

ERA UNIVERSITY
FACULTY OF ALLIED HEALTH SCIENCES & RESEARCH
BACHELOR OF SCIENCE IN MEDICAL LABORATORY
TECHNIQUES (B.SC MLT)
FRAMEWORK SECOND SEMESTER

Subject Code	Course Titles	Hours per week			Marks			CR
		L	Theory	Practical				
					Internal	External	Total	
BLT 201	Basic Clinical Biochemistry	3	1	-	30	70	100	4
BLT 202	Basic Hematology & Clinical Pathology	3	1	-	30	70	100	4
BLT 203	General Clinical Microbiology	3	1	-	30	70	100	4
BLT 204	Human Anatomy and Physiology	3	1	-	30	70	100	4
BLP 201	Basic Clinical Biochemistry - (P)	-	-	4	30	70	100	2
BLP 202	Basic Haematology & Clinical Pathology - (P)	-	-	4	30	70	100	2
BLP 203	General Clinical Microbiology- (P)	-	-	4	30	70	100	2
BLP 204	Human Anatomy and Physiology - (P)	-	-	4	30	70	100	2
	Guest Lecture/Tutorial/Seminar/visit to any medical research institution or reputed clinical laboratory	-	2	-	-	-	-	2
Total		12	6	16	240	560	800	26
Total Hours in Semester		550						

NOTE:

1. Abbreviations L - Lecture, T -
Tutorials and P – Practical

Considering four months per semester as working months, total contact hours per semester shall be 550 (Five hundred and **Fifty**)

Department of Medical laboratory technique Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques			Year/ Semester:	Ist year/ II sem
Course Name	Basic Clinical Biochemistry	Course Code:	BLT -201	Type: Semester	Theory
Credits	L- 3,T-1,P-0.			Total Sessions Hours:	60
Evaluation Spread	Internal Continuous Assessment:	30		End Term Exam:	70
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Objectives	The main objective of the subject is to impart the knowledge of apparatus, units, equipment, and volumetric analysis in the laboratory of clinical Biochemistry				
Course Outcomes (CO): <i>After the successful course completion, learners will develop following attributes:</i>					
Course Outcome (CO)	Students will comprehend the basics of Reagent preparation, Instrumentation and Sample analysis.				
CO1	This course makes the student to know about laboratory equipment and glassware used in clinical biochemistry lab.				
CO2	This course makes the student to know about the preparation and properties of distilled water used in medical laboratory.				
CO3	This course makes the student to know about analytical apparatus, concept of pH and its measurement.				
CO4	This course makes the student to know about volumetric analysis and reagent preparation used in clinical biochemistry lab				
CO5	This course makes the student to know about biochemical analysis, preservation, storage and specimen transport				
Pedagogy	Class room Teaching, Power point Presentation, Seminar,				
Internal Evaluation Mode	Continuous internal assessment and written exam				
Session Details	Topic	Hours	Mapped CO		
Unit 1	<ol style="list-style-type: none"> 1. Introduction to Medical lab. Technology, Role of Medical lab Technologist 2. Ethics and responsibility, Safety measures, First aid 3. Cleaning and care of general laboratory glass ware and equipment: Steps involved in cleaning soda lime glass, Steps involved in cleaning borosil glass 4. Preparation of chromic acid solution, Storage 	12	CO1		
Unit 2	<ol style="list-style-type: none"> 1. Method of preparation of distilled water, Type of water distillation plants, Storage of distilled water 2. Units of Measurement: S.I unit and CGS units, Conversion 3. Strength, molecular weight, equivalent weight 4. Normality, Molarity, Molality, Numerical 	12	CO2		
Unit 3	<ol style="list-style-type: none"> 1. Calibration of volumetric apparatus: Flask, Pipettes, Burettes, Cylinders 2. Analytical balance: Principle, Working, Maintenance 3. Concept of pH: Definition, Henderson Hassel batch equation, Pka value, pH indicator 4. Methods of measurement of pH: pH paper, pH meter, Principle, working, maintenance and calibration of pH meter 	12	CO3		

