

M.P.T - Master of Physiotherapy

CURRICULUM

Total No. of Credits: 100

I Semester

Category	Code	Course	Hours/Week			Credits
			Lecture	Tutorial	Practical	
Core	19MPT001	Basic Sciences – Theory	5	0	0	4
Core	19MPT002	Allied Sciences – Theory	5	0	0	4
Practical	19MPT003	Physical Rehabilitation- Practical	0	0	10	4
Practical	19MPT004	Movement Mechanics – Viva	0	0	5	4
Practical	19MPT005	Clinical Sciences - Viva	0	0	5	4
Total			10	0	20	20

II Semester

Core	19MPT006	Basic PT Interventions – Theory & Practical	8	0	2	6
Core	19MPT007	Advance Physiotherapeutic Intervention – Theory & Practical	8	0	2	6
Elective	_____	DSE Elective I	5	0	0	4
Elective	_____	Generic Elective I	5	0	0	4
Total			26	0	4	20

III Semester

Elective	_____	Basic Fundamentals –Theory & Viva	8	0	2	6
Elective	_____	PT Evaluation/ Documentation & Evidence Based Practice- Theory & Practical	8	0	2	6
Elective	_____	DSE Elective II	5	0	0	4
Elective	_____	GE Elective II	5	0	0	4
Total			26	0	4	20

List of specialty Electives – for III Semester

19BMPT001	Basic fundamentals in Orthopedics
19BMPT002	Basic fundamentals in Neurology
19BMPT003	Basic fundamentals in Cardiopulmonary diseases
19BMPT004	Basic fundamentals in Sports
19BMPT005	Basic fundamentals in Hand Conditions
19BMPT006	Basic fundamentals in Obstetrics & Gynaecology
19BMPT007	Basic fundamentals in Pediatrics

List of specialty Electives – for III Semester

19PMPT001	PT Evaluation/ Documentation/EBP in Orthopedics
19PMPT002	PT Evaluation/ Documentation/EBP in Neurology
19PMPT003	PT Evaluation/ Documentation/EBP in Cardiopulmonary diseases
19PMPT004	PT Evaluation/ Documentation/EBP in Sports
19PMPT005	PT Evaluation/ Documentation/EBP in Hand Conditions
19BMPT006	PT Evaluation/ Documentation/EBP in Obstetrics & Gynaecology
19BMPT007	PT Evaluation/ Documentation/EBP in Pediatrics

List of specialty Electives – for IV Semester

19IMPT001	Advance PT Intervention in Orthopedics
19IMPT002	Advance PT Intervention in Neurology
19IMPT003	Advance PT Intervention in Cardiopulmonary diseases
19IMPT004	Advance PT Intervention in Sports
19IMPT005	Advance PT Intervention in Hand Conditions
19IMPT006	Advance PT Intervention in Obstetrics & Gynaecology
19IMPT007	Advance PT Intervention in Pediatrics

Dissertation – for IV Semester

19DMPT001	Elective Orthopedics
19DMPT002	Elective Neurology
19DMPT003	Elective Cardiopulmonary diseases
19DMPT004	Elective Sports
19DMPT005	Elective Hand Conditions
19DMPT006	Elective Obstetrics & Gynaecology
19DMPT007	Elective Pediatrics

List of Discipline Specific Elective Courses

19MPT101	Clinical testing
19MPT102	Ergonomics
19MPT103	Food and Nutrition
19MPT104	English for communication
19MPT105	Computer & its application in PT
19MPT106	Biostatistics / Research Methodology
19MPT107	Applied Physics

Generic Elective Courses

19MPT151	Cardiopulmonary resuscitation
19MPT152	Clinical diagnosis
19MPT153	PT Evaluation
19MPT154	Applied Chemistry
19MPT155	Hospital Management

Syllabus

Core Courses

Course Objective:

The objectives of this course is that after 100 hours of lectures & demonstrations, in addition to clinics, the student will be able to understand the basic knowledge about the applied anatomy and applied physiology of various systems of the body, biomechanics & pathomechanics, nutrition, fitness & PT ethics.

This paper consist of the following 5 modules

1. Applied Anatomy
2. Applied Physiology
3. Movement Science
4. Exercise Physiology & Nutrition
5. PT Ethics / Education Technology

Course Outcomes:

1. This provides a detailed introduction on applied anatomy and applied physiology of different systems of the body
2. This course explains the structure and function, forces that affect motion and the resultant kinematics.
3. This gives better understanding of physiological mechanisms and organ systems that allow humans to engage in physical activity
4. This provides detail lecture on bio mechanics and pathomechanics of each joint.
5. This provides basic guideline to education system, teaching methodology, curriculum framing, guidance and counselling

UNIT I**APPLIED ANATOMY****20**

1. Cytoskeleton
2. Cardiovascular system
3. Respiratory system
4. Muscular system
5. Urinary system
6. Skin & sense organs
7. Lymphatic system
8. Nervous system
9. Skeletal system
10. Endocrine system
11. Digestive system
12. Reproductive system

I) THE HEART AND CIRCULATION

- a) Structure and properties of heart muscles
- b) The action of the heart
- c) Determinants of cardiac performance
- d) Normal E.C.G
- e) Maintenance of blood pressure
- f) Cardiac arrest and heart failure
- g) Outline of lymphatic circulation and pulmonary circulation Cardiovascular compensation for postural and gravitational changes
- h) Hypertension
- i) Edema
- j) Central and peripheral venous pressure

II) NERVOUS SYSTEM AND MUSCLES

- a) Outline the structure and function of the central nervous system
- b) Outline the autonomic nervous system
- c) Types of nerve cells, electrical phenomena in nerve cells
- d) Properties of mixed nerves
- e) Reflex action, reciprocal innervations
- f) Degeneration and regeneration of nerves
- g) Control of posture
- h) Outline of voluntary movement
- i) Cutaneous, deep and superficial sensations
- j) Synaptic transmission
- k) Neuromuscular transmission
- l) Properties of muscles, contractile responses, types of contraction, electrical phenomena and tonic reflexes

III) RESPIRATION

- a) Mechanics of respiration
- b) Breath sounds
- c) Properties of gases
- d) Exchange of gases
- e) Gas tension in air at sea level, tracheal air, cellular air, mixed air, plasma, arterial blood and mixed venous blood
- f) Lung volume
- g) Magnitude of dead space
- h) Control of bronchial smooth muscle
- i) Lung compliance
- j) Nervous control of respiration
- k) Chemical control of respiration
- l) Voluntary control of respiration
- m) Oxygen and CO₂ transport
- n) Acid - base reactions in blood

- o) Effects of exercise on respiration
- p) Artificial respiration

UNIT III

MOVEMENT SCIENCE

20

BIOMECHANICS AND PATHOMECHANICS

1. BASIC MOVEMENT TERMINOLOGY

- a. Core areas of study – Anatomy functional, Anatomy, Biomechanics, Kinesiology, Linear motion, angular motion, Kinematics, Kinetics, Static and Dynamic.
- b. Anatomical movement description – segmental names, anatomical terms, Movement descriptions – basics and specialized.
- c. Relative systems – relative – Absolute. Planes/ Axis.
- d. Characters of joint movement – Single and multiple joint movements.

2. SKELETAL CONSIDERATION OF MOVEMENT

- a. Functions of skeletal system
- b. Types of bones
- c. Bio mechanical characteristics of bones: Bone tissue, architecture of bone, strength and stiffness of bone
- d. Types of load, Bony articulations
- e. Types of joins and its descriptions such as diarthrodial or synovial etc.

3. MUSCULAR CONSIDERATION FOR MOVEMENT

- a. Structure of muscle, Physical organization of muscle, Fiber organization, Fiber type, Muscle attachment.
- b. Functional characteristics of muscles, muscle fiber potential. Functions of Muscles, Role of Muscle, Mechanical components in the muscle, Net muscle action. Factors influencing muscle force. Angle of attachment of muscle. Length – tension relationship, force velocity relationship, stretch shortening cycle, one and two joint muscle. Extra and intrafusal muscle fibers, Action potential, evoke potential ,kinetic potential, Tongue, Power strength & Endurance.

4. NEUROLOGICAL CONSIDERATIONS FOR MOVEMENT

- a. General organization of nervous system
- b. Motor neurons
- c. Structure of the motor neuron
- d. Motor unit
- e. Functional characteristics of motor unit
- f. Measurement of motor unit activities
- g. Sensory neurons, Functions of neural control, Reflex arc, myotonic, proprio spinal and supra spinal reflexes, sensory receptors- muscle spindle – nuclear chain fibers. Gamma and fusimotor. Innervations Golgi tendon organ (GTO) joint receptors.

5. FUNCTIONAL ANATOMY:

Classification of joints (Natural, Anatomical & Kinesiological)

- a. Upper extremity
- b. Lower extremity
- c. The trunk (spine)

Upper Limb

Shoulder Joint

- a. Gleno humeral
 - b. Scapulo thoracic
 - c. Acromioclavicular
 - d. Sterno - clavicular
 - e. Dynamic & static stability
 - f. Scapulo humeral rhythm
 - g. Elevators & Depressors of shoulder girdle
- } Joint type, movement

Elbow joint

- a. Types motion, axis of motion, mechanism & muscle producing movement.

