

Re-Accredited 'B++' 2.86 CGPA by NAAC

VEER NARMAD SOUTH GUJARAT UNIVERSITY

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

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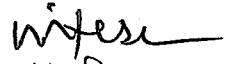
-: પરિપત્ર :-

યુનિવર્સિટી સંલગ્ન વિજ્ઞાન વિદ્યાશાખા હેઠળની તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૫-૨૬ થી અમલમાં આવનાર B.Sc. Medical Laboratory Technology Sem.-5 & 6 Major, Minor અને SEC ના અભ્યાસક્રમ સંદર્ભે મેડિકલ ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૨/૦૩/૨૦૨૫ની સભાના ઠરાવ ક્રમાંક:૦૨ થી કરેલ ભલામણ સ્વીકારી વિજ્ઞાન વિદ્યાશાખાની તા.૩૦/૦૪/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંક:૮ થી કરેલ ભલામણ સ્વીકારી એકેડેમિક કાઉન્સિલની તા.૫/૫/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંક: ૭૫ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

બિડાણ: ઉપર મુજબ

ક્રમાંક:ઓથો./પરિપત્ર/સિલેબસ/૧૧૯૫૦/૨૦૨૫

તા.૨૬-૦૫-૨૦૨૫


કુલસચિવ

પ્રતિ,

- ૧) યુનિવર્સિટી સંલગ્ન વિજ્ઞાન વિદ્યાશાખા હેઠળની તમામ કોલેજોનાં આચાર્યશ્રીઓ.
.....આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારું.
- ૨) ડીનશ્રી, વિજ્ઞાન વિદ્યાશાખા.
- ૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારું.



Veer Narmad South Gujarat University, Surat

Syllabus of

B. Sc. Medical Laboratory Technology

**As per NEP- 2020 [3 years (Degree) & 4 years
(Honours/Honours with Research)]**

Effective from 2025 - 2026

Program Specific Outcomes (PSOs) of B. Sc. Medical Laboratory Technology

The B. Sc. Medical Laboratory Technology (MLT) program is designed to equip students with the knowledge, skills, and practical expertise to work in various healthcare and diagnostic laboratory settings. The program focuses on medical laboratory sciences, providing comprehensive training in different laboratory departments, and prepares students to handle diagnostic procedures, laboratory equipment, and patient sample analysis. Upon successful completion of the B. Sc. MLT programme, graduates will be able to:

PSO 1: Fundamental knowledge of human health science

To have basic introductory knowledge and understanding of basic concepts in human anatomy, physiology, microbiology, immunology, pathology, parasitology, biochemistry, haematology, blood banking, haematology, histo-cytology, lab organization and lab management and various instruments and equipment of clinical laboratory.

PSO 2: Analytical and technical knowledge & expertise for patient care

Demonstrate proficiency in performing laboratory tests in disciplines such as haematology, clinical biochemistry, microbiology, immunology, pathology, parasitology, blood banking and molecular diagnostics to support accurate diagnosis and treatment of diseases. Utilize advanced analytical skills to interpret laboratory findings accurately and correlate results with clinical conditions to improve patient care.

PSO 3: Quality work and safe laboratory environment

Students will understand laboratory safety protocols and the importance of maintaining high standards of accuracy and precision in diagnostic testing.

PSO 4: Ethical and Professional Conduct

Adhere to professional ethics, confidentiality, and legal standards while performing laboratory procedures and handling patient information.

PSO 5: Communication and Teamwork

Exhibit effective communication skills to collaborate with healthcare professionals, ensuring timely and accurate delivery of laboratory results for clinical decision-making.

PSO 6: Perpetual Learning and skill enhancement

Commit to lifelong learning by updating knowledge in emerging trends, technologies, and advancements in medical laboratory sciences for continuous professional development.

PSO 7: Professional Competence

Graduates will be well-prepared to execute their work in clinical laboratories, hospital laboratories, public health organizations, research institutions, and medical device companies, and contribute to advancements in medical diagnostics and patient care.

PSO 8: Laboratory management and Quality Control

Apply knowledge of laboratory management principles, including quality control, equipment maintenance and inventory control to ensure efficient and effective laboratory operations.

PSO 9: Research and Innovation

Engage in scientific research, contributing to the development of innovative diagnostic techniques, improved testing methods, and advancements in medical laboratory science.

PSO 10: Entrepreneur skill

The student can empower their skill and scientific knowledge involving healthcare-minded individuals creating new businesses, services or solutions to address unmet needs or improve healthcare delivery, often through innovation and a focus on patients-centric care.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

B. Sc. Medical Laboratory Technology Major

Course Structure of Semester V & VI

SEMESTER – V							
Course Code	Title of The Course	Course Credit	Hrs. Per Week	Internal Marks (CCE)	External Marks (SEE)	Duration of Exam (Hr.)	Total Marks
MLT-MJ-501	Bhartiya Ghayan Parampara of Health and Medicine	02	02	25	25	01	50
MLTP-MJ-501	Practical Based on Bhartiya Ghayan Parampara of Health and Medicine	02	04	25	25	06	50
MLT-MJ-502	Diagnostic Bacteriology	02	02	25	25	01	50
MLTP-MJ-502	Practicals Based on Diagnostic Bacteriology	02	04	25	25	06	50
MLT-MJ-503	Clinical Biochemistry- 1	02	02	25	25	01	50
MLTP-MJ-503	Practicals Based on Clinical Biochemistry- 1	02	04	25	25	06	50
	Total	12	18	150	150		300
SEMESTER – VI							
MLT-MJ-601	Clinical Pathology	02	02	25	25	01	50
MLTP-MJ-601	Practicals Based on Clinical Pathology	02	04	25	25	06	50
MLT-MJ-602	Diagnostic Virology	02	02	25	25	01	50
MLTP-MJ-602	Practicals Based on Diagnostic Virology	02	04	25	25	06	50
MLT-MJ-603	Clinical Biochemistry- 2	02	02	25	25	01	50
MLTP-MJ-603	Practicals Based on Clinical Biochemistry- 2	02	04	25	25	06	50
	Total	12	18	150	150		300

[Subject Code-2503000505017001]

