



**INTEGRAL
UNIVERSITY**



Bachelor of Medical Laboratory Science – BMLS

Academic Scheme & Credit Framework



APPROVED SYLLABUS

2025

Ministry of Health & Family Welfare

Bachelor of Medical Laboratory Science – BMLS

Four-Year Degree Program (Including Internship and Research Dissertation)

1. Program Duration

The Bachelor of Medical Laboratory Science (BMLS) program shall be of five (4) years duration, consisting of:

- Three (3) years of academic instruction, and
- One (1) year of compulsory rotatory clinical internship and research dissertation

The academic program is divided into Eight (8) semesters.

2. Semester-wise Distribution of Instructional Hours

Year	Semester	Instructional Hours per Semester
First Year	Semester I	375
	Semester II	390
Second Year	Semester III	390
	Semester IV	390
Third Year	Semester V	390
	Semester VI	390
Fourth Year	Semester VII (Clinical Posting)	900
	Semester VIII (Research Dissertation)	900
Total		4125

3. Credit System (As per NCAHP Guidelines)

The credit system shall be adopted to define the instructional workload of a course.

4. Internship and Research Dissertation (Fourth Year)

The Fourth Year (Semesters VII & VIII) shall consist exclusively of compulsory rotatory clinical internship and research dissertation amounting to 1800 hours, aimed at developing clinical competence, professional ethics research sensitization in Medical Laboratory Sciences.

Total credits = 160 credits
Total Contact hours = 4125
Contact hours of all semesters = (375+ 390+390+390+390+390) + (900+900) = 4125

Credit Details:	
• Lecture / Tutorial: 1 credit	= 15 hours
• Practical: 1 credit	= 30 hours
• Clinical Lab postings: 1 credit	= 45 hours

Curriculum Outline

FIRST YEAR

First Semester

S.N.	Course Code	Course Title	Lecture	Tutorial	Practical	Total
1	BMLS001	Human Anatomy	3	1	0	4
2	BMLS002	Human Physiology	3	1	0	4
3	BMLS003	Fundamentals of the Healthcare System and Medical Laboratory Science (MLS) #	2	0	0	2
4	BMLS004	Communication and Professionalism#	2	0	0	2
5	BMLS005	Basic Emergency care and First aid	1	1	0	2
6	BMLS006	Basics of Computer Application	1	0	1	2
7	BMLS007	Human Anatomy practical	0	0	4	2
8	BMLS008	Human Physiology practical	0	0	4	2
TOTAL			12	3	9	20

Non-university exams

CURRICULUM MAPPING & CREDIT MANAGEMENT

Credits and Assessments Outline

FIRST YEAR

First Semester

S.NO	Course code	Course Titles	Credits/Week			Hours	Assessments		
			L	T	P	Total Hours	IA*	UE**	(IA+UE)
1	BMLS001	Human Anatomy	3	1	0	60	30	70	100
2	BMLS002	Human Physiology	3	1	0	60	30	70	100
3	BMLS003	Fundamentals of the Healthcare System and Medical Laboratory Science (MLS) #	2	0	0	30	15	35	50
4	BMLS004	Communication and Professionalism#	2	0	0	30	15	35	50
5	BMLS005	Basic Emergency care and First aid	1	1	0	30	30	70	100
6	BMLS006	Basics of Computer Application	1	0	1	45	30	70	100
7	BMLS007	Human Anatomy practical	0	0	4	60	30	70	100
8	BMLS008	Human Physiology practical	0	0	4	60	30	70	100
Total			12	3	9	375	9	375	700

Non-university exams

SEMESTER 1

Course Name: Fundamentals of the Healthcare System and Medical Laboratory Science **Credit = 2 (30 hours)**

Course Rationale: This course provides students with a comprehensive understanding of the Indian health care delivery system and the Clinical Laboratory in the health care system. Students will also understand the roles, responsibilities, and regulatory bodies of medical laboratory sciences.