Unit 4	<ol style="list-style-type: none"> 1. Volumetric analysis: Normal and molar solutions 2. Standard solutions 3. Preparation of reagents 4. Storage of chemicals 	12	CO4
Unit 5	<ol style="list-style-type: none"> 1. Osmosis: Definition, Types of osmosis, Factors affecting osmotic pressure 2. Specimen collection and Processing of Blood, Urine and CSF, Separation of Serum and Plasma for Biochemical Analysis 3. Deproteinization of sample, Handling of specimens for Testing, Transport of specimen 4. Preservation of specimen, Factors affecting the Clinical results, Effects of Storage on sample 	12	CO5

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	3	2	1	-	-	-	-	-	3	2
CO2	3	3	2	3	2	2	1	-	-	-	-	-	2	2
CO3	3	3	2	3	3	2	1	-	-	-	-	-	3	2
CO4	3	3	2	3	2	2	1	-	-	-	-	-	3	2
CO5	3	3	2	3	3	2	1	-	-	3	-	2	3	3

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:

Text- Books/ Reference Books	<ol style="list-style-type: none"> 1. Text book of Medical Laboratory Technology by P. B. Godker 2. Medical Laboratory Technology by K.L. Mukherjee volume III 3. Practical Clinical Biochemistry by Harold Varley 4. Instrumental Analysis by Chatwal Anand 5. Text book of Medical Biochemistry by Chatterjee, Shinde 6. Principal of Biochemistry by M.A. Siddiqi 7. Principal of Biochemistry by Lehninger 8. Biochemistry by Voet&Voet 9. Biochemistry by Stryer
Para Text	Unit 1: Introduction to Clinical Biochemistry Unit 2: Water and its molecular properties Unit 3: Calibration of Volumetric Apparatus and pH measurement Unit4: Volumetric analysis Unit 5: Biochemical analysis of clinical specimens

Recapitulation & Examination Pattern

Internal Continuous Assessment: 30 Marks (12 marks written exam + 18 marks continuous assessment)

Component	Marks	Pattern
Mid Semester	12	MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01
Class Test	6	MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01
Online Test/ Objective Test	4	

Department of Medical laboratory technique

Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques			Year/ Semester:	1st year/II sem
Course Name	Basic Hematology & Clinical Pathology	Course Code:	BLT-202	Type: Semester	Theory
Credits	L-3,T-1,P-0 CR-4			Total Sessions Hours:	60
Evaluation Spread	Internal Continuous Assessment:	30		End Term Exam:	70
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Objectives	Students will be made aware of the composition of blood and methods of estimating different components of blood. Students will learn the basic concepts of Hematology & routine clinical investigations of Hematology laboratory.				
Course Outcomes (CO): <i>After the successful course completion, learners will develop following attributes:</i>					
Course Outcome (CO)	Students will be able to collect, preserve and process blood samples. They will be able to perform efficiently routine investigations in clinical hematology laboratory. Students will also be able to carry out different immune-hematological investigations and coagulation profile tests. They will be able to handle automated instruments.				
CO1	Students will be able to understand know about anticoagulants and blood and its composition.				
CO2	Students will be able to understand about the formation of blood components and structure function of hemoglobin,				
CO3	Students will be able to maintain about the quality control in hematology.				
CO4	Students will be able to stain the blood smear, identify the different leucocyte and perform routine hematological test				
CO5	Students will be having understanding of analysis of body fluids and clotting disorders.				
Pedagogy	Class room Teaching, Power point Presentation, Seminar,				
Internal Evaluation Mode	Continuous internal assessment and written exam				
Session Details	Topic			Hours	Mapped CO
Unit 1	<ol style="list-style-type: none"> 1. Definition, Importance Important equipment used. 2. Laboratory organization and safety measures in Hematology Laboratory 3. Introduction to blood, its composition, function and normal cellular components 4. Anticoagulants: types, mode of action and preference of anticoagulants for different hematological studies 			12	CO1
Unit 2	<ol style="list-style-type: none"> 1. Collection and preservation of blood sample for various hematological investigations 2. Formation of cellular components of blood (Haemopoiesis), Erythropoiesis, Leucopoiesis, Thrombopoiesis. 3. Hemoglobin: definition, types, structure, synthesis and degradation 4. Morphology of normal blood cells 			12	CO2
Unit 3	<ol style="list-style-type: none"> 1. Normal Hemostasis & physiological properties of coagulation factors. 2. Quality assurance in Haematology 3. Internal and external quality control including reference p_reparation 4. Routine quality assurance protocol 5. Statistical analysis i.e. Standard deviation, Co-efficient of variation, accuracy and precision 			12	CO3

