**COURSE STRUCTURE**

**DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY (BSc MLT)**

**Academic Year: (2024 -25)**

| First Year | | | | | | |
|---|---|---|---|---|---|---|
| **SNo** | **Subjects** | **Subject Code** | **Hrs/week** | | | **Credits** |
| | | | **L** | **T** | **P** | **C** |
| 1. | English | 24HENG11T | 4 | - | - | 4 |
| 2. | Sociology & Psychology | 24HMLT11T | 3 | - | - | 3 |
| 3. | Anatomy-Theory | 24HMLT12T | 4 | - | - | 4 |
| 4. | Physiology-Theory | 24HMLT13T | 4 | - | - | 4 |
| 5. | Clinical Lab Practice-Theory | 24HMLT14T | 4 | - | - | 4 |
| 6. | Anatomy-Lab | 24HMLT12L | - | - | 4 | 2 |
| 7. | Physiology-Lab | 24HMLT13L | - | - | 4 | 2 |
| 8. | Clinical Lab Practice-Lab | 24HMLT14L | - | - | 6 | 3 |
| | Total | | 19 | - | 14 | **26** |

Title of the Course: **English** Year: I$^{st}$ Year
Category: BSc Branch: MLT
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

Title of the Course: **Sociology & Psychology** Year: I$^{st}$ Year
Category: BSc Branch: MLT
Subject Code: 24HMLT11T

| 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 approach – Freud, psychosocial approach – Eric Erikson and Neo- Freudian approach – 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 disorders.
- 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

**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.
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**

A) **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.

B) **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.

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

D) 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.

Title of the Course**: Anatomy-Theory** Year: I$^{st}$ Year
Category: BSc Branch: MLT
Subject Code: 24HMLT12T

| Lecture Hours | Tutorial Hours | Practical Hours | Credits |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

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 physiot

**I.THE HUMAN BODY AS A WHOLE:** Definitions, Subdivisions of Anatomy, Terms of location and positions, Fundamental Planes, Vertebrate structure of man and organization of the body cells and tissues.

**II. LOCOMOTION AND SUPPORT:**

THE SKELETAL SYSTEM: Types of bones, structure of bone, divisions of the skeleton, Appendicular skeleton, Axial skeleton - names of all the bones and their parts; joints - classification, types of movements with examples.

PRACTICALS - Demonstrations of all bones - showing parts.

Joints - X-rays of all normal bones and joints.

**III. ANATOMY OF THE NERVOUS SYSTEM**

CENTRAL NERVOUS SYSTEM: Spinal cord; Anatomy, functions reflex actions, Meninges, Main and Fundamental parts of Brain: Hind Brain, Midbrain – Forebrain – Brain, location, functions, coverings of brain. Injuries to spinal cord and brain - excluded

**IV. ANATOMY OF CIRCULATORY SYSTEM:** Heart size, location, coverings, chambers, blood supply, Blood vessels, General plan of circulation, pulmonary circuit - Names of arteries and veins and their positions.

Only histology of lymphatic system – included

**V. ANATOMY OF THE RESPIRATORY SYSTEM:**

Organs of Respiratory System – Nose-nasal cavity, Trachea, Bronchial Tree.

PNS & Larynx topics - excluded.

Pleurae and lungs, brief knowledge of parts and position.

## VI. ANATOMY OF THE DIGESTIVE SYSTEM:

Components of Digestive system, Alimentary tract, Anatomy of organs of Digestive System, Mouth, Tongue, Salivary glands, Liver, Biliary apparatus, Pancreas, Spleen-positions and brief functions.

## VII. ANATOMY OF EXCRETORY SYSTEM AND REPRODUCTIVE SYSTEM

Kidneys - location, gross structure; ureters, Urinary bladder, Urethra.

Male Reproductive System:Testis, duct system and Female Reproductive System: Ovaries, Duct system, Accessory organs

## VIII. ANATOMY OF THE ENDOCRINE SYSTEM:

Names of all endocrine glands and their positions; Only Hormones of endocrine glands - included. (Thyroid, Parathyroid, Pituitary and Adrenal glands, Gonads and Islets of pancreas) Functions of endocrine glands - excluded.

