SRI SAI RAGHAVENDRA (SSR) DEGREE COLLEGE
(AUTONOMOUS)
B.Sc. PROGRAMME - Under CBCS System Scheme
with effect from Acadamic Year: 2025-26

Subject: MEDICAL LABORATORY TECHNOLOGY COURSE

FIRST YEAR

SEMESTER – I

Code	Title of the Paper	Credits No. of	Hrs PW	Max. Marks			Total Marks
				Internal Exam	End Exam	Lab	
Theory							
BMLT 101 T	Human Anatomy Part-I	4	4	40	60	-	100
BMLT 102 T	Human Physiology Part-I	4	4	40	60	-	100
BMLT 103 T	Clinical Laboratory Practice-I	4	4	40	60	-	100
Practical							
BMLT 101 P	Human Anatomy Part-I	1	3	-	-	50	50
BMLT 102 P	Human Physiology Part-I	1	3	-	-	50	50
BMLT 103 P	Clinical Laboratory Practice-I	1	3	-	-	50	50
Languages							
AEC 1	English (First Language)	5	5	40	60	-	100
SLS 1	Second Language	5	5	40	60	-	100
	TOTAL:	**25**	**31**	**200**	**300**	**150**	**650**

SEMESTER – II

Code	Title of the Paper	Credits No. of	Hrs PW	Max. Marks			Total Marks
				Internal Exam	End Exam	Lab	
Theory							
BMLT 201 T	Human Anatomy Part-II	4	4	40	60	-	100
BMLT 202 T	Human Physiology Part-II	4	4	40	60	-	100
BMLT 203 T	Clinical Laboratory Practice-II	4	4	40	60	-	100
Practical							
BMLT 201 P	Human Anatomy Part-II	1	3	-	-	50	50
BMLT 202 P	Human Physiology Part-II	1	3	-	-	50	50
BMLT 203 P	Clinical Laboratory Practice-II	1	3	-	-	50	50
Languages							
AEC 2	English (First Language)	5	5	40	60	-	100
SLS 2	Second Language	5	5	40	60	-	100
	TOTAL:	25	31	210	340	150	700

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SEMESTER-I

Core Paper-I: HUMAN ANATOMY – Part-I

Theory : 4 Hours per Week	4 Credit	Internal Marks = 40 External Marks = 60

Unit-I: HUMAN BODY, LOCOMOTION & SUPPORT

1.1 Definitions, Subdivisions of Anatomy, Terms of location and positions, Fundamental Planes.
1.2 Vertebrate structure of man and organisation of the body cells and tissues.
1.3 Types of bones, structure of bone, divisions of the skeleton, Appendicular skeleton, Axial skeleton - names of all the bones and their parts.
1.4 Joints - classification, types of movements with examples.

Unit-II: ANATOMY OF THE DIGESTIVE SYSTEM

2.1 Components of Digestive system, Alimentary tract, Anatomy of organs of Digestive System.
2.2 Anatomy of Mouth, Pharynx, Salivary Glands and Esophagus,
2.3 Anatomy of Liver, Biliary apparatus, Pancreas
2.3 Anatomy of Pancreas & Intestine.

Unit-III: ANATOMY OF THE RESPIRATORY SYSTEM

3.1 Organs of Respiratory System – Nose-nasal cavity.
3.2 Anatomy of Larynx and Trachea.
3.3 Anatomy of Main Bronchi.
3.4 Anatomy of Lungs and Respiratory Membrane.

Unit-IV: ANATOMY OF CIRCULATORY SYSTEM

4.1 Anatomy of circulatory system parts (Heart structure & Blood Components)
4.2 Anatomy of Blood Vessels (Arteries, Veins & Capillaries).
4.3 Anatomy of circulatory system circuits (The pulmonary circuit, The systemic circuit & Coronary circuit)
4.4 Anatomy of lymphatic system.

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SEMESTER-I

Core Paper-II: HUMAN PHYSIOLOGY – Part-I

Theory : 4 Hours per Week	4 Credit	Internal Marks = 40 External Marks = 60

Unit-I: PHYSIOLOGY OF DIGESTIVE SYSTEM

1.1 Activities Occurring in the Mouth, Pharynx and Esophagus.
1.2 Activities of the Stomach (Composition of gastric juice, digestion in stomach.
1.3 Activities of the Small Intestine (Composition of Pancreatic Juice, Bile Juice, Intestinal Juice and digestion in Small Intestine)
1.4 Absorption of food.

