

BoS meeting
Sathyabama College of Physiotherapy

Date: 8/10/2024
Time: 10.30.a.m

Venue: board room physiotherapy department

Members present:

Chairperson:

Prof. Dr. L. Lakshmi

Dean, Sathyabama College of Physiotherapy

External:

Prof. Dr. P.Senthil Selvam

Principal, Vels College of Physiotherapy

Prof. Dr. V. Balchandar

Principal, Jaya College of Physiotherapy

Internal:

Prof. Dr. Igini Sabasti Prabhu S.

Controller of Examinations,
Sathyabama Institute of Science and Technology

Prof. Dr. Kumaran T

Principal, Sathyabama College of Physiotherapy

Introduction of the Internal and External Members by the Chair Person

All the external and internal members were introduced with a request of contributing their valuable inputs to the point.

Agenda of the meeting

1. Clinical training to be considered for practical end semester exam.
2. Clinical training to include 50 marks for internal and 50 marks for end semester examination.
3. One CA exam and one model exam to be conducted before End semester exam.
4. Inclusion of more skilled subjects as value added courses.

Minutes of the Meeting

Sn o	Agenda Point Discussed	Suggestions given by members	Type of syllabus change	Course Code/ Course Name	Semester of Course	Batch Effective from	Course Coordinator to update the change
1	Clinical training to be considered for practical end semester exam	To frame syllabus for the practical subject	Addition of the content	SPTB5106 P/ Clinical Training-I	v	2022	Ms Vishnu Priya
2	Value added course	Few Value Added Courses (VAC) listed below can be added along with the existing list to enhance the employability and to facilitate entrepreneurship skills of the students. This also can enhance the score in the NAAC Accreditations of the Institution. Research writing in Physiotherapy Educational leadership Marketing and Record maintenance				2025	Dr. Priya Kumari

		Active living with aging					
3		In the Programme Outcomes (PO), include the following To enhance the employability skills and entrepreneurship opportunity.				2025	
4		In the 3rd year or 4th year courses, few Elective Subjects can be included (which were not covered in the existing BPT programme course list) that can provide more opportunity for the students to identify to fit some of their personal choices and do little bit of specialization in their undergraduate programme itself. This will enhance their pursuance into master degree programme in a broader scope later. Some of the choice of Elective subjects for BPT programme: Sports injury management Hand rehabilitation Oncology rehabilitation Role of Physiotherapy in Palliative Care	Inclusion of the subjects			2025	Dr. Priya Kumari



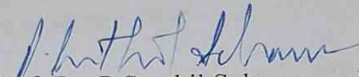
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SATHYABAMA COLLEGE OF PHYSIOTHERAPY

Signature

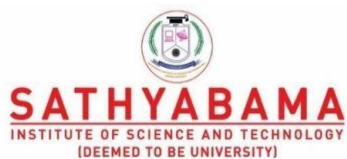
Prof. Dr. L. Lakshmi
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SATHYABAMA COLLEGE OF PHYSIOTHERAPY

Subject code	Course name
SPTB3101	Microbiology and Pathology
SPTB3102	Exercise therapy- I
SPTB3103	Electrotherapy- I
SPTB3104	Biomechanics- I
SPTB3105*	Nutrition, Balance Diet & Nutritional Disorders
SPTB3102P	Exercise therapy Practical- I
SPTB3103P	Electrotherapy Practical- I
SPTB4101	General medicine
SPTB4102	Exercise therapy- II
SPTB4103	Electrotherapy- II
SPTB4104	Biomechanics- II
SPTB4105*	Fitness/Exercise Physiology
SPTB4102P	Exercise therapy Practical- II
SPTB4103P	Electrotherapy Practical- II

SEMESTER III

SPTB3101	MICROBIOLOGY AND PATHOLOGY	L	T	P	EL	Credits	marks
		45	15	0	0	4	75

- The objective of this course is that after completion the students will be able to understand about the knowledge of pathology, microbiology including immunity, virology, antiseptics, and allergy..
- To know in detail about the diseases.

PATHOLOGY

UNIT I – Introduction

10 hrs

Disease, concepts of disease, classifications of lesions- Bacterial, viral, and parasitic infections a general outline. Cell injury, necrosis, and gangrene. Inflammation, healing and repair, Degeneration.

Haemorrhage, shock, thrombosis, embolism. Tuberculosis, typhoid. Deficiency diseases.

Tumours: Aetiology & spread. Common tumour. Blood: Anaemia, Heart and blood vessels, Common congenital anomalies, Rheumatic & coronary heart diseases.

UNIT II – Diseases

10 hrs

Respiratory system: Pneumonia, Bronchiectasis, Emphysema, Chronic bronchitis, Asthma.

Bone and joints: Autoimmune disease, Septic arthritis, Osteomyelitis. Skin: Leprosy.

Urinary system.

Central nervous system: CNS infections, vascular disorders.

Rheumatoid Arthritis.

Scleroderma and Psoriasis.

Diseases of muscle including Poliomyelitis, Myopathies.

Volkman's ischemia.

MICROBIOLOGY

UNIT III – Introduction

10 hrs

Introduction and history of microbiology.

General lectures on micro-organisms:

- a. Classification.
- b. Shape and arrangement.
- c. Special characteristics – spores, capsules, enzymes, motility, reproduction.

UNIT IV- Infection

- a. Disinfection and antiseptics.
- b. Sterilisation and asepsis.
- c. Antibacterial agents – fundamental aspect. Susceptibility test
- d. Infection – source of infection.
 - i. portals of entry.
 - ii. Spread of infection.