Radioulnar joint

- a. Type, motion, axis of motion muscles producing movement

Wrist joint

- a. Type, motion, axis of motion
- b. Mechanism of extension, radial deviation
- c. Lumbrical mechanism
- d. Interossei mechanism
- e. Flexor, extensor mechanism
- f. CMC, MCP, IPS – type, motion & mechanism
- g. Prehension activities

Lower limb

Hip joint

- a. Type, axis of motion
- b. Pelvic & femoral motion
- c. Unilateral, bilateral stance – stability & weight distribution
- d. Reduction of forces using canes
- e. Muscles producing movement

Knee joint

- a. Type, axis of motion
- b. Movement of Tibiofemoral & patellafemoral joint
- c. Muscles producing movements

Ankle joint

Types of axis of motion arthro & osteokinematics

- a. Subtalar joint
- b. Transverse joint
- c. Tarsal joint
- d. MTP joint
- e. IP joint
- f. Plantar arches & their functions

Trunk

- a. Vertebral column – structure of function & different types of vertebrae
- b. Ribs – structure of function of various joints involved in thoracic cage
- c. Types of movements taking place during respiration

6. PATHOMECHANICS & PATHOKINETICS OF PARALYTIC DISABILITIES

- a. Joints of Upper extremity
- b. Joints of Lower extremity. The trunk (spine)

Upper limb

Shoulder joint

Paralysis of trapezius, Serratus anterior, Rhomboids deltoid, supraspinatus, sub clavus, pectoralis major & Latissimus dorsi

- a. Operation for paralysis of trapezius, serratus - anterior & deltoid

Elbow joint

- a. Paralysis of elbow extensions, flexors
- b. Methods of transposition of forearm muscle
- c. Substitution by triceps
- d. Nurse maids elbow, students elbow
- e. Cubitus varus, valgus

Wrist joint

- a. Paralysis of finger flexor, extensors, lumbricals, interossei
- b. Implantation of flexors & extensors
- c. Arthrodesis of wrist with tendon transplantation
- d. Trigger finger
- e. De Quervain's tenosynovitis

- f. Mallet finger
- g. Claw finger

Hip

- a. Coxa vara, coxa valga, dysplasia of hip joint pelvic obliquity
- b. Paralysis of hip abduction, adductors, extensors flexors, internal & external rotators
- c. Reconstructive procedure of paralysed hip joint – paralytic conditions, shelving operation
- d. Substitution of abductors

Knee

- a. Genu valgum, genu varum, recurvatum
- b. Tibial torsion
- c. Patella alta & Baja
- d. Lateral dislocation of patella
- e. Paralysis of extensors, flexors
- f. Fasciodesis , Tenodesis, Osteoplastic arthodesis
- g. Reconstruction of paralytic genu valgus
- h. Reconstruction of flexor contracture

Ankle & Foot

- a. Pronated foot
- b. Pes planus
- c. Pes cavus
- d. Paralysis of dorsiflexors, Plantorflexors, invertors, evertors, intrinsic muscles of foot
- e. Transplantation of muscles for paralysis

Trunk

- a. Paralysis of neck, trunk flexors, extensors lat flexors & Rotators
- b. Disc prolapse
- c. Spondylosis, Spondylitis , spondylolysthesis
- d. Scoliosis
- e. Kyphosis
- f. Lordosis
- g. Hemivertebra
- h. Pigeon chest
- i. Barrel chest

UNIT IV EXERCISE PHYSIOLOGY & NUTRITION

20

1. Nutrition – the basis for human performance

- a. Carbohydrates
- b. Lipids & Proteins
- c. Vitamins
- d. Minerals and water
- e. Optimal Nutrition for exercise.

2. Energy for physical activity –
 - a. Energy Value of food
 - b. Introduction to energy transfer, energy, transfer in the body phosphate bond energy, energy released from food
 - c. Energy transfer and exercise
 - d. Measurement of human energy expenditure
 - e. Human energy expenditure during rest and physical activity
 - f. Energy expenditure during walking, jogging running and swimming
3. System of energy delivery and utilization: the cardiovascular system cardiovascular regulation and integration functional capacity of cardiovascular system.
4. Dynamics of pulmonary ventilation: Regulation of pulmonary ventilation, pulmonary ventilation during exercise, acid – base regulation.
5. Enhancement of energy capacity
 - a. Training anaerobic and aerobic power
 - b. Muscular strength Training muscles to become stronger strength measurements and resistance training, structural and functional adaptation to resistance training
 - c. Special aids to exercise training and performance
6. Exercise performance and environmental stress
 - a. Exercise at medium and high altitude
 - b. Exercise and thermal stress – Mechanism of thermoregulation. Thermoregulation and environmental stress during exercise
 - c. Sport diving
7. Body composition assessment, physique. Performance, and physical activity, overweight, Obesity and weight control.
8. Exercise in aging and disease prevention.
9. Physical Activity in healthy aging
 - a. Physical activity in the population
 - b. Aging and physiologic function
 - c. Physical activity, health and longevity
 - d. Coronary heart disease.
10. Clinical Exercise physiology for cancer, obesity HT, Diabetes

UNIT V PT ETHICS / PT EDUCATION TECHNOLOGY 20

1. Educational aims.
Agencies of Education.
Current issues and trends in education.
2. Concepts of teaching and learning.
Theories of teaching.

Relationship between teaching and learning.
Psychology of Education.

3. Physiotherapy Curriculum.
Committee, development, types, current trends and curriculum planning.
4. Principles and methods of teaching.
Strategies of teaching.
Organizations, writing lesson plans.

A V Aids.
5. Measurement and evaluation.
Meaning, Process, Standard and Nonstandard Tests.
6. Guidance and counseling. For students and faculty.
7. Faculty development for PT services.

P T ETHICS

PT Ethical Issues

- a. Ethical Rules of IAP and WCPT.
- b. Rules & Regulations of IAP.
- c. Objective of IAP.
- d. documentation

Physiotherapy and Law / Medico legal aspects

- a. Medico-legal aspects of physical therapy.
- b. Liability.
- c. Negligence.
- d. Malpractice.
- e. Licensure.

Total Hours:100

Textbooks:

1. Guyton, Text book of Physiology Elsevier, 4 Ed, 2000
2. Tora Tora , Textbook of Anatomy & Physiology, Churchill Livingston, 3 Ed, 2004
3. Chatterjee, Text Book of Physiology. JP, 2 Ed, 2001

References:

1. Grays Anatomy, mosby, 2Ed, 1994
2. Derek, Anatomy, Palpation and surface Marking, Elsevier, 4Ed, 1997
3. Sieg, Illustrated essentials of musculoskeletal anatomy, CBS, 2Ed, 1995
4. Nigel, Anatomy and human movement , MCGH, 4 Ed, 2000
5. T.S. Ranganathan , Textbook of anatomy, JP, 3 Ed, 1999
6. Palastanga , Anatomy and human Movement JAYPEE, 2 Ed, 2003
7. Cynthia. C.Norkin, Pamela , K.Levengle Joint structure & function, ELBS, 4 Ed, 2004
8. Axen, Illustrated Principal of exercise physiology, CBS, 1 Ed, 2000
9. Katch, Exercise physiology energy nutrition and human performance ELSEVIER, 4Ed, 2006
10. Frank, Exercise Physiology for health care professionals, mosby, 4 Ed, 1999
11. Power, Exercise Physiology.ELBS, 2 Ed, 2001
12. U. Sathyanarayana, Essentials of Biochemistry –Book and Allied (P) Ltd, Kolkatta.1 Ed, 2002
13. S.D.Seth, Text Book of Pharmacology, Churchill Livingstone.2 Ed, 2005
14. K.D.Tripathi, Essentials of Medical Pharmacology, JayPee Brothers 4 Ed, 2009

- 2) Population & samples
- 3) Sampling distribution
- 4) Sampling methods
- 5) Surveys in research

IV Vital & Health statistics

- 1) Uses of vital & health statistics in practice of PT
- 2) Sources & methods of collection & recording
- 3) Interpretation of commonly used vital & health statistics & estimate population using arithmetic progression method

V Research Methodology

I. Introduction

Importance of research in physiotherapy.

Ethics in physiotherapy research.

Introduction to the conceptual, empirical, interpretative, quantitative and qualitative research.

II. Conceptual Phase

Formulation of the problem.

Concepts and variables.

Literature review.

Hypothesis.

III. Empirical/Conducting Phase

Research design.

Brief overview of qualitative and quantitative approaches.

Population and samples

Collection of data.

Research data and analysis.

IV. Interpretative Phase

Discussion and conclusions.

Interpreting qualitative results.

V. Criticizing published results

Need for criticizing results.

Guidelines for criticizing results.

VI. Writing research for publication

Guidelines for writing results.

Recent trend in research

UNIT II MANAGEMENT/ADMINISTRATION/MARKETING 20

Management studies for Physiotherapy

1. Definition – Branches of management- Principles of health sector management.
2. General principles of management: Theories of management.