Unit-II: PHYSIOLOGY OF EXCRETORY SYSTEMS

2.1 Physiology of Urine Formation.
2.2 Properties and composition of normal urine, urine output.
2.3 Names & Abnormal constituents in urine, Micturition, Cystourethrogram.
2.4 Diuretics, Renal Function Tests; Actions of ADH, aldosterone, PTH on kidneys.

Unit-III: PHYSIOLOGY OF RESPIRATORY SYSTEM

3.1 Respiration, Mechanics of Breathing & Control of Respiration.
3.2 External, Internal Respiration and Gas Transport.
3.3 Spirometry: Spirogram, Spirometer.
3.4 Respiratory Volumes & Capacities (Tidal Volume, Inspiratory reserve volume, Expiratory reserve volume, Residual volume, Vital capacity, Dead space volume, Functional volume)

Unit-IV: PHYSIOLOGY OF CARDIOVASCULAR SYSTEM

4.1 Intrinsic conduction system of the Heart, The pathway of the conduction system.
4.2 Cardiac cycle, Heart Sounds and Cardiac Output.
4.3 Physiology of Circulation, ECG-Definition, determination, significance.
4.4 Cardiovascular Vital Signs (Blood Pressure, Pulse-Jugular & Radial pulse)

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SEMESTER-I

Core Paper-III: CLINICAL LABORATORY PRACTICE – Part-I

Theory : 4 Hours per Week	4 Credit	Internal Marks = 40 External Marks = 60

Unit-I: Laboratory Maintenance

1.1 Laboratory Services: levels of laboratories – Primary level, Secondary level and tertiary level.
1.2 Reference laboratories, Research laboratories and specific disease reference laboratories.
1.3 Infrastructure in the laboratories: 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.
1.4 Qualifications as per NABL document.

Unit-II: Principles of Clinical Laboratory Practices-1

2.1 Listing, cleaning, maintenance, SOP.
2.2 Verification of performance: Internal quality control.
2.3 Accidents and emergencies in the laboratory and protection.
2.4 Quality assurance: Internal and external quality assessment.

Unit-III: Principles of Clinical Laboratory Practices-2

3.1 Audit in a Medical Laboratory.
3.2 Introduction and Importance, NABL & CAP.
3.3 Responsibility, Planning, Horizontal, Vertical and Test audit.
3.4 Frequency of audit & Documentation

Unit-IV: Principles of Clinical Laboratory Practices-3

4.1 Awareness/Safety in a clinical laboratory, General safety precautions.
4.2 Safety: General safety measures, biosafety precautions.
4.3 Levels of biosafety laboratories: BSL1, BSL2, BSL3 & BSL4.
4.4 Patient management for clinical samples collection, transportation and preservation.

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SEMESTER-I

Core Paper-I: HUMAN ANATOMY - Part-I

PRACTICAL

Practical : 3 Hours per Week	1 Credit	Marks = 50

1. Demonstration to illustrate Circulatory, Digestive, Excretory and Reproductive Systems.
2. Demonstration of various parts of male & female reproductive system from models
3. Demonstration of all bones.
4. Demonstration of various joints & X-rays of all normal bones and joints.
5. Demonstration of structural differences between skeletal, smooth and cardiac muscles.

Suggested Readings *(Theory and Practical):*

1. Ross & Wilson ,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
2. Chaurasia B D, (2016), Human Anatomy, 7th edition, CBS publishers
3. Gerard J. Tortora and Bryan H.Derrickson,(Principles of Anatomy and Physiology,14th edition,Wiley Publications.

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SEMESTER-I

Core Paper-II: HUMAN PHYSIOLOGY - Part-I

PRACTICAL

Practical : 3 Hours per Week	1 Credit	Marks = 50

1. Collection of blood and study of haemocytometry, Haemoglobinometry.
2. Determination of specific gravity of blood.
3. Red Blood Cell Count, Leishman's staining and differential WBC count
4. Determination of Blood Groups
5. Determination of Erythrocyte Sedimentation Rate
6. Determination of packed cell volume

Suggested Readings *(Theory and Practical):*

1. Text book of Physiology for BDS students by Dr. Jain
2. Ross & Wilson,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
3. Sujit Chaudhury,(2011),Concise Medical Physiology,6th edition, NCBA
4. Sembulingam k,(2012),Essentials of Medical Physiology,6th edition, Jaypee Publications
5. Guyton and Hall,(2011) Textbook of Medical Physiology,12th Edition,Saunder/Elsevier
6. Gerard J. Tortora and Bryan H.Derrickson,(Principles of Anatomy and Physiology,14th edition, Wiley publications.