Unit 4	<ol style="list-style-type: none"> Preparation of thin and thick smears and its uses; staining of blood smears; Differential leucocytes count by manual and automated method; Physiological and pathological variations in leukocyte values; Theory of erythrocyte sedimentation rate; Measurement of ESR - manual and automated method; Hematocrit and red cell indices - Its use in clinical practice; Principle of automated blood cell counter; Reticulocyte count - Stains used; normal values; use of reticulocyte count in clinical practice 	12	CO4
Unit 5	<ol style="list-style-type: none"> Collection, transport and preservation of clinical specimens other than blood; Processing of various clinical Specimens; CSF examination in clinical practice Semen analysis in clinical practice; Sputum examination as relevant to Pathology lab; Stool examination as relevant to Pathology lab Mechanism of coagulation, coagulation factors; Common disorders of bleeding and coagulation; Approach to a patient with bleeding disorder; Bleeding time, clotting time, Platelet count Prothrombin time, Prothrombin concentration, INR; Clot retraction test and APTT 	12	CO5

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO3	PSO4	PS O5	PSO 6
CO1	3	3	1	3	2	3	1	-	3	3	1	2	2	2
CO2	3	3	3	1	2	2	1	-	3	3	1	2	2	2
CO3	3	3	3	3	1	2	2	3	3	3	1	3	2	2
CO4	3	3	3	2	2	3	2	1	3	3	1	2	3	2
CO5	3	3	3	1	2	2	3	-	3	3	1	2	2	3

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:

Text- Books/ Reference Books	<ol style="list-style-type: none"> Text book of Medical Laboratory Technology by Praful B. Godkar Practical Hematology by J.B. Dacie Clinical Diagnosis & Management by Laboratory methods (20th edition) by John Bernard Henry Atlas of Hematology (5th edition) by G.A. McDonald. <ol style="list-style-type: none"> Medical laboratory Technology by K.L. Mukherjee Volume-I De Gruchy's Clinical Hematology in Medical Practice.
Para Text	<p>Unit 1: Introduction to Haematology: Unit 2: General Characteristics and Types of Blood sample Unit 3: Quality Control in Haematology and Clinical Pathology. Unit 4: Tools and Techniques in Haematology. Unit 5: Hematological investigations of clinical samples.</p>

Recapitulation & Examination Pattern

Internal Continuous Assessment: 30 Marks (12 marks written exam +18 marks continuous assessment)

Component	Marks	Pattern
Mid Semester	12	MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01
Class Test	6	MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01
Online Test/ Objective Test	4	MCQ: 4
Assignment/ Presentation	4	Hard copy/Softcopy
Attendance	4	
Total Marks	30	

