ERA UNIVERSITY
FACULTY OF ALLIED HEALTH SCIENCES & RESEARCH
BACHELOR OF SCIENCE IN MEDICAL LABORATORY TECHNIQUES (B.SC MLT)
FRAMEWORK Third Semester
FOR THE ACADEMIC YEAR 2023 to 2024
Till the next change in the curriculum

Subject Code	Course Titles	Hours per week			Marks			CR
		L	Theory	Practical	Internal	External	Total.	
BLT 301	Biochemical metabolism	3	1	-	30	70	100	4
BLT 302	Basics of Hematological diseases	3	1	-	30	70	100	4
BLT 303	Systematic Bacteriology	3	1	-	30	70	100	4
BLT 304	Fundamentals of Histology	3	1	-	30	70	100	4
BLP 301	Biochemical metabolism - {P)	-	-	4	30	70	100	2
BLP 302	Basics of Hematological diseases - {P)	-	-	4	30	70	100	2
BLP 303	Systematic Bacteriology- (P)	-	-	4	30	70	100	2
BLP 304	Fundamentals of Histology- {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:**	**2nd year /3rd sem**
Course Name	**Biochemical Metabolism**	**Course Code:**	BLT301	**Type:**	**THEORY**
Credits	L:3 T:1 P:0			**Total Sessions Hours:**	**50**
Evaluation Spread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	Students will know about various metabolism and different biochemical cycles, their production, lyses, requirements and uses.				
CO1	To learn about the classification, digestion and metabolism of Carbohydrate				
CO2	To learn about the Protein metabolism, metabolism disorders and Urea cycle				
CO3	To learn about the lipid's biosynthesis and its oxidation				
CO4	To learn about the brief description of about Nucleic acid and Vitamins along with their deficiency disorders.				
CO5	To learn about the Enzyme mechanism and Hormonal disorders				
Pedagogy	White board, Seminar, Power-point presentation, e-lecture				
Internal Evaluation Mode	Continuous internal assessment and written exam				
Session Details	Topic			**Hours**	**Mapped CO**
Unit 1	**Carbohydrate Metabolism:** 1.Introduction, Importance and Classification 2.Digestion and Absorption 3.Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis 4.Disorders of carbohydrate metabolism.			10	**CO1**
Unit 2	**Protein Metabolism:** 1.Introduction, Importance and classification, Important properties of proteins 2.Digestion & absorption of Proteins 3.Protein synthesis, Metabolism of proteins 4.Disorders of protein metabolism and Urea Cycle			10	**CO2**

Unit 3	**Lipids** : 1.Introduction & Classification 2.Digestion & absorption of fats 3.Lipoproteins 4.Fatty acid biosynthesis & fatty acid oxidation	10	**CO3**
Unit 4	**Nucleic Acid & Vitamins:** 1.Introduction & Functions of Nucleic acid 2.Brief about structure of DNA & RNA, DNA Replication, & Transcription 3.Advances in Genetic Engineering 4.Vitamins: Definition, classification, functions dietary sources, daily requirement & Deficiency disorders	10	CO4
Unit 5	**Enzymes & Hormones:** 1.Introductions, Importance Classifications & Properties of enzymes 2.Mechanism of enzyme action, Factors affecting enzyme action 3.Enzyme kinetics & enzyme inhibiters 4.Hormones: Introduction Definition & Classification of hormones. Mechanism of hormone action, Effects of hormones on various metabolism & hormonal disorders	10	CO5

CO-PO and PSO Mapping

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

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

Suggested Readings:

Text- Books/ Reference Books	Practical Clinical Biochemistry by Harold Varley Text book of Medical Laboratory Technology by P. B. Godker Medical Laboratory Technology by Mukherjee Principal of Biochemistry by M.A. Siddiqi Instrumental Analysis by Chatwal Anand Text book of Medical Biochemistry by Chaterjee, Shinde Principal of Biochemistry by Lehninger Biochemistry by Voet&Voet Biochemistry by Stryer
Para Text	**Unit 1: Carbohydrate Metabolism:** **Unit 2: Protein Metabolism:** **Unit 3: Lipids** : **Unit4: Nucleic Acid & Vitamins:** **Unit 5: Enzymes & Hormones:**