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SEMESTER-I

Elective Paper-III: CLINICAL LABORATORY PRACTICE-Part-I

PRACTICAL

Practical : 3 Hours per Week	1 Credit	Marks = 50

1. Writing SOP of equipment maintenance, practical procedures done in the laboratory.
2. Internal / External quality control.
3. Sample collection, labeling, storage, transportation.
4. Biowaste management.
5. Biosafety.

***Suggested Readingss** (Theory and Practical):*

1. Teitz,(2007), Fundamentals of Clinical Chemistry,6th edition, Elsevier Publications
2. Bishop(2013),Clinical Chemistry,7th edition, Wiley Publications
3. Henry's Clinical Diagnosis and Management by Laboratory Methods,(2011),22nd edition,Elsevier.
4. Good Clinical Laboratory Practices, Indian Council of Medical Research, 2008
5. Good Clinical Laboratory Practices, World Health Organisation, 2009.
6. Understanding the principles of Good Clinical Laboratory Practices (GCLP), Global Health Laboratories, 2014.

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B.Sc. Medical Laboratory Technology Course I Year
SEMESTER-II

Core Paper-I: HUMAN ANATOMY – Part-II

Theory : 4 Hours per Week	4 Credit	Internal Marks = 40 External Marks = 60

Unit-I: ANATOMY OF MUSCULAR, SKELETEON AND INTEGUMENT SYSTEM

1.1 Microscopy anatomy of Skeletal Muscle, Cardiac muscle, smooth muscle.
1.2 Anatomy of Axial (Skull, vertebral column and Sternum) and Appendicular Skeleton system (Pelvic & Pectoral girdles, Forelimb and Hind limbs).
1.3 Anatomy of different types of Joints
1.4 Anatomy of the integumentary system (Skin, Hair and Nails).

Unit-II: ANATOMY OF EXRETORY & REPRODUTIVE SYSTEM

2.1 Anatomy of the Urinary System (Structure of Kidney, Nephron, Ureters, Urinary bladder and urethra).
2.2 Anatomy of Male Reproductive system.
2.3 Anatomy of Female Reproductive System.
2.4 Anatomy of Male and Female Reproductive accessory glands.

Unit-III: ANATOMY OF NERVOUS SYSTEM

3.1 Organization of the Nervous System (Structural and Functional Classification); Nervous Tissue Structure and Functions.
3.2 Anatomy of Central Nervous System (Brain, Spinal cord).
3.3 Anatomy of Peripheral Nervous System (Cranial Nerves and Spinal Nerves).
3.4 Anatomy of Autonomic, Sympathetic and Parasympathetic Nervous System.

Unit-IV: ANATOMY OF SPECIAL SENSES AND ENDOCRINE SYSTEM

4.1 Anatomy of the Eye (External and Accessory structures; Internal Structures)
4.2 Anatomy of the Ear (External, Middle and Internal Ear).
4.3 Structure and Hormones of Hypothalamus & Pituitary Gland.
4.4 Structure and Hormones of Thyroid, Parathyroid, Adrenal and Gonads.

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SEMESTER-II

Core Paper-II: HUMAN PHYSIOLOGY – Part-II

Theory : 4 Hours per Week	4 Credit	Internal Marks = 40 External Marks = 60

Unit-I: PHYSIOLOGY OF MUSCULAR, SKELETEON AND INTEGUMENT SYSTEM

1.1 Mechanism of Muscle Contraction (Sliding Filament Theory).
1.2 Function of the Skeletal System.
1.3 Physiology of the Integumentary system (Development of Skin color, Hair and Nail Growth).
1.4 Age related physiological changes in the muscular, skeleton and integument system.

Unit-II: PHYSIOLOGY OF REPRODUTIVE SYSTEM

2.1 Mechanism of Fertilization Events.
2.2 Physiology of Parturition (Birth).
2.3 Spermatogenesis and Oogenesis.
2.4 Physiology of Female Sexual cycles

Unit-III: PHYSIOLOGY OF NERVOUS SYSTEM

3.1 Propagation of nerve impulses and its pathway.
3.2 Neurotransmitters and their functions.
3.3 Synapse types and Synaptic Transmission.
3.4 Autonomic Functioning, Sympathetic Division and Parasympathetic Division.

Unit-IV: PHYSIOLOGY OF SPECIAL SENSES AND ENDOCRINE SYSTEM

4.1 Pathway of Light through the eye and light refraction.
4.2 Mechanism of Hearing.
4.3 The Chemistry of Hormones (Classification and types).
4.4 Mechanisms of Hormone Action and Control of Hormone Release.