3. Management studies related to local health care organization management & structure-planning delivery with quality assurance & funding of service delivery – information technology – Time management –career development in physiotherapy - preparing for 1st job etc.,
4. Personnel management: Policies and procedures. Basic concepts and theories.
5. Resource and quality management: planning with change and coping with change.
6. Performance analysis – physical structure / reporting system (man power / status / function/ quantity & quality of services / turn over – cost benefit – revenue contribution.
7. Administration – principles – based on the Goal & functions – at large hospital set up domiciliary services / private clinic / academic.
8. Methods of maintaining records
9. Financial issues including budget and income generation.
10. Principles of an organizational chart
11. Organization of a department: Planning, space, manpower, materials and basic Requirements and recruitment, policies and procedures.
12. Infrastructure in various departmental / segmental

P T Department Management

- a. Policies and procedures.
- b. Recruitment.
- c. Department Planning
- d. Principles of practice

UNIT – III

BIO-CHEMISTRY

20

I. Energy Source

Carbohydrates.

Fats.

Proteins.

II. Enzymes

Specificity and factors affecting enzyme activity, intracellular and extracellular enzymes, clinical significance of alkaline phosphatase, acid phosphatase, cholinesterase and creatine phosphokinase.

III. Metabolic pathways related to carbohydrate lipid and protein metabolism

Disorders of metabolism and related bio-chemical changes.

IV. Bio-chemical changes during muscle contraction

V. PH

Controlling factors and bio-chemical analysis.

VI. Physical stress and lactate levels

PATHOLOGY

- A. Introduction: Concepts of disease, classifications of lesions.
- B. Bacterial, viral and parasitic infections a general outline.
- C. Inflammation and repair, Degeneration, necrosis and gangrene.
- D. Haemorrhage, shock, embolism, thrombosis.
- E. Tuberculosis, leprosy, typhoid.
- F. Deficiency diseases.
- G. Tumours: Aetiology & spread. Common tumour.
- H. Blood: Anaemia, Heart and blood vessels, Common congenital anomalies, Rheumatic & coronary heart diseases.
- I. Respiratory system: Pneumonias, Bronchiectasis, Emphysema, Chronic bronchitis, Asthma.
- J. Bone and joints: Autoimmune disease, Septic arthritis, Osteomyelitis.
- K. Skin: Leprosy.
- L. Urinary system.
- M. Central nervous system: CNS infections, vascular disorders.
- N. Rheumatoid Arthritis.
- O. Scleroderma and Psoriasis.
- P. Diseases of muscle including Poliomyelitis, Myopathies.
- Q. Volkmann's ischemia.

MICROBIOLOGY

- A. Introduction and history of microbiology.
- B. General lectures on micro-organisms:
 - 1. Classification.
 - 2. Shape and arrangement.
 - 3. Special characteristics - spores, capsules, enzymes, motility, reproduction.
 - a. Disinfection and antiseptics.
 - b. Sterilisation and asepsis.
 - c. Antibacterial agents - fundamental aspect. Susceptibility test
- C. Immunity - natural and acquired.
 - 1. Infection - source of infection.
 - portals of entry,
 - spread of infection
 - 2. Non- specific immunity
 - 3. Allergy and hypersensitivity.
 - 4. Outline of common pathogenic bacteria and the diseases produced by them.

Treatment and prevention:

- a. Respiratory tract infections.
- b. Meningitis.
- c. Enteric infections.
- d. Anaerobic infections
- e. Urinary tract infections.
- f. Leprosy, tuberculosis and miscellaneous infections.

- g. Wound infections.
 - h. Sexually transmitted diseases.
 - i. Hospital acquired infections.
- D. Pathogenic Yeasts and fungi.
- E. Virology -Virus infections, with special mention of Hepatitis, Poliomyelitis & Rabies.

UNIT V

PHARMACOLOGY

20

Introduce the students to basic pharmacology of various common medication used and its effects on patients and during physiotherapy.

- A. Terminology
- B. Classification of drugs
- C. Factors influencing the dosage of drugs and its actions.
- D. Drug Allergy
- E. Principles of drug administration and routes.
- F. Definition, action, indications, contra - indications, adverse reactions of the following:
 - 1) Anti-inflammatory
 - 2) Anti-epileptic
 - 3) Sedatives, Hypnotics, Tranquilizers
 - 4) Muscle relaxants
 - 5) Alcohol
 - 6) Pulmonary effects of general anaesthetic agents
 - 7) Mucolytic agents
 - 8) Local anaesthetic agents
 - 9) Narcotic Steroids
 - 10) Vasodilators
 - 11) Insulin and oral hypoglycemic agents
 - 12) Antibiotics – Bactericidal, Bacteriostatic
 - 13) Chemotherapeutic drugs in leprosy and tuberculosis.

Evaluation

Total Hours:100

Textbooks:

1. Poddar S., Introduction to Research in Health Sciences, Churchill Livingstone, 3rd edition, 1988
2. Currier D.P., Elements of Research in physical therapy, Williams & Wilkins, Baltimore, 3rd edition 1990
3. Sundar Rao & Richard, An introduction to biostatistics, JP, 2nd edition, 2008
4. Elaine Lynne, Management in Health Care, Macmillan Publisher, 3rd Edition,2000.
5. Willam A. Reinke, Health Planning for Effective Management, Oxford University Press, 1stEdition, 1996

References:

1. Ashok Neeraja, Nursing Education, JP, 3rdEdition, 2011
2. Madhavan Nair, Education Methods, Jaypee, 4thEdition, 2009
3. Carolin Hicks, Research for physiotherapist, Mosby, 2ndEdition, 2006
4. Barbara, Statistical methods for healthcare research, Churchill Livingstone, 1stEdition, 1995
5. Barlene: Documenting functional outcomes in physical therapy., McGrawhill, 4thEdition, 1999

Course Objective:

After 200 hours of clinical practice, students should be able to

- i) Explain the concepts and principles of various Rehabilitation approaches.
- ii) Demonstrate assessment of patients using various Principles.
- iii) Analyze the patient's problems and come to a clinical diagnosis.

Course Outcomes:

1. One can understand about the significance & importance of history taking.
2. The clear understanding of orthopaedic rehabilitation can be attained
3. The clear understanding about the knowledge of cardiac rehabilitation can be attained
4. The clear understanding of pulmonary rehabilitation can be attained
5. The clear understanding of neurological rehabilitation can be attained

UNIT I INTRODUCTION 40

1. Assessment and treatment planning
2. Value of patient care
3. Significance of history taking
4. Importance of physical rehabilitation in community

UNIT II ORTHOPAEDIC REHABILITATION 40

1. Musculoskeletal assessment
2. Gait analysis
3. Perambulation and gait training
4. Rehabilitation management in arthritis
5. Amputation management

UNIT III CARDIO AND PULMONARY REHABILITATION 40

1. Cardio respiratory assessment
2. Exercise prescription
3. Pulmonary rehabilitation
4. Community based rehabilitation for pulmonary diseases patients
5. Vital signs

UNIT IV NEURO LOGICAL REHABILITATION

40

1. Neuro assessment
2. Stroke
3. Spinal cord injury
4. Assessment and intervention strategies for cognition and perceptual dysfunction for neuro patients

UNIT V GERIATRICS AND OBG

40

1. Role of physiotherapy in women health and OBG
2. Significance of exercise prenatal, antenatal and postnatal stages
3. Common gynecological problems
4. Geriatric rehabilitation

Evaluation

Total Hours: 200

Text books:

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

Reference:

1. David J. magee, orthopeadic physical assessment, saunders , 5th ed, 2008.

Course Objective:

After 100 hours of clinical practice, students should be able to explain & demonstrate functional anatomy, biomechanics, pathomechanics & gait pattern of various clinical conditions

Course Outcomes:

1. One can understand about the kinetics & kinematics of body
2. The functional anatomy of upper extremity, lower extremity trunk can be well understood
3. The biomechanical knowledge of various – musculoskeletal system can be understood
4. The pathomechanics of upper limb lower limb & trunk can be well known
5. The gait & its determinants can be very well understood

UNIT I	INTRODUCTION	20
	<ol style="list-style-type: none"> 1. Kinetics 2. Kinematics 3. Planes and axis 4. Linear and angular motion 5. Classification of joints 	
UNIT II	FUNCTIONAL ANATOMY	20
	<ol style="list-style-type: none"> 1. Upper extremity 2. Lower extremity 3. Trunk 	
UNIT III	BIO MECHANICS	20
	<ol style="list-style-type: none"> 1. Bio-mechanical characteristics of bone, soft tissue, articulation etc 2. Trabecular system 3. Muscular consideration of movement 4. Neurological consideration of movement 	
UNIT IV	PATHOMECHANICS	20
	<ol style="list-style-type: none"> 1. Pathokinetics of upper limb 2. Pathokinetics of lower limb 3. Pathokinetics of trunk 	

1. Determinants of gait
2. Gait cycle
3. Locomotive training and aids
4. Pathological gait

Evaluation

Total Hours: 100

Text books:

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

Reference:

1. David J. magee, orthopedic physical assessment, saunders , 5th ed, 2008.

Course Objective:

After 100 hours of clinical practice, students should be able to explain & demonstrate biochemistry, pathology, microbiology & pharmacology involved in various clinical conditions

Course Outcomes:

1. The energy source can be well understood
2. The biochemical analysis & standard levels can be known
3. The knowledge of pathology related to various condition can be gained
4. The allergic & immunity for various agents can be well understood
5. The pharmacology for various conditions diseases can be understood

UNIT I INTRODUCTION 20

1. Introduction and energy source
2. General outline of infection
3. Common terminologies used in pharmacology
4. Introduction of microbiology

UNIT I BIOCHEMISTRY 20

1. Food and nutrition
2. Enzymes
3. Metabolic pathways
4. Biochemical analysis
5. Physical stress and lactate levels

UNIT III PATHOLOGY 20

1. Inflammation and repair
2. Deficiency diseases
3. Autoimmune diseases
4. COPD

UNIT IV MICROBIOLOGY 20

1. Dysfunction and antiseptic
2. Sterilization
3. Allergy and hyper sensitivity
4. Immunity

1. Classification of drugs
2. Drug allergy
3. Routes of drug administration
4. Indication, contraindication and adverse effects of drugs

Evaluation

Total Hours: 100

Text books:

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

Reference:

1. David J. magee, orthopeedic physical assessment, saunders ,5th ed, 2008.

Course objective:

The objectives of this course is that after 200 hours of lectures & demonstrations, in addition to clinics, the student will be able to understand the basic knowledge about kinesiotherapeutics, ergonomics, electrotherapy, community rehabilitation & condition related to OBG.

