICROBIOLOGY/PATHOLOGY	Asst. Prof in Microbiology/Pathology.	PG with 3 yrsteaching experience
	1. ELECTROTHERAPY-I (LOW & MEDIUM FREQUENCY)	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	2. ELECTROTHERAPY-II (HIGH FREQ & ACTINOTHERAPY)	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	3. COMMUNITY MEDICINE	Asst. Prof of com. medicine	PG with 3 yrs teaching experience
	4. CLINICAL ORTHOPAEDICS	Asst. Prof of Orthopedics	PG with 3 yrs teaching experience
	5. CLINICAL NEUROLOGY	Asst. Prof of Neurology	PG with 3 yrs teaching experience
	6. CLINICAL CARDIO-RESPIRATORY DISEASES	Asst. Prof in Cardiology or Cardiovascular Surgeon	PG with 3 yrs teaching experience
	8. BIO STATISTICS & RESEARCH METHODOLOGY	-- --- - --	
	9. PHYSICAL MODALITIES MAINTANENCE	-- --- - --	
	1. PT IN ORTHOPAEDICS	Physiotherapist	MPT with 5 years or BPT with 10 years of teaching experience
	2. PT IN NEUROLOGY	Physiotherapist	MPT with 5 years

			or BPT with 10 years of teaching experience
	3. PT IN CARDIO RESPIRATORY CONDITIONS	Physiotherapist	MPT with 5 years or BPT with 10 years of

			teaching experience
	4. PHYSICAL MEDICINE AND REHABILITATION	Asst. Professor in Physical Medicine and Rehabilitation	PG with 3 yrs teaching experience
	PROJECT STUDY	PHYSIOTHERAPIST	MPT with 5 years or BPT with 10 years of teaching experience MPT with 5 years or BPT with 10 years of teaching experience

### **PSYCHOLOGY AND SOCIOLOGY**

**EXAMINATION AT END OF- 1 YEAR  
INSTRUCTION HOURS-100 HOURS**

#### **COURSE DESCRIPTION**

This course will enable the student to understand specific psychological factors and effects in physical illness and thus help them to have a holistic approach in their dealings with patients during admission, rehabilitation and discharge.

#### **COURSE OBJECTIVE**

The objective of this course is that after 100 hours of lectures, demonstrations, practical, clinic the students will be able to recognize and help with the psychological factors involved in disability, pain, disfigurement, unconscious patients, chronic illness, death, bereavement and medical – surgical patient / condition.

### **PSYCHOLOGY (50 HOURS)** **PART A – GENERAL PSYCHOLOGY**

## **A. DEFINITION OF PSYCHOLOGY**

Definition of psychology, basic information in relation to following schools methods  
And branches

**Schools:** structuralism, functionalism, behaviourism, psychoanalysis, gestalt psych. **Methods:** introspection, observation, inventory and experimental method.

**Branches:** general, child, social, abnormal, industrial, clinical, counselling

## **B. HEREDITY AND ENVIRONMENT**

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

## **C. DEVELOPMENT AND GROWTH BEHAVIOUR**

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

## **D. INTELLIGENCE**

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

## **E. MOTIVATION**

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

## **F. EMOTIONS**

Definition, differentiate from feelings, physiological changes of emotion. Rule of RAS, hypothalamus, cerebral cortex, SNS, adrenal gland, heredity and emotion, Nature and control of anger, fear, and anxiety.

## **G. PERSONALITY**

Definition. List the components: physical characteristics.

Discuss briefly the role of heredity, nervous system, physical characteristics, abilities, Family and culture on personal development.

**Basic concepts of Freud:** unconscious, conscious, id, ego, super ego. Personality assessment: interview, standardized, non standardized, exhaustive and

**Stress interviews.** List and define inventories BAL, CPI, MMPI. **Projective tests-** Rorschach, TAT, Sentence completion test.

## **H. LEARNING**

Definition, List the laws of learning as proposed by Thorndike.

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



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

### **I. THINKING**

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

### **J. FRUSTRATION**

Definition, sources, solution, conflict; approach – approach, avoidance – avoidance, Approach – avoidance.

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

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

**Attention** – Define attention and list the factors that determine attention: nature of

Stimulus intensity, color, change, extensity, repetition, primary motives. **Perception** – Define perception and list the principles of perception figure ground, Constancy, similarity, proximity, closure, continuity, values and interest, past experience context, needs, moods, religion, sex, perceived benefits and socioeconomic status. Define illusion and hallucination.

### **L. LEADERSHIP**

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

## **PART B– HEALTH PSYCHOLOGY** **(NOT FOR UNIVERSITY EXAMINATION)**

### **A. PSYCHOLOGICAL REACTIONS OF PATIENT**

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

### **B. REACTION TO LOSS**

Reaction to loss, death and bereavement, shock and disbelief, development of awareness, stage of acceptance.

### **C. STRESS**

Physiological and psychological changes, relation to health and sickness: psychosomatics, professional stress, burnout

**D. COMMUNICATION**

**Types** – Verbal, non- verbal, elements in communication, developing effective communication, specific communication technique.

**Counselling** – Definition, aim, differentiate from guidance, principles in counselling.

**E. COMPLIANCE**

Nature, factors, contributing to no compliance.

**F. EMOTIONAL NEEDS**

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

**G. GERIATRIC PSYCHOLOGY**

Specific psychological reactions and needs of geriatric patient

**H. PAEDIATRIC PSYCHOLOGY**

Specific psychological reactions and needs of pediatric patients.

**I. BEHAVIOUR MODIFICATION**

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

**J. SUBSTANCE ABUSE**

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

**SOCIOLOGY (50 HOURS)****A. INTRODUCTION**

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

**B. SOCIOLOGY AND HEALTH**

Social factors affecting health status, social consciousness and perception of illness. Social consciousness and meaning of illness, decision making in taking treatment. Institutions of health, their role in the improvement of the people.

**C. SOCIALIZATION**

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

**D. SOCIAL GROUPS**

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

**E. FAMILY**

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

**F. CULTURE**

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

**H. CASTE SYSTEM**

Features of the modern caste system and its trends.

**H. SOCIAL CHANGE**

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

**I. SOCIAL CONTROL**

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

**J. SOCIAL PROBLEMS OF THE DISABLED**

Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems, Population explosion.  
Poverty and unemployment, Beggary.  
Juvenile delinquency, Prostitution.  
Alcoholism, Problems of women in employment.

**K. SOCIAL SECURITY**

Social security and social legislation in relation to the disabled.

**ANATOMY**

**EXAMINATION AT END OF-I YEAR  
INSTRUCTION HOURS-200 HOURS**

**COURSE DESCRIPTION**

The study of anatomy will include identification of all gross anatomical structures. Particular emphasis will be placed on description of bones, joints, muscles, brain, cardio-pulmonary and

nervous system as these are related to the application of physiotherapy patients.

### **COURSE OBJECTIVES**

The objectives of this course is that after 200 hours of lectures, demonstrations, and practical the student will be able to demonstrate knowledge in human anatomy as needed for the study and practice of physiotherapy.

### **A.INTRODUCTION**

- 1 Define anatomy, subdivisions
- 2 Define anatomical position, anatomical terms, and planes
- 3 **Cell** – Define, parts of cell, function
- 4 **Tissue** – Define, classify
- 5 **Bone** – Define, classification with examples, microscopic anatomy of bone, blood supply
- 6 **Joint** – Define, classification with examples, feature of synovial joint: articulating surface Stability, mobility, nerve supply
- 7 Axis and Movements in a synovial joint
- 8 **Muscle** – Define, classify with examples, structure of skeletal muscle: myofibrils, Contraction
- 9 Define origin, insertion, muscle work, types of muscle work, group action- agonist, Antagonist, synergist, fixator, shunt and spurt muscle, levers with e.g.
- 10 **Nerve** – Structure, parts, synapse, neuron, classification

### **B.UPPER LIMB**

#### **1 OSTEOLGY**

Identify parts, borders, surfaces, attachments of bones– clavicle, scapula, humerus, radius, ulna, carpal bones, Meta carpal, phalanges.

#### **2 ARTHROLOGY**

Type, articular surface, muscle, ligaments, movements blood supply, nerve supply of joints-Sterno clavicular, acromio clavicular, shoulder, elbow, radio ulnar, IP, MCP, CMC

#### **3 MYOLOGY**

Identify muscles – origin, insertion, nerve supply, action of muscles of Scapula, upper arm, lower arm

#### **4 NEUROLOGY**

Identify nerves of upper limb and its origin, course, division, innervations, Relation, its applied anatomy of radial nerve, median nerve, ulnar nerve, Axillary nerve, musculocutaneous nerve.  
Brachial plexus – formation and root values.  
Dermatome of UL.

**5 ANGIOLOGY**

Distribution of blood vessels, lymph nodes, main arteries and veins of UL - Axillary, brachial, radial, ulnar arteries.

**6 AXILLA**

Identify boundaries, contents of axilla, branches of axillary artery and its relation.

7 Scapulo thoracic rhythm

8 Cubital fossa – Boundaries , contents, relation

**C.LOWER LIMB****1 OSTEOLOGY**

Identify parts, border, surface, attachments of bones – hip bone, femur, tibia, Fibula, patella, tarsal bones, Meta tarsal bones, phalanges

**2 ARTHROLOGY**

Type, articular surface, muscle, ligaments, movements, blood supply, nerve supply, of joints – hip, knee, tibio fibular, tarsal

**3 MYOLOGY**

Identify origin, insertion, nerve supply, action of muscles of – thigh, leg, sole of Foot

**4 NEUROLOGY**

Identify plexuses, nerves of LL, origin, course, innervations, applied anatomy, Relation of femoral nerve, sciatic nerve, tibial nerve, common peroneal nerve, Obturator nerve, superficial and deep peroneal nerve.

Lumbar

plexuses Sacral

plexuses

**5 ANGIOLOGY**

Distribution of blood vessels, lymph node of LL, main arteries and veins of LL – Femoral artery, femoral vein, tibial artery, posterior tibial artery.

6 Femoral triangle

7 Popliteal fossa – boundaries and contents

8 Arches of foot.

**D.THORAX AND ABDOMEN**

1 Osteology of vertebral column

- 2 Identify and classify vertebrae – typical & atypical
- 3 Parts and features of typical vertebrae.
- 4 Features of thoracic, lumbar, sacral, coccyx.
- 5 Intervertebral joint – articulating surface, movements, stability, mobility
- 6 Curvatures of vertebral column.
- 7 Contents of vertebral canal.
- 8 Sternum – parts, features (borders, surfaces, muscle attachments)
- 9 Define true, false, floating ribs
- 10 Mention parts and features of atypical rib.
- 11 Type and formation of joint between rib and vertebrae, between costal cartilage, costal cartilage and sternum, between parts of sternum.
- 12 Sternal angle.
- 13 Intercostals space and its contents.
- 14 Intercostals nerve – course and its branches.
- 15 Intercostals muscle – origin, insertion, nerve supply, action.
- 16 Diaphragm – origin, insertion, nerve supply, action, orifice, structures passing through Diaphragm.
- 17 Movements of ribs – pump handle and bucket handle movement
- 18 Normal position, external features of heart and parts of heart, internal features of Chambers of heart, blood supply, venous supply, conductive system Normal position, parts, relation, blood supply of URT & LRT, pleura and its reflection, nerve supply, bronchopulmonary segment, mechanics of respiration

## **E.HEAD AND NECK**

- 1 Skull (features, joints of skull bone, parts)
- 2 Identify internal and external auditory meatus, foramen magnum, stylomastoid foramen and structures passing through them
- 3 Anterior and posterior triangles of neck (boundaries and contents)
- 4 Muscles of the face (origin, insertion, action, nerve supply, applied anatomy)
- 5 Cranial nerve (origin, course, relation, innervations)
- 6 Trigeminal nerve (origin, course, relation, innervations)
- 7 General features of typical cervical vertebrae, atlas, axis, seventh cervical vertebrae.
- 8 Cervical plexus (formation, distribution, root values)
- 9 Sternomastoid, erector spinae, scalene
- 10 Atlantoaxial joint (articular surface, muscles, movements, ligaments, blood supply, NS)
- 11 Atlantooccipital joint (articular surface, muscles, movements, ligaments, blood supply, NS)
- 12 Position and extent of subclavian, vertebral, carotid arteries
- 13 Components of circle of Willis and its supply, applied importance
- 14 Internal jugular and subclavian vein (position, formation, and termination)
- 15 ANS
- 16 Parts of brain and its function, applied importance
- 17 Eye (parts, retina, optic pathway, nerve supply, muscles of eye)
- 18 Nose (parts, boundaries of nose, nasal cavity, sinuses)
- 19 Temporomandibular joint (type, articular surfaces, ligaments, movements, muscle responsible, nerve supply)
- 20 Ear (parts, organ of corti, nerve of hearing and its applied importance)

**F.PELVIS**

- 1 Formation and subdivision of bony pelvis
- 2 List features of male and female bony pelvis
- 3 Type, articular surface, ligaments, movements of joints of pelvis
- 4 Abdominal cavity and layers of abdominal wall (ant & post), (O, I, NS, ACT)
- 5 Rectus sheath
- 6 Inguinal canal (position, extent, formation, content)
- 7 Branches and distribution of abdominal aorta and iliac arteries
- 8 Mention features of pubic symphysis and sacro iliac joint
- 9 Muscles of pelvic floor (attachment, action, nerve supply)
- 10 Structures of urogenital diaphragm
- 11 Position, extent, parts, relation, blood supply, nerve supply, lymph drainage of kidney, ureter, urinary bladder, urethra.
- 12 Innervations of urinary bladder.