UNIT V- Immunity and prevention

15 hrs

- a. Immunity – natural and acquired, non-specific immunity.
- b. Allergy and hypersensitivity.
- c. Outline of common pathogenic bacteria and the diseases produced by them.

Treatment and prevention.

- d. Respiratory tract infections.
 - e. Meningitis.
 - f. Enteric infections.
 - g. Anaerobic infections
 - h. Urinary tract infections.
 - i. Leprosy, tuberculosis, and miscellaneous infections.
 - j. Wound infections.
 - k. Sexually transmitted diseases.
 - l. Hospital acquired infections.
 - m. Pathogenic Yeasts and fungi.
 - n. Virology -Virus infections, with special mention of
- b) Hepatitis, Poliomyelitis & Rabies.

Max hours = 60 hrs

Course outcome:

On completion of the course, student will be able to

CO1: Asses the disease and changes in structure and function of cells during disease condition gained, hemorrhage, shock and various blood vessel occlusive disease gained.

CO2: Determine the importance of nutrition, function of nutrition and its deficiency diseases gained,

CO3: Explain Pathogenesis and pathological changes of disease in various body system is understood properly.

CO4: Summarize the mechanism of autoimmune diseases

CO5: Elaborate about the various microorganism, its classification and structure gained, various method of sterilization and its importance gained.

CO6: Evaluate infectious diseases gained, To Know about immunity, types, and its importance

Text /Reference books:

1. Harsh Mohan, Text book of Pathology, Jaypee brothers, 7th edition-2015.
2. SatishGupte, The Short text book of Medical Microbiology by, Jaypee Brothers, 2nd Ed, 2004.
3. Ananthanarayananan & Jayaram Paniker, Text book of Micro biology, Orien Longman, 9th Ed, 2013.
4. Kumar, Essentials of Microbiology, JP, 1st Ed, 2014.
5. Datta, Textbook of Pathology, JP, 2nd Ed, 2004.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks

Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks

Part C: 10 Questions from unit 1 to unit 5 each carrying 2 marks each 20 marks

SPTB3102	EXERCISE THERAPY – I	L	T	P	EL	Credits	marks
		45	15	60	3	7	75

Course Objective:

- The objectives of this course are that after hours of lectures, demonstrations, practical and clinics the student will be able to list the indications and contra – indications of various types of exercise therapy,
- Demonstrate the different techniques, and describe their effects.

UNIT I – Introduction

10 hrs

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

UNIT II - Methods Of Testing

30 hrs

a. Functional tests

b.Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, niometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints Tests for neuromuscular efficiency

i. Electrical tests

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

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

iv. Static power Test

v. Dynamic power Test

vi. Endurance test

vii. Speed test Tests for Co-ordination

e. Tests for sensation

f. Pulmonary Function tests

g. Measurement of Limb Length: true limb length, apparent limb length, segmental limb length h.
Measurement of the angle of Pelvic Inclination

UNIT III - Passive Movements

30 hrs

Causes of immobility, Classification of Passive movements, specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses, Techniques of giving passive movements. Active Movements Definition of strength, power & work, endurance, muscle actions.

Physiology of muscle performance:

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

Types of active movements Free Exercise:

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

UNIT IV - Resisted Exercise

30 hrs

Definition, principles, indications, contraindications, precautions & techniques, effects and uses Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open Chain and Closed-Chain exercise. Specific exercise regimens

- i. Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training
- ii. Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle
- iii. Isometrics Isokinetic regimens

a) Relaxation

Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism,

Indications of relaxation, Methods & techniques of relaxation-Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods

UNIT V - Massage

20 hrs

- a. History and Classification of Massage Technique, Principles, Indications and Contraindications
Technique of Massage
- b. Classify, define, and describe: - effleurage, stroking, kneading, petrissage, deep friction, percussions, vibration and shaking etc. Preparation of patient: Effects, uses, indications and contraindications of the above manipulation.
- c. Massage manipulations-principles effects/merits/demerits -skills on extremities / scalp / spine/ abdomen / face.
- d. Therapeutic and physiological changes in Circulatory, Nervous, Musculoskeletal, Excretory, Respiratory, Integumentary system and Metabolism.

Max hours = 120 hrs

Course Outcome:

On completion of the course, student will be able to

- CO1 Classify fundamentals of muscle and joint function and their measurements
- CO2 Summarize the active movements of each joint
- CO3 Demonstrates the passive movements of each joint
- CO4 Illustrates practical knowledge on passive movement, resisted exercise and muscle grading,
- CO5 Classify, and describe active movements and passive movements. describe therapeutic massage
- CO6 Explain principle of exercise applications. Describe methods of testing – goniometry, manual muscle testing, Anthropometric Measurements, Measurement of Limb Length, and functional tests.

Text /Reference books:

- 1) Dena Gardiner, Principles of Exercise therapy, Bell and Hymes, 4th Ed, 1981.
- 2) Massage, manipulation & traction- Sydney Litch
- 3) Carolyn Kisner, Therapeutic Exercise, Jaypee Brothers, 6th Ed, 2012
- 4) Margeret Hollis, Practical Exercise therapy, ELBS, 4 Ed, 2004
- 5) Kendall, manual Muscle Testing, ELBS, 2Ed, 1997

6) Sebastian, Principles of Manual Therapy, Jaypee Brothers, 2 nd Ed, 201

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks

Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks

Part C:10 Questions from unit 1 to unit 5 each carrying 2 marks each20 mark

SPTB3103	ELECTROTHERAPY – I	L	T	P	EL	Credits	marks
		45	15	60	O	6	75

Course Objectives:

- The objective of this course is that after completion of lectures, demonstration, practical and clinical the student will be able to list the indications and contra – indications of various types of electrotherapies,
- Demonstrate the different techniques, and describe their effects.

