Kurukshetra University, Kurukshetra

(Established by the State Legislature Act-XII of 1956)
("A++" Grade, NAAC Accredited)

Syllabus
for
Under-Graduate Programme

Course: Bachelor of Vocation in Medical Laboratory Technology
(Semester 5th and 6th)

Under Multiple Entry-Exit, Internship and CBCS-LOCF in accordance to NEP-2020
With effect from the session 2025-26

Session:2025-26			
Part A-Introduction			
Subject	Bachelor of Vocation in Medical Laboratory Technology		
Semester	V		
Name of the Course	Biochemistry–V		
Course Code	B23-MLT-501		
Course Type:	**CC-A5**		
Level of the course (As per Annexure-I	**300-399**		
Pre-requisite for the course (if any)	---		
Course Learning Outcomes (CLO): CLO5 is based on practical component	After completing this course, the learner will be able to: 1. Demonstrate the knowledge of structure, function and inter-relationship of bio molecules. 2. Understand the integration of various aspects of metabolism andtheir regulatory pathways. 3. Know about the apparatus and reagents used in analytical and diagnostic section of biochemistry. 4. Teach about the concept of quality control. 5*. Gain knowledge of handling of sophisticated instruments for performing various tests.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	03	02	05
Max.Marks:100 **Internal Assessment Marks:30 (Theory 20+ Practical 10)** **End Term Exam Marks: 70 (Theory 50 + Practical 20)**		**Exam duration:** **Theory:3 Hours** **Practical:4 hours**	
Part B- Contents of the Course			
Instructions for Paper-Setter: Nine questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining eight questions will be set taking two questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	Qualitative analysis of urine for physical and chemical constitutents i.e. sugar, proteins, bile salts, bile pigments, ketone bodies, porphobilinogen, faecal occult blood.	10
II	Chemical analysis of body fluids i.e. Cerebrospinal fluid (CSF), pleural fluid, Ascitic fluid. Collection and recording of biological specimens, separation of serum plasma, preservation and disposal of biological samples material. Volumetric analysis - Preparation of standard acid and base solutions.	12
III	Qualitative tests of inorganic urinary ingredients : Chlorides, Phosphates, sulphur compounds, sodium (Na), Potassium (K), Calcium (Ca) and Magnesium (Mg) and their clinical significance.	10
IV	Pathological changes in composition of body fluids and their clinical co-relation. Nosocomial infections and sterility testing of I/V fluids and processing of various samples for hospital infections. Basic statistics (mean, median, mode, standard deviation (SD), coefficient of variation (CV), normal distribution, probability, t-test, chi-square test), normal and reference range.	13
V*	**PRACTICAL** 1. Collection and Processing of Laboratory Specimens. (a) Urine examination: Physical, Chemical, Microscopic and Biochemical (Organic and Inorganic). (b) Stool examination (c) Chemical examination of other body fluids : Cerebrospinal fluid (CSF), Pleural fluid, Ascitic fluid. 2. Volumetric analysis (a) Preparation of standard acid solutions. (b) Preparation of standard basic solutions. 3. (i) Titration of a mixture of a strong and a weak acid. (ii) Titration of a mixture of a strong acid and strong base. (iii) Titration of a mixture of a weak acid and strong base. 4. Preparation of quality control charts (Standard Deviation (SD), Coefficient of variation (CV)etc.) 5. Interpretation of quality control charts.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/classtestetc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 • Mid-Term Exam: NA	**End Term Examination:** **Theory: 50** (Written exam) **Practical: 20** (Seminar/ Demonstration/ Viva-voce/Lab records etc)

Part C- Learning Resources

Recommended Books/e-resources/LMS:

1. Medical Laboratory Technology (Volume 3): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
2. Essentials of Biochemistry, Second Edition, Dr.(Prof)Satyanarayana
3. Essentials of Biochemistry, 2nd Edition, Dr. PankajaNaik
4. Principles and Techniques of Biochemistry and Molecular Biology, 5Th Edition, Wilson & Walker