**PHYSIOLOGY, APPLIED PHYSIOLOGY****EXAMINATION AT END OF-I YEAR  
INSTRUCTION HOURS-150 HOURS****COURSE DESCRIPTION**

This course which runs concurrently with the anatomy course helps the student to Understand the basis of normal human physiology with special emphasis on the Functioning of the cardiovascular, musculoskeletal, nervous system and Respiratory system.

**COUSE OBJECTIVES**

The objective of this course is that after 150 hours of lectures, demonstrations, lab practical the student will be able to demonstrate an understanding of elementary Human physiology.

**PHYSIOLOGY (100 hours)****A.CELL**

1. Basic concepts of cell structure, components, functions, transport

**B.SKIN**

1. Structure, functions, temperature regulation

**C.BLOOD**

1. Composition and function of blood
2. **RBC**-morphology, formation, normal count, functions, physiological & pathological Variation

3. **WBC**- morphology, formation, normal count, functions, physiological & pathological Variation
4. **Blood platelets**-Morphology, normal count, formation, function, variation
5. **Hemoglobin**-Basic chemistry, function, fate of hemoglobin
6. **Blood clotting**-Definition, clotting factor, theories of clotting
7. **Blood group**-ABO system, Rh System
8. Blood volume and regulation
9. Blood transfusion

#### **D.CARDIO VASCULAR**

- 1 Structure and properties of cardiac muscle
- 2 Cardiac cycle, Conductive system, ECG
- 3 Heart sounds
- 4 Heart rate and regulation
- 5 Cardiac output and regulation
- 6 Blood pressure and regulation
- 7 Regional circulation- coronary, pulmonary, renal, cerebral
- 8 Effect of exercise in CVS system

#### **E.RESPIRATION**

- 1 Structure and function of respiratory system
- 2 Mechanics of respiration – Muscles of respiration, Lung & Chest wall compliance, V/Q Ratio, Surfactant
- 3 Transport of gases- O<sub>2</sub> & CO<sub>2</sub>
- 4 Nervous and Chemical regulation of respiration
- 5 Hypoxia, Cyanosis, Dyspnea
- 6 Acid Base Balance
- 7 Principles of Lung Function Test – Spiro meter, Lung volumes and capacities
- 8 Artificial respiration
- 9 Effect of exercise on respiratory system
10. Defense mechanism

#### **F.DIGESTION**

- 1 Structure and function of GI system
- 2 Mastication and Deglutition
- 3 **Saliva** – composition, function, regulation
- 4 **Gastric secretion** – composition, phases of secretion, function
- 5 **Pancreatic secretion** – composition, function, regulation
- 6 **Bile** – composition and function
- 7 Movements of small and large intestine
- 8 Digestion in mouth, stomach, intestine
- 9 Defecation

#### **G.EXCRETION**

- 1 Structure and function of kidney
- 2 Structure and function of nephron
- 3 **Formation of urine** – Filtration, Reabsorption, Secretion
- 4 Micturation



**H.ENDOCRINE**

1. General organization of endocrine glands
2. **General metabolism** – Carbohydrate, Fat, Protein
3. **Physiological action, regulation, disorder of hormones** – Adrenal, Pancreatic, Parathyroid, Thyroid.

**I.REPRODUCTION**

- 1 Male reproductive system
- 2 Female reproductive system
- 3 Pregnancy, function of placenta, parturition, lactation, contraception
- 4 Puberty and Menopause
- 5 Spermatogenesis and Oogenesis
- 6 Menstrual cycle

**J.NERVOUS SYSTEM**

- 1 General organization of nervous system
- 2 Structure, type and function of neuron
- 3 Properties of neurons
- 4 Synapse and synaptic transmission
- 5 Neurotransmitters
- 6 **Reflex** – Properties and types
- 7 **Sensory** – Receptors, sensory pathway, pain pathway, referred pain, modulation of pain
- 8 **Motor** – Basal ganglia, Cerebellum, Cortex –Function & Effect of lesion
- 9 Ascending and Descending pathway
- 10 Posture and Equilibrium
- 11 Muscle tone
- 12 **ANS** – organization, function of SNS & PSNS
- 13 **CSF** – composition, formation, circulation, function
- 14 LMN & UMN lesion

**K.SPECIAL SENSE**

- 1 **Vision** – rods and cones, retina and its function, visual pathway
- 2 **Hearing** – organ of corti, auditory pathway
- 3 Olfaction
- 4 Taste – taste buds

**L.MUSCLE**

- 1 **Structure of muscle** – Macroscopic & Microscopic (Myofibril, Myoneural junct)
- 2 Properties of skeletal muscle
- 3 Cardiac and smooth muscle
- 4 Chemical process involved in muscle contraction
- 5 Motor unit, EMG
- 6 Effect of exercise on muscular system
7. **Exercise metabolism** – O<sub>2</sub> dept, respiratory quotient

**APPLIED PHYSIOLOGY (50hours)****THE HEART AND CIRCULATION**

Structures and properties of heart muscle, action of heart, Normal ECG, Maintenance of Blood pressure, cardiac arrest and heart failure, hypertension, edema, central and peripheral venous pressure.

### **NERVOUS SYSTEM AND MUSCLES**

Outline the structure and function of central nervous system, Outline the ANS, Types of nerve cells, electrical properties of nerve cells, properties of mixed nerves, Reflex action, degeneration and regeneration of nerve, control of posture, outline of Voluntary movement, cutaneous, deep, and superficial sensation, synaptic transmission, neuromuscular junction, properties of muscles, contractile response, types of contraction.

### **RESPIRATION**

Mechanics of respiration, breath sounds, exchange of gases, lung volumes, lung compliance, nervous and chemical control of respiration, oxygen and carbon dioxide transport, acid base balance, artificial respiration.

## **BASIC & APPLIED PHYSICS FOR PHYSIOTHERAPY**

### **EXAMINATION AT END OF- 1 YEAR INSTRUCTION HOURS- 80 HOURS**

#### **MECHANICS:**

1. Definition of mechanics and Biomechanics
2. Force - Definition, diagrammatic representation, classification of forces, concurrent, coplanar and co-linear forces, composition and resolution of forces, angle of pulls of muscle
3. Gravity - Definition, line of gravity, Centre of gravity
4. Equilibrium - Supporting base, types, and equilibrium in static and dynamic state
5. Pulleys - system of pulleys, types and application
6. Springs - properties of springs, springs in series and parallel, elastic materials in use
7. Levers - Definition, function, classification and application of levers in physiotherapy  
& order of levers with example of lever in human body
8. Speed, Velocity, Work, Energy, Power, Acceleration, Momentum - principles, and practical application
9. Newton's Laws
10. Friction
11. Elasticity - Definition, stress, strain, HOOKE'S Law

#### **CURRENTS:**

1. DC Currents -Modern concept of electricity: fundamental electric charges (proton and

electron), bound and free electrons, free electrons and current, static electric charge, charging of an object potential and capacitance, potential difference and EMF

2. A. C. currents: Sinusoidal wave form, frequency, wavelength, Amplitude and phase of a sine wave, Average & RMS value of a sine wave
3. Quantity of electricity, magnitude of current, conductors and insulators, resistance of conductor and Ohm's law, resistances in series and parallel
4. Capacitors: Electric field around a capacitor, charging and discharging a capacitor, types of capacitor with application of each in Physiotherapy department
5. Rheostat: series and shunt Rheostat with application of each in the Physiotherapy department
6. Effects of electric Current: Thermal effect, chemical effect (ionization) and magnetic effect. Electric shock, Earth shock, causes and its prevention
7. Magnetism: Magnetic - non-magnetic substances and their properties, properties of magnet, molecular theory, poles of magnet and its properties, magnetic lines of force and their properties, Electromagnetism, magnetic effects of electric current, Electromagnetic induction, Lenz's law, Inductor and Inductance types of inductor, reactance and impedance.
8. Condenser – Potential & capacity, Principles, factors determining capacity, construction. Electric field, charging & discharging and use of condenser in electrotherapy.
9. Cosine law and its implications.
10. Physical effects of heat and radiation. Laws governing radiation.
11. Law of Grothaus and its implications.

### **Section – B**

1. Thermionic Valves: Thermionic emission, Diode and Triode valves and their characteristics, Construction and application of Cathode Ray Oscilloscope
2. Semiconductor Devices: Intrinsic and extrinsic semiconductors, Light Emitting Diodes, integrated circuits
3. Electronic Circuits: Rectifiers & smoothing circuits, Oscillators - Sinusoidal and nonsinusoidal types
4. A.C. AND D.C. meters: Functions and applications of Ammeter and volt meters, Ohmmeters, Wheat stone bridge
5. Introduction to Therapeutic Energies – Thermal, Mechanical, Electrical, Electromagnetic and magnetic - Definition, description, physiological effects,

pathological effects and dangers

6. Medical Instrumentation For Physical Therapy: Brief description of generation, circuit diagrams and testing
7. Low frequency currents, Direct currents, Medium frequency currents

### **BASIC NURSING AND FIRST AID**

**Non Examination Paper**

**30 Hours**

Nursing principles, bandaging extremities, bed making, positioning of patient

Lifting technique in bed, transferring from bed to wheel chair, transferring from bed to Stretcher.

Feeding, tube feeding, drips, transfusion.

Parental administration of medicine

### **ORIENTATION TO PHYSIOTHERAPY & COMPUTER APPLICATIONS**

**Non Examination Paper**

**60 Hours**

**COMPUTER APPLICATION 20 hours**

**Introduction to computer-** Characteristics of computer, History of Computer, Generation of Computer, Classification of Computers, IT Applications

**Parts of a computer-** Input Devices , Output Devices, Central Processing Unit, Components of CPU, Memory Unit, CISC and RISC, Peripheral Devices

**Working principle of a computer-** LANGUAGES AND PROGRAMMING, NUMBER SYSTEM, DATA AND ELECTRONIC DATA PROCESSING, COMMUNICATION AND NETWORKING, OPERATING SYSTEMS

Importance of computer in physiotherapy

**MS-Office – Word, Power Point, Excel, Publisher, out look**

**Corel Draw**

**Photoshop**

**Web Designing**

**Internet and its application-** Packet switched networks, What is Internet? ,Types of Information Available on internet ,Internet Address, Organizational Domains, Internet Protocol Address, Getting Connected to Internet, Types of Internet Access, Direct Connections, Internet Services,

ISDN(Integrated Services Digital Network), NICNCT, Archie Wide Area Information Server (WAIS), World Wide Web (WWW) ,

Tele Conferencing, Video Conferencing.

### **ORIENTATION TO PHYSIOTHERAPY 30 hours**

History of physiotherapy

Ethical rules and guidelines for physiotherapist

### **ORIENTATION TO MEDICAL TERMINOLOGIES - 10 Hours IN RELATION TO THE REGIONAL LANGUAGE**

### **GENERAL MEDICINE / GENERAL SURGERY / PAEDIATRICS / GERIATRICS**

### **EXAMINATION AT END OF-II YEAR INSTRUCTION HOURS- 150 HOURS**

### **COURSE DESCRIPTION**

The course will enable students to understand the conditions in general medicine, General surgery, pediatrics and Geriatrics and its application in relation with physiotherapy.

### **COURSE OBJECTIVES**

The objective of this course is that after 150 hours of lectures and demonstrations so that student will be able to understand the causes, findings, management in relation with physiotherapy.