UNIT I - INTRODUCTION

10 hrs

- a. Introduction to Electrotherapy – Definition and types, Therapeutic uses. Instrumentation, Importance of currents in treatment, Equipment demonstration.
- b. Shock-Electrical and earth: causes, effects, management, precautions, Safety measures in Electrotherapy Department.

UNIT II - LOW FREQUENCY CURRENTS

30 hrs

- a. Basics of Low Frequency stimulating currents
- b. Bio-electricity – electrical charge within body.
- c. Types of low frequency currents used in therapeutics
- d. Direct current – Galvanic current
- e. Interrupted DC
- f. Faradic current
- g. Surged Faradic current
- h. Pathophysiology of nerve lesion – Principles of selection of modes for assessment of nerve muscle function.

All types of therapeutic currents must be taught under the following sequence

- a. Definition: Production (Brief) – wave forms – duration
- b. Indication & contra indications
- c. Physiological effects
- d. Therapeutic effects

- e. Technique of application

Iontophoresis

- a. Theory
- b. Physiological effect and uses of various iontophoresis
- c. Effects of various ions.
- d. Techniques of iontophoresis for pain relief, reduction of oedema, wound healing, and hyperhidrosis.

Transcutaneous electrical nerve stimulation (TENS)

- a. Physiology of pain, pain modulation Gate control theory.
- b. TENS – Definition, Production, Types, Therapeutic and physiological effects, Indication & Contraindication, Technique of application.

UNIT III- MEDIUM FREQUENCY CURRENTS

30 hrs

- a. Interferential current
- b. Russian current
- c. Di dynamic current
- d. Sinusoidal current

All types of medium frequency currents must be taught under the following sequence.

- a. Definition: Production (Brief) – wave forms – duration
- b. Indication & contra indications
- c. Physiological effects
- d. Therapeutic effects
- e. Technique of application

UNIT IV - ELECTROMYOGRAPHY, NERVE CONDUCTION & BIO – FEEDBACK TESTING, ELECTRO-DIAGNOSTIC TESTING LIKE FG TEST, SD CURVE.

20 hrs

- a. Principles
- b. Instrumentation
- c. Application and uses.

UNIT VTRACTION

30 hrs

- a. Types
- b. Indications and contraindications
- c. Physiological and therapeutic effects
- d. Principles and application of traction

External Compressive Devices

- a. Types
- b. Indications and contraindications.
- c. Physiological and therapeutic effects
- d. Principles and application of traction.

Max hours = 120 hrs

Course outcome:

On completion of the course, student will be able to

- CO1: Classify types of therapeutic currents and its physiological, therapeutic effects gained.
- CO2: Determine about pain and pain modulation mechanism gained.
- CO3: Explain neuromuscular dysfunction by electro-diagnostic test is known.
- CO4: Categorize different types of low and medium frequency currents.
- CO5: Illustrate indication, contraindication, method of application gained. Knowledge about Traction, its indication, contraindication, method of application gained.
- CO6: Evaluate external compression device, indication, contraindication, method of application gained. Practical application of electrotherapy modalities for various conditions gained.

Text /Reference books:

1. Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Book seller. 9th Ed, 2012.
2. John Low and Anee Reed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4thEd, 2003
3. Edward Bellis Clayton, Nigel Palastanga, Claytons Electrotherapy: Theory and practice, 9th Ed, 1985
4. Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.
5. Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.
- 1) Tim Watson Electrotherapy evidence-based practice, Churchill Livingstone, 12th Ed, 2008.
- 2) Valma, J. Robertson, Electrotherapy explained, Butterworth, Heinmann, Elsevier, 4th Ed, 2014.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

- | | |
|---|----------|
| Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each | 30 Marks |
| Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each | 25 marks |
| Part C: 10 Questions from unit 1 to unit 5 each carrying 2 marks each | 20 marks |

SPTB3104	BIOMECHANICS – I	L	T	P	EL	Credits	marks
		45	15	0	0	4	75

Course Objective:

- The objectives of this course is that after lectures and demonstrations the student will be able to demonstrate an understanding of the principles of Biomechanics and Kinesiology and their application in the health and disease pertaining to muscles and joints of upper limb.

UNIT I	BASIC CONCEPTS IN BIOMECHANICS: KINEMATICS AND KINETICS	15 hrs
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- a. Types of Motion
- b. Location of Motion
- c. Direction of Motion
- d. Magnitude of Motion
- e. Definition of Forces
- f. Force of Gravity
- g. Reaction forces
- h. Equilibrium
- i. Objects in Motion
- j. Force of friction
- k. Concurrent force systems
- l. Parallel force system,
- m. Work
- n. Moment arm of force
- o. Force components
- p. Equilibrium of levers

UNIT II JOINT STRUCTURE AND FUNCTION

10 hrs

- Joint design
- Materials used in human joints
- General properties of connective tissues

- d. Human joint design
- e. Joint function
- f. Joint motion
- g. General effects of disease, injury, and immobilization.