SEMESTER V

MLT-MJ-501: BHARTIYA GHAYAN PARAMPARA OF HEALTH AND MEDICINE

Semester: V											
Course Code	MLT-MJ-501										
Course Title	Bhartiya Ghayan Parampara of Health and Medicine										
Course Type	Major										
Credit	2										
Course Level	300-399										
Teaching Hour/Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	<ul style="list-style-type: none"> • To introduce students to key Vedic concepts in Vedic medicinal science. • Explore the significant contributions of modern pioneers. • To provide Holistic approach to Traditional healers and sustainable healthcare. • To Practices passed down through generations regarding medicines and healing. • To explain Tradition diagnosis of illnesses and treatment using plant and natural remedies. 										
Course Outcome	<p>At the end of the course, the students will</p> <p>CO-1: Gain insights into the fundamental concepts, principles, and practices of ancient Indian medical science, including Ayurveda and Yoga. Recognize the significant contributions of renowned medical scientists such as <i>Susruta</i>, <i>Charak</i>, and <i>Patanjali</i> in shaping traditional healthcare practices, & identify key bioactive compounds derived from medicinal plants and understand their pharmacological significance in promoting health and treating diseases.</p> <p>CO-2: Understand the Evolution of Laboratory Medicine, Understand the traditional practice of urine & stool analysis. Develop an appreciation for the foundational concepts of laboratory medicine in Ayurveda and their influence on contemporary diagnostic practices.</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO-1										
	CO-2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	IKS of Health and Medical Science	15
1.1	An Ancient IKS and Medical Science	
1.2	Contribution of Medical Scientists of Ancient India (Ayurveda & Yoga): Susruta, Charak & Patanjali	
1.3	Ancient Indian Health and Medicine System	
1.4	Bioactive Molecules of Medicinal Plants and their Therapeutic role	
Unit-2	IKS in Diagnosis	15
2.1	History of Laboratory Medicine	
2.2	Nidana Sthana by Charak Samhita	

Undergraduate Program in Medical Laboratory Technology as per NEP 2020 [3 years (Degree) & 4 years (Honours/Honours with Research)] effective from 2025-2026

2.3	Uroscopy in Ayurveda: Introduction, Urine analysis in Ayurveda & Tailabindu Pariksha
2.4	Purisha Pariksha in Ayurveda

**MLTP-MJ-501: PRACTICALS BASED ON BHARTIYA GHAYAN PARAMPARA
OF HEALTH AND MEDICINE**

Semester: V											
Course Code	MLTP-MJ-501 [Subject Code- 2503000505017002]										
Credit	02										
Teaching Hour/Week	4 Hours										
Course Title	Practicals Based on Bhartiya Ghayan Parampara of Health and Medicine										
Course Objectives	<ul style="list-style-type: none"> To generate Holistic approach to Traditional healers and sustainable healthcare. To practices passed down through generations regarding medicines and healing. To develop the ability to interpret traditional methods of disease diagnosis and its prevention and treatment using plant and natural remedies. 										
Course Outcome	<p>At the end of the course, the students will be able to perform</p> <p>CO-1 & 2: Conduct qualitative identification of bioactive compounds present in medicinal plant and its antibacterial effect.</p> <p>CO-3 to 7: Diagnose and prognose diseases through urine and stool based on visual characteristics and oil drop tests.</p> <p>CO-8 & 9: Perform physical stool analysis to Diagnose the diseases.</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1-2										
	CO 3-9										

Course Content

1. Qualitative analysis of Bioactive compound present in Neem leaves / Tulsi leaves / Turmeric extract.
2. Antibacterial activity of Neem leaves / Tulsi leaves / Turmeric Extract by Agar Diffusion Assay.
3. Diagnosis of disease by Appearance of Urine
4. Diagnosis of disease by shape of oil drop spread in Urine
5. Prognosis of disease by spreading nature of the oil in Urine
6. Prognosis of disease by spreading direction of the oil in Urine
7. Prognosis of disease by spreading shape of the oil in Urine
8. Purisha Pariksha and disease involved in Ayurveda: Chakshusha Pariksha, Ghranaja Pariksha, Sparsha Pariksha, Prashna Pariksha
9. Jala Nimajjana Purisha Pariksha

Reference:

Sr. No.	Reference
1	Indian Health & Medicinal System: From Ancient India to Present word; Shaifali Dubey & Ankita Gupla et.al; World Journal of Pharmaceutical Research, Volume 7, Issue 4, 362-373
2	HISTORY OF SCIENCE AND TECHNOLOGY IN INDIA By Dr. Binod Bihari Satpathy; DDCE/ History (M.A.)/ SLM/ Paper
4	The Ancient Indian Knowledge System and The Medical Science; Ankit Raikwar; Qeios, CC-BY 4.0; July4:2023
5	https://www.carakasamhitaonline.com/index.php/Nidana_Sthana
6	Urine Analysis in Ayurveda and Modern Medicine: Exploring Convergence and Divergence; S. S. Hada, S. B. Singh & P. Mansoria; Journal of Ayurveda and Integrated Medical Science, October 2023
7	A Study on Tailabindu Oariksha-An Ancient Ayurvedic Method of Urine Examination as a Diagnostic and Prognostic Tool; P. Sangu & V. M. Kumar et.al.; AYU: Website: www.ayujournal.org ; DOI: 10.4103/0974-8520.85735
8	A review on Purisha Pariksha in Ayurveda; Rajesh Uikey & Anukul Chandra Kar; AYU: Website: www.ayujournal.org ; DOI: 10.4103/0974-8520.175536

MLT-MJ-502: - DIAGNOSTIC BACTERIOLOGY

Semester: V											
Course Code	MLT-MJ-502 [Subject Code-2503000505027001]										
Course Title	Diagnostic Bacteriology										
Course Type	Major										
Credit	2										
Course Level	300-399										
Teaching Hour/Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	<ul style="list-style-type: none"> • To understand the composition and distribution of normal flora in the human body. • Describe strategies for the surveillance, prevention, and control of hospital-acquired infections. • Emphasize the importance of hygiene, sterilization, and infection control protocols for reemerging diseases. • To develop the knowledge required for accurate bacterial diagnosis, essential for effective patient care and infection control in clinical settings. 										
Course Outcome	<p>At the end of the course, the students will get knowledge of</p> <p>CO-1: Epidemiological studies, Hospital Acquired Infection & Antimicrobial Sensitivity Test to find drug of choice.</p> <p>CO-2: This course equips students with essential knowledge and practical skills required for identifying, diagnosing, and managing infectious diseases in clinical and public health settings.</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1										
	CO2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Human-microbe interactions	15
1.1	Normal Flora of Human Body	
1.2	Epidemiology and Epidemiological methods	
1.3	Nosocomial infections: Source, Surveillance, Prevention, Control	
1.4	Emerging and Reemerging infectious disease and pathogens	
1.5	Antibiotic sensitivity tests: Principle & Method	
Unit-2	Causative Agents, Pathogenesis and Laboratory diagnosis of Bacterial Disease	15
2.1	Urinary Tract Infection	
2.2	Respiratory Tract Infection: Tuberculosis; Diphtheria; Pneumonia	
2.3	Gastrointestinal Diseases: Typhoid; Food Poisoning; Cholera	
2.4	Sexually Transmitted Disease: Syphilis; Gonorrhoea	
2.5	Neurological Disorder: Tetanus, Bacterial Meningitis	

Undergraduate Program in Medical Laboratory Technology as per NEP 2020 [3 years (Degree) & 4 years (Honours/Honours with Research)] effective from 2025-2026

Reference Books:

Sr. No.	Title/ Edition	Authors	Publiser
1	A Textbook of Medical Microbiology for MLT	Rinku Shukla & Jigisha Patel	New Popular Prakashan
2	A Textbook of Microbiology/ 9 th	Ananthanarayan and Paniker	Universities Press. (Arti Kapil – Editor)
3	Prescott’s Microbiology/11 th	Willey, Sandman & Wood	McGraw Hill
4	Textbook of Medical Laboratory Technology /3 rd	Praful B Godkar	Bhalani Publisher
5	Medical Microbiology/16 th	David Greenwood	Elsevier

MLTP-MJ-502: PRACTICALS BASED ON DIAGNOSTIC BACTERIOLOGY

Semester: V											
Course Code	MLTP-MJ-502 [Subject Code-2503000505027002]										
Credit	02										
Teaching Hour/ Week	4 Hours										
Course Title	Practicals Based on Diagnostic Bacteriology										
Course Objectives	<ul style="list-style-type: none"> To develop the technical skill required for accurate bacterial diagnosis, essential for effective patient care and infection control in clinical settings. 										
Course Outcome	At the end of the course, the students will be able to perform CO-1 to 8: Isolation and identification of pathogens from clinical samples like urine, stool, sputum, pus, CSF etc. and Antibiotic Susceptibility Test										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1-8										

Course Content

1. Processing of blood for identification of bacteria
2. Processing of urine for identification of bacteria
3. Processing of stool for identification of bacteria
4. Processing of CSF for identification of bacteria
5. Processing of sputum for identification of bacteria
6. Processing of pus for identification of bacteria
7. Processing of body fluid for identification of bacteria
8. Antimicrobial Susceptibility Test by Disc Diffusion Method

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology, Volume 1/ 3 rd	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India

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2	Practical Manual for Medical Laboratory Technology- Volume 1	Mayuri Dholaria, Jigna Naik, Urvashi Desai & Rinku Shukla	New Popular Prakashan
3	Medical Laboratory Technology Methods and Interpretations, Volume 1, 6 th Edition	Ramnik Sood	Jaypee Brothers Medical Publishers (P) LTD

MLT-MJ-503: CLINICAL BIOCHEMISTRY- 1

Semester: V											
Course Code	MLT-MJ-503 [Subject Code-2503000505037001]										
Course Title	Clinical Biochemistry- 1										
Course Type	Major										
Credit	2										
Course Level	300-399										
Teaching Hour/ Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	<ul style="list-style-type: none"> To equip students with the knowledge necessary for separation of plasma proteins, its functions, determination principle and clinical importance. To gain knowledge of isoenzymes and its importances for diagnosis of diseases. To obtain knowledge of normal homeostasis of acid base balance and its imbalances causing diseases. 										
Course Outcome	<p>At the end of the course, the students will get knowledge of</p> <p>CO-1: Explain the structure, functions, separation methods and clinical significance of proteins and enzymes. It defines clinical enzymology and explain the role of enzymes as diagnostic markers. Describe the concept of isoenzymes and their clinical significance. Identify the diagnostic importance of LDH, CK, and ALP isoenzymes in various diseases.</p> <p>CO-2: Explain the concept of acid-base balance and its importance in maintaining homeostasis. How pH of human blood is maintained by different mechanisms and Acid base imbalances</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1										
	CO2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Protein and Enzyme	15
1.1	Functions and separation of Plasma Protein	
1.2	Estimation and clinical significance of Total Protein, albumin & A:G ratio	
1.3	Electrophoretic pattern of protein fractions in health and disease	
1.4	Introduction to Clinical Enzymology	
1.5	Introduction of Isoenzyme and isoenzymes of LDH, CK and ALP	
Unit-2	Acid – Base Balance & Imbalance	15
2.1	Introduction	
2.2	Acid – Base balance in normal health	
2.3	Mechanism of regulation of pH <ul style="list-style-type: none"> a. Role of different blood buffer system b. Role of Respiration 	

Undergraduate Program in Medical Laboratory Technology as per NEP 2020 [3 years (Degree) & 4 years (Honours/Honours with Research)] effective from 2025-2026

	c. Role of Kidney	
2.4	Acid – Base imbalances: Acidosis & Alkalosis	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Clinical Biochemistry/ 1 st	Mayuri Dholaria & Urvashi Desai	New Popular Prakashan
2	Textbook of Medical Biochemistry	MN Chatterjee & Rana Shinde	Jaypee Brothers Medical Publishers LTD.
3	Biochemistry	J. Satyanarayana & U. Lakrapani	Elsevier; Books & Allied Pvt Ltd.
4	Textbook of Biochemistry/ 4 th	Vasudevan D. & Sreekumari S.	JaypeePublishers
5	Fundamental of Clinical Chemistry/ 4 th	N.W. Tietz	W.B. Saunders Co.Clinical Chemistry

MLTP-MJ-503: PRACTICALS BAES ON CLINICAL BIOCHEMISTRY- 1

Semester: V											
Course Code	MLTP-MJ-503 [Subject Code-2503000505037002]										
Credit	02										
Teaching Hour/ Week	4 Hours										
Course Title	Practicals Based on Clinical Biochemistry- 1										
Course Objectives	<ul style="list-style-type: none"> • This course equips students with the knowledge and technical skills necessary for accurate biomolecule assessment in diagnostic and research laboratories. • To Understand the Principles and methodology of Biomolecule Testing • To Develop skills for the performance of tests to find blood level of various biomolecules, to Interpret Laboratory Results, to Correlate Test Results with Clinical Conditions: • To Implement appropriate quality control measures to maintain accuracy and reliability in biomolecule testing. • To Utilize acquired skills to contribute effectively to clinical laboratories, research institutions, and healthcare settings. 										
Course Outcome	At the end of the course, the students will be able to CO-1to14: Develop proficiency in performing Quantitative tests for estimation of different biomolecules like glucose, protein, cholesterol, bile pigments, minerals, enzymes etc. present in blood for diagnosis of various diseases/ metabolic disorders as well as to check normal function of organs like kidney, liver, heart.										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1-14										

Course Content

Undergraduate Program in Medical Laboratory Technology as per NEP 2020 [3 years (Degree) & 4 years (Honours/Honours with Research)] effective from 2025-2026

1. Estimation of serum/ plasma Total Protein
2. Estimation of serum/ plasma Albumin, Globulin and A: G Ratio
3. Estimation of urine Microalbumin
4. Estimation of serum Potassium
5. Estimation of serum Sodium
6. Estimation of serum Calcium
7. Estimation of serum Chloride
8. Serum Total, Direct and Indirect bilirubin
9. Estimation of serum SGPT level
10. Estimation of serum SGOT level
11. Estimation of serum Amylase level
12. Estimation of serum ALP level
13. Estimation of serum LDH level
14. Estimation of serum CK level