Department of Medical laboratory technique

Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques			Year/ Semester:	1 st year/II Sem
Course Name	General Clinical Microbiology	Course Code:	BLT -203	Type:	THEORY
Credits	L- 3,T-1,P-0.			Total Sessions Hours:	60
Evaluation Spread	Internal Continuous Assessment	30 Marks		End Term Exam:	70 Marks
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Objectives	This subject gives a general insight into the history and basics of medical microbiology, imparts knowledge about equipment used in Medical Microbiology and basic procedures done in a medical microbiology laboratory i.e., microscopy, sterilization, disinfection, culture methods required to perform different microbiological tests in clinical microbiology lab and biomedical waste management.				
Course Outcomes (CO): <i>After the successful course completion, learners will develop the following attributes:</i>					
Course Outcome(CO)	This course makes the students know the handling of instruments and sterilization techniques, and able to make Various Culture media to improve the quality of Investigation by following quality Control. Students also know Immunology.				
CO1	The student will learn the historical background, glassware, equipment, types, principles, and operation of different microscopes used in clinical microbiology.				
CO2	The student will learn the types and principles of different sterilization techniques.				
CO3	The student will learn about the mode of action and properties of different antiseptics and disinfectants. A general insight into biomedical waste management will also be covered in this course.				
CO4	The student will learn about bacterial anatomy, the mode of nutrition and the physical parameters required for the growth of bacteria.				
CO5	The student will learn about the Microbial culture media, its classification and the quality control.				
Pedagogy	e-Lecture, PPT-slide, Classroom Teaching, Videos, White board				
Internal Evaluation Mode	Continuous internal assessment and written exam				
Session Details	Topic			Hours	Mapped CO
Unit 1	<ol style="list-style-type: none"> Definition, History, Host - Microbe relationship Glasswares Used in Microbiology- Introduction, Care and handling of glassware, Cleaning of glassware. Equipment used in clinical Microbiology Laboratory: Introduction, Care and maintenance including calibration. Microscopy: Introduction and history, Types, principle and operation mechanism of following microscopes- Light microscope, DGI, Fluorescent, Phase contrast, Electron microscope: Transmission/ Scanning 			12	CO1
Unit 2	<ol style="list-style-type: none"> Definition, Types and principles of sterilization methods Heat (dry heat, moist heat with special Reference to autoclave) Radiation, Filtration Efficiency testing to various sterilizers 			12	CO2

Unit 3	1. Definition, Types and properties. 2. Mode of action - Uses of various disinfectants 3. Precautions while using the disinfectants - Qualities of a good disinfectant 4. Testing efficiency of various disinfectants 5. Types of the waste generated - Segregation - Treatment - Disposal	12	CO3
Unit 4	1. Classification of microbes with special reference to prokaryotes & eukaryotes 2. Morphological classification of bacteria, Bacterial anatomy (Bacterial cell structures). 3. General nutritional & other requirements of the bacteria 4. Classification of bacteria on the basis of their nutritional requirements 5. Physical conditions required for growth, Normal growth cycle of bacteria (growth curve).	12	CO4
Unit 5	1. Culture media: Introduction 2. Classification of culture media (Example & Uses) solid media, liquid media, semisolid, Media, routine/synthetic/defined media, basal media, enriched, enrichment, Selective differential media, sugar fermentation media, transport media, preservation media and anaerobic culture media 3. Quality control in culture media, Automation in culture media preparation 4. Aerobic & anaerobic culture methods: Concepts, Methods Used for aerobic cultures, Methods used for anaerobic cultures 5. Introductions to Immunology: Immunity, Antigens and Antibodies 6. Care & handling of laboratory animals: Introduction, General care & handling. 7. Ethics & legality in use of laboratory animals.	14	CO5

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	3	3	3	1	-	-	-	-	3	3	2
CO2	3	2	1	3	2	3	1	-	-	1	-	3	3	2
CO3	3	2	1	3	2	3	1	-	-	1	-	3	3	2
CO4	3	2	1	1	1	2	1	-	-	-	-	1	1	1
CO5	3	2	1	3	2	3	1	-	-	2	-	3	3	3