Basic Physiotherapeutic Intervention

This paper consists of 5 modules

1. Kinesiotherapeutics
2. Ergonomics
3. Electrotherapeutics
4. Community Based Rehabilitation
5. OBG

Course Outcomes:

1. Implementation of various therapeutic approaches and manual techniques. Designs an exercise program to recover correct posture and activities.
2. Multiple levels of ergonomic consulting, workstation assessment, pre employment screening and functional capacity evaluation is assessed for an individual or in a group.
3. The student will be able to intervene appropriate electrotherapeutic modalities.
4. The students will be able to improve the self esteem and quality of life of the people in the community.
5. To assess, evaluate and formulates the PT management for various obstetrics and gynecological conditions.

UNIT I**KINESIOTHERAPEUTICS****40**

Introduction, definitions, principles and basics in exercise therapy

1. Therapeutic techniques, active exercises, passive movements, relaxation, coordination exercises, suspension, PRE, Massage, Stretching – active and passive, PNF
2. Various equipments in exercise therapy and its applications
3. Hydrotherapy – uses, principles, types
4. Therabands – types, application
5. Swiss ball
6. Muscle energy techniques
7. Cardiolates
8. Plyometrics
9. Posture and Gait
10. Gait lab analysis
11. Mobility aids

Introduction to Ergonomics, definition, area and scope of ergonomics

1. Environmental factors
2. Work care spectrum and role of PT
3. Job analysis, job site analysis, job task analysis
4. Pre employment screening, exit assessment
5. Work hardening
6. Education and education programme
7. Documentation
8. Practical ergonomics for different sections of the society.
9. Functional assessment for worker: Working class labour, hard labour, very hard labour, Chair class, Executive class and Bureaucratic class.
10. Explain the scope of Ergonomics in Modern Industrial society.

1. INTRODUCTION TO PHYSICAL AGENTS:

- a. Definition, Categories, History of Physical Agents.
- b. History of physical agents in Rehabilitation.
- c. Effects of Physical Agents.

2. a. SHORTWAVE DIATHERMY:

- a. Physics, biophysical and biomechanical effects of SWD, therapeutic effects of SWD, indications, dangers, precautions, application of inductothermy.
- b. Pulsed SWD: Biological effects, indications, contraindications and techniques of application, advantages and disadvantages.

b. LONG WAVE DIATHERMY

3. MICROWAVE DIATHERMY:

- a. Physics of MWD.
- b. Biophysical, biomechanical, therapeutic effects of MWD.
- c. Dosage, indications and contraindications.
- d. Techniques of MWD.
- e. Dangers, precautions, methods of application, advantages and disadvantages.
- f. Pulsed MWD.

4. ULTRASONIC THERAPY:

- a. Medical frequencies of ultrasound, production of ultrasound, physical phenomenon of ultrasound.
- b. Pulsed ultrasound.
- c. Physiological effects of ultrasonic energy.
- d. Indications, contraindications, dangers, coupling media, dosage, methods of application, techniques of application.
- e. Techniques of application in contact method, sub aquatic method users.

5. INFRA RED RADIATIONS:

- a. Physical apparatus for infra-red heating, physiological effects, indications, contraindications.
- b. Techniques of application.
- c. Advantages & disadvantages.

6. IONTOPHORESIS

- a. Direct currents.
- b. Strength of the solution, common drugs in usage today, apparatus used.
- c. Indications, contraindications.
- d. Dosage methods: in contact, sub aquatic, iontophoresis technique – treatment of hyperhidrosis, calcific tendonitis, allergic vasomotor rhinitis.
- e. Side effects, contraindications, techniques.

7. FARADIC STIMULATION

- a. Faradic type currents.
- b. Physiological effects, indications, contraindications.
- c. Faradic stimulation in weak pelvic floor muscles, Bell's palsy, reduction of limb oedema, disuse atrophy and reduction of arches of foot.

8. DIDYNAMIC CURRENTS:

- a. Physiological effects, indications, contraindications, methods of application, dosage.

9. INTERFERENTIAL THERAPY:

- a. Interferential currents, Rebox, Russian Currents
- b. Physics of IFT.
- c. Physiological effects and uses of IFT.

10. TENS:

- a. Principles of TENS.
- b. Physiology and modulation of pain
- c. Physiological effects, therapeutic effects of TENS.
- d. Obstetrical TENS, cancer pain & TENS, TENS for non-healing fractures.

11. LASER THERAPY:

- a. Cold LASER production, physical characteristics, physiological effects, dosage, pain control.
- b. Indications, contraindications.
- c. Trigger points.

12. CRYOTHERAPY:

- a. Cold packs, ice bags, ice massage, ice towels, compressive cryotherapy, vapocoolant sprays.
- b. Therapeutic effects of cryotherapy, uses in sports medicine, spasticity.

13. PARAFFIN WAX :

- a. Method of application – immersion, brushing, equipments requires.
- b. Physiological effects, therapeutic uses, benefits of the therapy.

14. SHOCK WAVE DIATHERMY

- Principles and uses

15. HOT PACKS:

- a. Hydro collator packs, temperature maintenance, physiological effects, methods of application, uses, advantages and disadvantages.

16. CONTRAST BATH:

- a. Equipment used method of application, indications, contraindications, physiological effects and therapeutic uses.

17. TRACTION:

- a. Types of spinal traction – continuous, intermittent, manual, auto traction, gravity lumbar traction.
- b. Indications for spinal traction.
- c. Contraindications, effects of traction, mechanical lumbar traction technique, cervical traction technique.

18. MECHANICAL EXTERNAL COMPRESSION:

- a. Causes of edema, pathophysiology of edema, types of edema.
- b. Methods of external compression – taping, intermittent compression, elastic support bandaging, gradient support, massage, exercise.
- c. Physiological effects, therapeutic uses.
- d. Patient education.

19. HVPGS

UNIT IV

COMMUNITY BASED PHYSIOTHERAPY

40

1. Psycho – social and socio-economical aspects of community health development
2. Population studies and epidemiological implications of Impairment and Handicap and
3. Disability, health statistics.
4. Health administration - management concept as applied to physiotherapy.
5. Health and fitness, Environmental health physiotherapy as a drugless system. Public
6. health education methods and appropriate media, Communications and Interactions.
7. Community based rehabilitation.
8. Nutrition and diet.
9. Child-care – prevention and social medicine.
10. Immunization programmes – malnutrition and early detection of disabling conditions and Intervention.
11. Maternal care Antenatal and Postnatal physiotherapy
12. Educated children, postnatal complications and prevention of postural defects, fitness Programme.
13. Industrial physiotherapy – prevention of injuries, physiological restoration, rehabilitation in industrial injuries.

14. Care of the aged, geriatric physiotherapy, life span yoga.
15. Psychosomatic approaches in management of stress disorders.
16. Changes in life style to reduce risk factors for disability, Drug dependence and iatrogenic disorders.

UNIT V

PHYSIOTHERAPY IN OBG

40

1. Anatomy & Physiology of female reproductive organs
2. Puberty & Menarche.
3. Physiological changes during pregnancy.
4. Labour & its complication.
5. Antenatal & Postnatal care.
6. Modalities in OBG.
7. Relaxation techniques in prenatal education.
8. Exercise in pregnancy.
9. Pregnancy discomforts & Management.
10. Post menopause problem & its Management.
11. Gynaecological disorder & its PT Management
 - a) Infective conditions
 - b) Back ache & abdominal pain
 - c) Displacement & Genital prolapse
12. Post operative care in gynecological surgery.
13. Urinary dysfunction – Physiotherapy management.
14. Lymph oedema & Role of Physiotherapy.

Evaluation

Total Hours:200

Textbooks:

1. Jennings ,Medical Electronics Applications , ELSEVIER, 1 Ed, 2012
2. Deirdre M.Walsh, Tens clinical application & related therapy , mosby, 3 Ed, 2009
3. Michelle Cameron , Physical agents in rehabilitation CBS, 2 Ed, 2001
4. Margaret Polden & Jill Mantle , Physiotherapy in Obstetrics and Gynecology , mosby, 2 Ed, 2004

References:

1. Cynthia Norikin, Biomechanics of Human Joints, ELBS, 5th Ed, 2010.
2. Kapand Ji, Biomechanics of Human Joints. Elsevier, 6th Ed, 2010
3. Brunstorms, Clinical Kinesiology, CBS, 3rd Ed, 2007

4. Frankel Nordin, Biomechanics of Joints MCGH, 1 Ed, 1995
5. John low & Ann reed, Electrotherapy explained principles, Churchill Livingstone, 4 Ed, 2003
6. Roger.M.Nelson, Clinical electrotherapy, CBS, 2 Ed, 2001
7. Sheila Kirchen, Claytons electrotherapy, Elsevier, 1 Ed. 2009
8. Joseph Khan, Principles & Practice of Electrotherapy, Mosby, 1 Ed, 1997
9. Susan.L.Michlorirz , Thermal agents in Rehabilitation, Mosby, 3 Ed, 2001
10. G.David Baxter, Laser (therapeutic) theory & Practice, CBS, 2 Ed, 2008

Course Objectives:

The objectives of this course is that after 200 hours of lectures & demonstrations, in addition to clinics, the student will be able to understand about electro physiology & diagnosis, medical imaging, manual techniques and current trends in pilates.