PLOCLO Mapping of B23-MLT-501

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	1.5	1.0	1.0	1.5	0.5	0
CLO2	1.5	1.0	1.0	2.0	1.0	0
CLO3	2.0	2.0	2.0	1.5	1.5	0
CLO4	2.0	2.0	2.0	0	1.0	0
CLO5	2.0	2.0	0.5	0	0	0

Session:2025-26			
Part A-Introduction			
Subject	Bachelor of Vocation in Medical Laboratory Technology		
Semester	V		
Name of the Course	Microbiology–V		
Course Code	B23-MLT-502		
Course Type:	CC-B5		
Level of the course (As per Annexure-I	**300-399**		
Pre-requisite for the course (if any)	---		
Course Learning Outcomes (CLO): CLO5 is based on practical component	After completing this course, the learner will be able to: 1. To know the basics of microbiology and knowledge about the contributions of microbiologists. 2. Identify the microorganisms and the disease process as well as aseptic and sterile techniques. 3. Impart general insight into the history, bacterial genetics and serology. 4. Provide knowledge about the equipment used in microbiology and safety precautions. 5*. Handle the instruments and know about the sterilizationtechniques.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	03	02	05
Max.Marks:100 **Internal Assessment Marks: 30(Theory 20 + Practical 10)** **End Term Exam Marks: 70 (Theory 50 + Practical 20)**		**Exam duration:** **Theory : 3 Hours** **Practical : 4 hours**	
Part B-Contents of the Course			
Instructions for Paper-Setter: Nine questions will be set in all. Question No.1 comprising of objective/short answer type questions from the entire syllabus, will be compulsory. There maining eight questions will be set taking two questions from each unit. The candidates will be required to attempt Q. No.1 & four others selecting one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	Bacteriological examination of water, milk, food and air; Toxin-antitoxin assays and pathogenicity tests; Epidemiological markers of microorganisms - serotyping Bacteriophage and Bacteriocin typing methods	10
II	Food poisoning (food intoxication and food infection) Bacterial food poisoning (Botulism, *Staphylococcus* and *Escherichia coli*), fungal food poisoning (*Aspergillus*, *Penicillium* and *Claviceps*)	10
III	Lab diagnosis of common bacterial infection viz : Pyogenic infections, Respiratory tract infections: Meningitis, Diphtheria, Whooping cough, Gas gangrene, Food-poisoning, Enteric fever, Acute diarrhoeal diseases, Cholera Urinary tract infection, Tuberculosis, Leprosy, Plague, Anthrax, Typhus fever, Syphilis, Gonorrhoea.	12
IV	Lab diagnosis of fungal infections viz: superficial dermatophyte fungal infections, cadidiasis, cryptococcosis pulmonary infections, mycetoma, other deep mycotic infections and subcutaneous fungal infections. Sporotrichosis, Chromoblastomycosis, Eye and Ear fungi infections.	13
V*	**PRACTICALS** 1. Determination of Biological oxygen demand (BOD) of water. 2. Determination of Chemical oxygen demand (COD) of water. 3. Demonstration of antibiotic sensitivity test. 4. Lab diagnosis of common bacterial infections 5. Lab diagnosis of common fungal infections. 6. Study of bacterial and fungal food poisoning.	30

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** • Class Participation:5 • Seminar/presentation/assignment/quiz/classtestetc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 • Mid-Term Exam: NA	**End Term Examination:** **Theory: 50** (Written exam) **Practical: 20** (Seminar/ Demonstration/Viva-voce/Lab records etc)

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Text Book of Microbiology for Nursing Students, AnantNarayan Panikar
2. Text Book of Ophthalmology, Khurana
3. Text Book of Microbiology, Baveja.