Strong contribution-3, Average contribution-2, Low contribution-1,-

Suggested Readings:

Text- Books/ Reference Books	<ol style="list-style-type: none"> 1. Practical Medical Microbiology by Mackie and McCartney 2. Text book of Microbiology by Ananthanarayan 3. Medical Microbiology by Panikar & Satish Gupte 4. District Laboratory Practice in tropical countries Vol II Microbiology by Monica Cheesbrough 5. Text book of Microbiology by Prescott 6. Microbiology For Medical Sciences by Bhagat Singh and Renu Singh 7. Medical laboratory Technology vol. I, II, III by Mukherje
Para Text	Unit 1: Introduction to Medical Microbiology Unit 2: Sterilization Unit 3: Antiseptics and Disinfectants Unit 4: General characteristics and classification of Microbes and Nutrition Unit 5: Types of microbial cultures and immunology

Recapitulation & Examination Pattern

Internal Continuous Assessment: 30 marks (12 marks written exam +18 marks continuous assessment)

Component	Marks	Pattern
Mid Semester	12	MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01
Class Test	6	MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01
Online Test/ Objective Test	4	MCQ: 4
Assignment/ Presentation	4	Hard copy/Softcopy
Attendance	4	
Total Marks	30	

Department of Medical laboratory technique

Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques		Year/ Semester:	1 st Year/ 2 nd Semester	
Course Name	Human Anatomy and physiology	Course Code:	BLT-204	Type: Semester	THEORY
Credits	L- 3,T-1,P-0.		Total Sessions Hours:	60	
Evaluation Spread	Internal Continuous Assessment:	30		End Term Exam:	70
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Objectives	Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body. This subject will develop an understanding of the structure and function of organs and organ systems in normal human body.				
Course Outcomes (CO): After the successful course completion, learners will develop following attributes:					
Course Outcome (CO)	This curriculum can stimulate the students to understand the basic anatomy of included system and the resultant unified organization there upon. Students will be able to understand functioning of various systems as well as its applied aspects.				
CO1	To study Human Anatomy and Physiology				
CO2	To learn about Muscular skeletal System and Lymphatic System				
CO3	To study the Human Respiratory system and Sense Organs				
CO4	Students will study the Cardiovascular System and Endocrine system				
CO5	Students will study the Nervous system				
Pedagogy	e-Lecture, PPT-slide, Classroom Teaching, Videos,				
Internal Evaluation Mode	Continuous internal assessment and written exam				
Session Details	Topic	Hours	Mapped CO		
Unit 1	<ol style="list-style-type: none"> Cell and cell organelles: Structure and classification, Function, Cell division {Mitosis and Meiosis} Tissues: Definition, Classification with structure and Functions Epithelial tissues, Connective tissues, Muscular tissues, Nervous tissue Blood: Composition & Function of blood 	12	CO1		
Unit 2	<ol style="list-style-type: none"> Introduction, Classification, Structure and function of skeletal system, muscles and joints Various movements of body Lymphatic system: Introduction, Structure and function, Lymph nodes Spleen, Thymus gland, Tonsils 	10	CO2		
Unit 3	<ol style="list-style-type: none"> Introduction, Structure, Function Mechanism of breathing and respiration Various terms involved in the respiratory System: Vital capacity, Total Volume, Reserve volume, Total lung capacity Structure and function of sense organ: Eye Ear, Nose Tongue 	10	CO3		
Unit 4	<ol style="list-style-type: none"> Anatomy and physiology of heart Blood circulation: Arteries and veins Conductive system of heart, Cardiac cycle, Introduction to ECG Endocrine system: Endocrine & exocrine glands, their location, structure & functions 	10	CO4		