Advanced Physiotherapeutic Intervention

This paper consists of 5 Modules

1. Electro Physiology
2. Electro Diagnosis
3. Basics of Medical Imaging
4. Manual Techniques
5. Pilates

Course Outcomes:

1. Knowledge about ECG, Echocardiogram, and Doppler studies gained.
2. Knowledge about clinical application of EMG and NCV gained.
3. Knowledge about various radiological imaging studies gained
4. Knowledge about manual techniques of joint mobilization and procedure of application gained.
5. Knowledge about Pilates, its concepts and application gained.

UNIT I**ELECTRO PHYSIOLOGY****40****Excitable Tissues – Nerve:**

- a. Excitation and conduction.
- b. Measurement of electrical events.
- c. Ionic basis of excitation and conduction
- d. Physiologic basis of nerve conduction tests – their reliability and access.

1. Excitable Tissues – Muscle:

- a. Skeletal muscle:
 1. Electrical phenomena & ionic fluxes.
 2. Contractile responses.
 3. Physiological basis of ECG.
 4. Normal & abnormal ECG.

b. Smooth Muscle:

1. Electrical properties.
2. Electrical events at synapse, chemical transmission of synaptic activity.
3. Electrical and ionic events in receptors.

2. Clinical Neurophysiology:

1. History of Clinical Neurophysiology: Introduction to electro diagnostic signals and their measurements.
2. Nerve Conduction Study:
 - a. Principles of nerve conduction study.
 - b. Median nerve.
 - c. Ulnar nerve.
 - d. Radial nerve.
 - e. Brachial plexus.
 - f. Cervical radiculopathy.
 - g. Lumbar plexus.
 - h. Lumbosacral radiculopathy.
 - i. Anomalous innervations of the extremities.
 - j. Nerve conduction of non-limb nerves.
 - k. Late responses.
 - l. Autonomic nervous system testing.

UNIT II

ELECTRO DIAGNOSIS

40

1. EMG:

- a. Introduction to EMG.
- b. Technique of EMG.

2. Clinical Application of EMG and NCV:

- a. EMG findings in neurological disorders.
- b. EMG & NCV studies in polyneuropathy.
- c. Repetitive Nerve Stimulation.
- d. Single fiber and macro EMG.
- e. Visual evoked potential.
- f. Brainstem auditory evoked potential.
- g. Somatosensory evoked potential.
- h. Motor evoked potential.

3. Electroencephalogram.

Principle & physiological basis.

4. Echo cardiogram & Doppler studies.

RADIOLOGY, RADIO DIAGNOSTICS & SONOGRAPHY

1. Introduction to Radiography: Radio Imaging and Radio Diagnostic:
 - a. Dimension in radiography.
 - b. Radio density.
 - c. A roentgen.
 - d. Analysis of image.
 - e. Positioning, viewing of radiograph, film markers.
 - f. Image quality factors: radiographic density, contrast, distortion, recorded results.

2. Common Imaging Studies:
 - a. X Ray – spinal, skull, peripheral.
 - b. Conventional topography.
 - c. Computed tomography (CT).
 - d. Contrast enhanced radiography.
 - e. Radio nucleide scan.
 - f. Magnetic resonance Imaging with Spectroscopy.
 - g. PET.
 - h. Myelography.
 - i. Nuclear Imaging.
 - j. Pneumo encephalogram.
 - k. EEG.
 - l. Ultrasonogram.
 - m. ECG & Doppler studies.
 - n. MUGA – Nuclear Test.

UNIT IV**MANUAL TECHNIQUES****40**

1. Introduction:
 - a. Definition of terms
 - b. Clinical reasoning process in manipulation therapy

2. Peripheral Joint Mobilization
 - a. Basic concept of joint motion – Arthrokinematics
 - b. Indication for joint mobilization
 - c. Limitation of joint mobilization
 - d. Contraindication and precaution
 - e. Procedures for applying passive joint mobilization
 - f. Mobilization with movement, principles and practice
 - g. Peripheral Joint mobilization technique.

UNIT V**PILATES****40**

- a. History
- b. Anatomy
- c. core stabilization

- d. concepts
- e. principles
- f. mat workouts
- g. machine workouts
- h. demonstration

Evaluation

Total Hours:200

Textbooks:

1. Josheph Arodgold M.D. .,Electro diagnosis of Neuro muscular disease, Mosby, 2nd Ed, 2007
2. ShinJ.oh, Clinical electrography case studies JP,2nd Ed, 2009

References:

1. Cyriax, Massage, Mc Graw Hill. 1 Ed, 2002
2. Rudolph Kessler., Management of common musculoskeletal problem , Mosby, 3rd Ed, 2002
3. Carolyn kiseener , Therapeutic exercise - Elsevier, 4th Ed, 2011
4. James A. Gould, Orthopaedic and sports physical therapy - CBCS, 2nd Ed, 2001

ELECTIVE COURSES

Course objectives:

The objectives of this course is that after 200 hours of lectures & demonstrations, in addition to clinics, the student will be able to understand about clinical cardio respiratory conditions and pharmacology in cardio respiratory conditions.

Course Outcomes:

1. To understand the development and maturation of heart and lungs
2. To know the abnormalities of heart and lungs
3. To understand the cardiovascular - pulmonary Physiology at various stress levels
4. To understand the drugs used in cardio vascular diseases
5. To understand the drugs used in pulmonary diseases

UNIT I

40

ANATOMY AND PHYSIOLOGY OF CARDIO – PULMONARY SYSTEMS:

1. Embryology of cardio – respiratory system - The embryonic development cardiovascular system, the embryonic development of respiratory system.
2. The structure and function of cardiovascular and respiratory systems - Biomechanics of Respiration, Mechanics of breathing – work of breathing, airway resistance, lung compliance, Control of respiration, Respiratory muscle – efficiency, endurance, training, fatigue, weakness. Normal and abnormal patterns of breathing, Cough reflex, Regulation of blood pressure, Autonomic nervous system on cardio pulmonary system, Vital signs, cardiovascular system – Heart, Blood vessels and systemic circulation, coronary circulation, conduction system.
3. Congenital abnormalities and aging

UNIT II

40

RESPIRATORY PHYSIOLOGY AND APPLIED ASPECTS:

1. Respiratory physiology - The gas transport system - Ventilation - Dead space - Restriction of gas - Mechanical properties - Compliance and surface tension - Resistance to gas flow - Diffusion - Oxygen carriage - Dissolved oxygen - Oxygen bound to hemoglobin - Oxy-hemoglobin dissociation curve - Total oxygen content - CO₂ carriage - CO₂ in plasma and erythrocytes - Perfusion and gravity - Cardiac output and

pulmonary vascular resistance - Ventilation – Perfusion interactions and shunts - Respiration , control of breathing - Acid – Base balance - Chemical and non – chemical mediation of ventilation.

2. Applied respiratory physiology - Hypoxia - Respiratory failure - O₂ therapy - Dyspnea - Cyanosis - Periodic breathing - Voluntary hyperventilation - Breath holding - Hyperbaric breathing - Hypercapnia - Hypocapnia - Lung defense mechanism - RDS in neonates - Respiration in hold - Air pollution, occupational exposure, environmental pollutants carrying lung cancer, cigarette smoking - Chest wall deformities.

UNIT III

40

CARDIAC PHYSIOLOGY AND APPLIED ASPECTS:

1. Cardiovascular physiology - Properties of cardiac muscle, Cardiac cycle, Cardiac output, Hemo-dynamics, Heart rate, Cardiovascular reflex and other control mechanisms, Systemic arterial blood pressure, Regional circulation.
2. Applied cardiovascular physiology – Ischaemic heart diseases, congenital heart diseases, cardiomyopathy, cardiac arrhythmia, arterial blood pressure.