PLOCLO Mapping of B23-MLT-502						
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	0.2	0.2	0	0.5	0.5	0
CLO2	1.5	0	1.0	1.0	1.5	0.5
CLO3	0.4	0.2	0.5	1.5	0.5	0.5
CLO4	1.0	0.2	0.5	0	1.0	1.5
CLO5	1.5	2.0	2.0	0	1.5	1.5

Session:2025-26			
Part A-Introduction			
Subject	Bachelor of Vocation in Medical Laboratory Technology		
Semester	V		
Name of the Course	Pathology–V		
Course Code	B23-MLT-503		
Course Type:	CC-C5		
Level of the course (As per Annexure-I	**300-399**		
Pre-requisite for the course (if any)	---		
Course Learning Outcomes (CLO): CLO5 is based on practical component	After completing this course, the learner will be able to: 1. Learn about histopathology, classification of tissues andtheir functions. 2. Impart awareness about the biopsy techniques. 3. Gain knowledge about the atopsy Techniques. 4. Use of various equipments for histology. 5*. Study of laboratory organization related to histology and cytology.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	03	02	05
Max.Marks:100 **Internal Assessment Marks:30 (Theory20+Practical10)** **End Term Exam Marks: 70 (Theory 50 + Practical 20)**		**Exam duration:** **Theory:3 Hours** **Practical:4 hours**	
Part B-Contents of the Course			
Instructions for Paper-Setter: Nine questions will be set in all. Question No.1comprising of objective/short answer type questions from the entire syllabus, will be compulsory. The remaining eight questions will be set taking two questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	Micro-organisms in the tissues-various staining techniques for their demonstration and identification; Examination of body fluids - peritoneal and pericardial fluid, bronchoalveolar lavage fluid, hydatid cyst fluid and Joint fluid.	13
II	Nucleic acids, DNA and RNA special stains and procedures; Tissues requiring special treatment i.e. eye ball, Endometrial biopsy, under calcified bone; Examination of semen - physical characters, count, motility, viability and morphology.	12
III	Autopsy Techniques; Neuropathological Techniques; Immunohistochemistry demonstration; Special microscopy-various types, Electron microscope, ultramicrotomy	10
IV	Museum techniques, microphotography and other display material, teaching material development; Enzyme histochemistry, demonstration of phosphatases, dehydrogenases, oxidases and peroxidases; Transportation of different clinical materials to distant laboratories.	10
V*	**PRACTICALS** 1. To study the process of laboratory diagnosis of : (a) Peritoneal and pericardial fluid (b) Bronchoalveolar lavage fluid (c) Hydatid cyst fluid (d) Joint fluid (e) Semen analysis 2. Isolation of chromosomal DNA from plant or bacteria or animal tissues. 3. Estimation of DNA by DPA method (Diphenylamine method) 4. Estimation of RNA by orcinol method. 5. Clinical enzymology and determination of transaminases, phosphatases, dehydrogenases and oxidases. 6. Simple assays for cell mediated immunity.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/classtestetc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 • Mid-Term Exam: NA	**End Term Examination:** **Theory:50** (Written exam) **Practical: 20** (Seminar/ Demonstration/Viva-voce/Lab records etc)

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Textbook of Medical Laboratory Technology, Volume 1, 3rd Edition byPraful Ghodkar
2. Textbook of Medical Laboratory Technology, Volume 2, 3rd Edition by Praful Ghodkar
3. Medical Laboratory Technology (Volume 1): Procedure Manual forRoutine Diagnostic, Kanai Mukharjee
4. Medical Laboratory Technology (Volume 2): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
5. Medical Laboratory Technology (Volume 3): Procedure Manual forRoutine Diagnostic, Kanai Mukharjee

PLOCLO Mapping of B23-MLT-503

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	0	1.0	1.0	1.5	1.0	0.5
CLO2	1.0	1.0	3.0	0.3	1.5	0.5
CLO3	0.5	1.5	1.0	1.5	1.5	1.5
CLO4	1.0	2.0	1.0	0	1.5	1.5
CLO5	1.5	2.5	1.5	0	1.5	1.5

