ANNAMACHARYA UNIVERSITY

(Estd Under AP Private Universities Establishment and Regulation Act,2016)

Rajampet, Annamayya District, AP-516126, INDIA

www.annamacharyauniversity.edu.in

1st Year - Bachelor of Physiotherapy (BPT)

CURRICULUM AND SYLLABUS

(For 2024-2025 Admitted Batch)

SCHOOL OF HEALTH SCIENCES

ANNAMACHARYA UNIVERSITY

Vision

- To be a globally recognized university by providing value-based education and promoting innovation and research for societal betterment.

Mission

- To embody 'Vidwan Sarvatra Pujyathey'.
- To deliver high-quality education by encouraging research, innovation, and critical thinking
- To nurture upright individuals by fostering an inclusive environment and inspiring service to society
- Uphold high standards of professional ethics leading to harmonious relationship with environment and society.

Bachelor of Physiotherapy

First Year

Sl.No	Subject Code	Subjects	Hrs/week			Credits
			L	T	P	C
1.	24HENG11T	English	4	-	-	4
2.	24HBPT11T	Sociology & Psychology	4	-	-	4
3.	24HBPT12T	Basic fundamentals of Physiotherapy	4	-	-	4
4.	24HBPT13T	Anatomy-Theory	4	-	-	4
5.	24HBPT14T	Physiology-Theory	4	-	-	4
6.	24HBPT15T	Biochemistry-Theory	4	-	-	4
7.	24HBPT13L	Anatomy-Lab	-	-	2	1
8.	24HBPT14L	Physiology-Lab	-	-	2	1
		Total	24	-	4	26

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Title of the Course: **English** Year: I[st] Year
Category: BSc Branch: BPT
Subject Code: 24HENG11T

Lecture Hours	Tutorial Hours	Practical Hours	Credits
4	**0**	**0**	4

Course Objectives: The course aims to enhance English language skills by improving their comprehension abilities and knowledge of grammatical structures and vocabulary. Students will develop effective writing skills, fostering a more comprehensive understanding of language use.

Course Outcomes:

At the end of the course, the student will be able to

1. Interpret prose and poetry, identifying themes, literary devices, and cultural contexts.
2. Apply grammatical concepts to enhance clarity and correctness in writing
3. Apply several useful reading techniques for better comprehension
4. Expand vocabulary through synonyms, antonyms, and word formation.
5. Improve writing skills for formal/informal communication.

Unit 1:

Prose: Stench of Kerosene: Amrita Pritam

Poetry: All the World's a Stage: William Shakespeare

(from As You Like It spoken by Jaques)

Grammar: Parts of Speech, Content and Structure words

Writing: Mechanics of Writing - Capitalization, Spellings, Punctuation

Vocabulary: Use of Dictionary

Unit 2:

Prose: The Last Leaf: O' Henry

Poetry: Ode on Solitude: Alexander Pope

Grammar: Nouns, Types of Nouns, Countable and Uncountable Nouns

Writing: Structure of a Paragraph, Cohesive devices – linkers

Vocabulary: Synonyms and Antonyms

Unit 3:

Prose: How much land does a man need?: Leo Tolstoy

Poetry: The Cloud: P. B. Shelly

Grammar: Use of Articles and Zero Articles; Prepositions

Reading: Techniques of Reading, Skimming and Scanning

Vocabulary: Prefixes, Suffixes, Word roots

Unit 4:

Prose: Thakur's Well: Premchand

Poetry: Ulysses: Alfred Tennyson

Grammar: Basic Sentence Structure, Questions, Question Tags

Reading: Identifying the sequence of ideas, techniques that help link ideas in a paragraph together

Vocabulary: Homonyms, Homophones, Homography

Unit 5:

Prose: The Lady or the Tiger: Frank Stockton

Poetry: John Donne: A Valediction: Forbidden Morning

Grammar: Verbs, Types of Verbs, Tense forms; Subject-verb Agreement

Writing: Summarizing, Note-making, Paraphrasing

Vocabulary: Compound words, Collocations, Phrasal Verbs

Unit 6:

Prose: Monday Morning: R. K. Narayan

Poetry: Rudyard Kipling: If

Grammar: Active & Passive Voice

Writing: Formal and Informal Letters

Vocabulary: Words often confused, Jargon

Unit 7:

Prose: Subha: Rabindranath Tagore

Poetry: Stopping by Woods on a Snowy Evening: Robert Frost

Grammar: Reporting verbs, Direct & Indirect speech

Reading: Reading Comprehension

Vocabulary: Common Medical Terminology

Unit 8:

Prose: Lalu: Sarat Chandra Chattopadhyay

Poetry: Palanquin Bearers: Sarojini Naidu

Grammar: Quantifiers and Qualifiers, Degrees of Comparison, Correction of Errors

Writing: Writing structured essays on specific topics

Prescribed Textbooks:

1. Essentials of English Grammar and Composition, N. K. Agarwal and Goyal Brothers, Prakashan Educational Publishers, New Delhi
2. Dubey, Sham Ji & Co. English for Engineers. Vikas Publishers, 2020
3. Murphy, Raymond. English Grammar in Use. 4th Ed. Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor,2014.

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(Estd Under AP Private Universities Establishment and Regulation Act,2016)

Title of the Course: **Sociology & Psychology** Year: I[st] Year
Category: BSc Branch: BPT
Subject Code: 24HBPT11T

Lecture Hours	Tutorial Hours	Practical Hours	Credits
4	**0**	**0**	4

COURSE DESCRIPTION:

This course introduces the all the basic sociological concepts, principles and social process and the various social factors affecting the family in rural and urban communities in India will be studied.

This course will enable the student to understand all the psychological factors that influence health and illness, and as to how people stay healthy, why they become ill and how they respond when they do get ill. By learning how the mind and body work together to produce physical and mental health they can deal effectively with the patients during their admission, treatment, recovery and discharge.

COURSE OBJECTIVES:

After getting exposed to this course the student will be able to understand the role of sociocultural factors as determinants of health and behaviour in health and sickness. They will be able to relate this to therapeutic situations in the practice of physiotherapy. They should also understand and manage the psychological aspects involved in pain, disability, disfigurement, unconsciousness, chronic illness, death bereavement, and surgical conditions.

Thus, the objectives of the course are:

- Understand the role of family and community in the development of human behaviour.
- Identify the subtle influence of culture in the development of human personality, the role of beliefs and values as determinants of individual and group behaviour.
- Learn to assess the social problems and participate in social planning.
- Appreciate the role of therapist as a member of the society and the interdependence of individuals and society
- Psychosocial assessment of patients in various developmental stages.
- Awareness of the patient's needs during admission, treatment, rehabilitation and discharge
- Explain the concepts of stress and its relationship to health, sickness and one's profession.
- Identify ego defense mechanisms and learn counseling techniques to help those in need.

UNIT-1

INTRODUCTION TO PSYCHOLOGY:

- Definition of Psychology, nature of psychology and aim of psychology
- Branches of Psychology: Basic fields and applied fields
- Methods of Psychology: Introspection, observation, interview, case study and experimental method, correlation and survey method
- Sensation, attention & perception:
    - sensory process – general characteristics of sensation.
    - Attention, kinds of attention, factors related to attention.
    - Perception: Definition, factors influencing perception, attributes of perception.

UNIT-2

- Definition, Nature of learning and Types of learning: classical conditioning, operant conditioning, trial and error, Insightful and observation learning.
- Approaches: Type approach – Sheldon, Trait approach-Cattell and Allport Psychoanalytic – Freud, psychosocial – Eric Erikson and Neo- Freudian – Adlar and Jung.
- Memory – short term and long-term memory and forgetting Definition, Nature of Intelligence, Mental Age concept (MA), Intelligence Quotient (IQ).
- Motivation: Definition, Drive, Incentive, Reinforcement, Types of Motivation, Basic Information About Physiological and Psychological Needs, Theories of Motivation (Need Theory, Maslow's Hierarchical Theory).

UNIT-3

PSYCHOLOGICAL REACTIONS AND LOSS OF REACTION OF A PATIENT:

- Psychological reactions of a patient during admission and treatment: Anxiety, shock, denial, suspicion, questioning, loneliness, regression, egocentricity, concern about small matters, narrowed interests, emotional over relations, perceptual change, disorientation, hallucinations, delusions, anger, hostility, loss of hope.
- Reaction to loss, death and bereavement: Shock and disbelief, development of awareness, restitution, stages of acceptance as proposed by Kubler - Ross.
- Personality Definition, nature of personality, characteristics and structure of personality, projective and non - projective tests of personality

UNIT- 4

- STRESS: Definition, Physiological and Psychological changes, relation to health and sickness: professional stress, burn out: psychosomatic disorder
- Counseling - Definition, aim, principles in counseling, techniques in counseling, phases of counselling, Qualities of counselors.
- Counselling for Substance Abuse Smoking, Alcoholism, Drug-Addiction
- EMOTIONAL NEEDS: Emotional needs and psychological factors in relation to unconscious patients, handicapped patients, bed ridden patients, chronic pain, spinal cord injury, paralysis, cerebral palsy, burns, amputations, disfigurement, head injury, degenerative disorders, parkinsonism, leprosy, incontinence and mental illness.