UNIT IV

40

Definitions, causes, patho-physiology, clinical features, investigations of the following condition

1. COPD
2. Restrictive lung disease
3. Chest wall deformities
4. Chest wall injuries
5. Congenital heart diseases (CHD)
6. Ischemic heart diseases
7. Peripheral vascular diseases
8. Cardiac and pulmonary surgical conditions

UNIT V

40

CARDIOVASCULAR AND RESPIRATORY PHARMACOLOGY:

1. Introduction to pharmacology a) Pharmokinetics b) Pharmacodynamics
2. Cardiac Drugs
 - a) Anti – ischemic drugs
 - b) Anti – arrhythmic drugs

- c) Anti – hypertensive therapy
- d) Pharmacologic management of lipid disorders
- e) Cardiac drugs used in critical care
- f) Diabetes.
- g) Pulmonary Drugs
- h) Broncho – dilator therapy
- i) Ancillary pulmonary medications

EVALUATION:

Total Hours: 200

Textbooks:

1. Frances J.Brannon, Cardio pulmonary rehabilitation, Basic theory & application – mosby, 4th ed, 2001
2. Joanne watching, Cardio pulmonary physical therapy, a clinical manual – CBCS, 3 ED, 2003
3. Ellen Hillegass steven sadowsky., Essentials of cardio pulmonary physical therapy, ELSEVIER, 2 ED, 1994

References:

1. Crofton & doogles Respiratory Diseases Vol – I & II, SEATON.1 Ed, 2003
2. Downie, Cash text book of chest, Heart & Vascular disorders, ELBS, 1 Ed, 2005
3. Berne, Cardio – Vascular Physiology, Mosby, 4Ed, 2012

Course Objectives:

The objectives of this course is that after ----- hours of lectures & demonstrations, in addition to clinics, the student will be able to understand about PT assessment, Diagnosis and evidence based practice related to various cardio respiratory conditions.

Course Outcomes:

1. To understand the evidence based assessment of cardio vascular system and pulmonary system
2. To know the evaluation of specific conditions of heart and lungs
3. To learn the cardio pulmonary evaluation in ICU and the assessment of cardio pulmonary Fitness
4. To learn To understand the diagnosis and differential diagnosis
5. To know the measurement and documentation methods.

UNIT – I

40

MEASUREMENTS & DOCUMENTATION

- a) Measurements - Types of measurements, selecting measurements, performing measurements, Interpreting measurements.
- b) Documentation - Purpose of documentation, Types of documentation, General guidelines for content and organization: i) Subjective information, ii) Objective information, iii) Assessment, iv) Plan, v) Summary.

UNIT – II

40

CARDIO-RESPIRATORY EVALUATION

- 1) History - History of illness, past medical history. Present medical history, occupational history, Social history, history of personal habits (smoking). Family history, previous treatment history.
- 2) General Respiratory Evaluation - History, chest examination.
- 3) Components of Chest Examination
 - a. Inspection - a. Evaluation of general appearance, topographical anatomic land marks,
 - b. Specific evaluation of head and neck, c. Chest wall configuration. Chest wall

- deformities, d. Evaluation of cough, and sputum, Anemia, Cyanosis, Clubbing, Respiratory Pattern
 - b. Auscultation - a. The stethoscope, b. Nomenclature & interpretations of breath and heart sounds, c. The examination technique, d. Interpretation of examination
 - c. Palpation - a. Evaluation of mediastinum and tracheal deviation, b. Evaluation of chest wall expansion, c. Evaluation of fremitus, d. Evaluation of accessory respiratory muscles, e. Evaluation of chest pain, f. Evaluation of diaphragmatic movement, g. Evaluation of edema
 - d. Mediate Percussion – resonance and diaphragmatic excursion
- 4) Laboratory Evaluation - Principles, analysis and Guidelines for interpretation of ABG, PFT, treadmill test, exercise tolerance test, ECG, ECHO, angiography, Doppler study chest radiography, bacteriological- and cytological tests, MUGA test. Evaluation of a Patient with Coronary Artery Disease - 1. Review of medical records and extraction of pertinent data, 2. Interview and examination of patient, 3. Preliminary assessment of clinical status, 4. Determination of candidacy for further evaluation, 5. Evaluation of functional activities, 6. Evaluation of activities of daily living, 7. Monitored ambulation, 8. Low level exercise test, 9. Definitive assessment regarding candidacy for exercise therapy, 10. Individually monitored aerobic exercise and strengthening program, 11. Maximal exercise test, 12. Additional invasive and non-invasive testing, 13. Serum lipid profile, 14. Evaluation of monitored job simulation, 15. Cardiac enzymes

Low Level Exercise Testing - Purpose, Contra - indications, Termination points

Maximal Exercise Testing - Purpose, Guidelines, Exercise test protocols, Contraindications and Precautions, Criteria for termination of test, Prognostic implications from exercise testing, Exercise prescription and activity recommendation based on maximal exercise test results, interpretation of maximal exercise test results. Exercise tolerance test or stress test METS and their use' in evaluation

UNIT – III**40****CARDIOPULMONARY EVALUATION IN INTENSIVE CARE UNIT**

1) Cardiopulmonary Evaluation of Ventilatory Dependent Patient - Assessment of ventilators, Respiratory rate, Respiratory pattern, Pulse rate, Temperature, Blood Pressure. Fluid and electrolyte balance; Chest tube drainage and fluid collection system. Arterial blood gas analysis. ECG monitoring, Intra-arterial lines, Pulmonary artery balloon flotation catheter, Intravenous lines, Central venous pressure, Intra aortic balloon counter pulsations, Intra cranial pressure, Electroencephalogram.

UNIT – IV**40**

- 1) Physiotherapy Evaluation of Respiratory conditions - Pre Operative evaluation of Pulmonary Surgeries · Post Operative evaluation of Pulmonary Surgeries
- 2) Physiotherapy Evaluation of Cardiac conditions - Pre Operative evaluation of Cardiac Surgeries · Post Operative evaluation of Cardiac Surgeries

UNIT – V**40**

- 1) Latest developments in physiotherapy evaluation of cardio respiratory conditions.
- 2) Clinical reasoning with evidence based evaluation.

Total Hours: 200

Course Objective:

The objectives of this course is that after 200 hours of lectures & demonstrations, in addition to clinics, the student will be able to understand about current and latest intervention used for various cardio respiratory conditions.

Course Outcomes:

1. Student should be able to plan appropriate treatment regime based on the knowledge of various subjects learned during this semester for the below mentioned condition.
2. Additionally emphasis should be on special techniques. ·Artificial respiration. · Exercise planning and prescription. . · Cardio pulmonary resuscitation, procedures and techniques.
3. Effects of aerobic, anaerobic exercises on cardiac functions. ·Adjuncts to chest physiotherapy
4. Physiotherapy techniques in relation with chest physiotherapy. ·Pediatric cardiopulmonary physiotherapy
5. Postoperative management of CABG and other cardiac surgeries. · Risk factors in cardio pulmonary bypass

Student should learn the physiotherapy interventions and recent advances in the physiotherapy management of following conditions.

Course Content

UNIT – I **50**

CPR

- 1) CPR – Indication, Technique for Adult and Paediatric subjects.

UNIT – II **50**

Physiotherapy Rehabilitation

- 1) Pulmonary Rehabilitation – Indication, Stages of Protocol
- 2) Cardiac Rehabilitation
- 3) Peripheral vascular diseases and its intervention
- 4) ICU and Physiotherapy Intervention including Paediatric ICU

UNIT – III

50

Physiotherapy Intervention following-

- 1) Pulmonary surgeries.
- 2) Cardiac Surgeries.
- 3) General surgeries

UNIT – IV

50

Exercise Prescription

- 1) Exercise testing, planning and prescription: aerobic and anaerobic exercise training.
- 2) Exercise Prescription for health promotion and fitness for special populations- DM, Obesity, IHD, COPD, HTN.

UNIT – V

50

Evidence Based Intervention & Case Discussion

- 1) Recent advances in Cardio respiratory physiotherapy including palliative care in cardiorespiratory conditions.
- 2) Critical appraisal and Evidence based intervention in Cardiorespiratory Physiotherapy intervention.

Course Objectives

This dissertation of clinical study / review of literature is designed to develop the aptitude among students towards further reading and selecting references and present a written dissertation, or conduct a comparative study of the value / efficacy of a physiotherapy procedure in selective group of patients and normal subjects or justify the chosen procedure.

Every candidate shall submit to the Registrar of the university in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within 4 months from the date of commencement of the course on or before the dates notified by the university. The synopsis shall be sent through the proper channel (Duly approved by the guide, HOD, Principal and Ethical committee) such synopsis will be reviewed and the university will register the dissertation topic. The dissertation is aimed to train a postgraduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions. Every candidate pursuing MPT degree course is required to carry out work on a selected research project under the guidance of a recognized postgraduate teacher. The result of such a work shall be submitted in the form of dissertation. Any change in the dissertation topic or guide shall be informed to the authorities of this university for its approval. No change in the dissertation topic or guide shall be made within nine months for commencement of university examination.

The printed text of dissertation should not be less than 50 pages/2500 words and shall not exceed 75 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing (Font 12, times New Roman) on one side of paper (A4 size, 8.27" X 11.69") and hard bound properly (No spiral binding). Four copies of dissertation thus prepared shall be submitted to the Controller of the Examination, three months before final examination on or before the dates notified by the university duly certified by the guide, head of the department and head of the institution.

A candidate who has submitted his/her dissertation once is not required to submit a fresh dissertation if he/she reappears for the examination in the same branch on the subsequent occasion, provided the dissertation has been accepted by the examiners

Total Hours: 250

Discipline specific electives

Discipline Specific Elective-I

19MPT101

CLINICAL TESTING

5 0 0 4

Course objective

The objective of this course is that after 100 hours of lectures & demonstrations, the student will be able to understand the knowledge about importance of special test and its implication to various conditions / problems / diseases.