Session:2025-26			
Part A–Introduction			
Subject	Bachelor of Vocation in Medical Laboratory Technology		
Semester	VI		
Name of the Course	Biochemistry–VI		
Course Code	B23-MLT-601		
Course Type:	CC-A6		
Level of the course (As per Annexure-I	**300-399**		
Pre-requisite for the course (if any)	---		
Course Learning Outcomes (CLO): CLO5 is based on practical component	After completing this course, the learner will be able to: 1. Provide a good theoretical and practical education in understanding activity of enzymes. 2. Understand the organization of a clinical laboratory including lab information system, autoanalyzers in laboratory for qualitative analysis. 3. Introduce various body fluids with their biochemical composition and regulatory mechanism in blood pH. 4. To provide knowledge about various body fluids with their importance in diagnosis of different diseases and texicology. 5*. Provide skills for accurate results as well as calibrate different laboratory instruments.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	03	02	05
Max.Marks:100 **Internal Assessment Marks: 30 (Theory20+Practical10)** **End Term Exam Marks: 70 (Theory 50 + Practical 20)**		**Exam duration:** **Theory:3 Hours** **Practical:4 hours**	
Part B- Contents of the Course			
Instructions for Paper-Setter: Nine questions will be set in all. Question No.1comprisingof objective/short answer type questions from the entire syllabus, will be compulsory. The remaining eight questions will be set taking two questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	Principles of enzyme activity determination. Units for expressing enzyme activity. Factors affecting enzyme activity, Mechanisms responsible for abnormal enzyme levels. Isoenzymes - creatine phosphokinase (CPK), creatine kinase (CK), Serum glutamic oxaloacetic transaminase (SGOT), and lactate dehydrogenase (LDH); serum glutamic pyruvic transaminase (SGPT).	10
II	Cholinesterase HBDH, amylase, alpha amylase, lipase, aldolase and myoglobin. Serum leucine, amino peptidase, alkaline and acid phosphatases, lactate dehydrogenase, creatine phosphokinase (CPK), Fructosamine test in semen. Analysis of renal biliary and prostatic stones, Tests of foetal well being by amniotic fluid, Analysis for alpha - foetoprotein and their clinical significance.	13
III	Gastric analysis, free and total acidity, pentagastrin test, histamine and caffeine stimulation tests; Thyroid function test : triiodothyronine T3, prohormone of T3 (T4), *thyroid*-stimulating *hormone (*TSH), Free T3, Free T4, protein bound iodine (PBI) and thyroglobulin; Infertility profile : TSH, Follicle stimulating hormone (FSH), *Luteinizing hormone LH*, Testosterone, estrogen, prolactin and Dehydroepiandrosterone (DHEA) sulphate.	12
IV	Toxicology : Alcohol, heavy metals (Zinc, Mercury etc.) salicylates, drug abuse, screening and drug interference with laboratory findings. Endocrinology : Estimation of growth hormone, Adrenocorticotropic hormone (ACTH), sex hormone binding globulin, Aldosterone, parathormon, cortisol and 17 - hydroxyprogesteron and their clinical significance.	10
V*	**PRACTICALS** 1. The study of progress curve obtained during the hydrolysis of p-nitrophenyl phosphate by serum alkaline phosphatase. 2. To study the variation of serum alkaline phosphatose activity with enzyme concentration. 3. The study of effect of temperature on the activity of alpha-amylase. 4. The study of thyroid function tests and infertility tests. 5. Estimation of : (a) Cortisol (b) Progesterone (c) Testosterone (d) *Creatine kinase* NAC (CK-NAC) (e) *Creatine kinase* MB (CK-MB) (f) Creatine phosphokinase (CPK) (g) Serum glutamic oxaloacetic transaminase (SGOT) (h) Serum glutamic pyruvic transaminase (SGPT)	30