### **GENERAL MEDICINE (70 hours)**

#### **A. INFECTIONS**

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

Bacteria – tetanus

Viral - Herpes simplex, zoster, varicella, measles, German measles, hepatitis

B, AIDS  
Protozoal – Filarial

## **B. HAEMATOLOGY**

Iron deficiency anemia, B 12, folic acid deficiency anemia.

Types of bleeding diathesis

Hemophilia

## **C. RESPIRATORY SYSTEM**

**Define, etiology, pathogenesis, pathology, clinical features, management**

COPD – chronic bronchitis and emphysema

Pneumonia – lobar, broncho, aspiration

Asthma

Bronchiectasis

Tuberculosis

Lung

abscess

RLD – occupational lung diseases

Chest wall deformities – funnel chest, pigeon chest, barrel chest, kyphoscoliosis

## **D. CARDIO-VASCULAR SYSTEM**

**Define, etiology, pathogenesis, pathology, clinical features, management**

Ischemic heart diseases

Myocardial infarction

Angina pectoris

Heart failure

Rheumatic fever

Infective

endocarditis

Hypertension

Congenital heart disease – ASD, VSD, fallots tetralogy, PDA, COA, AS, AR, MS, MR

Pulmonary infarction

Pulmonary embolism

DVT

## **E. BONE, JOINT AND CONNECTIVE TISSUE DISORDERS**

**Define, etiology, clinical findings, pathology, management of**

1. Osteoarthritis
2. Rheumatoid arthritis
3. Systemic lupus erythematosus
4. polymyositis
5. dermatomyositis
6. polyarthritis nodosa
7. scleroderma

## **F. RENAL DISEASES**

Acute and Chronic renal failure

Urinary tract infection - common clinical conditions complicated by UTI

## **G. METABOLIC DISEASES**

Diabetes mellitus – Types of diabetes, complication, management

Obesity

## **H. NEUROLOGY**

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

## **GENERAL SURGERY (20 hours)**

Describe abdominal surgical incisions

**Outline the incision and its complications of**

1. Appendectomy
2. Mastectomy
3. Hysterectomy
4. Colostomy
5. Hernioraphy
6. Cholecystectomy
7. Ileostomy
8. Thyroidectomy
9. Adrenalectomy
10. Prostatectomy

Define burns. Classify burns by depth and surface area. Explain etiology, clinical findings, complication, management, deformities due to burns, plastic surgery procedures in management of burns.

Outline the principles of tendon transfers – emphasis to hand, foot, facial paralysis.

Outline the principles of plastic surgery

Skin graft/flap – pedicle, tube, muscle flap Indication  
with burns/ wounds/ulcers Breast  
reconstruction

Hypertrophic scar / keloid management.

### **PAEDIATRICS (40 hours)**

Describe growth and development of a child from birth to 12 years – physical, social, Adaptive development.

High risk pregnancy – maternal factors and neonatal factors contributing to HRP – Gestational diabetes, Pregnancy induced HT, Bleeding in mother, Chronic maternal diseases such as heart disease, renal failure, TB, Epilepsy

Describe community programmes – immunization schedule

**Cerebral palsy** – Define, etiology, types, clinical findings, examination, management Briefly outline associated defects – MR, microcephaly, blindness Hearing and speech impairment, squint, convulsion.

**Muscular dystrophy** – Define, various forms, clinical manifestation, disabilities, management  
**Spina bifida, meningomyelocele** – outline development, clinical features, hydrocephalus and Medical and surgical management

**Still disease** – classification, pathology, clinical findings, treatment

**Normal diet of new born and child** – dietary calorie, requirement for normal child,  
 Malnutrition, rickets, vitamin D deficiency.

**Lung infections** – Bronchiectasis, lung abscess, bronchial asthma

### **GERIATRICS (20 hours)**

**Theories of Aging**

**Physiological changes that occur due to aging.**

**Diseases commonly encountered in elderly population**

1. Hypertension
2. Ischemic heart disease
3. Cerebro vascular accident
4. Benign prostatic hyperplasia
5. Cataracts
6. Falls in Elderly
7. Senile Osteoporosis
8. Hypostatic Pneumonia
9. Deconditioned status

### **BIO- MECHANICS AND APPLIED ANATOMY & KINESIOLOGY**

**EXAMINATION AT END OF-II YEAR**

**INSTRUCTION HOURS- 120 HOURS**

### **COURSE DESCRIPTION**

This course supplements the knowledge of anatomy and enables the students to have a better understanding of the principles of biomechanics and their applications in musculoskeletal function and dysfunction.



## **COURSE OBJECTIVES**

The objective of this course is that after 150 hours of lectures and demonstrations in Addition to clinical the student will be able to demonstrate an understanding of the principles of bio-mechanics and kinesiology and their application in health and disease.

### **A.MECHANICS**

- 1 Describe types of motion, planes of motion, direction of motion and quantity of motion.
- 2 Define forces, force vectors, components of forces.
- 3 Describe gravity, segmental centers of gravity, centre of gravity, and line of gravity of the human body, stability and centre of gravity, relocation of the centre of gravity.
- 4 Describe the reaction forces, Newton law of reaction.
- 5 Describe equilibrium-law of inertia and establishing equilibrium of an object
- 6 Describe objects in motion: law of acceleration, joint distraction in a linear force system and force of friction.
- 7 Describe concurrent force system: composition of force, muscle action lines, total muscle force vector, divergent muscle pulls, and anatomical pulleys.
- 8 Describe parallel force systems: first class lever, second class lever, third class lever – torque – mechanical advantage.
- 9 Define moment arm: moment arm of a muscle force, moment arm of gravity and anatomical pulleys
- 10 Describe equilibrium of a lever.

### **B.JOINT STRUCTURE AND FUNCTION**

- 1 Describe the basic principles of joint design and a human joint
- 2 Describe the tissue present in human joints: including dense fibrous tissue, bone,
- 3 Cartilage and connective tissue.
- 4 Classify joints – synarthrosis, amphiarthrosis, diarthrosis, and sub classification of Synovial joints
- 5 Describe joint function, kinematics chains, range of motion
- 6 Describe the general effects of injury and disease
- 7 Closed kinematics chain versus open kinematics chain
- 8 Hyaline cartilage and fibro cartilage.

### **C.MUSCLE STRUCTURE AND FUNCTION**

- 1 Describe mobility and stability functions of muscle.
- 2 Describe elements of muscle structure- composition of muscle fiber, motor unit, types of muscle fiber, muscle fiber size, arrangement and number, muscle tension, length – Tension relationship.
- 3 Active and passive insufficiency
- 4 Describe types of muscle contraction, speed, angular velocity, and applied load, voluntary Control, torque, isokinetic exercise
- 5 Factors affecting muscle tension
- 6 Active and passive tension
- 7 Concentric, eccentric, isometric contraction
- 8 Classify muscle – spurt and shunt muscle, tonic and phasic muscle

- 9 Agonist, antagonist and synergist
- 10 Factors affecting muscle function: type of joint and location of muscle attachments, Number of joints, sensory receptors
- 11 Isokinetic exercise with concentric exercise

#### **D.THE VERTEBRAL COLUMN**

- 1 Articulations, ligaments, muscles, typical vertebrae and intervertebral disc
- 2 Factors affecting stability and mobility
- 3 Structure and function of cervical, thoracic, lumbar and sacral vertebrae
- 4 Describe muscles of the vertebral column – flexors, extensors, rotators, lateral flexors
- 5 Describe the effect of injury and developmental defects
- 6 Lumbar – pelvic rhythm, Motions of the vertebral column

#### **E.THE SHOULDER COMPLEX**

- 1 Describe the structural components of the shoulder complex including the articulating surfaces, capsular attachment, ligaments, movements of the following joints, Sternoclavicular, Acromioclavicular, Scapulothoracic, Glenohumeral
- 2 Describe the function of the shoulder complex including dynamic stability of the Glenohumeral joint, scapulothoracic contributions
- 3 Describe the muscles of elevation (deltoid, supraspinatus, infraspinatus, teres minor, Subscapularis, upper trapezius, lower trapezius, serratus anterior, middle trapezius and Rhomboids
- 4 Describe the muscles of depression (Lattismus dorsi, pectoralis, teres major, and rhomboids)
- 5 Scapulohumeral rhythm, Coracoacromial arch.

#### **F.THE ELBOW COMPLEX**

- 1 Describe the structure of the humeroulnar, humeroradial including articulating surfaces, Joint capsule, ligaments, muscles
- 2 Describe the function of humeroulnar and humeroradial joints including the axis of motion, range of motion, muscle action
- 3 Describe the structure and function of superior and inferior radioulnar joint
- 4 Describe the stability and mobility of the elbow complex
- 5 Carrying angle
- 6 Factors limiting range of motion in flexion and extension, supination and pronation

#### **G.THE WRIST AND HAND COMPLEX**

- 1 Describe the structure of wrist complex including radio carpal joint, mid carpal joint, and the ligaments of the wrist complex.
- 2 Describe the function of the radio carpal joint and mid carpal joint including the movements and muscles involved
- 3 Describe the hand complex including structure of fingers – CMC, MCP, IPJ of fingers, Ligaments, range of motion
- 4 Describe the structure of the CMC, MCP, IP joints of thumb
- 5 Describe the extrinsic and intrinsic thumb muscles

- 6 Describe prehension, power, cylindrical, spherical and hook grip
- 7 Describe precision handling – pad to pad, tip top tip, pad to side prehension and
- 8 Functional position of the wrist
- 9 Role of interossei and lumbricals muscles at the MCP IP joints.

## **H.THE HIP COMPLEX**

- 1 Describe the structure of hip joint including the articulating surfaces on the pelvis and femur, angulations, angle of torsion, internal architecture of femur and pelvis, ligaments and muscles.
- 2 Describe the function of hip – rotation between pelvis, lumbar spine, and hip: pelvic Motion – anterior posterior pelvic tilting, lumbar pelvic rhythm, lateral pelvic tilting and Pelvic rotation.
- 3 Describe femoral motion
- 4 Describe hip stability in erect bilateral stance, sagittal plane equilibrium and unilateral stance
- 5 Describe reduction of forces with weight shifting and using a cane and deviations from normal in muscular weakness and bony abnormalities
- 6 Coxa valga and coxa vara on the basis of hip stability and mobility
- 7 Ante version and retroversion on the basis of hip stability and mobility

## **I.THE KNEE COMPLEX**

- 1 Describe the structure of the tibiofemoral joint – articulating surfaces on femur and tibia, The menisci, joint capsule and bursa, ligaments and other supporting structures Anterior – posterior and medial – lateral stability, muscle structure:
- 2 Knee flexors and Extensors: axes of knee complex: mechanical axis: anatomic axis and axis of motion.
- 3 Describe the function of the tibiofemoral joint: range of motion, flexion and extension, rotation, abduction and adduction, locking and unlocking, functions of menisci and Muscle function
- 4 Describe the structure and function of patellofemoral joint
- 5 Describe the effects of injury and disease in the tibiofemoral joint and patellofemoral Joint
- 6 Q angle, Bursa around the knee

## **J.THE ANKLE AND FOOT COMPLEX**

- 1 Describe the structure – ankle joint, tibia fibular joint, transverse tarsal joint, tarsometatarsal joint, metatarsophalangeal joints, and interphalangeal joint
- 2 Describe about arches of foot
- 3 Describe dorsi flexion and plantar flexion, inversion and eversion, adduction and abduction, supination and pronation relating to ankle foot complex.
- 4 Extrinsic and intrinsic muscles of the foot

**K.POSTURE**

- 1 Describe the effects of gravity and indicate the location of the gravity line in the sagittal Plane in optimal posture
- 2 Analyze posture with respect to the optimal alignment of joints in the AP and lateral view
- 3 Role of muscles and ligaments that maintain gravitational moments in erect posture
- 4 Explain the postural deviations – pesplanus, hallusvalgus, pescavus, idiopathic scoliosis, Kyphosis, lordosis

**L.GAIT**

- 1 Gait – Stance, Swing, Double support phases of gait and its sub division, parameters of gait
- 2 Analyze joint motion at hip, knee and ankle of the extremity during gait cycle
- 3 Describe the muscle activity at hip, knee and ankle throughout the gait cycle and muscle activity at the trunk and upper extremities.
- 4 Pathological gait and its biomechanical implications.