Course Outcomes:

1. To understand the concept of clinical testing and its significance
2. To be wellversed in implications and significance of special tests
3. To be wellversed in special tests of upperlimb joints
4. To understand the special tests of spinal joints
5. To clearly explain the special tests of lowerlimb joints

UNIT I

20

Clinical test and its Significance

1. Introduction to clinical tests
2. Importance of clinical testing

UNIT II

20

Implications of Special Tests

1. Special test of need
2. Implication and Significance of Special Tests

UNIT III

20

Upper Limb Joints

Special test of upper limb joints
-Shoulder Joint
-Elbow Joint
-Wrist Joint

UNIT IV

20

Spinal Joints

Special test of spinal Joints
-Cervical Joint

- Thoracic Joint
- Lumbar Joint

UNIT V

20

Lower Limb Joints

Special tests of lower limb joints

- Hip Joint
- Knee Joint
- Ankle Joint

Total Hours: 100

Textbook:

1. MC Rae , Clinical orthopaedic examination – ELBS, 2 Ed, 2003

Reference:

1. David Magee , Orthopaedic physical assessment , MC GrawHill, 3Ed, 2005

Discipline Specific Elective -II

19MPT102

ERGONOMICS

5 0 0 4

Course objective:

The objective of this course is that after 100 hours of lectures & demonstrations, the student will be able to understand the knowledge about ergonomics issues, evaluation and safe practice standards.

Course Outcomes:

1. Student should have understood the different types of work nature and its impact towards the human body.
2. Student should have understood how to perform the ergonomic evaluation & should also be aware of mandatory questions which needed to be asked related to the profession.
3. Student should also be aware of pre examination procedures and examination for a person before appointing them in to the work.
4. Student should be aware to perform a workplace assessment for all the profession & should have understood about all nature of work how it affects the normal system, body mechanics, and psychological level of the person.
5. Student should be able to differentiate the work nature of software and hardware professionals.

UNIT I

20

Introduction

1. History of ergonomics
2. Need of ergonomics
3. Domains in ergonomics

UNIT II

20

Ergonomic Assessment

1. Ergonomic cycle
2. Evaluation of ergonomic issues
3. Assessment tools
4. Exit assessment

UNIT III **20**

Job analysis

1. Requirement of job
2. Profile and candidate selection
3. Pre employment screening

UNIT IV **20**

Analysis

1. Job site analysis
2. Job task analysis
3. Avenues and benefits of ergonomics
4. Work hardening

UNIT V **20**

Current Trends in Ergonomics

1. Software in ergonomics
2. Regulatory bodies
3. Professionals in ergonomics
4. Legal issues and insurance policies

Total Hours: 100

Textbook:

1. Salvendy , Handbook of Human Factors and Ergonomics, Mosby, 1Ed, 2012

Reference:

1. Valevie, J Berg rice ergonomics in health care & rehabilitation, butter worth, 1998.

Discipline Specific Elective –III

19MPT103

FOOD AND NUTRITION

5 0 0 4

Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about Diet, balanced diet, metabolism, malnutrition, under-nutrition, overnutrition, deficiency disease.

Course Outcomes:

1. Become familiar about the nutritive values of food.
2. Explain about the food sources from which we obtain vitamins.
3. Become familiar with various compositions of food.
4. Become familiar with different cooking methodologies.
5. Explain thoroughly about the advantages and disadvantages of various convenience foods.

UNIT I SOURCES OF FOOD 20

- 1) Nutritive value of foods,
- 2) Food Sources from which Key vitamins are derived

UNIT II DIGESTIVE SYSTEM 20

1. Digestion and absorption –Digestion at each stage of the digestive system
2. Dietary guidelines- Factors affecting food requirements. Planning and serving of family meals. Meals for all ages and occupations.

UNIT III COMPOSITION OF FOOD 20

Composition and value of the main foods in the diet -
Milk, meat, fish, cheese, eggs, margarine and butter
cereals (wheat, rice, maize, millets, oats)
fruits and vegetables

UNIT IV PROCESSING OF FOOD 20

1. Cooking of food -Transfer of heat by conduction, convection and radiation.
2. Principles involved in the different methods of cooking – boiling, stewing, grilling, baking, roasting, frying, steaming, pressure cooking, cooking in a microwave oven.

1. Convenience foods- Foods partly or totally prepared by a food manufacturer – dehydrated, tinned, frozen, ready to eat. Intelligent use of these foods.
2. Advantages and disadvantages.

Total Hours:100

Text Book:

1. Agarwal, Textbook of human nutrition, JP, 1 Ed, 2014

Reference:

1. Kenneth F. Kiple, Kriemhild Coneè Ornelas, The Cambridge world history of food, Cambridge University Press, 1st ed, 2000

Discipline specific elective IV

19MPT104

ENGLISH FOR COMMUNICATION

5 0 0 4

Course Objective:

At the end of 100 hours of lectures the student will be able to:

1. Speak fluently, intelligibly and appropriately to teachers, Colleagues, Doctors, Patients and friends at the college, Hospital and hostel etc. about academic or (occupational) areas of interest.
2. Develop flexibility in reading; improve speed and rate of comprehension while tackling textbooks or reference material.
3. Write official letters to the warden, principal and other officials in the bank, post office etc.
4. Write reports about patients care.
5. Overcome the common errors in pronunciation and grammatical and idiomatic usage.

Course Outcomes:

1. Become fluent in speaking and enhance the ability to communicate effectively with colleagues, doctors, patients etc.
2. Well versed with comprehension skills and vocabulary enhancement.
3. Become familiar with writing various official letters, writing patients reports and summarise scientific sessions.
4. Understand about the grammatical and idiomatic usages.
5. Well versed with various methods of teaching by involving in group activities, role plays etc.

UNIT I SPOKEN COMMUNICATION

20

1. Learning to read the phonetic symbols
 1. Stress
 2. Intonation
 3. Rhythm
 4. Commonly mispronounced words
 5. Correct pronunciation of important commonly used words in clinical practice
 6. Note taking in lecture classes

UNIT II

VOCABULARY AND READING

20

1. Special features of English vocabulary
 1. Common errors in choice of word
 2. Semi technical vocabulary
 3. Collecting material from library on scientific topics
 4. Comprehensive exercises

Computer packages
MS Office
MS word
MS Excel
MS PowerPoint
Advantages and uses.

UNIT V

COMPUTER NETWORKS & GRAPHICS

20

Introduction to computer networks – Definition LAN, WAN advantage of Internet – worldwide web.

Computer Graphics: Definition – display devices – graphical input and output devices – multimedia – definition and application – computer applications in physiotherapy and clinical studies.

PRACTICALS

Exercises based on the following are to be dealt:

1. Computer operating systems like UNIX, MS-DOS etc.
2. Simple program In C.
3. MS-Office (MS-Word, MS-Excel, MS-Access, MS-PowerPoint)

Evaluation**Total Hours: 100****Text Books:**

1. C.Nellai Karunan, MS Office, CBS,4th Ed, 2006
2. Hunt N and Shelly J., Computers and commonsense, Prentice - hall of India New Delhi,2011

References:

1. E.Balaguruswamy – Programming in ANSI –C Tata Mc.Graw Hill-1997
2. Byron Gottfield – Programming with C, Prentice - hall of India,2nd Ed, 2000
3. Popst and Perrum, computer aided drug design, Academic press New york.1999
4. Writh, systematic programming- an introduction, Prentice Pub,3rd Ed,2005
5. Tanen Baum, Computer networks,2 Ed, 2012
6. Rajaraman ,Computer Graphics, Mc Graw Hill, 6 Ed, 2009

Discipline specific elective -VI

19MPT106

BIostatistics / RESEARCH METHODOLOGY

5 0 0 4

Course Objective

The objective of this course is after 100 hours of lectures the student should be able to have basic knowledge on Research Methodology and Bio Statistics.

Course Outcomes:

1. The student will be able to implement hypothesis testing
2. Important concepts relating to research design and measurements and scaling techniques.
3. To analyze experimental and observational study
4. Processing and analyzing data
5. To implement and calculate frequency distribution.

UNIT I INTRODUCTION TO BIostatistics 20

1. Introduction to Biostatistics
2. Frequency distribution
3. Measures of central tendency
4. Measures of dispersion

UNIT II STATISTICAL TOOL 20

1. Probability
2. Correlation & regression
3. Statistical inference

UNIT III COMMUNITY AND HOSPITAL STATISTICS 20

1. Vital statistics
2. Health statistics

UNIT IV RESEARCH METHODOLOGY 20

1. Introduction to research methodology
2. Steps in research process

UNIT V RESEARCH REPORT 20

1. Writing research report
2. Pilot Study

Evaluation

Total Hours:100

TextBook:

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

Reference:

1. Sundarrao, Introduction to biostatistics and Research Methodology, CBS, 1Ed, 2002

Discipline Specific Elective -VII

19MPT107

APPLIED PHYSICS

5 0 0 4

Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about the forces acting in human body, gravity, electricity and magnetism.