UNIT - 5

- **INTRODUCTION:** Definitions of Sociology, Sociology as a science of society, uses of study of Sociology, application of knowledge of Sociology in Physiotherapy
- **SOCIOLOGY AND HEALTH:** Concepts of health and disease, social factors affecting health status, social consciousness and perception of illness, decision making in treatment.
- **SOCIALIZATION:** Meaning of Socialization, types of Socialization, agencies of socialization, influence of social factors on personality, socialization in hospital, socialization in the rehabilitation of patients.
- **SOCIAL CONTROL**: Meaning of Social control, role of norms, folkways, customs, morals, religion, law and other means of social control in the regulation of human behavior

UNIT-6

- **COMMUNITY**: Definition and elements of community, concepts of community, role of rural and urban communities in public health, role of community in determining beliefs, practices and home remedies in treatment.
- **CULTURE:** Meaning, definition and characteristics, material culture and non-material culture, cultural diffusion, cultural lag, components of culture, impact of culture on human behavior, culture induced symptoms and diseases, sub-culture of medical workers.
- **CASTE SYSTEM:** Definition and characteristics, features of the modern caste system and its trends.

a) RACE: A biological human stratification, theories of races, classification of races, racism

UNIT -7

❖ **SOCIAL PROBLEMS OF THE DISABLED**: Consequences of the following social problems in relation to sickness and disability and remedies to prevent these problems.

- Population explosion
- Poverty and unemployment
- Beggary
- Juvenile delinquency
- Prostitution
- Alcoholism
- Problems of employed women

UNIT – 8

❖ **SOCIAL SECURITY:** Retirement as social and economic event, social security for civil servants, for general public through insurance schemes, for industrial workers (ESI Act) including Workmen Compensation Act and social legislation in relation to the disabled.

❖ **SOCIAL ADJUSTMENT AND SOCIAL GERONTOLOGY**: Social adjustment, Gerontology: ageing, social aspects of ageing, sexual adjustment, economic aspects of ageing, the ageing process, health and medical care.

❖ **SOCIAL WORKER:** The role of a medical social worker.

❖ Merits and demerits of social legislation.

Text Books for Sociology:

1) General and Medical Sociology - Dr. P. Ramasamy.
2) Text Book of Sociology - K P Neeraja.
3) Psychology and Sociology - Jacob Anthikad

Text Books for Psychology:

1) General Psychology - S.K. Mangal.
2) Introduction to Psychology - Atkinson and Hilgard.
3) Introduction to Psychology - Morgan and king.

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Title of the Course: **Basic Fundamentals of Physiotherapy** Year: IstYear
Category: BSc Branch: BPT
Subject Code: 24HBPT12T

Lecture Hours	Tutorial Hours	Practical Hours	Credits
4	**0**	**0**	4

Course Objective:

This course aims to provide students with a strong foundation in the principles of physiotherapy, including the understanding of forces, levers, and body mechanics, as well as the management of acute injuries and the use of orthotics and prosthetics. It covers ergonomics, common diseases, and basic life support, emphasizing the importance of posture and musculoskeletal health. Students will also learn about healthcare delivery systems, the role of physiotherapy in rehabilitation and disability, and professional ethics, preparing them to apply these concepts effectively in clinical practice.