**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.

Title of the Course: **Anatomy Lab** Year: I$^{st}$ Year
Category: BSc Branch: MLT
Subject Code: 24HMLT12L

| 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.

**HISTOLOGY**

**General Slides:** Hyaline Cartilage, Fibro Cartilage, Elastic Cartilage, T.S & L.S. Bone, Blood Vessels, Tonsils, Spleen, Thymus, Lymph node, Epithelial Tissue.

**Systemic Slides:**

1. G.I.T – Fundamental structure of G.I.T. & Liver, Stomach, Small intestine, R.S. - Lung, Trachea, Kidney, Endocrines - Pituitary, Thyroid and Parathyroid-Adrenal– Pancreas, Reproductive System: Ovary, Testis.

Title of the Course**: Physiology-Theory** Year: I$^{st}$ Year
Category: BSc Branch: MLT
Subject Code: 24HMLT13T

| Lecture Hours | Tutorial Hours | Practical Hours | Credits |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

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 it, demonstrations, practicals and clinics the student will be able to demonstrate an understanding of elementary human physiology.

**LECTURE OUTLINES**

1. **HEMATOLOGY:**
   a) BLOOD: Composition, properties and functions of Blood.
   b) RBC: Size, shape, functions, count, Physiological variations of RBC count Polycythemia, Erythropoiesis.
   c) HAEMOGLOBIN: Function, concentration, Physiological variation of concentration; methods of determination of Hb.
   d) WBC: Functions, production, life span, count, leukocytosis, Leukopenia,

      Leukemia, DLC.

   e) PLATELET: Size, Shape, count, production, Functions, Thrombocytopenic Purpura, bleeding time, clotting time.

f) BLOOD GROUPS: ABO and Rh grouping, criteria of classification, Antigen and Antibodies, percentage of distribution, Determination of Blood groups. Landsteiner's Law, significance of Blood groups.

g) BLOOD TRANSFUSION: Indication, general qualities of a donor, matching of donor's blood with recipient's blood, universal donor and recipient concept. Blood grouping or typing, cross matching, mismatched blood transfusion: causes and complications. Rh factor and Rh factor incompatibility – transfusion and erythroblastosis foetalis.

h) HAEMOSTASIS: Vasoconstriction, platelet plug formation, blood coagulation – Definition, clotting factors – Mechanism of blood clotting – Intrinsic and Extrinsic. Intravascular blood blotting, disorders of clotting, Vit-K deficiency bleeding, purpura, Hemophilia.

i) ANTICOAGULANTS: Classification, example and uses. BLOOD BANK

j) BLOOD INDICES: Color index, MCH, MCV, MCHC and BLOOD VOLUME: Normal value, determination of blood volume and

regulation of blood volume.

k) ESR and PCV: Determination, definition, values, variations, factors affecting, significance.

l) LYMPH - Lymphoid tissue formation, circulation, composition and functions of Lymph.

**2. CARDIOVASCULAR SYSTEM:**

a) Heart –brief description of function.

b) BLOOD PRESSURE: Definition, Normal values, physiological variations, factors affecting regulation of BP, Hypotension and Hypertension, Determination of BP.

c) PULSE: Jugular pulse, radial pulse.

d) HEART SOUNDS: Cause, characteristics and significance and phonocardiogram.

e) ECG: Definition, determination, significance, coronary circulation.

**3. DIGESTIVE SYSTEM:**

a) Functions of Digestive system. Physiological Anatomy of G.I.T. T.S. of Intestine, Nerve supply.

b) Saliva composition and Functions. Structure and functions of stomach. Properties, composition and functions of gastric juice. Functions of pancreas, composition, properties and functions of Pancreatic Juice. Functions of Liver, Properties, Composition and functions of bile. Gall bladder functions and its emptying; Jaundice. Functions of large intestine – composition and functions of succus entericus.

c) Defecation – stool, normal.