UNIT III MUSCLE STRUCTURE AND FUNCTION 10 hrs

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

UNIT IV BIOMECHANICS OF THE THORAX AND CHEST WALL 15 hrs

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

THE TEMPOROMANDIBULAR JOINT - General features, structure, function, and dysfunction

UNIT V THE VERTEBRAL COLUMN 10 hrs

- a. Describe the general structure and function of the vertebral column, describe factors affecting stability and mobility.
- b. Regional structure and function of cervical, dorsal, lumbar, and sacral vertebrae. Motions of the vertebral column. Lumbar-pelvic rhythm. Rotation of the vertebrae in each region.
- c. Movements of the ribs during rotation.
- d. Describe the muscles of the vertebral column, flexors, extensor, rotators, and lateral flexors Describe the effects of injury, developmental deficits, defects in vertebrae Forces acting on the vertebral column during specific motions.

Max hours = 60 hrs

Courser Outcomes:

On completion of the course, student will be able to

CO1: Illustrate basic concepts in Biomechanics, classify joints

CO2: Classify joint structures & its functions.

CO3: Apply biomechanics of movements at joints related to planes and axis, classify muscle and describe muscle structures & its functions. Discuss biomechanics of muscle related to force production.

CO4: summarize Biomechanics of the Thorax and Chest wall,

CO5: Interpret Biomechanics of The Temporal mandibular Joint,

CO6: Explain Biomechanics of vertebral column

Text /Reference books:

1. Joint structure and function – Cynthia Norkin, 7th edition
2. Textbook of Biomechanics by Subrata Pal
3. Kinesiology and Biomechanics by Bhartendu Kumar

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks

Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks

Part C: 10 Questions from unit 1 to unit 5 each carrying 2 marks each 20 marks

SPTB3105	NUTRITION, BALANCE DIET & NUTRITIONAL DISORDERS.	L	T	P	EL	Credits	marks
		15	0	0	0	1	50

Course Objective:

- The objectives of this course are that after lectures the student will be able to demonstrate a general understanding of the diet and nutrition to be prescribed during practice.

UNIT I –introduction

3 hrs

Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate. Definition, Normal values, factor affecting BMR Special dynamic action of food.

Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person

UNIT II- Balanced diet

3 hrs

Recommended dietary allowances Role of carbohydrates in diet: Digestible carbohydrates and dietary fibres Role of lipids in diet Role of proteins in diet: Quality of proteins – Biological value, net protein utilization, Nutritional aspects of proteins essential and non- essential amino acids. Nitrogen balance

UNIT III- Nutrition and Health

3 hrs

Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition program. Maternal nutrition and education

UNIT IV - Food and Nutrition:

3 hrs

Assessment – Nutritional and Energy requirements.

UNIT V- Nutritional Disorders

3 hrs

Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples Nutritional anaemias: Iron deficiency anaemia, Folic acid, Vit. B 12 deficiency anaemia including pernicious anaemia.

Deficiency diseases – clinical features and treatment; Protein – Energy Malnutrition: Clinical features and treatment; Obesity and its related disorders: Causes – Complications – benefits of weight loss – management of Obesity – diet, exercise, and medications.

Max hours = 15 hrs

COURSE OUTCOME

On completion of the course, student will be able to

CO1: Interpret about nutrition.

CO2: Assess basic concepts in Nutrition

CO3: Determine basic concepts in diet

CO4: Summarize nutrition and health

CO4: Evaluate nutrition and energy requirements

CO5: Explain the nutritional deficiency.

Text /Reference books:

- 1) Nutrition and Dietetics by Shubhangini A Joshi
- 2) All About Nutrition: Diet preparation tools with basic understanding by Mr. Hitesh Andel
- 3) Textbook of Nutrition and Dietetics by Ranjana Mahna & Seema Puri Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Set

IV SEMESTER

SPTB4101	GENERAL	L	T	P	EL	Credits	marks
	MEDICINE	45	15	0	0	4	75

Course Objective:

- The objectives of this course are that after lectures & demonstrations, in addition to clinics the student will be able to demonstrate a general understanding of the diseases that therapists would encounter in their practice.
- They should have a brief idea of the aetiology and pathology, what the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitations imposed by the disease on any therapy that may be prescribed.

UNIT I INFECTIONS

10 hrs

Outline the mode of spread and appropriate prevention measures, of the following communicable diseases.
Bacterial – Tetanus, Viral – Herpes Simplex, Zoster, Varicella, Measles, German measles, Hepatitis B, Aids
Protozoal – Filariasis

Hematology - Define and briefly describe clinical aspects of iron deficiency, B12 and folic acid deficiency anemia -
List types of bleeding diathesis - Describe the clinical features of Hemophilia.

UNIT II RESPIRATORY TRACT

15 hrs

- Bronchitis - Define, list etiological factors, and describe symptoms.
- Pneumonia - List types of pneumonia (lobar, broncho, aspiration pneumonia.).
- List etiologic agents and briefly outline symptoms and complications of pneumonia.
- Asthma - Define; describe briefly the etiological factors and clinical features of acute exacerbation.
- Chronic obstructive airway diseases - Define emphysema and chronic bronchitis. Briefly describe the pathology, symptoms of disease and clinical course.
- Tuberculosis - Describe the etiology, pathology, and clinical features of pulmonary TB.
- Bronchiectasis - Define and describe briefly the pathology and clinical symptoms of bronchiectasis, bronchopulmonary segments, and basis of postural drainage.
- Emphysema - Define and briefly describe etiological factors.
- Chest wall deformities - Describe funnel chest, Pigeon chest, barrel chest, Kyphoscoliosis of thoracic spine. Briefly outline functional disability of occupational, Lung diseases, List pneumoconiosis.