Unit – 1

Principles of Physiotherapy

- Force: Composition of force, Parallelogram of forces.
- Equilibrium: Stable, unstable, neutral.
- Gravity: Centre of gravity, Line of gravity.
- Levers: 1st, 2nd and 3rd order. Their examples in the human body and their practical application in physiotherapy, Forces applied to the body levers.
- Pulleys: Fixed, Movable
- Axis: Sagittal, Frontal, Horizontal.
- Planes: Sagittal, Frontal, Horizontal

Unit – II

Acute injuries & management and the uses of Orthotics & Prosthetics

- Mechanism of injury
- Acute muscle injuries
- Muscle strain

• Risks of muscle strain
• Muscle imbalance
• Muscle inflexibility
• Ligament sprain and difference between sprain and strain
• Orthotics & Prosthetics

Unit - III

Ergonomics & Health and Aerobics

• Work-related musculoskeletal disorders (MSDs).
• Risk factors associated with work-related MSDs & Possible Causes
• Common ergonomic symptoms
• Different types of Ergonomics & principles of ergonomics and
Ergonomic Control Method Warm-Up Period, Aerobic Exercise Period and Cool Down Period Application

UNIT-IV

Education & Awareness about common diseases and BLS

• Bell's palsy
• Diabetes
• Coronary artery heart disease
• OA Knee
• LBA
• BLS Theory

Unit – V

Posture and Body Mechanics

• Normal vs. abnormal posture
• Postural alignment
• Effects of poor posture on musculoskeletal health
• Ergonomics and its application
• Lifting techniques and body mechanics during activities

Unit – VI

Pattern of Health Care Delivery

• Healthcare delivery system in India at primary, secondary and tertiary care

• Community participation in healthcare delivery system, Health system in developed countries, Private Sector,

• National Health Mission,

• National Health Policy Issues in Health Care Delivery System in India

• National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Program

Unit - VII

Components of Physiotherapy Profession

Role of physiotherapy in meeting health care needs in India

• Needs versus Demands

• Physiotherapist as Educator

• Typical job settings

• Common problems and solutions

Rehabilitation

• Introduction to Rehabilitation, Definitions of Rehabilitation, Principals of Rehabilitation, its aim and objectives

• Concept of disability (including mental illness), definitions and classification

• Difference between incidence and prevalence, prevalence and incidence of disability

• History of disability rehabilitation

• Introduction to locomotor disability, disability and general medical conditions

• Global, National, State and local legislations concerning disability and development Poverty, disability and development programs

• Schemes and concessions for persons with disabilities, Advocacy and rights of persons with disabilities.

• Role of community in the prevention of disabilities.

Unit – VIII

Ethics of Physiotherapy

• The historical background pertaining to ethics in health profession, the four principles of bioethics

• List the guidelines pertaining to ethical practice of physiotherapy profession. the constitution and guiding principles of World Confederation of Physical Therapy (WCPT)/World

• Physiotherapy Outline the roles and responsibilities of physiotherapists laid down by WCPT /World Physiotherapy

• Outline the guidelines for ethical practice envisioned by WCPT / World

• Physiotherapy Outline the organizational structure and practice guidelines laid down by Indian Association of Physiotherapists (IAP)

• Legal aspects - Legal responsibility of Physiotherapist for their action in the professional context, understanding liability and obligations in case of medico legal cases.

• Consumer Protection Act

Text Books

- John Ebenezer- Essentials of Orthopaedics for Physiotherapists- 3rd edition 2016
- Susan B O'Sullivan, Physical Rehabilitation 6th Edition, 6 edition F A Davis; 2013. ISBN-13: 978-0803625792
- Kavitha Raja, Sivakumar T, Ethical issues: perspectives for the physiotherapists,2nd Edition, 2019
- Essentials of community physiotherapy and ethics-Rajendra Rajput
- Text book of therapeutic exercises by Lakshmi Narayanan. S

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Title of the Course: **Anatomy** Year: IstYear
Category: BSc Branch: BPT
Subject Code: 24HBPT13T

Lecture Hours	Tutorial Hours	Practical Hours	Credits
4	**0**	**0**	4

COURSE DESCRIPTION:

The course is designed to provide students with the working knowledge of those structures of the human body that form essential foundation for understanding their clinical studies. Studies are concerned with the topographical and functional anatomy of the limbs, thorax and brain. Particular attention is paid to the muscles, bones and joints of the regions. The abdomen, pelvis, perineum, head and neck and are to be studied with particular reference to topics of importance to physiotherapists.

INSTRUCTIONAL METHOD AND PEDAGOGY:

1. Interactive class room sessions using black-board and audio-visual aids.
2. Using the available technology and resources for e-learning.
3. Students will be focused on self-learning, practical learning and clinical exposure facilitated by the faculty.
4. Students will be enabled for continuous evaluation.
5. Case study, group discussions, role-plays and simulation exercises.