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

Interaction in class /class participation	6	
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:**	**2nd year/ 3rd sem**
Course Name	**Basic of Hematological Diseases**	**Course Code:**	**BLT 302**	**Type:**	**Theory**
Credits	**L:3 T:1 P:0**			**Total Sessions Hours:**	**50**
Evaluation Spread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	The students will be made aware of various diseases like anemia, quantitative disorders of Leucocytes, morphological alterations in blood cells, bleeding disorders				

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

Course Outcome(CO)	This course made the students competent enough to perform various laboratory test related to acute and chronic hematological disorders and Bleeding Disorders.		
CO1	To learn about the Anemia and its types		
CO2	To learn about the onset of Anemia in patients with different disorders		
CO3	To learn about the introduction and defects about bleeding disorders		
CO4	To learn about the types of bleeding disorders		
CO5	To learn about the evaluation of bleeding disorders		
Pedagogy	White board, PPT (Slide), Projector, Seminar		
Internal Evaluation Mode	Continuous internal assessment and written exam		
Session Details	**Topic**	**Hours**	**MappedCO**
Unit 1	**Anemia:** Introduction, Classification, Clinical Features, Evaluation and Investigation. Microcytic hypochromic anemia Macrocytic anemia Normocytic normochromic anemia	10	**CO1**
Unit 2	**Anemia:** Quantitative disorders of Leukocytes Cause and significance	10	**CO2**

	Granulocytic and Monocytic Disorders Lymphocytic Disorders Morphologic Alterations in Neutrophils ,Toxic granulation , Cytoplasmic vacuoles , Dohle bodies, May-Hegglin anomaly Alder-Reilly anomaly, Pelger-Huet anomaly, Chediak-Higashi syndrome		
Unit 3	**Bleeding disorders:** Introduction, definition, types and Causes of bleeding. Vascular defect, Platelet defect Factor deficiency Inhibitors, Hyper fibrinolysis	10	**CO3**
Unit 4	**Types of bleeding disorders:** Inherited bleeding disorders Acquired bleeding disorders Thrombosis: Introduction & Causes of thrombosis Monitoring of Anticoagulants, Oral anticoagulants by INR, Heparin	10	CO4
Unit 5	**Evaluation of bleeding disorders:** . Patient History, Clinical Features BT,CT, Platelets Count PT, APTT, PTT D-Dimer test, Fibrinogen Assay	10	CO5

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	3	2	1	-	-	2	-	-	-	1	-	-	3	1
CO2	3	1	1	-	-	2	-	-	-	1	-	-	1	1
CO3	3	1	1	-	-	2	-	-	-	1	-	-	1	1
CO4	3	1	1	-	-	2	-	-	-	1	-	-	1	1
CO5	3	3	2	3	-	3	-	-	-	3	-	-	3	1

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

Suggested Readings:

Text-Books/ Reference Books	Textbook of Medical Laboratory Technology by Praful B. Godkar Clinical Diagnosis & Management by Laboratory methods {20thedition) by John Bernard Henry Atlas of Haematology by G.A. McDonald De Gruchy's clinical Haematology in medical practice Medical Laboratory Technology by KL Mukherjee Volume-I Wintrobe's Clinical Haematology- 2013 by John P. Greer, Daniel A. Arber, Bertil E. Glader, Alan F. List
Para Text	Unit 1: Anemia: Unit 2: Anemia: Unit 3: Bleeding disorders: Unit4: Types of bleeding disorders: Unit 5:Evaluation of bleeding disorders:

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 theProgram	**Bachelor of Science in Medical Laboratory Techniques**			**Year/ Semester:**	**2nd year/III Semester**
CoureName	**Systematic Bacteriology**	**Course Code:**	**BLT-303**	**Type:**	**THEORY**
Credits	**L3T1P0**			**Total Sessions Hours:**	**50**
EvaluationSpread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type ofCourse	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	This subject will give information about the different types of bacterial culture procedures, staining procedures and biochemical tests used for identification of bacteria. The students will learn the morphology cultural characteristics, biochemical characteristics & laboratory diagnosis of various bacteria.				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	Students will know basics and procedure of different parameters used to assess Characteristics of different kinds of bacteria. Students will perform different Biochemical & special test to identify various bacteria.				
CO1	The students will be able to learn the Bacterial culture procedures and staining techniques used in bacteriology.				
CO2	The students will be able to learn the Principle, Procedure and Interpretation of the Biochemical test				
CO3	The students will be able to learn the about the morphology, pathogenesis and laboratory diagnosis of a few Gram-positive and Gram-negative bacteria				
CO4	The students will be able to learn the about the morphology, pathogenesis and laboratory diagnosis of a few Gram-positive and Gram negative bacteria				
CO5	The students will be able to learn the about the morphology, pathogenesis and laboratory diagnosis of a few aerobic and anaerobic bacteria				
Pedagogy	White board, Power point presentation, Video, Lecture				
Internal Evaluation Mode	Continuous internal assessment and written exam				
SessionDetails	**Topic**			**Hours**	**MappedCO**
Unit 1	**Bacterial culture & staining techniques in bacteriology:** Instruments used to seed culture media, Culture procedures - seeding a plate. Significance of staining in bacteriology- Principle, Reagent preparation, procedures and interpretation of- Simple staining, Gram staining, Negative staining, Albert's staining, Neissre's staining, Ziehl- Neelsen staining, Capsule staining, Spore Staining, Flagella staining, Fontana stain for spirochetes.			10	CO1
Unit 2	Biochemical tests for identification of different bacteria Principle, procedures and interpretation of the following biochemical tests- Catalase, Coagulase, lndole, Methyl Red Principle, procedures and interpretation of the following biochemical tests-			10	CO2

	Voges Proskauer, Urease, Citrate, Oxidase TSIA, Nitrate reduction, Carbohydrate fermentation, Huge and Leifson, Bile solubility H 2 S production, Demonstration of motility, Decarboxylases, CAMP, Hippurate hydrolysis, Nagler's reaction , Cholera-red reaction.		
Unit 3	**Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria-:** Staphylococcus, Streptococcus Pneumococcus, Neisseria gonorrhea and Neisseria meningitis Haemophilis, Corynebacterium Escherichia coli, Klebsiella, Citrobacter, Enterobacter	10	CO3
Unit 4	**Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria-:** Proteus, Salmonella, Shigella, Yersinia enterocolitica and Yersinia pestis. Vibrio, Aeromones and Plesiomonas Clostridia of wound infection Mycobacterium tuberculosis complex, Atypical Mycobacteria and M. leprae	10	CO4
Unit-5	Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria-: (10 Hrs.) Spirochetes - Treponema, Borrellia and leptospira Bordetella and brucella, Mycoplasma and Ureaplasma, Rickettsia, Chlamydia, Actinomyces, Pseudomonas and Burkholderia Brief introduction about non sporing anaerobic cocci and bacilli	10	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	2	3	-	-	1	3	-	3	3	1
CO2	3	3	2	3	2	3	-	-	1	3	-	3	3	1
CO3	3	3	2	2	2	2	-	-	1	2	-	3	3	1
CO4	3	3	2	2	2	2	-	-	1	2	-	3	3	1
CO5	3	3	2	2	2	2	-	-	1	2	-	3	3	1

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

Suggested Readings:

Text- Books/ Reference Books	Practical Medical Microbiology by Mackie & McCartney Volume 1 and 2 Text book of Microbiology by Ananthanarayanan Medical laboratory Technology Vol. I, II, Ill by Mukherje Microbiology For Medical Sciences by Bhagat Singh and Renu Singh Medical Microbiology by Paniker& Satish Gupte
Para Text	**Unit 1: Bacterial culture & staining techniques in bacteriology:** **Unit 2: Biochemical tests for identification of different bacteria:** **Unit 3: Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria** **Unit4: Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria** **Unit-5: Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria**

Recapitulation & Examination Pattern

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

Component	Marks	Pattern
Mid Semester	12	MCQ: 4 Short Answer Type Questions: 02 Long Answer Type Question: 01
Class Test	4	MCQ: 02 Short Answer Type Questions: 02 Long Answer Type Question: 01
Interaction in class /class participation	6	
Assignment/ Presentation	4	Hard copy/Softcopy

Attendance	4	
Total Marks	**30**	

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

Name of theProgram	**Bachelors of Science in Medical Laboratory techniques**			**Year/ Semester:**	**2nd year/ 3rd sem**
CourseName	**Fundamentals of Histology**	**CourseCode:**	**BLT 304**	**Type:**	**THEORY**
Credits	**L3T1P0**			**Total Sessions Hours:**	**60**
EvaluationSpread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type ofCourse	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	The student will study diseases associated with different body organs and systems.				