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology, 3 rd Edition, Volume 1	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
2	Practical Manual for Medical Laboratory Technology- Volume 2/ 2 nd	Mayuri Dholaria, Jigna Naik, Urvashi Desai & Rinku Shukla	New Popular Prakashan
3	Medical Laboratory Technology Methods and Interpretations, Volume 1/ 6 th	Ramnik Sood	Jaypee Brothers Medical Publishers (P) LTD
4	Medical Laboratory Technology - A Procedure Manual for Routine Diagnostic tests, Volume 1/ 2 nd	Kanai L. Mukherjee	Tata Mc Graw -Hill Education Private Limited, New Delhi

[Subject Code-2603000506017001]

SEMESTER VI
MLT-MJ-601: CLINICAL PATHOLOGY

Semester: VI											
Course Code	MLT-MJ-601										
Course Title	Clinical Pathology										
Course Type	Major										
Credit	2										
Course Level	300-399										
Teaching Hour/ Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objectives	<ul style="list-style-type: none"> • To define clinical pathology and its role in healthcare. • To understand specimen collection, handling and processing. • To explain the importance of laboratory tests in disease diagnosis, monitoring and treatment. • To learn common laboratory techniques including urine, sputum, CSF, semen and body fluid analysis • To interpret findings from various clinical specimens and other body fluid analysis. 										
Course Outcome	<p>At the end of the course, the students will get knowledge of</p> <p>CO-1: Techniques for collecting, preserving and transporting urine, sputum, stool and semen samples. Perform Physical, Chemical and Microscopic examination of urine and identify normal and abnormal constituents in urine. Physical, Microscopic and Chemical stool examination for the presence of parasites, occult blood fat and other abnormalities. Procedures for semen collection, liquefaction and analysis for recognising abnormalities and clinical implications. Perform macroscopic and microscopic sputum analysis to differentiate gram bacteria and AFB for tuberculosis. Correlate laboratory findings with clinical symptoms and disease conditions</p> <p>CO-2: The appropriate methods for collection, transportation, and preservation of body fluids and significance of sterility and contamination prevention in handling these specimens. Perform Physical, Chemical and Microscopic examination of CSF, pleural, peritoneal, pericardial and synovial fluid and differentiate between transudate and exudates based on biochemical parameters. Also correlate fluids with different clinical findings.</p>										
Mapping between COs and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1										
	CO2										

Course Content:

Undergraduate Program in Medical Laboratory Technology as per NEP 2020 [3 years (Degree) & 4 years (Honours/Honours with Research)] effective from 2025-2026

Unit No.	Content	Teaching Hours
Unit-1	Urine, Stool, Sputum & Semen Analysis	15
1.1	Introduction, Composition, Indication, Collection, Preservation & Transportation	
1.2	Urine Analysis: Physical, Chemical & Microscopic Examination, Pregnancy test	
1.3	Stool Analysis: Physical, Chemical & Microscopic Examination, Stool concentration techniques for ova	
1.4	Sputum Analysis: Physical & Microscopic Examination	
1.5	Semen Analysis: Physical, Chemical & Microscopic Examination	
Unit-2	C.S.F and Body Fluid Analysis	15
2.1	Introduction, Composition, Indication, Collection, Preservation & Transportation	
2.2	Physical, Chemical and Microscopic examination of C.S.F	
2.3	Correlation of Abnormal C.S.F. findings in various diseases	
2.4	Fluid Effusion: Transudate & Exudate	
2.5	Physical, Chemical and Microscopic examination of Pleural, Peritoneal, Pericardial and Synovial fluid	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Clinical Pathology/ 1 st	Jigna Naik & Ankita Leanwala	New Popular Prakashan
2	Textbook of Medical Laboratory Technology, Volume 1 / 3 rd	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
3	Practical Manual for Medical Laboratory Technology- Volume 2/ 2 nd	Mayuri Dholaria, Jigna Naik, Urvashi Desai & Rinku Shukla	New Popular Prakashan
4	Medical Laboratory Science - Theory and Practice	Ochei & A Kolhatkar	Tata Mc Graw -Hill Publishing Limited Company, New Delhi

MLTP-MJ-601: PRACTICALS BASED ON CLINICAL PATHOLOGY

Semester: VI	
Course Code	MLTP-MJ-601 [Subject Code-2603000506017002]
Credit	02
Teaching Hour/ Week	4 Hours
Subject Title	Practicals Based on Clinical Pathology
Course Objectives	<ul style="list-style-type: none"> The students will be trained in fundamental clinical techniques including various clinical samples.

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	<ul style="list-style-type: none"> Educate students on proper collection, preservation, and processing of clinical pathology specimens following standard guidelines. Provide hands-on experience in using laboratory instruments such as microscopes, centrifuges, and analyzers. 																																	
Course Outcomes	<p>At the end of the course, the students will be able to</p> <p>CO-1to4: Demonstrate proper techniques for collection, labeling, transportation, storage of urine, semen stool and sputum specimens. To perform physical chemical and microscopic examination of the above clinical specimens to correlate laboratory findings with clinical cases. Also to follow quality control procedures and maintain laboratory records, result interpretation and disposal of biomedical waste.</p> <p>CO-5-9: Demonstrate correct procedures for collection, transport and storage of serous & non serous fluids and CSF. To perform physical, chemical and microscopic examination to correlate fluid analysis results with clinical symptoms and disease conditions. To follow quality assurance practices in handling body fluid specimens</p>																																	
Mapping between Cos and PSOs	<table border="1"> <thead> <tr> <th></th> <th>PSO1</th> <th>PSO2</th> <th>PSO3</th> <th>PSO4</th> <th>PSO5</th> <th>PSO6</th> <th>PSO7</th> <th>PSO8</th> <th>PSO9</th> <th>PSO10</th> </tr> </thead> <tbody> <tr> <td>CO 1- 4</td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CO 5-9</td> <td style="background-color: black;"></td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> </tr> </tbody> </table>		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	CO 1- 4											CO 5-9										
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10																								
CO 1- 4																																		
CO 5-9																																		

Course Content

1. Physical, Chemical & Microscopic examination of urine
2. Physical, Chemical & Microscopic examination of stool
3. Physical & Microscopic examination of sputum
4. Physical, Chemical & Microscopic examination of semen
5. Physical, Chemical & Microscopic examination of cerebrospinal fluid
6. Physical, Chemical & Microscopic examination of pleural fluid
7. Physical, Chemical & Microscopic examination of peritoneal fluid
8. Physical, Chemical & Microscopic examination of pericardial fluid
9. Physical, Chemical & Microscopic examination of synovial fluid

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology/3 rd	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
2	Practical Manual for Medical Laboratory Technology- Volume 2/ 2 nd	Mayuri Dholaria, Jigna Naik, Urvashi Desai & Rinku Shukla	New Popular Prakashan
3	Medical Laboratory Technology Methods and Interpretations, Volume 1/ 6 th	Ramnik Sood	Jaypee Brothers Medical Publishers (P) LTD
4	Medical Laboratory Science - Theory and Practice	Ochei & Kolhatkar	A Tata Mc Graw -Hill Publishing Limited Company, New Delhi