Learning Objective: At the end of the course, students should be able to:

- Comprehend knowledge of the healthcare delivery system in India
- Identify the laboratory safety measures and biomedical safety management
- Understand the organisation, the importance of Clinical labs, Lab professionals and regulatory professional bodies

Unit	Topic	Hours
I	Introduction to healthcare delivery system - Healthcare delivery system in India at primary, secondary and tertiary care, classification of hospitals based on system of medicine, Community participation in healthcare delivery system, National Health Mission, National Health Policy, Issues in Health Care Delivery System in India	6
II	Visit to Clinical laboratories, Introduction to clinical Laboratory, Classification of Laboratory, Introduction to various sections/departments in clinical laboratories, Lab space and designing, Knowledge of lab organisational chart, Role of Laboratory in patient care	8
III	Lab safety measures- Infection control, Universal precautions, PPE, Vaccination, Chemical, physical, electrical and fire safety. Biomedical waste management	4

Unit	Topic	Hours
IV	Records and their importance in a hospital, Records maintained in the Laboratory as per ISO 15189, importance of records and reports, Data entry and management on an electronic health record system	3
V	Medical terminology - Derivation of medical terms, Basic medical terms, form medical terms utilising roots, suffixes, prefixes, and combining roots, Interpret basic medical abbreviations/symbols	6
VI	Regulatory Bodies & Professional Organisations: Roles & Responsibilities – MoHFW, NCAHP, State Council, Registration	3
	Total	30

Suggested Readings:

1. Textbook of Medical laboratory Technology, Mirnali Sant, CBS publishers. 2022
2. Textbook of Medical laboratory Technology, Ramnik Sood, Jaypee Publishers, 2006
3. Textbook of Medical laboratory Technology, Godkar PB, Bhalani Publishing House, 2024

Course Name: Communication Skills and Professionalism**Credit = 2 (30 hours)**

Course Rationale: The course comprises the study and development of the English language, listening, speaking, reading, and writing, which help students communicate well in academic and professional environments

Learning Objective: At the end of the course, students should be able to:

- Develop good communication skills
- Trains the students in oral presentations, expository writing, logical organisation and structural support.
- Develops professionalism, understands professional ethics and values for professional success

Unit	Topic	Unit
I	Communication Skills: The Importance of Communication, The Communication Process. Barriers to communication: Physiological, Physical, Cultural, Language, Gender, Interpersonal, Psychological and Emotional barriers	4
II	Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment. Elements of Communication: Introduction, Face-to-Face Communication, Tone of Voice, Body Language (Non-verbal communication), Verbal Communication.	4
III	Developing personal etiquette: personal appearance, importance of grooming, acknowledging and respecting, maintaining professionalism, cubicle etiquette, time management, attending classes, meetings, seminars, etc, table manners, greeting, Netiquette and Telephonic conversation	4
IV	Developing presentation and career skills: Introduction, Importance of Resume and CV, preparing Resume and CV, Interview Skill Tips, FAQ During Interviews, Mock interviews	8

IV	Professional values - Integrity, Objectivity, Confidentiality, Professional competence and due care, professional risks, professional responsibility, accountability, professional success	3
V	Personal Values - Ethical and Moral values, Attitude and behaviour, Personal Hygiene and Mental Health	3
	Total	30

Suggested Reading:

1. Graham Lock, Functional English Grammar: Introduction to Second Language Teachers. Cambridge University Press, New York, 1996.
2. Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications, USA, 2009

Course Name: Basic Emergency Care and First Aid**Credit 2 (30 hours)**

Course Rationale: Students will be able to perform basic emergency procedures and provide first aid in everyday medical situations.

Learning Objective: At the end of the course, students should be able to

- Assess emergencies quickly and accurately to ensure personal and victim safety.
- Demonstrate basic life-saving techniques, including CPR (Cardiopulmonary Resuscitation) and the recovery position.
- Provide appropriate first aid for common injuries such as wounds, burns, fractures, sprains, and poisoning.