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/classtestetc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 • Mid-Term Exam: NA	**End Term Examination:** **Theory: 50** (Written exam) **Practical: 20** (Seminar/ Demonstration/ Viva- voce/Lab records etc)

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Essentials of Biochemistry, Second Edition, Dr.(Prof) Satyanarayana
2. Essentials of Biochemistry, 2nd Edition, Dr. PankajaNaik
3. Principles and Techniques of Biochemistry and Molecular Biology, 5Th Edition, Wilson & Walker
4. An Introduction to Chemistry, 8th Edition by Mark Bishop
5. Clinical Chemistry made easy, 1st Edition by Hughes Tietz Fundamentals of Clinical Chemistry, 7th Edition by Carl Burtis

PLOCLO Mapping of B23-MLT-601

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	1.5	1.0	0.5	2.0	1.0	1.5
CLO2	1.5	2.0	2.0	0.5	2.0	2.0
CLO3	1.5	1.0	1.0	0.6	2.0	2.0
CLO4	2.0	1.0	2.0	0.3	2.7	2.0
CLO5	2.5	2.0	1.0	0.2	2.0	2.5

Session:2025-26			
Part A-Introduction			
Subject	Bachelor of Vocation in Medical Laboratory Technology		
Semester	VI		
Name of the Course	Microbiology–VI		
Course Code	B23-MLT-602		
Course Type:	CC-B6		
Level of the course (As per Annexure-I	**300-399**		
Pre-requisite for the course (if any)	---		
Course Learning Outcomes (CLO): CLO5 is based on practical component	After completing this course, the learner will be able to: 1. Know the occurrence, spread and control of pathogen infections. 2. Provide information about bacterial culture procedures, staining procedures and bio-chemical tests for identification of bacteria. 3. Know the occurrence, spread and control of mycological infections, culture methods required to perform micro-biological tests. 4. To learn general characters, life cycle and laboratorydiagnosis of various medically important protozoans. 5*. To train the students with knowledge of medically significant isolates in mycology, parasitology, isolation methods and treatments.		
Credits	Theory	Practical	Total
	03	01	04
Contact Hours	03	02	05
Max.Marks:100 **Internal Assessment Marks:30(Theory20+Practical10)** **End Term Exam Marks: 70 (Theory 50 + Practical 20)**		**Exam duration:** **Theory:3 Hours** **Practical:4 hours**	
Part B-Contents of the Course			
Instructions for Paper-Setter: Nine questions will be set in all. Question No.1comprisingof objective/short answer type questions from the entire syllabus, will be compulsory. The remaining eight questions will be set taking two questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting one question from each unit. All questions carry equal marks.			