Course Outcomes:

1. Students will know about the human body functions applied by the force gravity
2. Recognize how observation, experiment & theory work together to continue to expand the frontiers of knowledge of the physical universe
3. Analyze interpret and evaluate scientific hypotheses and theories , laws using rigorous methods
4. Students can understand the basic scientific principles, theories & laws as was as an awareness of the changing nature of science
5. Students aid gain knowledge about the current elasticity to differentiate the mode of transmission

UNIT – I INTRODUCTION 20

1. Forces in human body
2. Gravity, LOG, COG
3. Levers of the body
4. Anatomical pulleys
5. Body torque
6. Types of motion, Planes of motion, Axis, Direction and quality of motion

UNIT – II MUSCLES 20

1. Elasticity- Hook's law.
2. Stress / strain curve
3. Angle of pull & the mechanical efficiency of muscle
4. Types of muscle work

UNIT – III HYDROTHERAPY AND HEAT 20

1. Laws of hydrotherapy & its application
2. Heat & its application

UNIT – IV**ELECTRICITY****20**

1. Static electricity
2. Current electricity
3. Working & importance of current in clinical practice
4. Electro Magnetic spectrum

UNIT – V**MAGNETISM****20**

1. Definition
2. Properties of magnets
3. Electromagnetic induction
4. Magnetic forces and field

Text Books:

1. Claytons , Electrotherapy Explained – CBS, 9 Ed, 2013
2. John Low and Anee Reed , Electrotherapy Explained –, Butterworth Heinmann pub, 1Ed, 2000

Reference:

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

Generic Electives

Generic elective I

19MPT151

CARDIOPULMONARY RESUSCITATION

5 0 0 4

Course objective:

Upon successful completion of 100 hrs the student will be able to apply first aid and perform cardiopulmonary resuscitation (CPR).

Course Outcomes:

1. To be wellversed in defining CPR and understand the Principles of CPR
2. To be wellversed in checking and positioning the victims
3. To clearly explain the procedures in CPR
4. To understand the concept of signals of a heart attack
5. To clearly explainthe concept of Adult, Child and infant CPR

UNIT I INTRODUCTION TO CPR 20

1. Definition of CPR
2. Health concerns as it relates to performing Community CPR or First Aid.

UNIT II PRINCIPLES OF CPR 20

1. Check, Call, and Care techniques.
2. Good Samaritan Laws and getting permission from victims.

UNIT III INDICATIONS FOR CPR 20

1. Checking an unconscious victim.
2. Positioning victims.

UNIT IV PROCEDURES IN CPR 20

1. Steps in determining care of a victim. Examples: rescue breathing, CPR, etc.
2. Matt work on all skills related to Community CPR.

1. Signals of a heart attack.
2. Adult, child, and infant CPR.

Total Hours:100**Textbook:**

1. Chandra, Handbook of Interventional Cardiology, JP, 1 Ed, 2015

Reference:

1. Davidson, A Text Book of Medicine, Churchill Livingstone, 21 st Ed, 2010.

Generic Elective – II

19MPT153

CLINICAL DIAGNOSIS

5 0 0 4

Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about Clinical diagnosing Ortho, Neuro and Cardio-respiratory Conditions.

Course Outcomes:

1. To understand the concept of clinical diagnosis and its significance
2. To be well versed in clinical assessment and diagnosis in musculoskeletal conditions
3. The students gain the knowledge of assessment and diagnosis in cardio respiratory conditions
4. To be well versed in sports injury assessment and diagnosis
5. More knowledge about obstetrics and gynecological diseases assessment and diagnosis

UNIT I CLINICAL DIAGNOSIS OF ORTHOPAEDIC CONDITIONS 20

1. Fracture
2. Congenital disorders
3. Deformities
4. Trauma & injury
5. Orthopedic disabilities arising due to neurological conditions

UNIT II CLINICAL DIAGNOSIS OF NEUROLOGICAL CONDITIONS 20

1. Stroke
2. Brain tumours
3. Psychiatric disorders
4. Cerebellar dysfunction
5. Epilepsy
6. Demyelinating disorders

UNIT III CLINICAL DIAGNOSIS OF CARDIAC CONDITIONS 20

1. Congenital heart diseases
2. Circulatory disorders
3. Arrhythmias
4. Cardiomegaly

UNIT IV CLINICAL DIAGNOSIS OF RESPIRATORY CONDITIONS 20

1. Abnormal breathing patterns
2. COPD
3. Occupational lung diseases
4. TB & Tumours

UNIT V CLINICAL DIAGNOSIS OF OBG CONDITIONS 20

1. Prolapse of uterus
2. Hernia
3. Mastectomy
4. Antenatal complications
5. Post natal complications

Total Hours:100

Text Book:

1. Davidson, A Text Book of Medicine, Churchill Livingstone, 21 st Ed, 2010.

Reference:

1. Magee, Textbook of orthopaedics, ELBS, 7Ed, 2002

Course objective:

The objective of this course is that after 60 hours of lectures & demonstrations, the student will be able to understand the knowledge about Physiotherapy evaluation of various conditions including orthopaedics, neurology, cardio respiratory, sports and Hand conditions.

Course Outcomes:

1. To understand the importance of evaluation and screening
2. To be wellversed in PT evaluation in orthopaedic conditions
3. To understand PT evaluation in cardio-pulmonary conditions
4. To be wellversed in PT evaluation in Neurological conditions
5. To clearly explain the concept of PT evaluation in sports and Hand conditions.

UNIT-I	INTRODUCTION	20
	<ol style="list-style-type: none">1. Importance of evaluation2. Importance of screening3. Clinical decision making4. Methods of evaluation5. General evaluation formats	
UNIT – II	ORTHOPEDIC EVALUATION	20
	<ol style="list-style-type: none">1. PT Evaluation in orthopedic conditions2. Range of motion3. Limb length measurement4. End feels	
UNIT – III	CARDIOPULMONARY EVALUATION	20
	<ol style="list-style-type: none">1. PT Evaluation in Cardiopulmonary conditions2. Normal & abnormal heart sounds3. ECG waveforms – normal & abnormal4. Auscultation techniques	

UNIT – IV**NEUROLOGICAL EVALUATION****20**

1. PT Evaluation in Neurology conditions
2. Myotomes
3. Dermatomes
4. Reflex testing
5. Tone assessment

UNIT – V**SPORTS AND HAND EVALUATION****20**

1. PT Evaluation in Sports & Hand conditions
2. Common sports injuries
3. Hand function
4. Ergonomic measures

Total Hours:100**Text Books:**

1. David Magee , Orthopaedic physical assessment , MCgH, 3Ed, 2005
2. Frown Felter, Cardiopulmonary evaluation, ELBS, 2 Ed, 1997

Reference:

1. Lindsay ,Neurology Assessment – Mosby, 3 Ed, 2009
2. David , Sports Injuries assessment and Rehab – CBS, 1 Ed, 2004

Generic Elective - IV

19MPT154

APPLIED CHEMISTRY

5 0 0 4

Course objective:

The objective of this course is that after 100 hours of L,D,P the student shall be able to understand the basic knowledge about the ATP production, energy source & body and other biochemical activity / changes that occur in our body.

Course Outcomes:

1. Student will know about the energy source that invalid in human body
2. Student will know about the acidic reaction & mechanism
3. They will know about the metabolism of the body and how the process occur
4. Student will know about the nutrition and the deficiency
5. Student will know about the clinical tester to identify the internal function of the organs

UNIT – I

INTRODUCTION

20

1. Energy source of body
2. Carbohydrates
3. Protein
4. Fat

UNIT – II

ENERGY SYSTEMS

20

1. ATP Production
2. Aerobic & Anaerobic Metabolism
3. Lactic acid production
4. Lactic acid clearance mechanism

UNIT – III

METABOLISM

20

1. Protein metabolism – Digestion, absorption, Urea cycle
2. Carbohydrate metabolism
3. Fat metabolism

UNIT – IV

NUTRITION

20

1. Composition of food
2. Balanced diet
3. Nutritional deficiency disorders
4. Major dietary constituent & their importance

1. Metabolic equivalence
2. Types of energy expenditure
3. Liver function test
4. Renal function test
5. Lipid profile in serum

Total Hours:100**Text Book:**

1. B.E. Deb, Basics in Bio chemistry – JP, 2Ed, 1997

Reference:

1. Chatterjee, Text book of medical biochemistry, JP, 8 Ed, 2012

Course objective:

Students can explore public policy, community relations, human resource management, hospital finance, fundraising, physician relations and collective bargaining after completing 100 hrs of lecture.

Course Outcomes:

1. To understand the concepts and type of principles of management
2. To clearly explain the research methods for management
3. To be wellversed in Hospital Architecture, planning and Design
4. To understand the concept of materials management
5. To be wellversed in Ethics and laws in Hospital management

UNIT I PRINCIPLES OF MANAGEMENT 20

1. Principles of Management
2. Organizational Behaviour

UNIT II TYPES OF MANAGEMENT 20

1. Accounting and Finance for Managers
2. Marketing Management
3. Human Resource Management
4. Quantitative Techniques for Management

UNIT III IMPORTANCE OF MANAGEMENT 20

1. Research Methods for Management
2. Corporate Communication
3. Operations Management

UNIT IV HOSPITAL MANAGEMENT 20

1. Hospital Architecture, Planning And Design
2. Materials Management
3. Hospital Operation – I (Patient Care)
4. Hospital Operation – II (Supportive Services)

1. Bio-Sciences & Epidemiology
2. Hospital Information System
3. Health Laws & Policies
4. Hospital Environment and Ethics

Total Hours:100

Textbook:

1. Wallace J. Hopp , Hospital Operations: Principles of High Efficiency Health Care, Pearson higher education Publication, 2nd Ed,2012

Reference:

1. Goyal & Sharma,Hospital Administration and Human Resource Management, PHI Publisher,2013