Undergraduate Program in Medical Laboratory Technology as per NEP 2020 [3 years (Degree) & 4 years (Honours/Honours with Research)] effective from 2025-2026

[Subject Code-2603000506027001]

MLT-MJ-602: - DIAGNOSTIC VIROLOGY

Semester: VI											
Course Code	MLT-MJ-602										
Subject Title	Diagnostic Virology										
Course Type	Major										
Credit	2										
Course Level	300-399										
Teaching Hour/Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	<ul style="list-style-type: none"> • Comprehensive understanding of the principles, techniques and methodologies used in the identification, diagnosis and monitoring of viral infections. • It aims to equip students with the knowledge and skills required to accurately detect viruses using laboratory based diagnostic tools. • Understanding the molecular and clinical aspects of viral infections. • Analysing emergency viral threats and understanding the challenges of diagnosing novel viruses. 										
Course Outcome	<p>At the end of the course, the students will</p> <p>CO-1: Understand viral pathogenesis and epidemiology with basic characteristics of viruses like mumps measles, rubella, influenza, rabies SARS: COVID and poliomyelitis and their classification. Diagnosis of viral infections and different direct and indirect diagnostic methods for viral infections with biosafety protocol.</p> <p>CO-2: Understand the pathophysiology and progression of HIV/AIDS, differentiate between types of hepatitis and their etiological agents, understand the virology and transmission of herpes simplex viruses, Dengue and Chikungunya with different diagnostic methods.</p>										
Mapping between Cos and POs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1										
	CO2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Causative Agents, Pathogenesis and Laboratory diagnosis of Viral	15

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	Diseases- 1	
1.1	General Laboratory Diagnosis of Viral Infections	
1.2	Mumps, Measles, Rubella	
1.3	Influenza & Rabies	
1.4	SARS: COVID-19	
1.5	Poliomyelitis	
Unit-2	Causative Agents, Pathogenesis and Laboratory diagnosis of Viral Diseases- 2	15
2.1	AIDS	
2.2	Hepatitis	
2.3	Herpes	
2.4	Chikungunya	
2.5	Dengue	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	A Textbook of Medical Microbiology for MLT/ 1 st	Rinku Shukla & Jigisha Patel	New Popular Prakashan
2	A Textbook of Microbiology/ 9 th	Ananthanarayan and Paniker	Universities Press.(Arti Kapil– Editor)
3	Prescott's Microbiology/11 th	Willey, Sandman & Wood	McGraw Hill
4	Medical Laboratory Science - Theory and Practice	Praful B Godkar	Bhalani Publisher
5	Medical Microbiology/16 th	David Greenwood	Elsevier

MLTP-MJ-602: PRACTICALS BASED ON DIAGNOSTIC VIROLOGY

Semester: VI	
Course Code	MLTP-MJ-602 [Subject Code-2603000506027002]
Credit	02
Teaching Hour/ Week	4 Hours
Course Title	Practicals Based on Diagnostic Virology
Course Objective	<ul style="list-style-type: none"> • It aims to provide students with both theoretical knowledge and hands on experience in various virological techniques. • It helps learn how to identify and diagnose viral infections using different laboratory techniques such as ELISA and antigen/antibody detection. • Perform and interpret serological assays such as lateral flow assays and interpret results from commercial rapid test kits used in virology diagnostics. • Analyse laboratory findings in correlation with clinical symptoms. Ensure accuracy and reliability of test results through quality control (QC) measures.

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Course Outcome	<p>At the end of the course, the students will be able to</p> <p>CO-1to8: Perform rapid tests for detection of HIV, HAV, HBsAg, HCV, HEV, Covid-19, Dengue and Chikungunya. Understand the principles of rapid testing and explain the immunochromatographic assay principles used in rapid tests for HIV HBsAg HCV HEV and Dengue. Demonstrate proper specimen collection techniques and follow SOPS for different test kits. Understand the clinical significance of each test and correlate test results. Adhere to biosafety guidelines when handling blood borne pathogens and disposal of waste.</p> <p>CO-9 & 10 Understand the immunoassay principle and gain clear understanding of enzyme linked immunosorbent assay including Ag-Ab interactions for HIV and HBsAg. Learn about the structure, function and immunological markers of HIV and Hepatitis B including significance of HIV antibodies and HBsAg in diagnosis.</p>										
Mapping between COs and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1-8										
	CO 9-10										

Course Content

1. Rapid test for detection of HIV
2. Rapid test for detection of HAV
3. Rapid test for detection of HBsAg
4. Rapid test for detection of HCV
5. Rapid test for detection of HEV
6. Rapid test for COVID-19
7. Rapid test for Dengue
8. Rapid test for Chikungunya
9. ELISA for detection of HIV Ab (Demonstration)
10. ELISA for detection of HBsAg (Demonstration)

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology, Volume 1/ 3 rd	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
2	Practical Manual for Medical Laboratory Technology- Volume 1	Mayuri Dholaria, Jigna Naik, Urvashi Desai & Rinku Shukla	New Popular Prakashan
3	Medical Laboratory Technology Methods and Interpretations, Volume 1, 6 th Edition	Ramnik Sood	Jaypee Brothers Medical Publishers (P) LTD

MLT-MJ-603: CLINICAL BIOCHEMISTRY- 2

Semester: VI											
Course Code	MLT-MJ-603										
Course Title	Clinical Biochemistry- 2										
Course Type	Major										
Credit	2										
Course Level	300-399										
Teaching Hour/ Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	<ul style="list-style-type: none"> Understand the fundamentals and basic principles of clinical biochemistry including biochemical basis of diseases. Demonstrate proficiency in laboratory techniques used in clinical biochemistry, Interpret biochemical test results and their significance in disease diagnosis and management. Analyze the biochemical basis of metabolic disorders such as diabetes, hyperlipidemia, and inborn errors of metabolism. 										
Course Outcome	<p>At the end of the course, students will be able</p> <p>CO-1: To understand the physiology of glucose homeostasis and roles of insulin and other hormones in maintaining blood glucose levels. Discuss the pathophysiology of Diabetes Mellitus, explain the impact of insulin on glucose metabolism and overall health. Analytical methods of blood glucose, HbA1c, and diabetic profile</p> <p>CO-2: To understand lipid and lipoprotein metabolism and describe transport and breakdown of lipids and lipoproteins in the body. To discuss causes and consequences of dyslipidemia including hypercholesterolemia and lipid profile test.</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1										
	CO2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Regulation of blood glucose	15
1.1	Regulation of Blood glucose level	
1.2	Blood Glucose Estimation and its clinical significance	
1.3	GTT and its types	
1.4	Glycosylated Hemoglobin and its determination	
1.5	Diabetes mellitus and Diabetic profile test	
Unit-2	Lipid and Lipoprotein	15
2.1	Definition, Classification and Function	
2.2	Factors influencing blood cholesterol level and its Pathological variations	
2.3	Lipoprotein: Introduction, Classification and Separation	
2.4	Metabolism and clinical disorder of Lipoprotein	
2.5	Lipid Profile Tests: Total and HDL Cholesterol, Triglyceride & Lipoproteins	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Clinical Biochemistry/ 1 st	Mayuri Dholaria & Urvashi Desai	New Popular Prakashan
2	Textbook of Medical Biochemistry	MN Chatterjea & Rana Shinde	Jaypee Brothers Medical Publishers LTD.
3	Biochemistry	U. Satyanarayana & U. Chakrapani	Elsevier; Books & Allied Pvt Ltd.
4	Textbook of Biochemistry/ 4 th	Vasudevan D. & Sreekumari S.	Jaypee Publishers
5	Fundamental of Clinical Chemistry/4 th	N. W. Tietz	W. B. Saunders Co. Clinical Chemistry