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

Course Outcome(CO)	Students will able to identify the gross sections as per the nature of organs, tissue and diseases.
CO1	Students will be able to learn the Diseases of Alimentary and Digestive system
CO2	Students will be able to learn the Diseases of Circulatory and Respiratory System
CO3	Students will be able to learn the Diseases of Urinary and Reproductive system
CO4	Students will be able to learn the Diseases of Nervous, Endocrine system and sense organs
Pedagogy	White board, Power point presentation, Video, Lecture
Internal EvaluationMode	Continuous internal assessment and written examination

Session Details	**Topic**	**Hours**	**MappedCO**
Unit 1	**Alimentary & Digestive System:** 1. Diseases of mouth, Diseases of Esophagus- Esophageal varices. 2. Digestive System: Gastritis, Peptic ulceration, Appendicitis microbial diseases, food poisoning, hernia, Intestinal obstructions & mal absorption. 3. Accessory Digestive glands: Salivary glands- mumps Liver - hepatitis, liver failure, cirrhosis. Pancreas- 4. pancreatitis. 5. Gall Bladder- Gall stones, jaundice and cardiovascular diseases	14	**CO1**
Unit 2	**Circulatory & Respiratory System:** 1. Diseases of Blood vessels- Atheroma, Arteriosclerosis, heart block. 2. Disorders of Blood Pressure-Hyper & Hypotension. 3. Respiratory System: Upper respiratory tract infection, Bronchi, Asthma 4. Pneumonia, Lung abscess, Tuberculosis, Lung Collapse	14	**CO2**

Unit 3	**Urinary & Reproductive System:** **1.** Glomerulonephritis, Nephrotic syndrome, renal failure, renal calculi **2.** Urinary obstruction, Urinary tract infection. **3.** Reproductive system: Sexually transmitted diseases, Pelvic inflammatory disease 4. Disorder of cervix {CIN), Disease of ovaries, ectopic pregnancy, prostatitis, Infertility	14	**CO3**
Unit 4	**Nervous, Endocrine System & Sense Organs** **1.** Neuronal damage, ICP, Cerebral Infarction, head injury, Alzheimer's disease, dementia. **2.** Endocrine System , Pituitary: Hyper & Hypo secretions. 3. Thyroid: Goiter, Adrenal: Cushing Syndrome, Addison Disease, Pancreas: Diabetes. 4. Ear: Otitis, Eye: Cataract	14	**CO4**

CO-PO and PSO Mapping

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

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

Suggested Readings:

Text- Books	Anatomy &Physiology - Ross and Wilson Human Anatomy and Physiology by Pearce Di Fiore's Atlas of Histology Medical Laboratory Technology by KL Mukherjee-Volume Ill Text book of Pathology by Robbins
Reference Book	Anatomy &Physiology - Ross and Wilson
Para Text	**Unit 1: Alimentary & Digestive System:** **Unit 2: Circulatory & Respiratory System:** **Unit 3: Urinary & Reproductive System:** **Unit4: Nervous, Endocrine System & Sense Organs**

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
Interaction in class /class participation	6	
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:**	**2nd year/ 3rd sem**
Course Name	**Biochemical Metabolism**	**Course Code:**	BLP301	**Type**	**PRACTICAL**
Credits	L:0 T:O P:4			**Total Sessions Hours:**	**30**
Evaluation Spread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill

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

CO1	Students will be able to learn about the presence of carbohydrates and reducing sugar by using chemical reagents
CO2	Students will be able to learn about the determination of Glucose concentration
CO3	Students will be able to learn about the determination of Urea and creatinine
CO4	Students will be able to learn about the determination of Albumin protein
CO5	Students will be able to learn about the determination of cholesterol
Pedagogy	
Internal Evaluation Mode	Continuous internal assessment and practical exam