Unit	Topic	Hours
I	First Aid-Introduction, Aims & objectives of first aid, Priorities of first aid, Golden rules of first aid, Qualities & responsibilities of first aider, Simple first aid measures in selected conditions like Food poisoning, Snake bite, Scorpion bite, Dog bite, foreign bodies in various organs, Burns, Haemorrhage	10
II	Shock- Definition, Types of shock, General Features of shock, Investigations of shock, Initial management & first aid of shock	4
III	Poisoning- Definition, Causes of poisoning, Sources of Poisoning, Symptoms of poisoning, First aid & Management, Antidotes, Common drugs poisoning, Carbon monoxide poisoning	4
IV	Introduction: Chain of survival, team dynamics & multi-rescuer resuscitation. Vital signs of patients- Body temperature, Pulse, Blood Pressure, Respiration	4

V	Basic Life Support (BLS) in adults: Flowchart approach, approach to victim, techniques of CPR, BLS in paediatric Victims: checking pulse in children, chest compressions techniques, Bag mask ventilation technique	8
	Total	30

Suggested Reading:

1. Manual of first aid, 1st edition, Gupta Abhitabh, 2012, Jaypee Publishers
1. Emergency medicine, 5th edition, SN Chugh, Ashimachugh 202, CBS publishers

Course Name: Human Anatomy

Credit =4 (60 hours)

Course Rationale: Students will understand the structure and function of organs and organ systems in the human body.

Learning Objective: At the end of the course, students should be able to

- Comprehend the gross, functional and applied anatomy of various structures in the human body.
- Identify the microscopic structures of various tissues and organs in the human body and correlate the structure with the functions.
- Comprehend the basic structure and connections between the various parts of the central nervous system so as to analyse the integrative and regulative functions of the organs and systems.

Unit	Topic	Hours
I.	General Anatomy: Introduction to Anatomy, terms and terminology. Regions of Body, Cavities and Systems. Surface anatomy – Musculoskeletal, vascular, cardio-pulmonary system. General Embryology.	4
II	Tissues- Classification and description of the basic tissues of the body. Histology: Epithelium, compact bone, muscles, connective tissue, nervous tissue, artery, vein and lymphatic tissue. Connective tissue & its modification, tendons, membranes, and special connective tissue.	4
III	Musculoskeletal system: • Bone structure, blood supply, ossification, and classification. • Muscle classification, structure, types and functional aspects. • Joints–classification, structures of joints, movements, range, blood supply, nerve supply, dislocations	8
IV	Respiratory system: Structure of the upper and lower respiratory tract. Thorax: Pleural cavities & pleura, Lungs and respiratory tree, Heart and great vessels, Diaphragm	6

V	Digestive system - Parts/Structure of digestive system, Abdominal cavity - divisions, Muscles of abdominal wall, Liver, Pancreas, Spleen, Alimentary canal, Gall bladder, Intestine (small & large), and accessory organs of digestion	6
VI	Excretory System: Anatomy of the Kidney. Structure of the kidney, ureter, urinary bladder, male and female urethra. General description of pelvic organs. Lymphatic system- Lymphatic vessels and lymph, lymph nodes, Spleen. Mediastinum – division and contents	6
Unit	Topic	Hours
VII	Cardiovascular system: Circulatory system – major arteries and veins of the body, structure of blood vessels, Heart structure, positions, chambers, valves, internal & external features, Blood supply to heart, Conductive system of heart	8
VIII	Nervous system: Classification of the nervous system. Nerve – structure, classification, microscopy with examples. Spinal cord- anatomy, structure and features of Meninges, Ventricles of the brain, CSF circulation	6
IX	Sensory system: Structure of the Visual system, Auditory system, Gustatory system, Olfactory system, Somatosensory system, Skin	6
X	Reproductive system: Structure of male and female reproductive organs. Endocrine system: Pituitary gland, Thyroid, Parathyroid	6
	Total	60

Course Rationale: Students will be able to identify and demonstrate anatomical structures of various organ systems.