**EXERCISE THERAPY - I****CHAPTER A - INTRODUCTION TO EXERCISE THERAPY & APPLIED BIOMECHANICS**

1. Introduction
2. Effect of therapeutic exercise
3. Types of skeletal muscle fibers (Type I & Type II)
4. **Classification of muscle-Based on arrangement of fascicule**
  1. **Parallel**-Strap, fusiform, rhomboidal, triangular
  2. **Oblique**-Unipennate, bipennate, multipennate
  3. **Circular**
5. **Types of muscular contraction**  
Isotonic, Isometric, Concentric, Eccentric
6. **Group muscle action**  
Agonist, Antagonist, Neutralizer, Stabilizer or Fixator
7. **Range of muscle work**  
Full range, Inner range, Middle range, Outer range

**APPLIED BIO-MECHANICS**

1. **Anatomical movement**
  - a. Flexion, Extension, Abduction, Adduction, Medial rotation, Lateral rotation,
  - b. Circumduction, Inversion, Eversion, Dorsi flexion, plantar flexion, Protraction
  - c. Retraction, Supination, Pronation, Elevation, Depression.
2. **Range of motion (ROM)**-Definition, Types-Active Rom, Passive Rom
3. **Kinematic chain**-Types-Open and Closed chain, Examples
4. **Active and Passive insufficiency**-Definition, Examples
5. **Type of motion**-Angulatory or Rotatory, Translation or Linear, Curvilinear
6. **Force**-Composition, Parallelogram of force
7. **Gravity**-Centre of gravity, Line of gravity
8. **Equilibrium**-Stable, Unstable, Neutral

9. **Pulley**-Fixed and Movable
10. **Springs**-Series and Parallel
11. **Levers**-I st order, II nd order, III rd order, Examples, Application in PT
12. **Axis**-Sagittal, Frontal, Transverse, Vertical
13. **Planes**-Sagittal, Frontal, Horizontal
14. Newton laws of motion
15. Definition of speed, Velocity, Work, Energy, Power, Acceleration, Momentum
16. Friction, Inertia
17. Normal pelvic tilt, anterior pelvic tilt, posterior pelvic tilt, Lateral tilt, muscles
18. Responsible for alternation and corrective measures

## CHAPTER B - STARTING POSITION AND DERIVED POSITION

### 1. Starting position

Definition, Purpose, **Positions**-Standing, Sitting, Lying, Kneeling, Hanging

### 2. Derived position

Definition, Purpose, **Positions**-

**Standing**-High standing, Walk standing, Stride standing, Step standing

Toe standing, half standing, Cross standing

**Sitting**-Crook sitting, Long sitting, Stoop sitting, Squatting, Side sitting

**Lying**-Prone lying, half lying, Crook lying, side lying

**Kneeling**-Half kneeling, kneel sitting, prone kneeling, inclined prone kneel

**Hanging**-Half hanging

## CHAPTER C-ACTIVE AND PASSIVE MOVEMENT

1. Introduction

2. **Classification of movement**-Active & Passive

3. **Active movement**-Definition, Indication, Effect, Types- Free, Active assisted, assisted resisted, resisted

4. **Passive movement**-Definition, Types- Relaxed passive movement-upper & lower extremity, Passive manual mobilization-mobilization of joint, Manipulation of joint, Stretching of soft tissues

## CHAPTER D – RELAXATION

1. Introduction

2. Indication

3. **Relaxation techniques**-Local, General, Others

### 4. Local relaxation

Therapist massage

Passive movement

Muscle energy techniques

Hold relax

Contract relax

### 5. General relaxation

Contrast method

Reciprocal inhibition

**6. Other relaxation**

- Mental imagery
- Autogenic training
- Yoga & Meditation
- Music therapy
- Creational activities
- Social modality

**CHAPTER E - MAT ACTIVITIES & FUNCTIONAL RE-EDUCATION**

## 1. Introduction

**2. Demonstrate common mat activities**

- Rolling-Prone on elbows-Prone on hands-Hook lying-Bridging-Quadruped position-Long sitting-Short sitting-Kneeling-Half kneeling-Standing-Walking

**CHAPTER F - HYDROTHERAPY**

## 1. Introduction

## 2. Definition

**3. Principle**

- Buoyancy
- Hydrostatic pressure
- Hydrodynamic pressure
- Turbulence

## 4. Indication &amp; Contraindication

## 5. Physiological &amp; Therapeutic effects

## 6. Advantages

**7. Types of hydrotherapy**

- Hubbard tank
- Hydrotherapy pool
- Foot bath
- Body wraps
- Contrast bath

## 8. Exercises in hydrotherapy

**CHAPTER G - POSTURE**

## 1. Definition

## 2. Postural control

## 3. Standard posture

4. **Types of posture**-Standing & Dynamic**5. Faulty or Abnormal postures**

- Excessive lordosis
- Kyphotic lordosis
- Sway back
- Flat back
- Flat neck
- Scoliosis
- Forward head
- Assessment of posture

## CHAPTER H - GAIT, HUMAN LOCOMOTION , WALKING AIDS/ CRUTCH WALKING

1. Introduction
2. Definition
3. Gait cycle
4. Phases of gait
5. Muscular activity during stance & swing phase
6. **Characteristic of normal gait**

Vertical displacement of COG (Pelvic tilt), Lateral pelvic tilt, Horizontal dip of Pelvis, Pelvic forward and backward rotation, Knee flexion, Double limb support, Single limb support, cadence, step length, stride length, step duration, stride duration, Base width, Degree of toe out or foot angle

7. **Pathological gait**
  - Trendelenburg gait
  - Circumductory gait
  - Hip hiking gait
  - Foot drop gait
  - Calcaneal gait
  - Flexed knee gait
  - Scissoring gait
  - Parkinson gait
  - Antalgic gait
  - Wide base gait
  - Lordotic gait
  - Anterior trunk bending
  - Posterior trunk bending

### WALKING AIDS

1. Definition
2. Indication
3. **Types of walking aids**
  - Crutches
  - Canes
  - Walkers
  - Wheel chair

#### 4. **Crutches**

**Types**-Axillary, Elbow or Forearm, Gutter

**Measurement for crutches**-Axillary & Elbow

**Parts of crutch**-Axillary & Elbow

Crutch muscles and preparatory exercise

**Gait pattern**-Four point gait, two point gait, three point gait, PWB, NWB

Swing to & Swing through, stair climbing

#### 5. **Canes**

Purpose

**Types of cane**-Standard cane, Standard adjustable canes, Tripod, Quadripod

**Gait pattern**-Three point gait, two point gait

**6. Walkers**

Purpose

Parts

**Types**-Rigid walking frame, Foldable walker, Rollator, Reciprocal walker, Gutter Walker

**7. Wheel Chair**

Introduction

Purpose

**Parts of wheel chair**

Wheels, tyres, wheel locks, casters, hand rim, foot rest, tilt bar, seat and back rest.

**Measurement**

Seat width, Seat height, Seat depth, Back rest height, Arm rest height.

**Types of wheel chair**

Rigid, Foldable, One arm driven wheel chair, Powered wheel chair

**CHAPTER I - MUSCLE GRADING/MANUAL MUSCLE TESTING**

1. Introduction
2. Principles
3. Uses
4. Precaution & Contraindication

**Types of muscle grading**

Available ROM method

Make or Break test

Active resistance test

**Grading system**

Medical Research Council (MRC)

Plus & Minus grade

Daniels & Worthingham

Kendall & Kendall

**Demonstrate the skill to grade**

Upper limb muscle

Lower limb muscle

Trunk muscle

**CHAPTER J - MUSCLE STRENGTHENING/RE-EDUCATION OF MUSCLES**

1. Definition
2. **Demonstrate various reeducation techniques on different group of muscles of**  
Upper extremity, lower extremity, trunk.
3. **Demonstrate the progressive exercise in strengthening using various methods**  
(According to muscle power-Grade I to Grade V)



## CHAPTER K - RESISTED EXERCISE

1. Definition
2. **Types of resisted exercise**-Manual & Mechanical
3. **Manual**-Definition, principle, technique by therapist & patient
4. **Mechanical**-Definition, principle, technique by weights, pulleys, spring
5. Uses of resisted exercise
6. **Progressive resisted exercise**
  - Definition
  - Repetition maximum (RM) method
  - Delorme & Watkins
  - Mac queen
  - Zinovieff (oxford technique)

## CHAPTER L - JOINT MOBILIZATION

1. Introduction
2. Definition
3. Joint range-Outer range, Middle range, Inner range
4. Causes of joint range limitation
5. Effect of prolonged immobilization
6. Indication & Contraindication
7. **Principle**
  - Position of patient
  - Position of therapist
  - Relaxation
  - Fixation
  - Support or Stabilization
  - Direction of movement
  - Force & Range / Distraction or Traction
  - Intensity & Duration
8. **Methods of peripheral joint mobilization**
  - Muscle relaxation techniques**
    - Free exercise
    - Hold relax
    - Contract relax
  - Muscle stretching techniques**
    - Forced passive movement
    - Passive stretching / self stretching
    - Mechanical stretching
  - Oscillatory technique**
  - Sustained translatory joint play techniques**

## EXERCISE THERAPY - II

### CHAPTER A - HISTORY, CLASSIFICATION, PHYSIOLOGICAL EFFECTS OF MASSAGE ON VARIOUS BODY SYSTEMS, THERAPEUTIC APPLICATION OF MASSAGE & SPORTS MASSAGE

1. **History of massage**
2. **Definition of massage**
3. **Mechanical points to be considered**

(Manipulation, time of day for treatment, comfort and support of patient-positioning, Draping, bolstering, position of operator, using body weight, contact and continuity)

1. **Technique** –Indications and contraindication

#### 2. **Classification of massage**

1. Based on character of Technique-
  - A. Stroking manipulation
  - B. Pressure manipulation
  - C. Vibratory manipulation
  - D. Tapotement or Percussion manipulation
2. Based on depth of tissue reached-
  - A. Light massage
  - B. Deep massage
3. Based on parts of body massaged-
  - A. General massage
  - B. Local massage
4. Based on means of application of pressure-
  - A. Manual massage
  - B. Mechanical massage

#### **Physiological effects of massage on various body systems**

(Effect on-circulatory system, excretory system, muscular system, nervous system  
Metabolic system, respiratory system, skin)

#### **MASSAGE TECHNIQUE**

**Stroking manipulation-** Superficial stroking, deep stroking or Effleurage

**Pressure manipulation-**

- A. Kneading-palmer & digital kneading, ironing

B. Petrissage-picking up, wringing, skin rolling

C. Friction-circular&transverse friction

**Percussion manipulation-**

Clapping, hacking, beating, pounding, tenting Contact heel percussion

**Vibratory manipulation-**vibratory& shaking

**TECHNIQUES USED FOR VARIOUS PARTS OF BODY**

**Massage for upper limb-**scapular region, shoulder joint, upper arm, elbow joint, Forearm, wrist joint, hand

**Massage for lower limb-**thigh, knee joint, leg, foot(ankle&toes)

**Massage for back-**neck and upper back, middle and lower back, gluteal region

**Massage for face**

**Massage for abdomen**

**SPORTS MASSAGE**

Introduction, role of massage in sports

**Massage manipulations-**stroking, effleurage, petrissage, acupressure, tapotement, Vibration, shaking

**Ice massage**

**Categories of sports massage-**pre event massage, intermediate massage, post Event massage

**THERAPEUTIC APPLICATION OF MASSAGE**

1. Relaxation
2. Oedema
3. Radical mastectomy
4. Venous ulcer
5. Painful neuroma
6. Bells palsy
7. Sprain and Strain
8. Fibrositis

**CHAPTER B – STRETCHING**

1. Definition
2. Indication & Contraindication
3. Purpose of stretching
4. Physiological changes in muscle to stretch

5. Neurological changes in muscle to stretch

## **6. Types of stretching**

Passive

Active or self stretching

PNF

Ballistic stretching

Dynamic

Isometric

### **1. Lower extremity muscle stretching**

Iliacus & psoas major, adductor, hamstring, Tensor fascia latae, quadriceps,

Tendo Achilles (gastrocnemius & sole us), Piriformis, Tibialis anterior,

Peroneus longus, Peroneus brevis, EHL, EDL, EDB

### **2 Trunk & Upper extremity stretching**

Low back extensors, Levator scapulae & upper fibers of trapezius,

Middle fibers of trapezius & Rhomboids major and minor, Pectoralis major,

Supraspinatus, Subscapularis, Infraspinatus & teres minor, Lattismus dorsi

Elbow flexors-biceps, Elbow extensors-triceps, Wrist extensors, Wrist

Flexors, Common extensors-ECRL, ECRB, ECV, ED, Wrist & finger flexors- FCR, FCU,

FDS, FDP, Intrinsic muscles of hand

## **CHAPTER C – GONIOMETRY**

1. Definition

2. Normal range of motion of joints

3. **Types of goniometer**

Universal goniometer

Gravity dependent goniometer or fluid goniometer

Pendulum goniometer

Electrogoniometer

Procedure or steps in joint range measurement

### **Demonstrate measuring of individual joint range using goniometer**

Shoulder joint, elbow joint, radioulnar joint, wrist joint, MCP joint, PIP joint, Hip joint,  
Knee joint, ankle joint, subtalar joint