[Subject Code-2603000506037002]

MLTP-MJ-603: PRACTICALS BASED ON CLINICAL BIOCHEMISTRY- 2

Semester: VI	
Course (subject) Code	MLTP-MJ-603
Credit	02
Teaching Hour/ Week	4 Hours
Subject Title	Practicals Based on Clinical Biochemistry- 2
Course Objective	<ul style="list-style-type: none"> To develop hands-on skills in performing biochemical laboratory tests relevant to clinical diagnostics. To understand the principles, methodologies, and clinical significance of biochemical assays To accurately analyze and interpret biochemical data in the context of disease diagnosis and patient management
Course Outcome	<p>At the end of the course, students will be able</p> <p>CO-1&2: To understand the principle and biochemical basis for blood glucose estimation by GOD-POD method, working principle and technology behind glucometers for point of care testing. Differentiate between normal, prediabetic, and diabetic glucose levels based on WHO and ADA guidelines. Evaluate the accuracy, advantages, and limitations of both methods for clinical and diagnostic use. Understand clinical applications and diabetes management.</p> <p>CO-3&4: To understand the principle of HbA1c and OGTT in diagnosing diabetes. Analyze and interpret HbA1c results in relation to diabetes diagnosis and long-term glucose control. Explain standard GTT protocol including preparation, glucose</p>

	administration and blood sample collection. Ensure precision and accuracy in HbA1c and OGTT measurements using appropriate controls and calibration. CO-5to10: Explain the biochemical basis and clinical significance of estimating Triglycerides (TG), Total Cholesterol, Urea, Creatinine, Very Low-Density Lipoprotein (VLDL), High-Density Lipoprotein (HDL), and Low-Density Lipoprotein (LDL). Evaluate lipid profile parameters (TG, Cholesterol, HDL, LDL, VLDL) to assess risk factors for cardiovascular diseases.										
Mapping between COs and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO-1-2										
	CO 3-10										

Course Content

1. Estimation of blood Glucose by GOD/POD method
2. Estimation of blood Glucose by glucometer
3. Oral Glucose Tolerance Test
4. Estimation of HbA₁C (Demonstration)
5. Estimation of Serum Triglyceride(TG)
6. Estimation of Serum Total Cholesterol
7. Estimation of Serum HDL, LDL & VLDL Cholesterol
8. Estimation of Serum Urea and Blood Urea Nitrogen(BUN)
9. Estimation of Serum Creatinine
10. Estimation of Serum Uric acid

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology, 3 rd Edition, Volume 1	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
2	Practical Manual for Medical Laboratory Technology- Volume 2/ 2 nd	Mayuri Dholaria, Jigna Naik, Urvashi Desai & Rinku Shukla	New Popular Prakashan
3	Medical Laboratory Technology Methods and Interpretations, Volume 1/ 6 th	Ramnik Sood	Jaypee Brothers Medical Publishers (P) LTD
4	Medical Laboratory Technology - A Procedure Manual for Routine Diagnostic tests, Volume 1/ 2 nd	Kanai L. Mukherjee	Tata Mc Graw -Hill Education Private Limited, New Delhi

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Minor Elective Course Structure of Semester V & VI

SEMESTER -V							
Course Code	Course Title	Credit (Theory/ Practical)	Teaching duration per Week (in Hr.)	External Marks (SEE)	Internal Marks (CCE)	Exam Time Duration	Total (Marks)
MLT-ME-501	Basics of Biochemistry-1	02	02	25	25	01	50
MLTP-ME-501	Practicals Based on Basics of Biochemistry-1	02	04	25	25	06	50
MLT-ME-502	Basics of Parasitology	02	02	25	25	01	50
MLTP-ME-502	Practicals Based on Basics of Parasitology	02	04	25	25	06	50
SEMESTER-VI							
MLT-ME-601	Basics of Biochemistry-2	02	02	25	25	01	50
MLTP-ME-601	Practicals Based on Basics of Biochemistry-2	02	04	25	25	06	50

SEMESTER V

MLT-ME-501 BASICS OF BIOCHEMISTRY-1

Semester: V											
Course Code	MLT-ME-501										
Course Title	Basics of Biochemistry-1										
Course Type	Minor Elective										
Credit	2										
Course Level	300-399										
Teaching Hour/ Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	<ul style="list-style-type: none"> Understand fundamental concept including classification based on structure, function and properties of Biomolecules i.e. carbohydrate & lipid 										
Course Outcome	At the end of the course, the students will get knowledge of CO-1: Chemical structure, classification, biological function of carbohydrates CO-2: Classification, biological function, characteristics of lipid including detailed knowledge of compound lipid, cholesterol, TG										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1										
	CO2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Carbohydrates	15 Hr.
1.1	Definition and Classification of carbohydrate	
1.2	Monosaccharides and its importance	
1.3	Disaccharides and its importance	
1.4	Polysaccharides and its importance	
Unit-2	Lipids	15 Hr.
2.1	Definition, Classification and Biological role of lipids	
2.2	Simple lipids: Triglyceride	
2.3	Compound lipids: Phospholipid, Glycolipid and Lipoprotein	
2.4	Derived lipids: Cholesterol and Fatty acid	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Biochemistry	U. Satyanarayan	Books & Allied pvt Ltd, Kolkatta.
2	Textbook of Medical Laboratory Technology, 3 rd Edition, Volume 1	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
3	Medical Laboratory Technology - A Procedure Manual for Routine Diagnostic tests, Volume 1/ 2 nd	Kanai L. Mukherjee	Tata Mc Graw -Hill Education Private Limited, New Delhi
4	Fundamentals of Biochemistry	L Jain, Sunjay Jain, tin Jain	S Chand & company, New Delhi