CARDIO - VASCULAR SYSTEM

Cardiac failure - Define. List causes and symptoms.

Rheumatic fever - Define and briefly describe etiology and gross pathology of rheumatic heart disease.

Infective endocarditis - Define and outline etiology, symptoms, and complications.

Ischemic heart disease - Outline pathology of IHD, define angina pectoris and Myocardial infarction, Describe the clinical features, and broadly outline medical and surgical therapy.

Hypertension - Define and outline the clinical features, complications & goals of therapy.

Outline pathogenesis and clinical features of pulmonary embolism, Deep vein thrombosis, pulmonary infarct.

Congenital heart disease - List ASD, VSD, Fallot's Tetralogy and PDA & briefly outline the pathologic anatomy.

UNIT III BONE, JOINT AND CONNECTIVE TISSUE DISORDERS

15 hrs

- a. Brief introduction to concept of autoimmune disease.
- b. Define: Systemic lupus erythematosus, Polymyositis, Dermatomyositis, Polyarteritis Nodosa, and Scleroderma.
- c. Rheumatoid arthritis - Describe etiology, clinical features and complications, drug therapy and non-pharmacological therapy.
- d. Osteoarthritis - Describe etiology, clinical features and complications and review non-steroidal anti-inflammatory drugs and steroids.

RENAL DISEASES

- a. Define and briefly outline acute and chronic renal failure.
- b. Urinary tract infection - Pathogenesis, outline common clinical conditions complicated by UTI.

METABOLIC DISEASES

- a. Diabetes - define and outline etiology. List types of diabetes & complications and briefly outline use of insulin, diet and oral hypoglycemic agent in management of diabetes.
- b. Obesity - Define and outline management.

GERIATRICS

List diseases commonly encountered in the elderly population and their role in causing disability: Hypertension, Ischemic Heart disease, Cerebrovascular accidents, Benign prostatic Hyperplasia, Cataracts & other causes of failing vision.

UNIT IV ENT, OPHTHALMOLOGY, DERMATOLOGY, PEDIATRICS

10 hrs

ENT - Outline the anatomy and physiology of hearing, Use of audiometry in assessment of hearing.

Briefly classify causes of hearing loss. Outline the conservative and surgical intervention, including types and availability of hearing aids.

Outline the functions of vestibular apparatus

Outline the common ENT infectious diseases which affect hearing, breathing and speech and their management.

OPHTHALMOLOGY

- a. Eye lesions in leprosy, including causes, treatment and complications of Exophthalmos.
- b. Field defects arising from lesions in the visual pathway, their clinical symptoms and methods of testing.
- c. Effect of Paralysis of ocular muscles and treatment.
- d. Causes, clinical features and a treatment of disorders of ocular movement occurring in diseases such as myasthenia gravis, progressive supranuclear palsy and lower motor neuron diseases.
- e. Causes, clinical features, treatment, and prognosis in Visual failure arising from cataract, inflammatory disorders, Vitamin A deficiency, Glaucoma and Trachoma; emphasis on preventable causes and prophylactic measures.
- f. Define blindness, and visual disability evaluation. Investigative procedures used for testing visual failure, including basic screening procedures for visual acuity suitable for community health surveys.

DERMATOLOGY

- a) Diseases of skin – leprosy, pigmentary anomalies, vasomotor disorders, trophic ulcers their classifications and management dermatitis, bacterial and fungal parasitic and viral infections, skin diseases related to rheumatology, tropical skin diseases and Hyperhidrosis.

UNIT V PEDIATRICS

10 hrs

- a) Describe growth and development of a child from birth to 12 years: including physical, social, adaptive development.
- b) List the maternal and neonatal factors contributing to high-risk pregnancy & the neonate: Inherited disease: maternal infections - viral and bacterial: maternal diseases incidental to pregnancy, such as gestational diabetes, pregnancy induced hypertension: chronic maternal diseases such as heart diseases, renal failure, tuberculosis, diabetes, epilepsy: bleeding in the mother at any trimester.
- c) Briefly describe community program: International (WHO), national and local, for prevention of

poliomyelitis, blindness, deafness, mental retardation, and hypothyroidism. Outline the immunization schedule for children.

- d) Cerebral Palsy: Define and briefly outline etiology - Prenatal, perinatal, and postnatal causes: briefly mention pathogenesis, types of cerebral palsy (Classification), findings on examination: General Examination, examination of C.N.S., Musculoskeletal system, respiratory system, GI tract & nutritional status.
- e) Briefly outline associated defects; Mental retardation, microcephaly, blindness, hearing and speech impairment, squint, and convulsions. Briefly outline treatment. Outline prevention: Appropriate management of high-risk pregnancies, prevention of neonatal and postnatal infections, metabolic problems.
- f) Muscular dystrophy: Outline various forms, modes of inheritance and clinical manifestation; physical findings in relation to disabilities, progression of various forms and prognosis. Describe treatment goals in forms which are and are not fatal.
- g) Spina bifida, meningomyelocele: Outline development: clinical features - lower limbs, bladder, and bowel control; complications - U.T.I. & hydrocephalus: medical treatment and surgical treatment.
- h) Still's disease: Classification pathology in brief, physical findings, course & prognosis. Outline treatment, prevention, and correction of deformity.
- i) Acute C.N.S. infections: Classify (Bacterial and viral) and outline the acute illness, CNS sequelae leading to mental retardation, blindness, deafness, speech defect, motor paralysis, bladder and bowel problems, seizure disorder and specific problems such as subdural effusion, hydrocephalus, pressure sores, feeding difficulties.
- j) Normal diet of newborn and child: List dietary calorie, fat, protein, mineral and vitamin requirement in a normal child and in a child with malnutrition. Classify and outline etiology, findings, and treatment of Rickets: Vitamin D deficiency and resistant rickets.
- k) Lung infections: Outline the clinical findings, complications and medical treatment of bronchiectasis, lung abscess and Bronchial asthma.