Unit	Topics	Contact Hours
I	Serological Test : Widal, Antistreptolysin O (ASO), Liver Function test (LFT), C- Reactive Protein (CRP) , Rosewaller, Brucella, agglutination, Cold agglutinin, Venereal Disease Research Laboratory (VDRL), *Treponema pallidum* hemagglutination (TPHA), fluorescent treponemal antibody-absorption (FTA-ABS), Serological tests for fungal infection and skin tests, Advanced techniques in microbiology Counter Current Immunoelectrophoresis CCIEP, Co-agglutination, Gas liquid chromatography (GLC), High performance liquid chromatography (HPLC) etc, Rapid diagnostic methods and Automation in Microbiology; Culture and Drug sensitivity test : Culture, isolation and identification of pathogens from urine, pus and sputum and recording of recording of their results.	13
II	Principle of serological techniques used in virology – part 1 - Haemagglutination assay (HA) , Haemagglutination Assay Inhibition (HAI), Single Radial Haemolysis (SRH), Reverse Passive Haemagglutination Assay (RPHA), Indirect Haemagglutination Assay (IHA), Complement Fixation Test (CFT); Principles of serological techniques used in virology Part II : Nuchal translucency (Nt), Enzyme Linked Immunosorbent Assay (ELISA), Radio Immunoassay (RIA), Indirect Fluorescent antibody (IFA) , Immuno - peroxidase test.	12
III	Morphology and life cycle of protozoans- Free living Amoebae, *Balantidium*, *Toxoplasma*, Diagnosis, morphology and life cycle of trematodes *Schistosomes* (blood flukes), Intestinal Flukes	10
IV	Serological and Immunological Techniques used in diagnosis - Gel – diffusion, Indirect Haemagglutination Assay (IHA), Indirect Fluorescent antibody (IFA), Enzyme Linked Immunosorbent Assay (ELISA), Indirect Fluorescent antibody, Identification of adult forms- Mosquitoes, Flies, Ticks and fleas Animal care, handling and uses in parasitology. Preparation of parastic antigens and antisera, handling and operating of sophisticated equipments	10
V*	**PRACTICALS** 1. Study of parasitology, Morphology and life cycle of - Free living Amoeba, Balantidium, Toxoplasma 2. Diagnosis of Morphology and life Cycle of trematodes - Schistosomes Intestinal Flukes, Blood Flukes 3. Identification of adult forms of mosquitoes, flies, ticks and fleas. 4. Study of serological techniques a. Principles of serological techniques used in Virology - Part 1 : Haemagglutination assay (HA) , Haemagglutination Assay Inhibition (HAI), Single Radial Haemolysis (SRH), Reverse Passive Haemagglutination Assay (RPHA), Indirect Haemagglutination Assay (IHA), Complement	30

	Fixation Test (CFT) b. Principles of Serological techniques used in Virology-Part-11 Nuchal translucency (Nt), Enzyme Linked Immunosorbent Assay (ELISA),Radio Immunoassay (RIA), Indirect Fluorescent antibody (IFA) , Immuno - peroxidase test. c. Serological test, Widal, Antistreptolysin O (ASO), Liver Function test (LFT), C- Reactive Protein (CRP), STS, Rose-Waaler Test. d. Serological test; Brucella agglutination, Cold agglutinin test, Venereal Disease Research Laboratory (VDRL), *Treponema pallidum* hemagglutination (TPHA), fluorescent treponemal antibody-absorption (FTA-ABS) 5. Serological and Immunological Techniques used in diagnosis-Gel – diffusion, Indirect haemagglutination assay (IHA), Indirect Fluorescent antibody (IFA), Enzyme Linked Immunosorbent Assay (ELISA), Indirect Fluorescent antibody	

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/classtestetc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 • Mid-Term Exam: NA	**End Term Examination:** **Theory:50** (Written exam) **Practical: 20** (Seminar/ Demonstration/Viva-voce/Lab records etc)

Part C-Learning Resources

Recommended Books/ e-resources/LMS:

1. Microbiology for Nursing and Allied Sciences. Dr. Arora 2nd Edition
2. Textbook of Microbiology for Nurses Anantnarayan 1st Edition
3. Practical and Applied Microbiology Anuradha De 4th Edition
4. Text Book of Microbiology Anantnarayan 10th Edition
5. TextBook of Microbiology and Parasitology PrafulGodkar 1st Edition
6. Medical Parasitology C. P. Baweja 3rd Edition

PLOCLO Mapping of B23-MLT-602						
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	1.5	1.0	1.0	0.5	2.0	1.4
CLO2	1.4	2.4	2.6	0.2	2.1	2.7
CLO3	1.5	2.5	2.2	0.2	2.3	2.6
CLO4	0.5	1.5	2.4	0.8	2.8	2.7
CLO5	1.5	2.5	2.3	0.3	2.7	2.7