Unit 5	1. Important terms, types of body fluid, total body water, A venues by which water leaves and enters body, general principles for fluid balance 2. Cardinal principle, How body fluids maintain Homeostasis, Electrolytes & ions 3. Function of electrolytes, How electrolyte imbalance leads to fluid imbalance	08	CO5
Unit 6	1. Organization; accessory organs; structure & function (Mouth, Tongue, Teeth, Esophagus, Pharynx, Stomach, Intestine, Rectum, Anus) 2. Digestive glands; physiology of digestion of carbohydrates, lipids & proteins 3. Liver: structure and function	08	CO6
Unit 7	1. Structure of male and female reproductive system 2. Gametogenesis in male, female, menstrual cycle. 3. Placenta and extra embryonic membranes 4. Urinary system: Main parts, Structure& function of kidney, structure of nephron 5. Physiology of excretion & urine formation, urine.	10	CO7
Unit 8	1. Parts, function & structure; brain, spinal cord, spinal & cranial nerves 2. All none principle, role of neurotransmitters in transmission of nerve impulse	06	CO8

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO7	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO8	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:

Text- Books/ Reference Books	1. Anatomy & Physiology- Ross and Wilson 2. Anatomy and Physiology for nurses by Evelyn Pearce 3. Anatomy and Physiology for nurses by Sears 4. Anatomy and Physiology for nurses by Pearson 5. Anatomy and Physiology by N Murgesh 6. Anatomy and Physiology: Understanding the Human Body by Clark
Para Text	Unit 1: Introduction to human Anatomy and Physiology Unit 2: Muscular skeletal system & Lymphatic System Unit 3: Respiratory System & Sense Organs Unit 4: Cardiovascular System & Endocrine System Unit 5: Body fluids and their significance Unit 6: Digestive system: Unit 7: Genital system & Urinary System: Unit 8: Nervous system:

Recapitulation & Examination Pattern

Internal Continuous Assessment: 30 marks (12 marks written exam + 18 marks continuous assessment)

Component	Marks	Pattern
Mid Semester	12	MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01
Class Test	6	MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01
Online Test/ Objective Test	4	MCQ: 4
Assignment/ Presentation	4	Hard copy/Softcopy
Attendance	4	
Total Marks	30	

Department of Medical laboratory technique

Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques			Year/ Semester:	1st Year /II Semester
CourseName	Basic clinical Biochemistry	CourseCode:	BLP-201	Type:	Practical
Credits	L-0,T-0,P-4.			Total Sessions Hours:	30
EvaluationSpread	Internal Continuous Assessment:	30		End Term Exam:	70
Type ofCourse	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Outcomes (CO): After the successful course completion, learners will develop following attributes:					
CO1	This course makes the student to learn about the cleaning of laboratory glassware				
CO2	This course makes the student to learn about the preparation of distilled water				
CO3	This course makes the student to learn about principle and working of pH meter				
CO4	This course makes the student to learn about the preparation of molar solution				
CO5	This course makes the student to learn about the osmosis and dialysis				
Pedagogy	Hands-on experiment, demonstration				
Internal Evaluation Mode	Continuous internal assessment				
SessionDetails	Topic				MappedCO
Unit 1	<ol style="list-style-type: none"> 1. Cleaning of the laboratory glass ware (Volumetric and non-volumetric) 2. Preparation of distilled water 3. Principle, working and maintenance of pH meter. 4. To prepare 0.1 N NaOH solution. 5. To prepare 0.2N HCl solution 6. To prepare 0.1 molar H₂SO₄ 7. To prepare 0.2 Molar Sodium carbonate solution. 8. Demonstration of osmosis and dialysis. 				CO1
Unit 2	<ol style="list-style-type: none"> 1. Preparation of distilled water 				CO2
Unit 3	<ol style="list-style-type: none"> 1. Principle, working and maintenance of pH meter 				CO3

Unit 4	<ol style="list-style-type: none"> To prepare 0.1 N NaOH solution. To prepare 0.2N HCl solution. To prepare 0.1 molar H₂SO₄ To prepare 0.2 Molar Sodium carbonate solution. 	CO4
Unit 5	2. Demonstration of osmosis and dialysis	CO5