STUDENT LEARNING OUTCOMES/OBJECTIVES:

GENERAL OBJECTIVES:

At the end of the one-year course the student will be able to understand:

1. Levels of organization of the human body.
2. Topographical and functional anatomy of the limbs, thorax, head and neck, abdomen and pelvis.
3. The muscles, bones and joints of the various regions.
4. Application of basic knowledge of anatomy in practice of physiotherapy.

UNIT-1

INTRODUCTION:

a) Define Scope of Anatomy, Discuss the Anatomical Position and anatomical Terminology common anatomical terminologies (Groove, tuberosity, trochanters etc.) Identify Anatomical positions of body, axes, and planes
b) Bones: Discuss Composition, Functions, Classification based on Morphology, Describe Development and Structure; Formation / Development of Bones esp. Long Bones; Parts of Long Bones Discuss the Blood Supply of Bones
c) Cartilage: Describe Types and Features of cartilage
d) Joints: Define and state types Discuss the features of fibrous, Cartilaginous & Synovial joints, sub-types of synovial joints Explain the movements of joints, factors permitting and limiting these movement Discuss blood supply of joints; applied aspects.

UNIT-2

a) Muscles: Discuss Comparative Feature of Skeletal, Smooth and Cardiac Muscles, parts & structure of Skeletal Muscle including fascicular architecture Describe Blood supply and nerve supply of Skeletal Muscle; Motor Unit

- Discuss the Types of Skeletal Muscles based on their action i.e. Agonists, Antagonists, Fixators, Synergists, Origin & Insertion, Tendon; Isometric & Isotonic contractions; Applied Aspects

b) Connective Tissue: Explain Composition i.e. Cellular & Non-Cellular components; Types and functions of connective tissue; Ligaments; Applied As- pects.

c) General Embryology: Describe Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations. Development of skin, Fascia, blood vessels, lymphatic, (outline only details not required).

- Discuss Development of bones, axial and appendicular skeleton and muscles, Neural tube, brain vessels and spinal cord, Develop- ment of brain and brain stem structures

d) Integumentary System:

- Discuss the Structure of skin and its appendages

UNIT 3:

Musculo Skeletal Anatomy of Upper Extremity

Identify Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, and Phalanges.

Identify Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.

Explain Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand. Discuss Arches of hand, skin of the palm and dorsum of hand.

UNIT 4:

Musculo Skeletal Anatomy of Lower Extremity

Identify Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.

Identify Soft parts: Gluteal region, Anterior, posterior, medial and lateral aspects of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compart- ment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.

Discuss Joints of the lower limb: Hip Joint, Knee joint, Ankle and joint, joints of the foot.

Unit 5:

Thorax: <u>Cardio-vascular system:</u>

Describe Mediastinum: Divisions and contents Pericardium

Describe Thoracic Wall: position, shape and parts of the heart; conducting System

Describe blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.

<u>Respiratory system:</u>

Outline the respiratory passages, Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on bronchopulmonary segments.

Describe Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.

Describe Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action

Unit 6:

Musculo skeletal anatomy of trunk & pelvis

Identify Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs. Discuss Soft tissue: Pre and Para vertebral muscles, intercostal muscles, anterior abdominal wall muscles, Inter-vertebral disc Describe Pelvic girdle and muscles of the pelvic floor

Musculo Skeletal Anatomy of Head and Neck

Identify Osteology: Mandible and bones of the skull

Identify Soft parts: Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck

Unit 7:

Abdomen: Describe Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum, Describe large blood vessels of the gut.

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

Identify Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver, spleen, pancreas, kidney, urinary bladder, intestines, and gall bladder

Endocrine glands: Describe Position, shape, size, function, blood supply and nerve supply of the following glands: Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus

Unit 8:

Neuro Anatomy: Discuss Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system (Cranial nerves, Peripheral nervous system, Peripheral nerve , Neuromuscular junction , Sensory end organs , Central Nervous System, Spinal segments and areas, Brain Stem , Cerebellum , Inferior colliculi , Superior Colliculi , Thalamus , Hypothalamus , Corpus striatum , Cerebral hemisphere , Lateral ventricles ,Blood supply to brain , Basal Ganglia, The pyramidal system , Pons, medulla, extra pyramidal systems , Anatomical integration*)*

Text books:

- B.D Chaurasia's Human Anatomy-Regional and applied; CBS publishers, Vol 1,2,3,4, 9th Edition 2022.
- A.k. Datta, Essentials of human anatomy; Current books international publishers; Volume: 1,2,3,4; 10th Edition 2019

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Title of the Course: **Anatomy Lab** Year: Ist Year
Category: BSc Branch: BPT
Subject Code: 24HBPT13L

Lecture Hours	Tutorial Hours	Practical Hours	Credits
0	**0**	**2**	**1**

LIST OF EXPERIMENTS:

1. Demonstration of anatomical terms, positions, planes, axis, movements, and tissues.
2. Demonstration of bones, joints, and muscles in human body.
3. Demonstration of heart, blood vessels, and lymphoid organs in human body.
4. Demonstration of organs of digestive system in human body.
5. Demonstration of organs of respiratory system in human body.
6. Demonstration of microscope, microscopic structures of cell, objects, and general tissues in human body.
7. Demonstration of organs in human excretory system.
8. Demonstration of human reproductive organs.
9. Demonstration of exocrine and endocrine glands in human body.
10. Demonstration of organs of nervous system and sense organs in human body.
11. Demonstration of microscopic structures of various systemic organs in human body.

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Title of the Course: **Physiology** Year: I[st] Year
Category: BSc Branch: BPT
Subject Code: 24HBPT14T

Lecture Hours	Tutorial Hours	Practical Hours	Credits
4	**0**	**0**	4

COURSE DESCRIPTION:

This course which runs concurrently with the anatomy course helps the students to understand the basis of normal human physiology with special emphasis on the functioning of the cardiovascular, respiratory, musculoskeletal and nervous system.

COURSE OBJECTIVES:

The objective of this course is that after 150 hours of lectures, demonstrations, practicals and clinics the student will be able to demonstrate an understanding of elementary human physiology.

LECTURE OUTLINES

UNIT-1

CELL:

Outline of basic concepts of cell structure, functions of components

transport across membranes.

SKIN

Structure; functions; blood flow; temperature regulation.

BLOOD

- Outline of components and their functions – RBC, WBC, Platelets
- Blood groups.
- Significance of RBC & WBC counts, ESR and other related tests.
- Clotting mechanisms
- Blood volume and its regulation.

UNIT-2

Nerve Muscle Physiology

- Structure of muscle tissue: Gross structure and microscopic structure. Arrangement of myofibrils. Myoneural junction.
- Chemical processes involved in muscle contraction.
- Physiology of muscle contraction, simple muscle twitch, quantal summation, wave summation, treppe, tetany, effects of temperature changes. All or none law. Fatigue, isotonic, isometric and isokinetic contractions.

ENDOCRINES

Outline of the various hormones and their actions with special emphasis on thyroid and parathyroid hormones

UNIT-3

CIRCULATION

- Structure & Properties of cardiac muscle, cardiac cycle.
- ECG, Heart sounds, cardiac output.
- Factors regulating the action of the heart.
- Blood pressure – its maintenance and regulation.
- Cerebral circulation, renal circulation, pulmonary circulation.
- Effects of exercise, effects of postural changes.
- Lymph, factors affecting flow of lymph.

UNIT-4

RESPIRATION:

- Defense mechanisms in the respiratory tract, mucociliary transport, mechanics of respiration.
- Transport of blood gases. Acid-base balance.
- Lung function tests (including lung volumes), Artificial ventilation.
- Nervous and chemical regulation of respiration
- Hypoxia-types and causes
- Effects of exercise on respiration.

UNIT-5

EXERCISE PHYSIOLOGY

- Exercise metabolism. Oxygen debt, Respiratory quotient
- Development of endurance, factors affecting endurance and muscle strength. Factors affecting general and cardiorespiratory endurance. Aerobic and anaerobic work. Efficiency of muscular activity, aerobic versus anaerobic (eg.speed, work, load, fatigue, diet, obesity)
- Age and exercise, age changes in muscle function, age changes in CVS, age changes in pulmonary function, age and physical work capacity, age and nervous system.
- Environment and exercise, adaptation to heat and cold, exercise in heat and in cold. Human limitation in heat, acclimatization to heat, exercise at high altitudes.