**4. RESPIRATORY SYSTEM:**

a) Functions of Respiratory system, stages of Respiration.

b) Transportation of Respiratory Gases.

c) Transportation of O2: Direction, pressure gradient. Forms of

d) transportation, Oxygenation of Hb. Quantity of O2 transported.

e) Transportation of CO2. Direction, pressure gradient, modes of transportation.

f) Spirometry: Spirogram, Spirometer.

g) LUNG VOLUMES: Tidal Volume, Inspiratory Reserve Volume, Expiratory Reserve Volume, Vital Capacity, Forced Expiratory Volume 1, Forced Expiratory Volume 2, Forced Expiratory Volume 3

**5. ENDOCRINE SYSTEM:**

a) HORMONE: Definition, Local and General Hormones, properties of Hormones, Endocrine glands of the body and their location.

b) PITUITARY: Situation, Master Endocrine Gland; Anterior and Posterior Parts, Anterior pituitary Hormones, functions and regulation of secretion of each of them, Dwarfism Acromegaly, Gigantism

c) POSTERIOR PITUITARY: ADH, and Oxytocin-source, functions, diabetes insipidus.

d) THYROID GLAND: Physiological Anatomy and location, Hormones secreted, Physiological functions, endocrine disorders – Hypo and Hyper secretion – Goitre, Cretinism, Myxedema, Grave's disease.

e) ADRENAL GLAND: Adrenal Cortex - Hormones secreted: Gluco corticoids, Mineralocorticoids, sex steroids, functions of cortisol and Aldosterone.

f) Endocrine Disorders – Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome.

g) ADRENAL MEDULLA: Functions of adrenaline and Nor-Adrenaline.

h) PANCREAS: Hormones of Pancreas: Insulin-functions and actions, Glucagon - functions and actions. Regulation of blood glucose level; Diabetes Mellitus.

i) PARATHYROID GLAND: PTH functions and actions. Hypo and Hyper secretion of PTH, tetany.

j) CALCITONIN: Functions and actions, Regulation of blood calcium level.

**6. NERVOUS SYSTEM AND SPECIAL SENSES**:

a) Muscle & Nervous system

b) Functions of Nervous System in brief: of all parts of CNS

c) EEG

d) CSF: formation, circulation, properties, composition and functions; lumbar puncture.

e) VISION: functions of different parts of the eye. Refractive errors of eye and correction. Field of vision. Structure and functions of retina, Pupillary reflexes, color vision: color blindness, tests for color blindness.

f) HEARING: functions of outer, middle and inner ear, Deafness and Tests for deafness. Rinne's test. Weber's test.

**7. Excretory System**: **Excretory Organs**

a) KIDNEYS: Functions of kidneys,

b) Functional unit nephron

c) Mechanism of Urine Formation: GFR,

d) Selective Reabsorption, substances reabsorbed, glucose, urea, amino acids, chlorides, H ions etc.

e) Properties and composition of normal urine, urine output. Names & Abnormal constituents in urine, Micturition, Cystourethrogram.

f) Diuretics, Renal Function Tests

g) Actions of ADH, aldosterone, PTH on kidneys.

**8. REPRODUCTIVE SYSTEM :**

a) Functions of Reproductive system in male and female.

b) Semen secretion, composition, factors influencing, abnormalities, Oligozoospermia.

c) Ovulation, Menstrual cycle, Menstrual Fluid.

d) Pregnancy, Pregnancy tests.

e) Lactation – factors affecting- composition of breast milk.

**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

Title of the Course: **Physiology lab** Year: I$^{st}$ Year

Category: BSc Branch: MLT

Subject Code: 24HMLT13L

| Lecture Hours | Tutorial Hours | Practical Hours | Credits |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

## List of Experiments:

1. Study of Microscope and its uses
2. Collection of blood and study of haemocytometry
3. Haemoglobinometry
4. Determination of specific gravity of blood
5. White Blood Cell Count
6. Red Blood Cell Count
7. Determination of Blood Groups
8. Leishman's staining and differential WBC count
9. Determination of Erythrocyte Sedimentation Rate
10. Determination of packed cell volume
11. Calculation of Blood Indices
12. Fragility Test for R.B.C
13. Determination of Bleeding Time
14. Determination of Clotting Time
15. Blood Pressure Recording
16. Examination of arterial pulse - included
17. Artificial Respiration
18. Determination of Vital Capacity

Title of the Course: **Clinical Laboratory Practices-Theory** Year: I$^{st}$ Year