**End feel**-Normal & Pathological

Precaution & Contraindication

## CHAPTER D - SUSPENSION THERAPY

### 1. Definition

### 2. Principle

Friction

Pendulum

Eliminating gravity movement

Advantages & Disadvantages

### 3. Suspension Instruments

Suspension frame

Supporting ropes

Pulleys

Slings

S-hook and dog clip

Wooden cleat

### 4. Procedure

### 5. Types of suspension

Axial suspension

Vertical suspension

Pendular suspension

### 6. Demonstrate suspension therapy for upper extremity & lower extremity

### 7. Upper extremity- shoulder Flexion, Extension, Medial Rotation, Lateral Rotation, Abduction, Adduction, elbow Flexion, Extension

### 8. Lower extremity- Hip Flex, Extension, Abduction, Adduction, Medial Rotation, Lateral Rotation, knee Flexion, Extension

## CHAPTER E - BALANCE EXERCISES

### 1. Balance

Definition

Cause of balance disorder

Condition

Evaluation

Balance exercise

**2. Balance evaluation**

Romberg test

Hall pike test

Functional reach test

**3. Balance exercise**

Exercise for weakness

Exercise for movement strategies

Static balance exercise

Dynamic balance exercise

Balance exercise for vestibular dysfunction

**CHAPTER F - CO- ORDINATION EXERCISES****1. Co-ordination**

Definition

Causes of co-ordination disorder

Condition

Tests for co-ordination

Co-ordination exercise

**2. Co-ordination test**

Standing

Walking

Sitting or Supine

Finger to nose

Finger to therapist finger

Finger to finger

Alternate nose to finger

Finger opposition

Pronation /Supination

Alternate heel to knee

Drawing an imaginary circle on air with UE & LE

Position holding

Rebound test

### **3. Co-ordination exercise**

#### **Frenkel exercise in**

Supine, Sitting, Walking

#### **Functional activity retraining**

Brushing

Combing hair

Pick up small object from table or floor

Practice writing

Draw numbers or alphabets

## **CHAPTER G - CHEST PHYSIOTHERAPY**

1. Definition

2. Physiological basis

### **3. Classification**

Vibration or Shaking

Percussion or Clapping

## **CHAPTER H - BREATHING EXERCISES**

1. Definition

2. Indication & Contraindication

3. Physiological effect

### **4. Types of Breathing Exercises**

Diaphragmatic breathing exercise

Apical breathing, Costal breathing, Posterior basal

Glossopharyngeal

Pursed lip breathing

Inspiratory hold

## **CHAPTER I - DESCRIBE THE COMPLICATIONS TO PATIENTS DUE TO PROLONGED BED REST/ DEMONSTRATION, MAINTENANCE EXERCISE FOR PATIENTS ON PROLONGED BED REST**

## **CHAPTER J - GROUP EXERCISE**

1. Introduction

2. Advantages & Disadvantages

3. Indication

**4. Formation of group**

Space

Selection of patients

Number of patients

Instruction to patients

Group type

**5. Type of exercise****CHAPTER K – TRACTION****1. Definition****2. Mechanism of action of traction****3. Indication & Contraindication of traction****4. Types of traction****A. Based on methods of application-**1. Manual

2. Mechanical

3. Positional

4. Inversion

5. Hydraulic

**B. Based on nature of pull -** 1. Continuous traction

2. Sustained traction

3. Intermittent traction

**C. Based on regions applied -**

1. Cervical traction

2. Lumbar traction/Pelvic traction

**5. Traction parameters - (Weight, Time, Hold, Relax)****CHAPTER L - PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF)****1. Introduction****2. Definition****3. Principles**

Pattern of motion

Diagonals

Motion components



**4. Basic procedure**

Agonist & Antagonist  
 Traction & Approximation  
 Normal timing  
 Stretch stimulus  
 Stretch reflex  
 Manual contact  
 Command & Communication  
 Line of movement

**5. PNF patterns for Upper Extremity**

D1 Flexion, D1 Extension, D2 Flexion, D2 Extension

**6. PNF pattern for Lower Extremity**

D1 Flexion, D1 Extension, D2 Flexion, D2 Extension

**7. Demonstrate PNF Technique**

**Repeated contractions**

**Slow reversals**

**Rhythmic stabilization**

**Hold relax**

**Rhythmic initiation**

**MICROBIOLOGY & PATHOLOGY**

**EXAMINATION AT END OF-II YEAR  
 INSTRUCTION HOURS- 100 HOURS**

**COURSE DESCRIPTION**

The course will enable students to understand the conditions in Microbiology and Pathology and its application in relation with physiotherapy.

**COURSE OBJECTIVES**

The objective of this course is that after 100 hours of lectures and demonstrations in Addition to clinical the student will be able to understand the causes, findings, investigations, management in relation with physiotherapy.

**MICROBIOLOGY (50 HOURS)**

- A. Introduction
- B. Classification, Shape and arrangement
- C. Disinfection and antiseptic

- D. Sterilization and asepsis
- E. Allergy & hypersensitivity
- F. **Immunology** – Definition, antigen, antibody reaction, autoimmunity, natural and Acquired immunity.
- G. **Infection** – Definition, source of infection, portal of entry, spread of infection, type.
- H. **Bacteriology** – Infection caused by
  1. Gram Positive bacteria – clostridium tetani & coryne bacterium diphtheria
  2. Gram negative bacteria – klebsiella, pseudomonas, salmonella, v.cholera
  3. Mycobacterium – M.tuberculosis, M.leprae, atypical mycobacteria
- I. **Outline the bacteria causing the following diseases**
  1. RTI
  2. Meningitis
  3. Enteric infection
  4. Anaerobic infection
  5. UTI
  6. Leprosy, TB
  7. STD
  8. Wound infection
  9. Hospital acquired infection
- J. **Viruses** – Definition, size, shape, structure, classification, cultivation, diagnosis of Viral infection.
- K. **Outline the virus causing the following diseases**
  1. HIV
  2. Hepatitis
  3. Polio
  4. Measles
  5. Rubella
  6. Herpes.

### **PATHOLOGY (50 HOURS)**

- L. **Introduction**
  1. General pathology – cell injury, causes
  2. Reversible injury – Types, morphology, swelling, hyaline, fatty change
  3. Irreversible injury – Types of necrosis, apoptosis, calcification, dystrophic, Metastasis
  4. Concepts of disease
- B. **Inflammation and repair**
  1. Acute inflammation – causes, features, examples
  2. Inflammatory cell and mediators
  3. Chronic inflammation – causes, features, examples
  4. wound healing
  5. Regeneration and repair.
- C. **Circulatory disturbance**
  1. Edema
  2. Chronic venous congestion
  3. Thrombosis
  4. Embolism
  5. Infarction

6. Gangrene
7. Shock

**D. Growth disturbance**

1. Atrophy
2. Neoplasia – benign & malignant

**E. Specific pathology**

1. CVS – atherosclerosis, IHD, MI, HT, CCF, RHD, peripheral vascular diseases.
2. RS – COPD, pneumonia – lobar, broncho, viral, acquired, TB – prim & sec, Atelectasis, asthma
3. Skin – leprosy
4. NS – CVA, coma, polio, Parkinsonism, myasthenia gravis
5. Bone and joint – arthritis, osteomyelitis, autoimmune disease, spondylosis, Osteomalacia, GOUT, Tenosynovitis, AS
6. Muscle – MD, polio, myopathies.

**ELECTROTHERAPY - I**

**LOW FREQUENCY AND MEDIUM FREQUENCY**

**EXAMINATION AT END OF-III YEAR  
INSTRUCTION HOURS- 150 HOURS**

**COURSE DESCRIPTION**

In this course the student will learn the principles, technique and effects of electrotherapy as a therapeutic modality in the restoration of physical function.

**COURSE OBJECTIVES**

The objective of this course is that after 250 hours of lectures, demonstrations, practicals and clinics the student will be able to list the indications and contraindications of various types of electrotherapy demonstrate the different technique and describe their effects.

**CHAPTER A-ELECTRICITY**

- 1 Definition and types
- 2 Therapeutic uses
- 3 Basic physics
- 4 Working
- 5 Importance of current in treatment
- 6 Uses

**CHAPTER B -BASIC CONCEPTS IN ELECTRICAL STIMULATION**

- 1 Resting Membrane Potential
- 2 Action Potential
- 3 Propagation of Action Potential
- 4 Motor Unit

**CHAPTER C-THERAPEUTIC CURRENT**

- 1 Definition
- 2 Principles
- 3 Types –Low Frequency current and Medium Frequency current
- 4 **Types of Low Frequency Current**
  - Interrupted Galvanic Current/Modified Direct Current/Interrupted Direct Current
  - Faradic Type Current
  - Tens
  - Iontophoresis
  - Sinusoidal Current
  - High Voltage Pulse Galvanic Stimulation (HVPGS)
  - Diadynamic Current
  - Functional Electrical Stimulation (FES)
- 5 **Types of Medium Frequency Current**
  - Interferential Current-1.2 Pole IFC (Russian Current-2000HZ, Medium Frequency Current-4000HZ)    2.4 Pole IFC (4000HZ-4100HZ)-Classical & Vector

**CHAPTER D -FARADIC CURRENT**

1. Definition, Type, Duration
2. Production, Surging of Faradic Current
3. Physiological effects & Therapeutic effects of Faradic Current
4. **Technique of application of Faradic Current**
  - Motor Point
  - Preparation of apparatus (Assembling, Testing)
  - Preparation of patient
  - Stimulation of motor point

**CHAPTER E-INTERRUPTED DIRECT CURRENT**

- 1 Definition, Type, Duration, Shape, Frequency
- 2 Production
- 3 Physiological effect & Therapeutic effect of Interrupted direct current
- 4 Effect of IGC on Innervated muscle & Denervated muscle
- 5 **Technique of application of IGC**
  - Motor Point
  - Preparation of apparatus (Assembling, Testing)
  - Preparation of patient
  - Stimulation of motor point

**CHAPTER F-SELECTION OF CURRENT**

- 1 Differentiate between types of current, duration, shape, frequency used in stimulating nerve and muscle

**CHAPTER G-ELECTRODIAGNOSIS**

1. Introduction
2. Definition
3. Physiological basis
4. **Principles of electro diagnosis**

SD Curve Rheobase,  
 Chronaxie  
 Electromyography (EMG)  
 Definition  
 Recording electrodes  
 Myoelectrical signal, amplifiers, display devices  
 Basic wave pattern of an EMG signal

Nerve Conduction Test (MCV, NCV)

H reflex

F Wave

Faradic-IDC

test

Galvanic tetanus ratio

#### 5. **SD Curve Test**

Definition

Type of current used, shape, frequency

Procedure

Advantage, Disadvantage

Characteristic of curve (Normal, Partial, Complete denervation)

Factors that affect accuracy of SD curve

### **CHAPTER H-BIO-FEEDBACK**

1. Definition
2. Basis of biofeedback
3. Principles of biofeedback
4. Uses of biofeedback
5. EMG bio feedback

### **CHAPTER I -TENS**

- 1 Definition
- 2 Neurophysiology of pain
- 3 Acute pain & chronic pain
- 4 Pain pathway
- 5 Neuromodulation of pain
- 6 **Pain modulation**- Gate control theory, descending pain suppression
- 7 **Parameter of Tens**-Waveform, Frequency, Pulse width, amplitude
- 8 **Type of Tens**- 1. High Frequency Low Intensity Tens or Conventional Tens
  2. Acupuncture like Tens
  3. Brief Intense Tens
  4. Burst Mode Tens
9. Electrode Placement, Advantage & Disadvantage of Tens, Uses of Tens and Contraindication of Tens

### **CHAPTER J -IONTOPHORESIS**

- 1 Definition
- 2 Physics of iontophoresis
- 3 Technique of application of iontophoresis
- 4 Ions commonly used in iontophoresis and their clinical indication
- 5 Physiological effect & Therapeutic effect of iontophoresis

- 6 Dosage of iontophoresis
- 7 Dangers & Contraindication of iontophoresis

### **CHAPTER K-INTERFERENTIAL CURRENT**

1. Definition
2. Production of interferential current
3. **Types of interferential current**
  1. Static interferential current or Classical interferential current (4 pole method)
  2. Dynamic interferential current or Isoplanar vector field (4 pole method) or Four electrodes with rotating vector
4. **Parameters of IFT**
  1. Quadripolar or Bipolar application
  2. Vector or Scanning mode
  3. Suction versus Plate electrode
  4. Current intensity
  5. Frequency sweep
  6. Amplitude modulated frequency
  7. Treatment duration
5. Indications & contraindication of IFC
6. Physiological effects of IFC
7. Dangers of IFC

## **ELECTROTHERAPY - II**

### **HIGH FREQUENCY AND ACTINOTHERAPY**

#### **EXAMINATION AT END OF-III YEAR INSTRUCTION HOURS- 200 HOURS**

### **COURSE DESCRIPTION**

In this course the student will learn the principles, technique and effects of electrotherapy as a therapeutic modality in the restoration of physical function.