UNIT-6

a) DIGESTION

- Digestion in the mouth, stomach and intestine
- Gastric juice, bile, pancreatic juice, intestinal juice
- Mechanics of control of secretions and motility
- Diet, nutrition.

b) EXCRETION

- Structure of nephron
- Formation of urine
- Micturition

UNIT-7

REPRODUCTION

- Male reproductive system.
- Female reproductive system
- Outline of pregnancy, functions of placenta, parturition, lactation and contraceptive measures.
- Physiology of foetus, factors that affect foetal growth

SPECIAL SENSES: Vision, audition, olfaction, gustation, vestibular apparatus

UNIT-8

NERVOUS SYSTEM

i. Introduction to nervous system.
ii. Neural tissue –
    a. Neuron
    b. Neuroglia
iii. Classification of nerve fibers.
iv. Properties of nerve fibers
v. Degeneration and regeneration of nerve fibers.
vi. Receptors
vii. Synapse
viii. Neurotransmitters
ix. Reflex activity
x. Spinal cord
xi. Pathways in spinal cord – ascending and descending tracts
xii. Physiology of pain
xiii. Brain stem
xiv. Thalamus
xv. Internal capsule
xvi. Hypothalamus.
xvii. Basal ganglia
xviii. Cerebral cortex
xix. Limbic system
xx. Reticular formation
xxi. Proprioceptors
xxii. Muscle tone, posture and equilibrium
xxiii. Vestibular apparatus
xxiv. CSF
xxv. Autonomic nervous system

TEXT BOOKS:

1. K Sembulingam, Essentials of Medical Physiology, 9th Edition, Jaypee Medical Publishers, 2022
2. Guyton & Hall, Text book of Medical Physiology, 13th Edition, Saunders publisher, 2015

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Title of the Course: **physiology lab** Year: I[st] Year
Category: BSc Branch: BPT
Subject Code: 24HBPT14L

Lecture Hours	Tutorial Hours	Practical Hours	Credits
0	**0**	**2**	**1**

List of Experiments:

a. HAEMATOLOGY:

1) Demonstration of packed cell volume
2) Estimation of Haemoglobin by Sahli's method
3) Determination of total RBC count
4) Determination of total WBC count
5) Determination of differential leucocyte count
6) Determination of Blood groups
7) Determination of Bleeding time and clotting time
8) Determination of E.S.R

b. HUMAN EXPERIMENTS

1. Recording of systemic arterial blood pressure and effect of exercise on BP
2. Demonstration of vital capacity measurement and peak expiratory flow rate.
3. Clinical examination of cardio vascular system including arterial pulse
4. Clinical examination of sensory nervous system
5. Clinical examination of motor nervous system and reflexes
6. Examination of light reflexes and hearing tests.
7. Clinical examination of cranial nerves.
8. Clinical examination of color vision and acuity of vision.

ANNAMACHARYA UNIVERSITY

(Estd Under AP Private Universities Establishment and Regulation Act,2016)

Title of the Course: **Biochemistry** Year: Ist Year
Category: BSc Branch: BPT
Subject Code: 24HBPT15T

Lecture Hours	Tutorial Hours	Practical Hours	Credits
4	**0**	**0**	4

Objectives: At the end of the course the student should be able to understand

1. Biochemical and functional organization of the cell and sub cellular organelles.
2. Basic structural, biochemical and functional aspects of bio molecules and their interrelations.
3. Basic and clinical aspects of enzymology.
4. Basic and nutritional aspects of vitamins
5. Basic principles of biological oxidation and bioenergetics.
6. Outlines of digestion and absorption of bio molecules
7. Basic principles of metabolism and overview of important bio molecules, their regulation and integration.
8. Biochemical principles of signal transduction and its role in metabolic integration.
9. Basic principles of fluid, electrolyte and acid – base balance
10. Basic principles of nutrition including minerals.
11. Biochemistry of muscle, connective tissue and muscle contraction.
12. Basic molecular concepts of body defense and homeostasis.
13. Basic biochemistry of diseases involving Neuro musculo skeletal system.
14. Basics of clinical chemistry.

Student need not know the details of structures, formulas, individual chemical reactions and their mechanisms.