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	3	3	2	-	-	-	1	-	3	1	-
CO2	2	3	1	2	3	2	-	-	-	1	-	3	1	-
CO3	2	3	1	3	3	2	-	-	-	1	-	3	1	-
CO4	2	3	2	3	2	2	-	-	-	1	-	3	1	-
CO5	2	3	1	2	3	2	-	-	-	1	-	2	1	-

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:

Text- Books/ Reference Books ReferenceBooks	<ol style="list-style-type: none"> Practical Clinical Biochemistry by Harold Varley Principal of Biochemistry by M.A. Siddiqi Instrumental Analysis by Chatwal Anand Text book of Medical Biochemistry by Chatterjee, Shinde Principal of Biochemistry by Lehninger
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Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	12	MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01
Class Test	6	MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01
Online Test/ Objective Test	4	MCQ: 4
Assignment/ Presentation	4	Hard copy/Softcopy
Attendance	4	
Total Marks	30	

CO4	3	3	1	3	3	3	-	-	-	2	-	-	3	3
CO5	3	3	1	3	1	2	-	-	-	2	-	-	3	3
CO6	3	3	1	3	1	2	-	-	-	2	-	-	3	3
<i>Strong contribution-3, Average contribution-2, Low contribution-1,</i>														
Suggested Readings:														
Text- Books/ Reference Books	Practical Hematology by J.B. Dacie Clinical Diagnosis & Management by Laboratory methods (20th edition) by John Bernard Henry													
Recapitulation & Examination Pattern														
Internal Continuous Assessment:														
Component	Marks				Pattern									
Mid Semester	12				MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01									
Class Test	6				MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01									
Online Test/ Objective Test	4				MCQ: 4									
Assignment/ Presentation	4				Hard copy/Softcopy									
Attendance	4													
Total Marks	30													

Department of Medical laboratory technique Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques			Year/ Semester:	1 st year/II semester
Course Name	General clinical Microbiology	Course Code:	BLP-203	Type:	Practical
Credits	L- 0,T-0,P-4.			Total Sessions Hours:	60
Evaluation Spread	Internal Continuous Assessment:	30		End Term Exam:	70
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	

Course Outcomes (CO): After the successful course completion, learners will develop following attributes:

CO1	This course makes the student to know about handling of glassware and microscope, sterilization techniques, working of antiseptics and disinfectants, culture media preparation			
Pedagogy	Hands-on experiment, demonstration			
Internal Evaluation Mode	Continuous internal assessment			
Session Details	Topic			Mapped CO
Unit	<ol style="list-style-type: none"> 1. To demonstrate safe code of practice for a Microbiology laboratory 2. To prepare cleaning agents & to study the technique for cleaning & sterilization of glassware. 3. To demonstrate the working & handling of Compound microscope. 4. To demonstrate the method of sterilization by autoclave including its efficacy testing. 5. To demonstrate the method of sterilization by hot air oven including its efficacy testing. 6. To demonstrate the method of sterilization of media/solution by filtration. 7. Demonstration of Antiseptics, Spirit, Cetrimide & Povidone-iodine. 8. To demonstrate the use of disinfectants. 9. Demonstrate the precaution while using disinfectants. 10. To prepare working dilution of commonly used disinfectants. 11. To demonstrate the different morphological types of bacteria 12. Preparation of one culture media from each type 13. To demonstrate aerobic culture 14. To demonstrate anaerobic culture 15. Visit to animal house & demonstrate about care of laboratory animals 			CO1

CO-PO and PSO Mapping

CO	P O 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1		3	3	1	3	3	-	-	1	1	-	3	2	-