### **COURSE OBJECTIVES**

The objective of this course is that after 200 hours of lectures, demonstrations, practicals and clinic the student will be able to list the indications and contraindications of various types of electrotherapy demonstrate the different technique and describe their effects.

### **CHAPTER A-SHORT WAVE DIATHERMY**

- 1 Definition
- 2 Principle of working
- 3 Indication & contraindication of SWD
- 4 **Bio-physics of deep heating using SWD**
  1. Capacitor or condenser field method
  2. Inductance or Magnetic field method
- 1 **Production**
  1. Construction-A. Machine circuit or Oscillator circuit B.Patient circuit or Resonator circuit

2. Mechanism of production of SWD
3. Indications for circuits to be in tune
4. Transmission of shortwave in to tissues
- 2 Technique or Method of application of SWD**
  1. Preparation of equipment (warming, tuning, testing of machine)
  2. **Application of treatment-** A. Condenser field method/Capacitor field method  
B. Cable method/Inductothermy
  3. **Condenser field method**
    - A. Type of electrode
    - B. Size of electrode
    - C. Electrode spacing-Wide & Narrow spacing
    - D. Electrode positioning -1. Co-planar
      2. Contra planar
      3. Mono planar
      4. Cross fire method
  4. **Cable field method**
    - A. Electrode
    - B. Electrostatic field & Magnetic field
    - C. Advantage
    - D. Dosage
- 3 Dangers of SWD
- 4 Precautions and contraindication of SWD
- 5 Pulsed Short Wave Diathermy**
  - A. Definition, Frequency, Wavelength
  - B. Production
  - C. Parameters-1. Pulse repetition rate (PRR)
    2. Pulse duration (PD)
    3. Peak pulse power (PPP)
  - D. Physiological effect
  - E. Indication & contraindication
  - F. Dosage

## **CHAPTER B-MICRO WAVE DIATHERMY**

- 1 Definition
- 2 Bio-physics of micro wave diathermy
- 3 Indication & contraindication of MWD
- 4 Production of MWD (Magnetron)
- 5 Technique of application of MWD**
  - A. Patient preparation
  - B. Selection of treatment applicator
  - C. Selection of appropriate power level And application of treatment
  - D. Dosage
  - E. Physiological & Therapeutic effects
  - F. Dangers

## **CHAPTER C-ULTRASOUND THERAPY**

- 1 Definition
- 2 Bio-physics of ultrasound
- 3 Indication & contraindication of ultrasound
- 4 Properties of ultrasound-Reflection, Transmission, Absorption
- 5 Ultrasonic field
- 6 Coupling media
- 7 Production of ultrasound
- 8 Technique of application of ultrasound**
  - A. Testing of machine
  - B. Application of ultrasound**
    1. Direct contact method
    2. Water bath method
    3. Water bag method
  - C. Treatment parameters**
    1. Intensity
    2. Mode-Continuous or Pulsed
    3. Frequency-1 MHz or 3 MHz
    4. Treatment duration
    5. Pulsed mark: Space ratio
- 1 Dosage
- 2 Physiological & Therapeutic effects of ultrasound
- 3 Dangers of ultrasound
- 4 Phonophoresis**
  - A. Definition
  - B. Principle of working
  - C. Drugs used in phonophoresis
  - D. Techniques of application of phonophoresis
  - E. Contraindication

## **ACTINOTHERAPY**

### **CHAPTER A-BASICS**

- 1 Define heat and temperature
- 2 Physical effect of heat
- 3 Transmission of heat
- 4 Radiation energy and its properties
- 5 Electro magnetic spectrum
- 6 Laws governing radiation
- 7 Skin-Structure, Depth of penetration, Functions

### **CHAPTER B-INFRARED RADIATIONS**

- 1 Definition
- 2 **Production**-Types of generators (Luminous & Non-Luminous), Working
- 3 Indication & Contraindication
- 4 Physiological & Therapeutic effect of IRR



- 5 Dangers
- 6 **Technique of treatment**
  - A. Choice of apparatus
  - B. Arrangement of lamp and patient
  - C. Preparation of patient
  - D. Application of treatment
  - E. Treatment frequency and duration

## **CHAPTER C-ULTRA VIOLET RADIATION**

- 1 Definition
- 2 Classification
- 3 **Production of UVR**
  1. **Mercury vapour lamp**-1. Air cooled medium pressure Mercury vapor lamp (Alpine Sun Lamp)
    2. Water cooled medium pressure Mercury vapor Lamp (Kromayer Lamp)
  2. **Fluorescent Tube** (Theraktin Tunnel)
    - 1 Tridymite formation
    - 2 Cooling of lamp
  - 3 **Technique or principle of application of treatment**
    - A. Preparation of patient
    - B. Preparation of apparatus
    - C. Setting up
    - D. Application
    - E. Progression
- 1 **Dosage**
  - A. Test dose
  - B. Calculation of progression of dosage
- 2 PUVA apparatus
- 3 Care of lamp
- 4 Sensitizers, Photosensitization, Filters
- 5 Erythema, Pigmentation, Penetration
- 6 Indication & Contraindication
- 7 Physiological effect & Therapeutic effect of UVR
- 8 **Demonstrate of UVR for following conditions**  
Acne-shoulder&chest, back&chest, Alopecia areata & Totalis, Psoriasis, ulcer Pressure sore, Rickets, General body bath

## **CHAPTER D-LASER**

- 1 Definition
- 2 **Properties of laser**
  - A. Monochromaticity
  - B. Coherence
  - C. Collimation
- 1 **Production of laser**
  - A. Lasing medium
  - B. Resonating chamber
  - C. Energy source

- 2 **Types of laser**
  - A. Ruby laser or crystal laser
  - B. Helium-neon laser or gas laser
  - C. Diode laser or semiconductor laser
- 3 **Technique of application**
  - A. Grid method
  - B. Scanning method
- 4 **Dosage parameters**  
(Area of treatment, energy density, pulse repetition rate, power output, irradiation)
- 5 Indications & Contraindications
- 6 Physiological effect & Therapeutic effect
- 7 Dangers

#### **CHAPTER E-SUPERFICIAL HEAT MODALITIES**

- 1 **Moist hot packs**-Definition, Working, Technique of application
- 2 **Hydro collator pack**-Definition, Apparatus, working, Technique of application
- 3 **Paraffin wax bath**-Definition, apparatus, Technique of application
- 4 **Whirl pool bath**-Definition, apparatus, Technique of application
- 5 **Hubbard tank**-Definition, apparatus, Technique of application

#### **CRYOTHERAPY**

- 1 Definition
- 2 Biophysics
- 3 Indication & contraindication
- 4 **Technique of application**
  - A. Ice pack
  - B. Ice massage
  - C. Cold pack
  - D. Cold whirlpool
  - E. Cryo-cuff
  - F. Cold spray
  - G. Cryo stretch
  - H. Cryo kinetics
- 5 **Contrast bath**-Definition, Principle, Technique of treatment, Indication, Contraindication

#### **COMMUNITY MEDICINE**

#### **EXAMINATION AT END OF-III YEAR INSTRUCTION HOURS- 55 HOURS**

#### **COURSE DESCRIPTION**

The course will enable students to understand the effects of the environment and the community dynamics on the health of the individual.

#### **COURSE OBJECTIVES**

The objective of this course is that after 55 hours of lectures and demonstrations the student will be able to demonstrate an understanding of the influence of social and environmental factors of health of individual and society.

- A. Outline the natural history of diseases and the influence of social, economic and cultural aspects of health and diseases.
- B. Outline the various measures of prevention and methods of intervention especially for diseases with disability.
- C. Outline the natural care delivery system and the public health administration system at central and state government level- primary health care, school health, health team at district hospitals and PHC, voluntary and international agencies in health care.
- D. Outline selective national health schemes.
- E. Define occupational health and list methods of prevention of occupational hazards.
- F. Outline the Employees State Insurance scheme and its benefit
- G. Describe the social security measures for protection from occupational hazards, Accidents, diseases and workman compensation act.
- H. Define community based rehabilitation, institution based rehabilitation. Describe the advantages and disadvantages of institution based and community based Rehabilitation.
- I. Describe the following communicable diseases with reference to water reservoir, Mode of transmission, route of entry and levels of prevention
  - A. Poliomyelitis
  - B. Meningitis
  - C. Encephalitis
  - D. Tuberculosis
  - E. Filariasis
  - F. Leprosy
  - G. Tetanus
  - H. Measles
- J. Describe the epidemiology of Rheumatic heart disease, cancer, chronic Degenerative disease, cerebrovascular accident
- K. Outline the influence of nutritional factors such as protein energy malnutrition, Anemia, vitamin deficiency and minerals on disability, nutritional programmes, Balanced diet, nutritional requirement and source, food adulteration.
- L. List the principles of health education, methods of communication and role of Health education in rehabilitation service-AV aids, planning a health education Programme.
- M. Define the role of community leaders and health professional in health education.
- N. Outline the role of international health agencies in rehabilitation of the disabled.

## **CLINICAL ORTHOPAEDICS FOR PHYSIOTHERAPY**

### **EXAMINATION AT END OF-III YEAR INSTRUCTION HOURS-55 HOURS**

#### **COURSE DESCRIPTION**

Following the basic science and clinical sciences course introduce the student to the Orthopedic conditions which commonly cause disability. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitations imposed by orthopedic pathology on the functioning of the individual

#### **COURSE OBJECTIVES**

The objective of this course is that after 55 hours of lectures and demonstrations in addition to clinics the student will be able to demonstrate an understanding of orthopedic conditions causing disability and their management

#### **A. INTRODUCTION TO ORTHOPAEDICS**

- 1 Introduction to orthopedic terminology
- 2 Clinical examination
- 3 Common investigations
- 4 Principles of management

#### **B. PRINCIPLES OF OPERATIVE TREATMENT**

- 1 Indications
- 2 Contraindications
- 3 Outline principles of: arthrodesis, Arthroplasty, Osteotomy, Bone grafting, Tendon transfers.

#### **C. SOFT TISSUE LESIONS**

- 1 Sprains and Muscle strains
- 2 Capsulitis
- 3 Bursitis
- 4 Tenosynovitis
- 5 Fascitis
- 6 Tendonitis

#### **D. FRACTURES AND DISLOCATIONS**

- 1 Types of fractures including patterns, open and closed fractures – dislocations.
- 2 Difference between dislocation and subluxation
- 3 General and local signs & symptoms of fractures, dislocations
- 4 Principles of management of fracture, dislocations
- 5 Prevention and treatment of complication – VIC, sudecks atrophy, carpal tunnel syndrome, myositis ossificans, shoulder-hand syndrome
- 6 Fracture healing

**E. UPPER LIMB FRACTURES**

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

**F. LOWER LIMB FRACTURES**

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

**G. SPINAL FRACTURES**

- \* Outline the mechanism, clinical features, principles of management, complications.

**H. DISLOCATIONS**

- \* Outline the mechanism, clinical features, principles of management and complications of recurrent dislocation of the shoulder and patella.

**I. AMPUTATIONS**

1. Classify amputations, list indication of surgery
2. Principles of amputation
3. Principles of management
4. Complications and management

**J. BONE AND JOINT INFECTIONS**

- \* Outline the etiology, clinical features, management, complications – septic arthritis, Osteomyelitis, tuberculosis – including spinal TB.

**K. BONE AND JOINT TUMORS**

- \* Classify and outline the clinical features, management and complications of the following: Benign and malignant bone tumor, osteoma, osteosarcoma, osteoclastoma, Ewing sarcoma, multiple myeloma.

**L. CHRONIC ARTHRITIS**

- \* Outline the pathology, clinical features, mechanism of deformities, management and Complications of – RA, OA, AS.