1. Study of anatomical plans and positions
2. Histological study of tissues
3. Study of Skeletal system
4. Study of respiratory system
5. Study of digestive system
6. Study of urinary system
7. Study of Cardiovascular system
8. Study of Nervous system
9. Study of sensory organs: eye, ear, nose, tongue and skin
10. Study of reproductive system

***Clinical laboratory rotation/observation can be incorporated wherever possible**

Suggested Readings:

- Ross and Wilson – *Anatomy and Physiology in Health and Illness*, 11th Ed., Elsevier
- Chaurasia B.D. – *Human Anatomy*, 7th Ed., CBS Publishers
- Gerard J. Tortora & Bryan H. Derrickson – *Principles of Anatomy and Physiology*, 14th Ed., Wiley
- Frank H. Netter – *Atlas of Human Anatomy*, 7th Ed., Elsevier
- Frederic H. Martini et al. – *Fundamentals of Anatomy and Physiology*, 9th Ed., Pearson
- Gray's Atlas of Anatomy – Richard Drake, Elsevier
- Manju Chugani & Preysi Chauhan – *Simplified Anatomy and Physiology for Paramedical Students*, Jaypee

Course Name: Human Physiology

Credit = 4 (60 hours)

Course Rationale: Students will gain knowledge of the organisation of human body cells, tissues, blood and physiological functions of various organ systems of the human body

Learning Objective: At the end of the course, students should be able to

- Understand the functioning of various organ systems of the body and their interactions
- Elucidate the physiological aspects of normal growth and development.

Unit	Topic	Hours
I.	General Physiology- Cell: morphology, structure and function of cell organelles, Structure of cell membrane, Transport across cell membrane, Intercellular communication, Homeostasis	4
II	Blood- Introduction-composition & function of blood, WBC, RBC, Platelets formation & functions, Immunity, Plasma: composition, formation & functions, Plasma Proteins:-types & functions, Blood Groups- types, significance, determination, Haemoglobin, Haemostasis.	4
III	Nervous system and muscle: Organisation of the nervous system. Structure and function of muscle and nerve cells. Functions of the brain, the Spinal cord, the cranial and spinal nerves, and the Motor system. Sensory system. ANS, Synapse, neuromuscular transmission reflex arc, reflex action and reflexes, Cerebrospinal fluid	8
IV	Respiratory System: General organisation, Mechanics of respiration, Regulation of respiration, Gaseous exchange in lungs and tissues, Pulmonary ventilation, volumes and capacities, Effect of exercise on respiration, hypoxia.	6
V	Digestive System- Digestion & absorption of nutrients, Gastrointestinal secretions & their regulation, Functions of Liver, pancreas & stomach, Gastrointestinal tract disorders	6

VI	Renal System: Functions of the kidney, urine formation, Glomerular filtration rate, clearance, Tubular function. Water excretion, concentration of urine-regulation of Na ⁺ , Cl ⁻ , K ⁺ excretion, Physiology of urinary bladder	6
VII	Lymphatic and immunological system: Lymph glands and circulation of lymph, Spleen structure and function, Immunity – Formation of T-cells and B-cells, Antigen, Antibody and Immune response.	6
Unit	Topic	Hours
VIII	Cardiovascular system: Functions of the heart, organisation of the cardiovascular system, structure and properties of cardiac muscles. Cardiac output, cardiac cycle, and conducting system of the heart. Heart sounds, regulation of heart rate, pulse, blood pressure and its regulation. ECG, cardio-respiratory changes during exercise	8
IX	Endocrine system- Physiology of the endocrine glands – Pituitary, Pineal Body, Thyroid, Parathyroid, Adrenal, Gonads, Thymus, Pancreas. Hormones secreted by these glands, their classifications, and their functions.	8
X	Male and female reproductive system: Male: functions of testes & penis, pubertal changes in males, testosterone: action & regulations of secretion, ejaculatory mechanism & dysfunction Female: functions of ovaries and uterus, pubertal changes, menstrual cycle, oestrogens and progesterone action and regulation. Physiological changes during pregnancy, Placenta and placental circulation.	6
	Total	60