UNIT-1- NUTRITION:

a) Importance of nutrition
b) Calorimetry - energy values, calorimeters, respiratory quotient and its significance, specific dynamic action of food.
c) Basal metabolic rate - definition, normal values, factors affecting B.M.R. food, energy expenditure for various activities.
d) Nutritional aspects of carbohydrates, fat and fibers
e) Nutritional aspects of proteins - essential and non-essential amino acids, chemical score, digestibility coefficient, biological value, net protein utilization, nutritional classification of proteins (complete and incomplete), nitrogen balance and its significance.
f) Composition of food, balanced diet, dietary recommendations, nutritional supplementation.
g) Protein - energy malnutrition, Kwashiorkor and Marasmus

UNIT-2 - CARBOHYDRATES:

i. Definition, chemistry, classification, common carbohydrates, their sources and composition.
ii. Digestion and absorption of carbohydrates.
iii. Glycolysis - aerobic, anaerobic, energetics, regulation, Cori's cycle, Gluconeogenesis.
iv. Citric acid cycle and its energetics
v. Glycogenesis, glycogenolysis and their regulation, role of liver and muscle glycogen.
vi. Hormonal regulation of blood sugar level.
vii. Metabolic disorders of glycogen, lactose intolerance, diabetes mellitus.

UNIT-3 - LIPIDS:

a) Definition, classification of lipids, classification of fatty acids, examples and functions of common lipids, essential fatty acids and their importance.
b) Classification, sources and functions of lipoproteins
c) Digestion and absorption of lipids
d) Beta-oxidation and its energetics, regulation
e) Fatty acid biosynthesis, energetics, regulation
f) Fat metabolism in adipose tissue, lipoprotein lipase, hormone sensitive lipase.
g) Ketone body formation and utilization
h) Cholesterol and its importance, common hyperlipoproteinemia's.

UNIT-4 - PROTEINS:

a. Definitions of proteins and amino acids, classification of amino acids and proteins, essential amino acids, functions of amino acids and proteins
b. Enzymes - definition, coenzymes, factors affecting enzyme activity, regulation of enzyme activity, enzyme inhibition, isoenzymes and clinical significance of enzymes.
c. Digestion and absorption of proteins.
d. Transamination, deamination and urea cycle.
e. Specialized products produced from amino acids – Phenylalanine, Tyrosine, Tryptophan, Arginine, Glycine, Methionine

UNIT-5 - GENETICS:

Nucleic acids – Functions of DNA and RNA, differences between DNA and RNA Genetic code.

HORMONE ACTION:

Classification of hormones and mechanism of hormone action

i. Receptors, signal transduction, second messengers (Ca, cAMP, Inositol Phosphates) and their role in cell function.
ii. Neurotransmitters.

UNIT-6 - VITAMINS:

Definition, classification according to solubility

i. Individual vitamins - sources, coenzyme forms, functions, RDA. Digestion, absorption and transport, deficiency and toxicity.

TRACE MINERALS:

i. Individual minerals – Calcium, Phosphate, Iron, Magnesium, Fluoride, Selenium, Molybdenum, Copper, Zinc, Sources, RDA, Digestion, Absorption, Transport, Excretion, Functions, Disorders.
ii. Phosphate, calcium and iron in detail.

UNIT-7 - MUSCLE CONTRACTION:

Contractile elements in muscle, process of muscle contraction.

CONNECTIVE TISSUE:

Biochemistry of connective tissue, collagen, glycoproteins, proteoglycans.

CELL BIOLOGY:

Cell membrane structure, mechanism of transport across cell membrane, intracelluar organelles and their functions, briefly cytoskeleton.

UNIT-8 - ACID - BASE BALANCE, WATER AND ELECTROLYTES:

i. Body water, osmolarity, extra and intracellular sodium and potassium, regulation of water & electrolyte balance, buffers, pH., buffer systems in the blood.

ii. Role of lungs and kidneys in acid-base balance.

CLINICAL BIOCHEMISTRY

i. Relevance of blood levels of glucose, urea, calcium, phosphates, pH, bicarbonate, enzymes, lipids and lipoproteins.

ii. Urine levels of sugar, creatinine, proteins

iii. Competitive inhibitors, clinically important enzymes.

iv. Liver function tests.

v. Renal function tests.

TEXT BOOKS:

1. U. Satyanarayana, U. Chakrapani “Biochemistry” Elsevier, 2020.
2. Vasudevan DM. “Textbook of Biochemistry for Medical Students” Jaypee Brothers Medical Publishers. 2019
3. Indumati V, Sowbhagya Lakshmi,” Integrated Textbook of Biochemistry” Paras Medical Publishers, 2021.
4. Naik Pankaja. “Essentials of Biochemistry” Jaypee Brothers Medical Publishers. 2017