**M. LOW BACK PAIN**

- \* Definition, causes of low back ache, clinical findings, assessment, management

**N. SPINAL DEFORMITIES**

- \* Classify spinal deformities and outline the salient clinical features, management And complication

**O. POLIOMYELITIS**

1. Describe the pathology, clinical features, pathology, prevention, management,
2. Residual problems of polio, treatment of residual paralysis,
3. Principles of muscle transfers

**P. CONGENITAL DEFORMITIES**

- \* Outline the clinical features and management of CTEV, CDH, Flat foot, vertical talus, limb deficiency – radial club hand, femoral, tibial, fibular deficiency, meningomyelocele,

arthrogryposis multiplex congenital, osteogenesis imperfecta.

### **Q. PERIPHERAL NERVE INJURIES**

Outline the clinical features, management, and reconstructive surgery of

1. Radial, median and ulnar nerve lesions
2. Sciatic and lateral popliteal nerve lesions
3. Brachial plexus injuries including Erbs palsy, Klumpke palsy, crutch palsy.

### **R. HAND INJURIES**

- \* Outline the clinical features, management and complications of Tendon, bone, and joint Injury.
- \*

### **S. LEPROSY**

- \* Outline clinical features, management and complications of neuritis, muscle paralysis, Tropic ulcer of hand and feet deformities.

## **CLINICAL NEUROLOGY FOR PHYSIOTHERAPY**

### **EXAMINATION AT END OF-III YEAR INSTRUCTION HOURS-55 HOURS**

### **COURSE DESCRIPTION**

Following the basic science and clinical science course, this course introduces the Student to the neurological conditions which commonly cause disability.

### **COUSE OBJECTIVE**

The objective of this course is that after 55 hours of lectures and demonstration the student will be able to demonstrate an understanding of Neurological conditions causing disability and their management. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitations imposed by neuropathology on the functioning of the individual

### **A. NEUROANATOMY**

- 1 Basic anatomy of brain and spinal cord
- 2 Blood supply of brain and spinal cord
- 3 Anatomy of the visual pathway
- 4 Connections of the cerebellum and extra pyramidal system
- 5 Relationship of spinal nerve to the spinal cord segments
- 6 Tract of the spinal cord
- 7 Brachial, lumbar and sacral plexuses
- 8 Cranial nerves.

### **B. NEUROPHYSIOLOGY**

Neurophysiologic basis of tone, disorder of tone, posture, bladder control, muscle contraction, movement, and pain.

### **C. ASSESSMENT**

- 1 Basic history taking to determine whether the brain, spinal cord, peripheral nerve is involved
- 2 Assessment of higher mental function – orientation, memory, attention, speech, language
- 3 Assessment of cranial nerves
- 4 Assessment of motor power
- 5 Assessment of sensory function – touch, pain, temperature, position
- 6 Assessment of tone – spasticity, rigidity, and hypotonia.
- 7 Assessment of cerebellar function
- 8 Assessment of higher cortical function – apraxia
- 9 Assessment of gait abnormalities

### **D. CLINICAL FEATURES AND MANAGEMENT**

#### **1. Congenital childhood disorders**

Cerebral palsy  
Hydrocephalus  
Spina bifida

#### **2. Cerebrovascular accidents**

Definition, etiology, classification – thrombotic, embolic, hemorrhagic  
Clinical findings, management.

#### **3. Trauma**

Head injury  
Spinal cord injury

#### **4. Diseases of the spinal cord**

Craniocerebral junction anomalies  
Syringomyelia  
Cervical and lumbar disc lesions  
Tumors  
Spinal archnoiditis

#### **5. Demyelinating diseases**

Guillain – barre syndrome  
Acute disseminated encephalomyelitis  
Transverse myelitis  
Multiple sclerosis

#### **6. Degenerative disorders**

Parkinson disease  
Dementia

#### **7. Infections**

Pyogenic meningitis sequelae  
Tuberculous infection of CNS  
Poliomyelitis  
Tabes dorsalis  
HIV infection Encephalitis

**8. Disease of the muscle**

Myopathies  
Muscular dystrophy  
Spinal muscular atrophy

**9. Peripheral nerve disorders**

Peripheral nerve injuries  
Entrapment neuropathies  
Peripheral neuropathies

**10. Spinal cord lesions**

Paraplegia Quadriplegia  
Neurogenic bladder

**11. Miscellaneous**

Disorders of ANS  
Epilepsy  
Myasthenia gravis  
Intracranial tumors  
Motor neuron disease  
Alzheimer disease

**CLINICAL CARDIO-RESPIRATORY DISEASES FOR PHYSIOTHERAPY**

**EXAMINATION AT END OF-III YEAR  
INSTRUCTION HOURS-55 HOURS**

**COURSE DESCRIPTION**

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

**COUSE OBJECTIVE**

The objective of this course is that after 55 hours of lectures and demonstration in addition to clinics the student will be able to demonstrate an understanding of Cardio-thoracic conditions causing disability and their management. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitations imposed by cardiovascular pathology on the functioning of the individual

**A. ANATOMY AND PHYSIOLOGY****1 Respiratory system**

Upper respiratory tract  
Lower respiratory tract – Trachea, Bronchial tree, Bronchopulmonary segments  
Respiratory unit, hilum of lung.



Muscles of respiration

Pleura, intra pleural space, intra pleural pressure, surfactant

Mechanics of respiration – Chest wall movements, lung & chest wall compliance

V/Q relationship, airway resistance

Respiratory centre, Neural & chemical regulation of respiration

Lung volumes and lung capacities, Spiro meter, lung function test

Pulmonary circulation, Lung sounds, cough reflex

## 2 Cardiovascular system

Chambers of heart, semi lunar and atria ventricular valves ,Coronary circulation, conductive system of heart Cardiac cycle, ECG, Heart sounds Blood pressure, pulse, cardiac output

### **B. CARDIO VASCULAR SYSTEM**

1. Define, etiology, pathogenesis, clinical features, complications, Conservative and surgical management of the following conditions

1. Ischemia heart disease
2. Myocardial infarction
3. Heart failure
4. Cardiac arrest
5. Rheumatic fever
6. Hypertension
7. Infective endocarditis
8. Myocarditis & cardiomyopathy

2. Surgical conditions that require post surgical Physiotherapy.  
Open heart surgery (OHS) and closed heart surgery (CHS)

Thoracotomy – Median sternotomy

Heart lung machine

Angioplasty

CABG

PTCA

Valve replacement

Valvotomy

Conditions requiring CHS – Mitral stenosis, Aortic stenosis, PDA, COA

Conditions requiring OHS-ASD, VSD, PS, TOF, TPGV, MS, MR, AS, AR

Describe the principles of cardio vascular stress testing.

### **C. RESPIRATORY SYSTEM**

1. Define, etiology, pathogenesis, clinical features, investigation, complications, Conservative and surgical management of the following conditions
  1. COPD – chronic bronchitis and Emphysema
  2. Bronchial asthma
  3. Suppurative disease- Bronchiectasis, Lung abscess
  4. Common infectious disease-Pulmonary TB, Pneumonia
  5. Interstitial lung disease
  6. Occupational lung disease
  7. Pulmonary vascular disease-pulmonary HT, pulmonary thromboembolism
  8. Cancer lung
  9. Aspergillosis
  10. Cystic fibrosis
  11. Disease of pleura- Pneumothorax, hydropneumothorax, pleural effusion, Empyema
2. **Chest wall injuries**
  - Fracture rib
  - Flail chest
  - Pneumothorax
  - Haemothorax
  - Haemopneumothorax
  - Lung contusion
  - Injury to great vessels and bronchus

### **3. PHYSIOTHERAPY FOR THORACIC SURGERIES**

**Thoracotomy**  
**Lobectomy**  
**Pneumonectomy**  
**Decortication**

4. Describe about suctioning during chest physiotherapy – Indications, types, steps, and complications

### **BIO-STATISTICS AND RESEARCH METHODOLOGY**

**Non Examination Paper**

**20 Hours**

Research methods and methodology

Research process

Research design

Collection of data

Sampling methods

Data analysis, interpretation and presentation

Central tendency and dispersion

Correlation and regression

Testing hypothesis.

### PHYSICAL MODALITIES MAINTANENCE

**Non Examination Paper**

**30 hours**

### **BIO-PHYSICS**

#### **1. Physical principles**

- 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 Importance of currents in treatment.
- d) **Static Electricity:** Production of electric charge. Characteristic of a charged body. Characteristics of lines of forces. Potential energy and factors on which it depends. Potential difference and EMF.
- e) **Current Electricity:** Units of Electricity: farad, Volt, Ampere, Coulomb, Watt
- f) **Condensers:** Definition, principle, Types- construction and working, capacity & uses.
- g) **Alternating current.**
- h) **Magnetism:** Definition. Properties of magnets. Electromagnetic induction.

Transmission by contact. Magnetic field and magnetic forces. Magnetic effects of an electric field.

- i) Conductors, Insulators, Potential difference, Resistance and intensity
- j) Ohm's law and its application to DC and AC currents. Fuse: construction, working and application.
- k) Transmission of electrical energy through solids, liquids, gases and vacuum.
- l) **Rectifying Devices**-Thermionic valves, Semiconductors, Transistors, Amplifiers, transducer and Oscillator circuits.
- m) Display devices and indicators-analogue and digital.
- n) **Transformer:** Definition, Types, Principle, Construction, Eddy current, working uses
- o) **Chokes:** Principle, Construction and working, Uses

#### **2. Effects of Current Electricity**

- a) Chemical effects -Ions and electrolytes, Ionisation, Production of an EMF by chemical actions.
- b) Electromagnetic Induction.
- c) Electromagnetic spectrum.

#### **3. Electrical Supply**

- a) Brief outline of main supply of electric current
- b) Dangers-short circuit, electric shocks.
- c) Precaution-safety devices, earthing, fuses etc.
- d) First aid and initial management of electric shock

#### **4. Various agents**

- 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.

### **PT IN ORTHOPEDIC CONDITIONS**

#### **EXAMINATION AT END OF-IV YEAR INSTRUCTION HOURS- 200 HOURS**

#### **COURSE DESCRIPTION**

This course serves to integrate the knowledge gained by the students in clinical orthopedics with the skills gained in exercise therapy, electro therapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to pathology in the musculoskeletal system.

#### **COURSE OBJECTIVES**

The objectives of this course in those 200 hours of lectures and demonstrations, practical and clinical, the student will be able to identify disability due to musculoskeletal dysfunction. Set treatment goals and apply their skills in exercise therapy, electro therapy and massage in clinical situation to restore musculo skeletal function.

#### **A. ASSESSMENT OF JOINTS & SPINE**

- 1 Subjective-** History
- 2 Objective** examination
- 3 Observation**  
Built, Tropical changes, Posture, attitude of the limb and deformity, Gait, External appliances
- 4 Palpation**  
Temperature, Texture, Tenderness, edema & Swelling, joint crepitation, pulse
- 5 Examination**  
Musculoskeletal examination  
Tone-Spasticity & Rigidity  
Motor examination-ROM, Joint play & End feel, Muscle power, Reflexes, Limb length, Muscle girth  
Sensory examination-Superficial & deep sensation, Pain assessment-onset, location, pattern, quality, rating, aggravating & relieving factors, type of pain
- 6 Respiratory**-chest expansion
- 7 Higher function**-Level of consciousness, mental status, communication
- 8 Functional assessment**
- 9 Special test**

## **B. FRACTURE AND DISLOCATION**

1. Define fracture. Review the types, signs and symptoms, principles of immobilization and healing of fracture.
2. Describe the PT assessment of a patient with a fracture during the immobilization And post immobilization period.
3. List the aims of PT management in a patient with a fracture.
4. Describe the methods of mobilization of a patient after healing of a fracture.
5. Review the mechanism of injury, clinical features, treatment and complications and describe the PT management and home programme for the following injuries:
6. Fracture clavicle, upper 1/3 rd of humerus
7. Fracture head of radius, olecranon process, shaft of radius and ulna, colles
8. Fracture scaphoid, bennets and potts fracture, dupuytren's contracture, calcaneum and metatarsal- march
9. Spinal fracture
10. Dislocation of
  - a. hip(congenital), traumatic posterior and central
  - b. Shoulder (anterior and recurrent)
  - c. Patella
11. Joint replacement – Knee and Hip ( Total and partial )

## **C. REGIONAL CONDITIONS**

PT assessment, problems, means, conservative and surgical management, rehabilitation for the following conditions

1. Cervical and lumbar spondylosis
2. Spondylolisthesis
3. TB spine
4. Postural deformities of spine – kyphosis, lordosis, scoliosis.
5. Ankylosing spondylitis
6. Intervertebral disc prolapse
7. Periarthritis shoulder
8. Amputation
9. Poliomyelitis
10. Osteoarthritis
11. Rheumatoid arthritis
12. Leprosy

13. Cerebral palsy

14. Burns

**15. Soft tissue injury –**

Strain

Sprain – knee and ankle ligament

injury Bursitis – subacromial and  
prepatellar Synovitis

Tendonitis

Tenosynovitis

Fibrositis

Rupture of tendons – Quadriceps and tendoachilles Tennis elbow

Torticollis

Suraspinatus and biceps tendonitis

**PT IN NEUROLOGICAL SCIENCES**

**EXAMINATION AT END OF-IV YEAR**

**INSTRUCTION HOURS- 150 HOURS**

**COURSE DESCRIPTION**

This course serves to integrate the knowledge gained by the students in clinical neurology with the skills gained in exercise therapy, electro therapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to pathology in the nervous system.