MLTP-ME-501: PRACTICALS BASED ON BASICS OF BIOCHEMISTRY-1

Semester: V											
Course Code	MLTP-ME-501										
Credit	2										
Teaching Hour/ Week	4 hours										
Course Title	Practicals Based on Basics of Biochemistry-1										
Course Objectives	<ul style="list-style-type: none"> To build up skill for estimation of Blood sugar and lipid level including Cholesterol which can be helpful for diagnostic, prognostic and research purpose. 										
Course Outcome	<p>At the end of the course the students will be able to</p> <p>CO- 1&2: Perform qualitative testing of glucose by standard chemical method or rapid strip method, interpret test results to identify the presence of glucose in biological samples.</p> <p>CO-3to6: Perform quantitative estimation of blood glucose, total cholesterol, HDL cholesterol and Triglyceride level in blood using appropriate laboratory techniques to assess conditions such as hypoglycemia, hyperglycemia, and diabetes, to evaluate cardiovascular risk and related health conditions.</p> <p>develop the practical skills and analytical knowledge required for effective biochemical testing, diagnosis, and monitoring of metabolic and cardiovascular conditions.</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1&2										
	CO 3-6										

Course Content

1. Qualitative analysis of Glucose by chemical method
2. Qualitative analysis of Glucose by reagent strip method
3. Estimation of Blood Glucose
4. Estimation of Serum Total cholesterol
5. Estimation of Serum HDL cholesterol
6. Estimation of Serum Triglyceride

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Practical Clinical Biochemistry: Methods and Interpretation/4 th	Ranjan Chawla	JaypeeBrothers
2	Textbook of Medical Laboratory Technology, 3 rd -Volume 1	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
3	Medical Laboratory Technology - A Procedure Manual for Routine Diagnostic tests, Volume 1/ 2 nd Edition	Kanai L. Mukherjee	Tata Mc Graw -Hill Education Private Limited, New Delhi
4	Fundamentals of Biochemistry	L Jain, Sunjay Jain, Nitin Jain	S Chand & company, New Delhi
5	Biochemistry	U. Satyanarayana	Books & Allied pvt Ltd, Kolkatta.

[Subject Code-2503000505057001]

MLT-ME-502 BASICS OF PARASITOLOGY

Semester: V											
Course Code	MLT-ME-502										
Course Title	Basics of Parasitology										
Course Type	Minor										
Credit	2										
Course Level	300-399										
Teaching Hour/ Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	At the end of the course, the students will get knowledge of <ul style="list-style-type: none"> • Concepts of Parasitology • Role of Parasites • Protozoa, and helminths, and to know general characteristics of helminths, their morphology, life- cycle and lab diagnosis of these parasites. 										
Course Outcome	At the end of the course the students will be able to CO-1: Understand the Basics of Parasitology including definition, types, interaction with hosts and characteristics of protozoa and helminths. Identify the role of parasites in human health and disease. CO-2: Identify the morphology and life cycle of parasites present in blood, urine, stool and sputum & demonstrate appropriate diagnostic methods for detecting parasites in various specimens.										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1										
	CO 2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Introduction to Parasites	10 Hr.
1.1	Host and Parasites: Definition and Types	
1.2	General characteristics and examples of Protozoa	
1.3	General characteristics and examples of Nematodes	
1.4	General characteristics and examples of Trematodes	
1.5	General characteristics and examples of Cestodes	
Unit-2	Parasites in Clinical Specimen: Morphology, life cycle and laboratory diagnosis	20 Hr.
2.1	Parasites Present in Blood: <i>Plasmodium vivax</i> and <i>Plasmodium falciparum</i> , <i>Wuchereria bancrofti</i>	
2.2	Parasites Present in Stool: <i>Giardia lamblia</i> , <i>Ascaris lumbricoides</i> , <i>Taenia saginata</i> and <i>Taenia solium</i> , <i>Enterobius vermicularis</i> ,	
2.3	Parasites Present in Urine: <i>Entamoeba histolytica</i> , <i>Trichomonas vaginalis</i> , <i>Schistosoma haematobium</i>	
2.4	Parasites Present in Sputum: <i>Strongyloides stercoralis</i>	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Parasitology / 7 th	C K Jayaram Paniker	Jaypee publishers

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2	Medical Parasitology/5 th	D. R. Arora and Brij Bala Arora	CBS Publishers and Distributors Pvt. Ltd
3	(Protozoology and Helminthology)/13 th	D. Chatterjee	CBS Publishers and Distributors Pvt. Ltd
4.	Textbook of Medical Laboratory Technology, 3 rd -Volume 1	Praful B. dkar & Darshan B. dkar	Bhalani Publishing House Mumbai, India

[Subject Code-2503000505057002]

MLTP-ME-502: PRACTICALS BASED ON BASICS OF PARASITOLOGY

Semester: V											
Course Code	MLTP-ME-502										
Credit	2										
Teaching Hour/ Week	4 hours										
Course Title	Practicals Based on Basics of Parasitology										
Course Objectives	<ul style="list-style-type: none"> To achieve essential diagnostic skills in parasitology required for the identification, diagnosis, and understanding of medically important parasites in clinical practice. 										
Course Outcome	<p>At the end of the course the students will be able to</p> <p>CO-1: Identify various parasites based on morphological features through observation of permanent slides and charts.</p> <p>CO-2: Identify various parasites based on life cycle by observing charts.</p> <p>CO-3: Perform rapid diagnostic tests for the detection of <i>Plasmodium</i> species. Interpret test results to differentiate between various types of malaria.</p> <p>CO-4: Conduct rapid tests for the identification of <i>Wuchereria bancrofti</i> and accurately interpret results for diagnostic confirmation.</p> <p>CO-5: Prepare thick & thin blood smear and its staining techniques to identify different morphological forms of <i>Plasmodium</i> species under a microscope.</p> <p>CO-6: Conduct saline and iodine preparation techniques for stool examination. Identify motile trophozoites, cysts, and other parasitic forms.</p> <p>CO-7: Perform stool concentration techniques for improved detection of parasite ova and cysts.</p>										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1-7										

Course Content

1. Morphological Study/ Demonstration of different parasites by permanent slides/charts.
2. Identification of parasites from its lifecycle chart
3. Identification of malarial parasites by rapid diagnostic tests.
4. Identification of *Microfilaria* by rapid diagnostic tests.
5. Identification of various morphological forms of malarial parasites from stained slides (Blood smear)/permanent slides/ photographs.
6. Microscopic examination of stool by a) Saline Preparation b) Iodine Preparation

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7. Identification of ova and cysts of stool parasites using concentration methods.