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SEMESTER-II

Core Paper-III: CLINICAL LABORATORY PRACTICE – Part-II

Theory : 4 Hours per Week	4 Credit	Internal Marks = 40 External Marks = 60

Unit-I: Laboratory Ethics

1.1 Ethical Considerations: Non – maleficence, beneficence, risk minimization, institutional arrangement, ethical review.
1.2 Ttransmission of ethical values, voluntariness, compliance.
1.3 Standard Operating Procedures: Definition, format, text of SOP, types of SOP.
1.4 Human Biosafety Ethical Committees and functions

Unit-II: Good Laboratory Practices-1

2.1 Good Laboratory Practice (GLP), Introduction to Basics of GLP and Accreditation.
2.2 Aims of GLP and Accreditation.
2.3 Brief knowledge about National and International Agencies for clinical laboratory Accreditation.
2.4 Awareness/Safety in a clinical laboratory, General safety precautions. HIV: pre- and post-exposure guidelines, Hepatitis B & C: pre and post-exposure guidelines.

Unit-III: Good Laboratory Practices-2

3.1 Introduction and importance of calibration and Validation of Clinical Laboratory instrument.
3.2 Ethics in Medical laboratory Practice.
3.3 Sample analysis: Introduction, factors affecting sample analysis.
3.4 Reporting results. basic format of a test report, reported reference range, clinical alerts, abnormal results.

Unit-III: Good Laboratory Practices-3

4.1 Results from referral laboratories, release of examination results, alteration in reports.
4.2 Sample accountability.
4.3 Purpose of accountability.
4.4 Methods of accountability.

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SEMESTER-II

Core Paper-I: HUMAN ANATOMY - Part-II

PRACTICAL

Practical : 3 Hours per Week	1 Credit	Marks = 50

1. General Slides: Hyaline Cartilage, Fibro Cartilage, Elastic Cartilage, T.S & L.S.Bone.
2. General Slides: Blood Vessels, Tonsils, Spleen, Thymus, Lymph node, Epithelial Tissue, Skeletal and Cardiac Muscle, Peripheral nerve and optic nerve.
3. Systemic Slides: G.I.T – Fundamental structure of G.I.T. & Liver, Stomach, Small intestine

i. R.S. - Lung, Trachea. Kidney TS.

4. Systemic Slides: Kidney, Pituitary, Thyroid, Parathyroid, Adrenal, Pancreas.
5. Systemic Slides: Ovary & Testis, Uterus.

Suggested Readings:

1. Ross & Wilson ,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
2. Chaurasia B D, (2016), Human Anatomy, 7th edition, CBS publishers
3. Gerard J. Tortora and Bryan H.Derrickson,(Principles of Anatomy and Physiology,14th edition,Wiley Publications.

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SEMESTER-II

Core Paper-II: HUMAN PHYSIOLOGY - Part-II

PRACTICAL

Practical : 3 Hours per Week	1 Credit	Marks = 50

1. Calculation of Blood Indices.
2. Osmatic Fragility Test for R.B.C
3. Determination of Bleeding Time & Clotting Time
4. Blood Pressure Recording
5. Determination of Vital Capacity

Suggested Readings:

1. Text book of Physiology for BDS students by Dr. Jain
2. Ross & Wilson,(2014),Anatomy & Physiology in health & illness,11th edition, Elsevier Publications
3. Sujit Chaudhury,(2011),Concise Medical Physiology,6th edition, NCBA
4. Sembulingam k,(2012),Essentials of Medical Physiology,6th edition, Jaypee Publications
5. Guyton and Hall,(2011) Textbook of Medical Physiology,12th Edition,Saunder/Elsevier
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SEMESTER-II

Core Paper-III: CLINICAL LABORATORY PRACTICE - Part-II

PRACTICAL

Practical : 3 Hours per Week	1 Credit	Marks = 50

1. Demonstration of automation in clinical laboratory.
2. Sterilization by heat (Hot air oven, Autoclave).
3. Sterilization by filtration (Membrane filter & HEPA).
4. Sterilization by radiation (Ionizing and Non- ionizing), Sterilization by chemicals (Alcohol, Phenols, Aldehydes, Ethylene oxide).
5. Disinfection Techniques by Tube- dilution technique, Phenol-coefficient technique, Agar plate technique.

Suggested Readings:

1. Teitz,(2007), Fundamentals of Clinical Chemistry,6th edition, Elsevier Publications
2. Bishop(2013),Clinical Chemistry,7th edition, Wiley Publications
3. Henry's Clinical Diagnosis and Management by Laboratory Methods,(2011),22nd edition,Elsevier.
4. Good Clinical Laboratory Practices, Indian Council of Medical Research, 2008
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