Max hours = 60 hrs

Course outcomes:

On completion of the course, student will be able to

CO1: Analyze basic idea of different diseases and infections

CO2: Determine knowledge on symptoms and pathology of diseases

CO3: Summarize knowledge on analyzing and interpreting imaging findings into the physical therapy.

CO4: Evaluate diagnostic process and provides information on normal and abnormal developmental disorders in pediatrics.

CO5: Explain the foundation of differential diagnosis and provide a basic knowledge on physiological and pathological changes during old age

CO6: Explain information on normal and abnormal developmental disorders in pediatrics

Text /Reference books:

- 1) Davidson, A Text Book of Medicine, Churchill Livingston, 21 st Ed,2010.
- 2) K.D.Tripathi , Essentials of Medical Pharmacology, Jaypee Brothers.1Ed,2007
- 3) Harrison, Principles of Medicine, Mc Graw hill, 17th Ed,2008.
- 4) OP Ghai, Essential Pediatrics, CBS Publishers, 7th Ed,2010.
- 5) Kumar and Clarks, Clinical medicines, Jaypee Brothers, 3rd Ed,2013.
- 6) Multani, Principles of geriatrics physiotherapy, Jaypee Brothers, 1st Ed,2008.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks

Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks

Part C:10 Questions from unit 1 to unit 5 each carrying 2 marks each20 marks

SPTB4102	EXERCISE THERAPY – II	L	T	P	EL	Credits	marks
		45	15	60	0	6	75

Course Objective

- The objectives of this course is that after lectures, demonstrations, practical and clinics the student will be able to list the indications and contra - indications of various types of exercise therapy.
- Demonstrate the different techniques, and describe their effects.

UNIT I PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION

10 hrs

Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb Procedure: components of PNF, Techniques of facilitation, Mobility: Contract relax, Hold relax, Rhythmic initiation, strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization Stability: Alternating isometric, rhythmic stabilization, Skill: timing for emphasis, resisted progression Endurance: slow reversals, agonist reversal

UNIT II SUSPENSION THERAPY

20 hrs

Definition, principles, equipment's & accessories, Indications & contraindications, Benefits of suspension therapy -Types of suspension therapy: axial, vertical, pendularTechniques of suspension therapy for upper limb Techniques of suspension therapy for lower limb

STRETCHING

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

UNIT III - AEROBIC EXERCISE

30 hrs

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

HYDROTHERAPY- Definitions, Goals and Indications, Precautions and Contraindications,

Properties of water, Use of special equipment, techniques, Effects and uses, merits and demerits

INDIVIDUAL AND GROUP EXERCISES- Advantages and Disadvantages, Organization of Group exercises, Recreational Activities and Sports.

UNIT IV MANUAL THERAPY & PERIPHERAL JOINT MOBILIZATION

30 hrs

- a. Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan
- b. Biomechanical basis for mobilization, Effects of joint mobilization, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

FUNCTIONAL RE-EDUCATION

- a. Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lower limb and Upper limb activities

UNIT V BALANCE EXERCISES.

30 hrs

Components of balance (sensory, musculoskeletal, biomechanical) , Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types Balance retraining.

CO-ORDINATION EXERCISE

Causes for Inco-ordination, Test for co-ordination: equilibrium test, non-equilibrium test Principles of coordination exercise. Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.

POSTURAL CORRECTION

Principles of re-education: corrective methods and techniques, Patient education

WALKING AIDS

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

Max hours = 120 hrs

Course Outcomes:

On completion of the course, student will be able to

CO1: Classify principle of PNF.

CO2: Analyse patterns, techniques of PNF.

CO3: Identify types of suspension and Describe methods of applying it and describe functional re-education.

CO4: Demonstrate Aerobic exercises, mobilization of peripheral joints,

CO5: Explain balance& coordination exercises.

CO6: Evaluate stretching techniques and classify the types of stretching, define principle of hydrotherapy and describe its various applications, Describe different walking aids and its uses

Text /Reference books:

- 1) The Principles of Exercise Therapy. M. Deena Gardiner.
- 2) Therapeutic Exercise (English, Hardcover, Lynn Allen Colby, Carolyn Kisner)
- 3) Therapeutic Exercise by Carrie M Hall and Lori Thein Brody
- 4) Muscles: Testing and Function, with Posture and Pain by Florence PetersonKendall

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks

Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks

Part C:10 Questions from unit 1 to unit 5 each carrying 2 marks each20 marks

SPTB4103	ELECTROTHERAPY – II	L	T	P	EL	Credits	marks
		45	15	60	0	6	75

Course Objectives

- The objective of this course is that after hours of lectures, demonstration, practicals and clinical .
- The student will be able to list the indications and contra – indications of various types of electrotherapies, demonstrate the different techniques, and describe their effects.