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Parasitology 7 th edition	C K Jayaram Paniker	Jaypee publishers
2	Medical Parasitology/5 th	D.R. Arora and Brij Bala Arora	CBS Publishers and Distributors Pvt. Ltd
3	Protozoology and Helminthology/13 th	K. D. Chatterjee	CBS Publishers and Distributors Pvt. Ltd
4	Short Textbook of Medical Microbiology including Parasitology/10 th	Satish Gupte	Jaypee
5	Textbook of Medical Laboratory Technology, Volume 1/ 3 rd	Praful B. Godkar& Darshan B. Godkar	Bhalani Publishing House Mumbai, India

[Subject Code-2603000506047001]

SEMESTER: VI
MLT-ME-601BASICS OF BIOCHEMISTRY-2

Semester: VI											
Course (subject) Code	MLT-ME-601										
Subject Title	Basics of Biochemistry-2										
Course Type	Minor										
Credit	2										
Course Level	300-399										
Teaching Hour/ Week	2 Hours										
Teaching Time	15×2= 30 Hours										
Course Objective	At the end of the course, the students will get knowledge of <ul style="list-style-type: none"> • Essentials of Biochemistry • Role of Biomolecules • Understand the basic concepts of carbohydrates, lipids, proteins and nucleic acids to develop interest in the metabolic role of these biomolecules 										
Course Outcome	At the end of the course, the students will get knowledge of CO-1 Explain the structure, properties and functions of proteins and nucleic acids with details of protein structure (primary, secondary, tertiary and quaternary). To discuss the significance of proteins in health and disease. CO-2 Illustrate the structure of DNA and RNA including base pairing and double helix formation and to discuss the significance of nucleic acids in health and disease.										
Mapping between Cos and POs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1										
	CO2										

Course Content:

Unit-1	Proteins	15 Hr.
1.1	Classification & Biological role of proteins	
1.2	Simple proteins	
1.3	Conjugate proteins	
1.4	Structural organization of proteins	
Unit-2	Nucleic acids	15 Hr.
2.1	Nitrogen bases, Nucleoside, Nucleotide	
2.2	Structure of DNA (Watson-crick model, variants)	
2.3	Structure of RNA	
2.4	Biological functions of nucleic acids	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology, 3 rd -Volume 1	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India
2	Medical Laboratory Technology - A Procedure Manual for Routine	Kanai L. Mukherjee	Tata Mc Graw -Hill Education Private Limited, New Delhi

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	Diagnostic tests, Volume 1/ 2 nd Edition		
3	Fundamentals of Biochemistry	L Jain, Sunjay n, Nitin Jain	S Chand & company, New Delhi
4	Biochemistry	U. Satyanarayan	Books & Allied pvt Ltd, Kolkatta.

[Subject Code-2603000506047002]

MLTP-ME-601: PRACTICALS BASED ON BASICS OF BIOCHEMISTRY-2

Semester: VI											
Course Code	MLTP-ME-601										
Credit	2										
Teaching Hour/ Week	4 hours										
Subject Title	Practicals Based on Basics of Biochemistry-2										
Course Objective	At the end of the course, the students will able to, <ul style="list-style-type: none"> Estimate and learn various biochemistry test done in laboratory for Function tests and Protein metabolism. 										
Course Outcome	At the end of the course, the students will CO-1 to 3 Students will gain practical skills in identifying proteins using qualitative analysis techniques, estimating serum total protein through quantitative methods and analysing albumin and total protein levels with clinical significance. CO- 4 to 6 Students will develop the ability to analyse serum urea, BUN & measure serum urea and blood urea nitrogen levels with biochemical techniques, estimate serum creatinine and understand its clinical significance. To assess serum uric acid and quantify its levels to know its physiological and pathological conditions.										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO1-3										
	CO4-6										

Course Content

1. Qualitative Analysis of Proteins
2. Estimation of Serum Total protein.
3. Serum Total Protein and Albumin.
4. Serum Urea and Blood Urea Nitrogen
5. Serum Creatinine
6. Serum Uric acid

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Practical Clinical Biochemistry: Methods and Interpretation/4 th	Ranjan Chawla	Jaypee Brothers
2	Textbook of Medical Laboratory Technology, Volume 1/ 3 rd	Praful B. Godkar & Darshan B. Godkar	Bhalani Publishing House Mumbai, India

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B. Sc. Medical Laboratory Technology

Skill Enhancement Course Structure of Semester V

SEMESTER V

Course Code	Course Title	Credit (Theory)	Teaching duration per Week (in Hr.)	External Marks (SEE)	Internal Marks (CCE)	Exam Time Duration	Total (Marks)
MLT-SEC-501	Biomedical Waste Management	02	02	25	25	01	50

MLT-SEC-501: BIOMEDICAL WASTE MANAGEMENT

Semester - V	
Course Code	MLT-SEC-501 [Subject Code-2503000505067001]
Course Title	Biomedical Waste Management
Course Type	Skill Enhancement Course
Credit	2 (Theory)
Course Level	300-399
Teaching Hour/ Week	2 Hours
Teaching Time	15×2= 30 Hours
Course Objective	<ul style="list-style-type: none"> • Causes, effects and control measure of biomedical waste generation, management protocol and describe the duties, roles and responsibilities of technician. • To help prevent harm to workers, property, the environment and the general public. • Graduate will adhere to policies and regulations of healthcare system and follow infection control, safety and biomedical waste disposal practices to improve patient outcomes. • Demonstrate technical expertise in biomedical waste segregation, hand hygiene and PPE donning (putting on) and doffing (taking it off) techniques.
Course Outcome	<p>At the end of the course, the students will able to</p> <p>CO-1: Types of waste generated, identify the characteristics and risks associated with different waste types, identify major sources of healthcare waste and the activities that generate it and demonstrate safe workplace practices to minimize risks associated with waste handling.</p> <p>CO-2: Understand steps for Management of Biomedical Waste including segregation, treatment and disposal as per WHO guidelines.</p>

	Understand the roles and responsibilities of staff in managing BMW. Ensure compliance with environmental safety standards in BMW disposal.										
Mapping between Cos and PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10
	CO 1										
	CO2										

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	Waste generation and safe environment	15 Hr.
1.1	Introduction-Waste, Classification of waste- Hazardous and Non- Hazardous waste	
1.2	Hazardous waste category	
1.3	Health-care waste- major sources, activities, Risk	
1.4	Safe working environment and practices	
Unit-2	Biomedical waste (BMW) management and its disposal	15 Hr.
2.1	Introduction and Classification of BMW (As per WHO), Responsibility of staff in BMW management	
2.2	Waste Management Processes-Segregation, Storage and Transportation of BMW.	
2.3	Biomedical waste management in a clinical laboratory - Disposal of used samples, reagents and other biomedical waste	
2.4	Treatment & Disposal BMW	

Reference Books:

Sr. No.	Title/Edition
1	Text book of Medical Laboratory Technology, 3 rd edition, volume-1, Authors Praful B. Godkar, Darshan P. Godkar Publisher Bhalani Publishing house, Mumbai, India
2	National Health Programmes and Policies. Authors Sunil K Vimal. CBS Publishers and Distributors Pvt Ltd, 1 st Edition 2018
3	Govt. of India, Ministry of Environment and Forests Gazette notification No 460 dated July 27, New Delhi: 1998: 10-20.
4	Bio Medical Waste Management Rules, 2016. Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub Section (i), Government of India Ministry of Environment, Forest and Climate Change. Notification; New Delhi, the 28th March, 2016.
5	Guidelines for Management of Healthcare Waste as per Biomedical Waste Management Rules, 2016
6	ORGANIZATION WH. Safe health-care waste management. 2004. Safe Management of Waste from Health Care Activities 2nd Edition: WHO

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