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:		
Text book/ReferenceBooks	Practical Medical Microbiology by Mackie and McCartney	
Recapitulation & Examination Pattern		
Internal Continuous Assessment:		
Component	Marks	Pattern
Mid Semester	12	Exercise :0 4 Spotting: 04 File: 02 Viva: 01
Class Test	6	MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01
Online Test/ Objective Test	4	MCQ: 4
Assignment/ Presentation	4	Hard copy/Softcopy
Attendance	4	
Total Marks	30	

Department of Medical laboratory technique
Course Outline Effective From: 2023-24

Name of the Program	Bachelors of Science in Medical Laboratory techniques			Year/ Semester:	1st Year/II semester
CourseName	Human Anatomy and Physiology	Course Code	BLP-204	Type:	Practical
Credits	L-0,T-0,P-4			Total Sessions Hours:	30
EvaluationSpread	Internal Continuous Assessment:	30		End Term Exam:	70
Type ofCourse	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Outcomes (CO): <i>After the successful course completion, learners will develop following attributes:</i>					
Course Outcome(CO)	The student will be able to demonstrate knowledge in human anatomy and physiology as needed for the study .				
CO1	To identify anatomical aspect of the level of organization of the human body practically.				
CO2	To examine the various blood cells, eye and ear.				
CO3	To identify anatomical and functional aspect of nervous system, muscles, bones and joints of the various regions practically. To understand the nerve, muscle physiology& its application..				
CO4	To identify anatomical and functional aspect of musculoskeletal structure of superior & inferior extremity.				
Pedagogy	Hands-on experiment, demonstration				
Internal Evaluation Mode	Continuous internal assessment				
SessionDetails	Topic	Hours	MappedCO		
	<ol style="list-style-type: none"> 1. Demonstration of various parts of body 2. Demonstration of tissues of body 3. Demonstration of parts of digestive system 4. Demonstration of parts of respiratory system 5. Demonstration of parts of skin 6. Demonstration of parts of excretory system 7. Demonstration of various parts of circulatory system (Demonstration from models) 8. Examination of blood film for various blood cells from stained slides 9. Blood pressure estimation 10. Demonstration of various parts of nervous system (brain and spinal cord)(Model) 11. Structure of eye and ear (demonstration from models) 12. Demonstration of reflex action 13. Demonstration of structural differences between skeletal, smooth and cardiac muscles (permanent mounts) 14. Demonstration of various bones and joints 15. Demonstration of various parts of reproductive system (Male and female from models and charts) 16. To study circulatory system from charts and transverse section (TS) of artery and vein from permanent slides. 17. To study digestive system from charts and TS of liver, spleen and pancreas from permanent slides. 18. Study of Urinary system (charts) 19. Study of Genital system (male & female) from charts and TS of testis and ovary from permanent slides. 20. To study nervous system (From models/ charts) 21. To study various body fluids. <p>Note: Demonstrations can be done with the help of models, charts and histological</p>	30	CO1-5		

	slides													
CO-PO and PSO Mapping														
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO 2	PSO3	PSO 4	PSO 5	PSO6
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO7	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO8	1	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Strong contribution-3, Average contribution-2, Low contribution-1,</i>														
Suggested Readings:														
Text- Books/ ReferenceBooks	1 Anatomy & Physiology- Ross and Wilson 2 Anatomy and Physiology for nurses by Evelyn Pearce 3 Anatomy and Physiology for nurses by Sears 4 Anatomy and Physiology for nurses by Pearson 5 Anatomy and Physiology by N Murgesh 6 Anatomy and Physiology: Understanding the Human Body by Clark													
Recapitulation & Examination Pattern														
Internal Continuous Assessment: 30 marks														
Component					Marks					Pattern				
Internal Continuous Assessment:														
Component					Marks					Pattern				
Mid Semester					12					MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01				
Class Test					6					MCQ: 02 Short Answer Type Questions: 01 Long Answer Type Question: 01				
Online Test/ Objective Test					4					MCQ: 4				
Assignment/ Presentation					4					Hard copy/Softcopy				
Attendance					4									
Total Marks					30									