<table>
<tr><td colspan="5">Session:2025-26</td></tr>
<tr><td colspan="5">Part A-Introduction</td></tr>
<tr><td>Subject</td><td colspan="4">Bachelor of Vocation in Medical Laboratory Technology</td></tr>
<tr><td>Semester</td><td colspan="4">VI</td></tr>
<tr><td>Name of the Course</td><td colspan="4">Pathology–VI</td></tr>
<tr><td>Course Code</td><td colspan="4">B23-MLT-603</td></tr>
<tr><td>Course Type:</td><td colspan="4">CC-C6</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="4">300-399</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="4">---</td></tr>
<tr><td>Course Learning Outcomes (CLO):

CLO5 is based on practical component</td><td colspan="4">After completing this course, the learner will be able to:
1. Provide knowledge about the immune systems.
2. Gain knowledge about various rheumatological diseases.
3. Enable the students to know about the antigen-antibody reactions.
4. Learn about the cytological techniques.
5*. Study of markers for tumors and cancers.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td colspan="2">Total</td></tr>
<tr><td>03</td><td>01</td><td colspan="2">04</td></tr>
<tr><td>Contact Hours</td><td>03</td><td>02</td><td colspan="2">05</td></tr>
<tr><td colspan="2">Max.Marks:100
Internal Assessment Marks:30(Theory20+Practical10)
End Term Exam Marks: 70 (Theory 50 + Practical 20)</td><td colspan="3">Exam duration:
Theory:3 Hours
Practical:4 hours</td></tr>
<tr><td colspan="5">Part B-Contents of the Course</td></tr>
<tr><td colspan="5"><u>Instructions for Paper-Setter:</u>
Nine questions will be set in all. Question No.1comprisingof objective/short answer type questions from the entire syllabus, will be compulsory. The remaining eight questions will be set taking two questions from each unit. The candidates will be required to attempt Q.No.1 & four others selecting one question from each unit. All questions carry equal marks.</td></tr>
</table>

Unit	Topics	Contact Hours
I	Cells and organs of the immune system, Immunoglobulins, antibodies and humeral immune response, Allergy	10
II	Rheumatological diseases and investigations, Rheumatoid arthritis test (RA), Infection and the immune system, Cancer Immunology	10
III	Tumor markers, Tissue typing for kidney transplant and bone-marrow transplant, Laboratory tests for demonstration of antigen, antigen-antibody reaction and cell mediated immunity.	12
IV	Cervical cytology-basis of detection of malignant and premalignant lesions, Hormonal assessment with cytologic techniques and sex chromatin and pregnancy tests, Fine needle Aspiration cytology-principles, indications and utility of the technique with special emplasis on role of cytotechnician in Fine Needle Aspiration Cytology (FNAC) clinics.	13
V*	**PRACTICALS** 1. Tumor and cancer markers : (a) Estimation of Alpha feto-proteins (AFP) (b) Estimation of Carcino embryonic antigen (CEA) (c) Estimation of Prostrate specific antigen (PSA) 2. Study of cervical cytology.	30

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/classtestetc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 • Mid-Term Exam: NA	**End Term Examination:** **Theory:50** (Written exam) **Practical: 20** (Seminar/ Demonstration/Viva-voce/Lab records etc)

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Textbook of Medical Laboratory Technology, Volume 1, 3rd Edition by PrafulGhodkar
2. Textbook of Medical Laboratory Technology, Volume 2, 3rd Edition by Praful Ghodkar
3. Medical Laboratory Technology (Volume 1): Procedure Manual for RoutineDiagnostic, Kanai Mukharjee
4. Medical Laboratory Technology (Volume 2): Procedure Manual for RoutineDiagnostic, Kanai Mukharjee
5. Medical Laboratory Technology (Volume 3): Procedure Manual for RoutineDiagnostic, Kanai Mukharjee

PLOCLO Mapping of B23-MLT-603						
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	1.0	1.7	2.3	0	2.0	2.2
CLO2	1.2	2.0	2.6	0	1.0	2.0
CLO3	1.4	2.4	2.2	0	1.0	2.0
CLO4	1.4	2.5	0.5	0	1.0	1.5
CLO5	1.2	2.4	2.6	0	1.0	3