UNIT I- Introduction

20 hrs

- a. Define electricity and types, electromagnetic induction, Principles construction & types of transformers, Condensers, Valves, Rectifiers, Oscillation, Review the physics and principles of Magnetism.
- b. Fuse and grid-explain with diagram the working and use of these two.

UNIT II - SHORT WAVE DIATHERMY

30 hrs

- a. Properties of H.F. currents - Sustained and unsustained, Damped and undamped, Impedance, Define Nodes and Antinodes. Explain, with examples, the fields, set up, Define wavelength.
- b. Types of high frequency currents.
- c. Production of H.F. currents – Principles, Construction of apparatus with diagram, Tuning of machine, Regulation of current, Physiological and therapeutic effects.
- d. Methods - Condenser field, Cable method, Effects of 2 fields.
- e. Technique of Applications - Testing machine, Preparation of patient, Types of electrodes, Position and size of electrodes, Application of current, Dosage.
- f. Dangers and precautions.
- g. Pulsed diathermy: Indications and contra-indications, application.

MICROWAVE DIATHERMY - Describe the following - Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

LONG WAVE DIATHERMY - Describe the following - Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

D. SHOCKWAVE THERAPY - Describe the following - Construction, Working, Indications, Contra indications, Therapeutic uses, Techniques of application and dosage.

INFRARED RADIATION

- a. Describe the following - Infrared Radiation, wavelength and frequency, Types of generators and its working, Physiological effects, Therapeutic effects and uses.
- b. Technique of irradiation - Choice of apparatus, Preparation of patient, Arrangement of lamp, Application of treatment, Duration, and frequency.
- c. Dangers
- d. Indications & contra-indications

F. ULTRA VIOLET RADIATION

- a. Electric arc - Process of ionization & Transmission of current through gases, Types of lamps, Construction of lamps, fluorescent tube for U.V. production.
- b. PUVA apparatus and Care of lamp.
- c. Physiological and therapeutic effects - in detail photosensitization.
- d. Indications, contra-indications, and dangers.
- e. Technique of application: Test dose, Local treatment, and General irradiation.
- f. Conditions (common) in which above treatment is given.
- g. Sensitizers
- h. Filters

UNIT III- ULTRASOUND THERAPY

30 hrs

- a. Definition, Properties of Ultrasound – Reflection, Transmission, Absorption. Piezo-electric effects
- b. Properties of ultrasonic fields: depth of penetration in relation to (a) intensity and (b) frequency.
- c. Physiological and therapeutic Effects on tissues – Thermal, Mechanical, Chemical, and biological.
- d. Indication and Contra Indications
- e. Coupling media
- f. Pulsed Ultrasound Therapy - Principles of pulsed Ultrasound, Effects and uses of pulsed Ultrasound.
- g. Techniques of application: a. Methods - direct contact, water bath, water bag. b. Dosage in acute and chronic conditions
- h. Dangers
- a) Phonophoresis – Method and effects, Choice of drug used for phonophoresis.

UNIT IV- PARAFFIN WAX

20 hrs

Describe the following - Methods of heating tissues, Effects and indications, Circulatory effects Effects on sensory nerves, Effects on skin, Indications & contra indications, Its uses in various Conditions.

MOIST HEAT (FLUIDOTHERAPY)

Describe the following - Methods of heating tissues, Effects and indications, Circulatory effects on sensory nerves, Effects on skin, Indications & contra indications, Its uses in various Conditions.

CRYOTHERAPY

- a. Describe the following - Physical principles, Physiological effects and uses, Techniques of application – Preparation, Application, Modification.
- b. Methods: Ice pack, Ice towel, Immersion, Ice cube.
- c. Indications & contra-indications.
- d. Cryokinetics and its effect.

UNIT V – LASER

20 hrs

Define LASER and briefly outline its therapeutic indications, contra-indications, efficacy, and precautions advisable.

Max hours = 120 hrs

Course outcomes

On completion of the course, student will be able to

- CO1: Asses various types of therapeutic high frequency currents and its physiological, therapeutic effects gained,
- CO2: Classify various types of therapeutic sound waves and its physiological, therapeutic effects gained.
- CO3: Evaluate about LASER therapy and its uses gained.
- CO4: Analyzevarious types of heat therapy, cryotherapy and method of application is understood.
- CO5: Explain Knowledge about recent physical modalities and its method of application,
- CO6: Apply effect and uses gained. and practical application of electrotherapy modalities for various conditions gained.

Text /Reference books:

- 1) Clayton's Electrotherapy – Therapy and practice – Angela Forster, All India Traveler Book seller. 9th Ed, 2012.
- 2) John Low and Anee Reed, Electrotherapy Explained –, Butterworth Heinmann Pub. 4th Ed, 2003
- 3) Edward Bellis Clayton, Nigel Palastanga, Claytons Electrotherapy: Theory and practice, 9th Ed, 1985
- 4) Valma, J. Robertson, Electrotherapy explained, Butterworth , Heinmann, Elsevier, 4th Ed, 2014.
- 5) Jagmohan Singh, Electrotherapy, Jaypee Brothers, 2nd Ed, 2012.
- 6) Basanta Kumar Nanda, Electrotherapy explained, Jaypee Brothers, 1st Ed, 2006.
- 7) Tim Watson Electrotherapy evidence-based practice, Churchill Livingstone, 12th Ed, 2008.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks: 75

Exam Duration- 3 hrs

Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks

Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks

Part C: 10 Questions from unit 1 to unit 5 each carrying 2 marks each 20 marks

SPTB4104	BIOMECHANICS -II	L	T	P	EL	Credits	marks
		45	15	0	0	4	75

Course Objectives:

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

UNIT I - The shoulder complex and the elbow complex

10 hrs

- a. The shoulder complex: Structure and components of the shoulder complex and their integrated function
- b. The elbow complex: Structure and function of the elbow joint– humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury.