Category: BSc Branch: MLT

Subject Code: 24HMLT14T

| Lecture Hours | Tutorial Hours | Practical Hours | Credits |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**Course Description:**

The Clinical Lab Practice course provides foundational knowledge and practical skills essential for functioning effectively in various types of medical laboratories. It covers the classification of laboratories by service level, infrastructure requirements, personnel qualifications, and standard equipment maintenance. Students learn the proper techniques for specimen collection, storage, and transport, alongside the preparation and use of standard operating procedures (SOPs). Emphasis is placed on laboratory safety, biosafety levels, ethical considerations in clinical testing, quality assurance methods, and biomedical waste management, preparing students for real-world challenges in clinical diagnostics and laboratory management.

**Course Objective:**

By the end of this course, students will be able to understand and apply essential laboratory protocols and procedures, ensure safe and ethical handling of biological specimens, maintain quality standards through internal and external assessments, and contribute to efficient laboratory operations while adhering to biosafety and waste management guidelines. This foundation aims to develop competent, responsible, and safety-conscious medical laboratory technologists.

## LECTURE OUTLINES

1. **Laboratory Services:**

   levels of laboratories – Primary level, Secondary level and tertiary level.

   Reference laboratories, Research laboratories and specific disease reference laboratories.

2. **Infrastructure in the laboratories**

   a) Laboratory space: Reception, specimen collection, quality water supply, power supply, work area, specimen / sample / slide storage, cold storage, record room, wash room, biomedical waste room, fire safety, etc.

   b) Personnel in the laboratory: Qualifications as per NABL document.

   c) Equipment: Listing, cleaning, maintenance, SOP, verification of performance: Internal quality control.

   d) Reagents and materials: Purchase, maintenance, storage, use

3. **Specimen Collection**, **Storage and Transport:**

   General guidelines of collection, labeling, handling, transportation storage of specimens. Care in handling specimens. Accession list, Worksheet, Reporting test results, Specimen rejection record, Recording of Laboratory data, Maintenance of records.

4. **Standard operating Procedure:**

   Definition, format, text of SOP, types of SOP

5. **Safety in Laboratories**:

   General safety measures, biosafety precautions, levels of biosafety laboratories: BSL1, BSL2, BSL3, BSL4.

6. **Ethical considerations**:

   Non – maleficence, beneficence, risk minimization, institutional arrangement, ethical review, transmission of ethical values, voluntariness, compliance.

7. **Quality assurance:**

   Internal and external quality assessment.

   Accidents and emergencies in the laboratory.

8. **Bio waste management.**

Handling rules, Classification and treatment of Bio medical waste,

Disposal of Bio medical waste: Types of color bins used.

**Text Books: -**

**1.** ICMR (2008) guidelines for good clinical laboratory practices.

**2.** NIH: DAIDS guidelines for Good Clinical Laboratory Practice Standards; 2011.

3. Pavani Unnam Text Book of Clinical Laboratory Practice

Title of the Course: **Clinical Laboratory Practices-Lab** Year: I$^{st}$ Year
Category: BSc Branch: MLT
Subject Code: 24HMLT14L

| Lecture Hours | Tutorial Hours | Practical Hours | Credits |
|---|---|---|---|
| 0 | 0 | 6 | 3 |

**List of Experiments:**

1. Writing SOP of equipment maintenance, practical procedures done in the Laboratory for the following equipment's:

- Microscope
- Centrifuge
- Spectrophotometer
- pH Meter
- Autoclave:
- Incubator

2. Internal / External quality control

3. Sample collection, labeling, storage, transportation:

- Blood Sample Collection.
- Urine Sample Collection
- Correct labeling with patient details, date/time, and type of specimen.
- Storage Conditions: Refrigeration, room temperature storage based on sample type.
- Sample Transportation: Use of biohazard bags, temperature control, timely delivery.

4.Bio- waste management

- Color-coded Bin Usage: Yellow (infectious waste), red (sharp objects), black (non-hazardous waste).
- Sharps Disposal: Use of puncture-proof containers.
- Chemical Waste Handling: Safe disposal procedures for reagents and solvents.
- Documentation: Maintaining records of waste disposal.
- Demonstration of Autoclaving Waste: Proper sterilization before disposal.

5. Biosafety Methods