Course Name: Human Physiology Practical

Credit = 2 (60 hours)

Course Rationale: Students will develop an understanding of the normal functioning of human organ systems and explain their physiological processes.

1. Perform blood collection
2. Estimation of Hemoglobin
3. Demonstrate blood cell count – RBC count and WBC count
4. Prepare blood smear and staining
5. Measure Blood pressure and Pulse Rate
6. Demonstration of ECG
7. Demonstration of EMG
8. Perform Reflexes testing
9. Spirometry and PFT (Pulmonary function test)

***Clinical laboratory rotation/observation can be incorporated wherever possible**

Suggested Readings:

- Guyton & Hall – *Textbook of Medical Physiology*, Elsevier
- C.C. Chatterjee – *Human Physiology*, Medical Allied Agency
- K. Sembulingam – *Essentials of Medical Physiology*, Jaypee
- Gerard J. Tortora & Bryan H. Derrickson – *Principles of Anatomy and Physiology*, 14th Ed., Wiley
- Ross and Wilson – *Anatomy and Physiology in Health and Illness*, 11th Ed., Elsevier

Course Name: Basic Computer Applications

Credit = 2 (1 credit theory =15 hours; 1 credit practical = 30 hours)

Course Rationale: Students will be familiarised with computer operating systems, using Microsoft Office tools, and internet use in healthcare.

Learning outcome: At the end of the course, students will be able to

- Identify the basic components and functions of computer hardware and software
- Use word processing software to create, format, and edit professional documents.
- Created and managed spreadsheets with basic formulas and designed presentations.

Unit	Topic	Hours
I	Introduction to Computers: Generations of computers, Applications of computers, Parts of a Computer, I/O devices, computer uses in healthcare	3
II	Basics of Operating System: Introduction to OS, Features of Windows OS, File management, User interface basics	2
III	Microsoft Word and PowerPoint: Introduction to Word, Typing medical documents, formatting, tables, inserting images, Introduction to powerpoint, slide creation	3
IV	Microsoft Excel, Access: Introduction to Excel and Access, Entering data, basic formulas, formatting cells, simple charts	2
V	Internet & Email: Definition, types of network, using browsers, opening email, attaching reports, basic internet safety	2
VI	Computers in Healthcare: Electronic health record, Hospital Information System basics, digital patient records, lab reporting usage	3
	Total	15

Practical

Credit: 1 (30 hours)

Course Rationale: This course enables students to gain practical computer literacy skills to create Word files, spreadsheets, and PowerPoint presentations

1. MS Word – Document Creation- Resume, lab report typing, alignment, save & print
2. MS Word – Formatting & Tables- Medical charts, tables for patient information
3. MS Excel – Data Entry- Entering blood test reports and patient data
4. MS Excel – Basic Formulas- Average, sum, and conditional formatting
5. PowerPoint – Basic Slides- Creating a 5-slide presentation on hospital safety
6. Internet Browsing & Searching- Using Google for medical topics, downloading forms
7. Email Usage- Create an email, send a lab report with an attachment
8. MS Access database creation- Patient database creation
9. MS Access HTML integration in the database- Patient database creation view HTML webpage
10. Demonstrate use of Artificial Intelligence tools

Suggested Readings:

1. V. Rajaramana, *Computer basics and programming*, PHI Learning Pvt. Ltd.
2. Michael Miller, *Computer Basics and Absolute Beginner's Guide*, Que Publishing