UNIT II - The wrist and hand complex

10 hrs

Structural components and functions of the wrist complex; structure of the hand complex; functional position of the wrist and hand.

UNIT III - The Hip Complex

15 hrs

structure and function of the hip joint; hip joint pathology arthrosis, fracture, bony abnormalities of the femur:

The Knee Complex:

structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease

UNIT IV - The Ankle and Foot

15 hrs

Complex: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure, and function of the

plantar arches, muscles of the ankle and foot, deviations from normal structure and function – Pes Planus and Pes Cavus

UNIT V - Analysis Of Posture and Gait

10 hrs

Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; general features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics, and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries, and malalignments in gait;

Movement Analysis: ADL activities like sitting – to standing, lifting, various grips, pinches.

Max hours = 60 hrs

Course Outcomes:

On completion of the course, student will be able to

- CO1: Analyze Biomechanics of the shoulder complex.
- CO2: Asses Biomechanics of the elbow Joint.
- CO3: Apply Biomechanics of wrist joint and hand complex.
- CO4: Explain Biomechanics of the hip Joint, knee and ankle complex.
- CO5: Evaluat Biomechanics of the hip Joint, knee and ankle complex.
- CO6: Identify biomechanical analysis of human gait and human posture.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max marks:75

Exam Duration- 3 hrs

- Part A: 2 Questions from unit 1 to unit 5 each carrying 15 marks each 30 Marks
- Part B: 5 Questions from unit 1 to unit 5 each carrying 5 marks each 25 marks
- Part C:10 Questions from unit 1 to unit 5 each carrying 2 marks each20 marks

SPTB4105	FITNESS/ EXERCISE PHYSIOLOGY	L	T	P	EL	Credits	marks
		15	0	0	0	1	0

Course Objective:

- The objective of this course is that after completion of lectures, student shall be able to demonstrate and understand the principles of exercise physiology.
- The student should be able to understand about the importance of fitness, exercise and its importance to human body.

UNIT I - PHYSIOLOGY OF EXERCISE

3 hrs

Effects of acute and chronic exercise on

- a. O₂ transport
 - i. Muscle strength/power/endurance
 - ii. B.M.R. /R.Q.
 - iii. Hormonal and metabolic effect
 - iv. Cardiovascular system
 - v. Respiratory system
 - vi. Body fluids and electrolyte
- b. Effect of gravity / altitude /acceleration / pressure on physical parameters
- c. Physiology of Age

PULMONARY FUNCTIONS

- a. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.
- b. Respiratory adjustments in exercises.
- c. Artificial respiration
- d. Breath sounds.

CARDIO VASCULAR FUNCTIONS

- a. Blood flow through arteries, arterioles, capillaries, veins and venules.
- b. Circulation of Lymph, Oedema
- c. Factors affecting cardiac output.
- d. Circulatory adjustment in exercise and in postural and gravitational changes,
- e. Pathophysiology of fainting and heart failure.

UNIT II - MUSCLES AND NERVOUS SYSTEM FUNCTIONS

3 hrs

- a. Peripheral nervous system, neuromuscular transmission, Types of nerve fibers.
- b. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV
- c. Degeneration and regeneration of nerve, Reactions of denervation's.
- d. Synaptic transmission, stretch reflex- Mechanism and factors affecting it.
- e. Posture, Balance and Equilibrium/Coordination of voluntary movement.
- f. Voluntary motor action, clonus, Rigidity, incoordination.
- g. Special senses- Vision, taste, hearing, vestibular,
- h. Olfaction
- i. Sympathetic and Parasympathetic regulation, Thermoregulation.

BLOOD FUNCTIONS

Thalassemia Syndrome, Hemophilia, VWF, Anemia, Leukocytosis, Bone marrow transplant

METABOLIC FUNCTIONS

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

UNIT III - INTRODUCTION TO FITNESS

3 hrs

- a. Fitness - Introduction to health
- b. Principles of exercise, tests of endurance & strength

FITNESS AND EXERCISE - Types of exercises - Aerobic - Anaerobic

UNIT IV – Fitness

3 hrs

Importance of Exercise in Fitness- Selection of appropriate exercises, Beneficial & adverse effect of exercise

UNIT V- Forms of fitness

3 hrs

- a. Fitness Training- Resistance Training, CWT, Incremental exercise, Agility
- b. Forms of Fitness- Aerobic Dance – Zumba

Max hours = 15 hrs

Course outcomes

On completion of the course, student will be able to

CO1: Assess fitness, principles of exercises and testing of endurance and strength.

CO2: Classify the types of exercises .

CO3: Analyse knowledge of aerobics and anaerobic exercises.

CO4: Evaluate different type of muscle strengthening, therapeutic effects of aerobic and Zumba dance.

CO5: Apply changes happening in the body post exercise,

CO6: Explain internal structure damage in person encounter during injuries & should know how to perform a differential evaluation for diagnosing the type of injury.

RECOMMENDED BOOKS:

- 1 Text book on Medical Physiology-By Guyton ,Text Book of Medical Physiology – Sembuling