**COURSE OBJECTIVES**

The objectives of this course in those 150 hours of lectures and demonstrations, practical and clinical, the student will be able to identify disability due to neurological dysfunction. Set treatment goals and apply their skills in exercise therapy, electro therapy and massage in clinical situation to restore neurological function.

**A. NEUROANATOMY AND NEUROPHYSIOLOGY**

**Structure and function of**

- 1 Cerebral hemispheres
- 2 Cerebellum
- 3 Spinal cord
- 4 Peripheral nerves
- 5 Pyramidal system
- 6 Extra pyramidal system
- 7 Neuron
- 8 Synapse

**B. PRINCIPLES OF ASSESSMENT**

- 1 Evaluation and functional physiotherapy assessment with appropriate reasoning for

- planning and implementation of treatment technique.
- 2 History taking
  - 3 Assessment of higher function
  - 4 Assessment of cranial nerves
  - 5 Assessment of sensation – pain, temperature and dorsal column
  - 6 Assessment of motor system – muscle power, joint mobility, balance, co-ordination
  - 7 Assessment of tone,
  - 8 Assessment of reflexes – superficial and deep
  - 9 Assessment of gait
  - 10 Assessment of posture
  - 11 Assessment of limb length
  - 12 Assessment of functional abilities

### **C. PRINCIPLES OF TREATMENT**

- 1 Principles and theories of motor control and learning
- 2 Application of transfer and functional re-education exercise, postural exercise and gait training.
- 3 Functional training in bladder dysfunction.
- 4 Principles of co-ordination and balance exercise
- 5 Understand and application of neurotherapeutic skills like PNF, NDT, Carr & Shepherd, Brunstrom, Rood approach
- 6 Knowing principle in using tools of therapeutic gym such as vestibular ball, tilt board, bolsters.
- 7 Principles of use of ambulatory aids in neurological conditions – spastic UMN lesion, LMN lesion, cerebellar dysfunction,
- 8 Principles of use of splints and braces in spastic UMN lesion and in flaccid LMN lesion in Both UL & LL.
- 9 Review the management of chronic pain in neurological condition with respect to the type of pain, treatment modalities available, and selection criteria for each modality.
- 10 Treatment of altered tone – hyper tonicity and hypo tonicity
- 11 Sensory re education – hypersensitivity, hyposensitivity, anesthesia.
- 12 Motor re-education – strengthening exercises, co-ordination exercise, joint mobilization exercise, use of PNF technique.
- 13 Treatment to improve function – free exercise, activities of daily living, mat exercise, Mobilization exercise.

### **D. PHYSIOTHERAPY MANAGEMENT OF NEUROLOGICAL CONDITIONS IN ADULT**

1. Stroke
2. Monoplegia
3. Brain tumor
4. Spinal cord tumor
5. Parkinsonism
6. Cerebellar lesion
7. Motor neuron disease

8. Disorder of the spinal cord – paraplegia, quadriplegia, syringomyelia, transverse myelitis, Spinal dyspharism
9. Head injury
10. Peripheral nerve injury
11. Guillian bare syndrome
12. 7th cranial nerve palsy
13. Low back pain syndrome
14. Brachial neuralgia
15. Demyelination of the nervous system – multiple sclerosis
16. Disorder of the neuromuscular junction – myasthenia gravis
17. Viral meningitis
18. Tabes dorsalis

#### **E. PHYSIOTHEAPY MANAGEMENT OF NEUROLOGICAL CONDITIONS IN CHILDREN**

1. Cerebral palsy
2. Developmental delay
3. Spina bifida
4. Muscular dystrophy
5. Poliomyelitis
6. Hydrocephalus
7. Brachial plexus injury – erb palsy, klumkes palsy.

### **PT IN CARDIO-RESPIRATORY CONDITIONS**

#### **EXAMINATION AT END OF-IV YEAR INSTRUCTION HOURS- 100 HOURS**

#### **COURSE DESCRIPTION**

This course serves to integrate the knowledge gained by the students in clinical cardio-respiratory conditions with the skills gained in exercise therapy, electro therapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to pathology in the cardio-respiratory pathology.

#### **COURSE OBJECTIVES**

The objectives of this course in those 100 hours of lectures and demonstrations, practical and clinical, the student will be able to identify disability due to cardio-respiratory dysfunction. Set treatment goals and apply their skills in exercise therapy, electro therapy and massage in clinical situation to restore cardio-respiratory function.

#### **A. ANATOMY AND PHYSIOLOGY**

- 1 Trachea and Bronchial tree
- 2 Bronchopulmonary segments
- 3 Respiratory unit
- 4 Muscles of respiration
- 5 Lung & Chest wall compliance



- 6 v/q ratio
- 7 Anatomical dead space and Physiological dead space
- 8 Pulmonary defence mechanism
- 9 Mechanics of breathing
- 10 Surface anatomy of lungs and heart
- 11 Lung volumes and Lung capacities
- 12 Coronary and pulmonary circulation
- 13 Conductive system of heart
- 14 Cardiac cycle

## **B. PHYSIOTHERAPY ASSESSMENT**

1. Evaluation and functional physiotherapy assessment with appropriate reasoning for implementation of chosen treatment technique.
2. Subjective assessment – chief complaints, history
3. Functional assessment – ADL assessment
4. Objective assessment – physiotherapy assessment of cardiothoracic conditions.

### **5. Respiratory Conditions**

1. Obstructive lung disease – Chronic bronchitis and Emphysema
2. Bronchiectasis
3. Bronchial asthma
4. Lung abscess
5. Chest Infections - Pneumonia
6. Restrictive lung disease – OLD, Chest wall deformities,
7. Pulmonary Surgery – Pneumonectomy, Lobectomy, Segmenectomy

Pre-operative and post-operative PT management

### **6. Cardiac conditions**

- a. Coronary artery diseases – IHD, MI, Heart failure
- b. Hypertension
- c. Cardiac surgery – CABG, PTCA

Pre-operative and Post-operative PT management

## **C. PT TREATMENT**

1. Define, indications, contraindication, physiological effect, types, steps, precaution, complication of the following chest physical therapy technique

Breathing exercise –DBE, Costal, Segmental, Apical

Breathing control

Breathing re-education during functional activities

Relaxation position for breathlessness patient

Forced expiratory technique

Thoracic expansion exercise

Chest mobility exercise

Active cycle of breathing  
 Positive expiratory pressure  
 Manual hyperinflation  
 Incentive Spirometry  
 Postural drainage – Modified PD, Home PD  
 Cough – Stages of cough, types of cough, steps in teaching voluntary cough  
 Factors affecting cough mechanism  
 Huff – Low, Mid, High lung volume huff  
 Vibrations, Percussion, Shaking  
 Ventilator – Modes, types, principles, weaning  
 Humidification – Physiology, Bubble jet, Pass over, Ultrasonic nebulizer humidifier  
 Nebulization – Physiology, MDI, Ultrasonic,  
 Suctioning – Oropharyngeal, Nasopharyngeal, intubated, steps, complications

### **Pulmonary Rehabilitation**

Define, indication, outcomes, steps in pulmonary rehabilitation, contraindication  
 Education

### **Cardiac Rehabilitation**

Define, Indication, Phases of cardiac rehabilitation, contraindication, benefits,  
 Education

### **Physiotherapy in general surgery**

Pre-operative and Post-operative management for patient with abdominal surgery  
 Conditions – appendectomy, mastectomy, gastrectomy, hysterectomy, hernioraphy, cholecystectomy, colostomy

### **Physiotherapy in Intensive Care Unit**

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

### **Physiotherapy for ventilator dependent patient**

Definition of ventilator, Types of ventilator, Principles of Ventilator, Indication Of ventilator, PT assessment of ventilator dependent patient, PT management

### **Physiotherapy for peripheral vascular diseases**

Definition, Physiology, Conditions of PVD, evaluation-arterial, venous, lymphatic, Doppler, Treatment-Buergers exercise, cold laser, electrical stimulation, Intermittent compression.

## **REHABILITATION MEDICINE**

### **EXAMINATION AT END OF-IV YEAR INSTRUCTION HOURS- 100 HOURS**

#### **COURSE DESCRIPTION**

Following the basic sciences and clinical sciences this course will enable the students to understand their role in the management of disability within the rehabilitation.

#### **COURSE OBJECTIVES**

The objective of this course is that after 100 hours of lectures and demonstrations in addition to clinical the student will be able to demonstrate concept of team approach in Rehabilitation, identification of residual potential in patient with partial or total disability.

#### **A. INTRODUCTION**

Define the term rehabilitation. Explain its aims and principles.

Discuss the team work involved in rehabilitation, explaining briefly the role of each team member.

#### **B. THERAPEUTIC TECHNIQUES**

Explain the principles and mechanism of therapeutic techniques with relevant precaution And contraindication.

1. Joint mobilization
2. Reducing spasm
3. Assisting weak muscles
4. Increasing endurance
5. Muscle re-education following muscle transfer surgery
6. Strengthening muscles
7. Increasing co-ordination
8. Improving balance
9. Gait training

#### **C. COMMUNICATION PROBLEMS**

Identify communication problems, classify these and outline principles of treatment.

#### **D. BEHAVIORAL PROBLEMS**

Identify behavioral problems in the disabled and outline the principles of management.

#### **E. PAIN**

Describe the theories of pain and discuss therapeutic management of pain using various modalities.

Define myofascial pain syndrome and outline the management.

## **F. EVALUATION OF PHYSICAL DYSFUNCTION**

Demonstrate methods of evaluation for physical dysfunction and management of disabilities for

1. Spinal cord injury
2. Stroke
3. Cerebral palsy
4. Arthritis
5. Muscular dystrophy
6. Hansen disease
7. Peripheral nerve lesion
8. Fracture
9. Cardio –respiratory dysfunction

## **G. ORTHOTIC DEVICES**

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

## **H. PROSTHETIC DEVICES**

Describe types of artificial limbs and their functions. Demonstrate methods of training in their use.

## **I. MOBILITY AIDS**

Explain about the various types of mobility aids and their functions.  
Wheelchair, walker, crutch, cane.

## **J. PRE – VOCATIONAL EVALUATION**

Discuss methods and term involved in pre-vocational evaluation and training.

## **K. ARCHITECTURAL BARRIERS**

Describe architectural barriers and possible modifications with reference to RA, CVA, SCI and other disabling conditions.

## **L. DISABILITY EVALUATION**

Outline the principles of disability evaluation and discuss its use.

## **N. SOCIAL IMPLICATIONS**

Outline the social implications of disability for the individual and for the community.

## **O. COMMUNITY BASED REHABILITATION**

Describe a CBR module and compare this with an institutional based rehabilitation system.

**PROJECT WORK/CASE STUDY**  
**EXAMINATION AT END OF-IV YEAR**  
**COMMENCEMENT OF WORK: III YEAR**

**OBJECTIVES**

This assignment of clinical study is designed to develop the aptitude among students to reading, selecting reference, review of literature, collection of data, analysis, to present a written report or study in a selective group of patients and normal subjects. The work shall be commenced in the III year itself.

The student will submit to the university a written project/case study/report through Institution of study.

The student will be expected to submit the above one month before the final year theory Examination of the B.P.T degree course.

**GUIDANCE**

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

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

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

**EVALUATION/SCORING**

Total marks for project work/case study

Internal assessment – 50

External assessment – 25

Oral – 25

Total – 100.

**PHYSICAL EDUCATION**

NON EXAMINATION PAPER

40 HOURS

Basic principles of general fitness-warming up exercise-aerobics-cooling down exercise.

Group and recreational activities - general fitness exercise-warm up-stretching-mobility-strengthening-cool down exercise.

Diet & nutrition in general digestion, food for athlete, slimming diets, ideal body weight and obesity.