Session Details	Topic	Mapped CO	
	1.To determine the presence of carbohydrates by Molisch test. 2.To determine the presence of reducing sugar by Fehling solutions 3.To determine the presence of reducing sugar by Benedicts method. 4.To determine starch by Iodine test. 5.Determination of Glucose in serum & plasma 6.Estimates of blood Glucose by Falin& Wu method 7.Determination of Urea in serum, plasma & urine. 8.Determination of Creatinine in serum or plasma 9.Determination of serum Albumin 10.Determination of Cholesterol in serum or plasma		

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO 8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	2	3	-	-	1	3	-	3	2	3
CO2	3	3	3	3	2	3	-	-	1	3	-	3	2	3
CO3	3	3	3	3	2	3	-	-	1	3	-	3	2	3
CO4	3	3	3	3	2	3	-	-	1	3	-	3	2	3

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

Suggested Readings:

Text- Books/ Reference Books	Practical Clinical Biochemistry by Harold Varley Text book of Medical Laboratory Technology by P. B. Godker Medical Laboratory Technology by Mukherjee Principal of Biochemistry by M.A. Siddiqi Instrumental Analysis by Chatwal Anand Principal of Biochemistry by Lehninger Biochemistry by Voet&Voet Biochemistry by Stryer

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:**	**2nd year/ III Semester**
Course Name	**Basic of Haematological Diseases**	**Course Code:**	**BLP302**	**Type:**	**Practical**
Credits	**L0T0P4**			**Total Sessions Hours:**	**60**
Evaluation Spread	**Internal Continous Assessment :**	**30**		**End Term Exam:**	**70**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives					

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

CO1	The students will be able to learn the Microscope, centrifuge and its functioning
CO2	The students will be able to learn the Leukocyte count
CO3	The students will be able to learn the fibrinogen assay
CO4	The students will be able to learn the Blood smear and hemoglobin estimation method.
Pedagogy	Laboratory hands-on experience, PPT, whiteboard
Internal EvaluationMode	Continuous internal assessment and practical exam

Session Details	**Topic**	**MappedCO**
Unit 1	1. Parts of microscope; its functioning and care 2. Parts of centrifuge; its functioning and care	CO1
Unit 2	1. General Blood Picture 2. TLC Count 3. DLC Count 4. Platelets Count 5. Demonstration of Normal & Alternatives forms of RBC,s 6. Demonstration of Normal & Alternatives forms of WBC,s	CO2
Unit 3	1. PT, APTT,PTT Test 2. BT,CT & Fibrinogen Assay	CO3
Unit 4	1. Haemoglobin estimation methods (Sahli's, Oxyhaemoglobin, and cyanmethaemoglobin) 2. Preparation of thick and thin blood smear for malarial parasite (Leishman/Giemsa/JSB)	CO4

CO-PO and PSO Mapping														
CO	**PO1**	**PO 2**	**PO3**	**PO 4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO 1**	**PSO 2**	**PSO3**	**PSO 4**	**PSO 5**	**PSO 6**
CO1	3	3	-	3	3	3	-	-	1	3	-	3	3	3
CO2	3	3	-	3	3	3	-	-	1	3	-	3	3	3
CO3	3	3	-	3	3	3	-	-	1	3	-	3	3	3
CO4	3	3	-	3	3	3	-	-	1	3	-	3	3	3
Strong contribution-3, ***Average contribution-2 ,*** ***Low contribution-1,***														
Suggested Readings:														
Reference Books	Practical Haematology by J.B. Dacie													
Para Text	**Unit 1: Tools and techniques in hematology** **Unit 2: Leukocyte count** **Unit 3: APTT** **Unit4: Blood smear and Haemoglobin detection technique**													

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:**	**2nd year /III Semester**
Course Name	**Systematic Bacteriology-practical**	**Course Code:**	**BLP 303**	**Type:**	**Practical;**
Credits				**Total Sessions Hours:**	**60**
Evaluation Spread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill

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

CO1	The students will be able to learn the cultural procedures and instruments used in the medical bacteriology lab
CO2	The students will be able to learn the staining techniques used for the bacteria identification
CO3	The students will be able to learn the biochemical tests used for the identification of bacteria
CO4	The students will be able to learn the morphological, cultural, and biochemical characteristics of common bacteria from isolated clinical samples
Pedagogy	Hand on / Demonstration
Internal Evaluation Mode	**Internal Continuous Assessment**

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	1. To demonstrate the instruments used to seed culture media 2. To learn techniques for Inoculation of bacteria on culture media 3. To isolate specific bacteria from a mixture of organisms.		**CO1**
Unit 2	1. To demonstrate simple staining (Methylene blue) 2. To prepare India ink preparation to demonstrate negative staining. 3. Bacterial identification: To demonstrate reagent preparation, procedure, and interpretation for Gram stain/ Albert stain/ Neisser's staining/ Z-N staining /Capsule staining/Demonstration of flagella by staining methods/Spore staining/To demonstrate spirochetes by Fontana staining procedure		**CO2**
Unit 3	1. To prepare the reagent and demonstrate the following biochemical tests with positive and negative control bacteria: Catalase, Coagulase, indole, Methyl Red (MR), Voges Proskauer (VP), Urease, Citrate, Oxidase, TSIA, Nitrate reduction, Carbohydrate fermentation, Huge and Leifson, Bile solubility, H2S production, Demonstration and motility, Decarboxylases, CAMP, Hippurate hydrolysis, Nagler's reaction		**CO3**
Unit 4	1. To demonstrate various characteristics (morphological, cultural, and biochemical) of bacteria commonly isolated from clinical samples i.e Staphylococcus, Streptococcus, Corynebacterium, Escherichia coli, Klebsiella, Citrobacter Enterobacter, Proteus, Salmonella, Shigella, Vibrio cholera, Mycobacterium tuberculosis		**CO4**

CO-PO and PSO Mapping

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

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

Suggested Readings:

Text book/ Reference Books	1. Practical Medical Microbiology by Mackie & McCartney Volume 1 and 2
Para Text	**Unit 1: Inoculation and isolation of bacteria** **Unit 2: Staining techniques in bacteriology** **Unit 3: Biochemical test for identification of bacteria** **Unit4: Characteristics of bacteria**

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	**Marks**	**Pattern**
Mid Semester	12	Exercise :0 4 Spotting: 04 File: 02 Viva: 02
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:**	**2nd year/ 3rd sem**
Course Name	**Fundamentals of Histology**	**Course Code:**	**BLP 304**	**Type:**	**Practical**
Credits	**L0T0P4**			**Total Sessions Hours:**	**30**
Evaluation Spread	**Internal Continuous Assessment:**	**30**		**End Term Exam:**	**70**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill

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

CO1	The student will learn about the different staining procedure used in Histopathology Lab-Buccal mucosa, organs of digestive system, liver pancreas, gall bladder
CO2	The student will learn about various types of microscopes
CO3	The student will learn about stained slide preparation associated with different body organs and system- Circulatory, Respiratory, Nervous, Urinary, Endocrine
Pedagogy	Hands on/ Demonstration
Internal Evaluation Mode	Continuous internal assessment and practical exam

Session Details	**Topic**	**MappedCO**
Unit 1	1. To study squamous cell from cheek cells (Buccal mucosa) 2. To study stained slide preparation from organs of digestive system 3. Study of stained slides of liver, pancreas, gall bladder	CO1
Unit 2	1. Study of various types of microscopes and draw diagram in practical notebook	CO2
Unit 3	2. To study stained slide preparation from organs of circulatory system 3. To study stained slide preparation from organs of Respiratory system 4. To study stained slide preparation from organs of Nervous system 5. To study stained slide preparation from organs of Urinary system 6. To study stained slide preparation from organs of Endocrine system	CO3

CO-PO and PSO Mapping

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

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

Suggested Readings:

Text book/reference book	Anatomy &Physiology - Ross and Wilson

Para Text	**Unit 1: Staining procedures** **Unit 2: Microscopes** **Unit 3: Stained slide preparation**

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**	