Re-Accredited 'B++' 2.86 CGPA by NAAC
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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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-: પરિપત્ર :-

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન PGDMLT અભ્યાસક્રમ ચલાવતી કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, PG. Diploma in Medical Laboratory Technology વિષયનાં અભ્યાસક્રમ રિવાઈઝ કરવા બાબતે મેડીકલ લેબોરેટરી ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૩/૦૭/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ અન્વયે કરેલ ભલામણ સ્વીકારી વિજ્ઞાન વિદ્યાશાખાની તા.૧૪/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૦ અન્વયે કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૩૪ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

મેડીકલ લેબોરેટરી ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૩/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૨

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર PG Diploma in Medical Laboratory Technology (PG DMLT) વિષયનાં સેમેસ્ટર ૧ અને ૨ નો અભ્યાસક્રમ સર્વાનુમતે મંજૂર કરી તે મંજુર કરવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૧૪/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૦

:: આથી ઠરાવવામાં આવે છે કે, મેડીકલ લેબોરેટરી ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૩/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ અન્વયે કરેલ ભલામણ સ્વીકારી શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર PG Diploma in Medical Laboratory echnology (PG DMLT) વિષયનાં સેમેસ્ટર ૧ અને ૨ નો અભ્યાસક્રમ સર્વાનુમતે મંજૂર કરી એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૧૭/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૩૪

:: આથી ઠરાવવામાં આવે છે કે, વિજ્ઞાન વિદ્યાશાખાની તા.૧૪/૦૭/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૧૦ અન્વયે કરેલ ભલામણ સ્વીકારી મંજુર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૧૮૮૦૫/૨૦૨૩
તા.૨૧–૦૭–૨૦૨૩

કુલસચિવ

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન PGDMLT અભ્યાસક્રમ ચલાવતી કોલેજોનાં આચાર્યશ્રીઓ.
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

Post Graduate Diploma in Medical Laboratory Technology (PGDMLT)

1. Title of the Course: P.G. Diploma in Medical Laboratory Technology (PGDMLT)

2. Eligibility: Candidate should have any of the following (A) or (B) degree

(A) B.Sc. degree in Microbiology, Chemistry (Biology at F.Y. B.Sc. level), Botany, Zoology, Medical Technology, Medical Laboratory Technology, Biochemistry, Biosciences, Life sciences, Biotechnology or Environmental Science as the principal subjects

(B) Degree in M.B.B.S., BDS, BAMS, BHMS, B.Sc. Nursing, B. Pharmacy, B.Sc. Optometry, B. Physiotherapy

3. Duration: One Year (2 Semester)

4. Medium of Instruction: English

5. Program Outcome:

Post Graduate Diploma in Medical Laboratory Technology (PGDMLT) program is designed to prepare students for a career in laboratory. This course provides in-depth understanding and on hand training of principles, concept and techniques of Clinical laboratory tests for disease diagnosis. Some of the major areas that will be covered in this program are: Basic Knowledge of Medical Laboratory and safe laboratory practices. It also includes concepts and working in different departments of Medical Laboratory like, Microbiology, Immunology, Immunohaematology, Biochemistry and Enzymology, Haematology, Clinical Pathology, Parasitology, Laboratory management, Laboratory Instruments and Advance analytical techniques.

At the end of the program, candidates will be able to...

- Apply knowledge and technical skills associated with medical laboratory technology for delivering quality clinical investigations support.
- Perform routine clinical laboratory procedures within acceptable quality control parameters in different departments like, Haematology, Clinical Pathology, Biochemistry, Blood Bank and Microbiology of clinical laboratories.
- Demonstrate technical skills, social behavior and professional awareness for functioning effectively as a laboratory technologist or laboratory technician.
- Function in an ethical and professional manner without bias against any ethnicity, race, religion, caste or gender.

6. Program Specific Outcome:

Post Graduate Diploma in Medical Laboratory Technology (PGDMLT) is concerned with the diagnosis, treatment and prevention of disease through the use of clinical laboratory tests. Doctors rely on laboratory technologies to detect, diagnose and treat diseases. The programme covers the basics of preclinical subjects such as Biochemistry, Pathology, Microbiology, Immunology, Parasitology, Haematology, Blood banking, Laboratory management and Instrumentation and Advance techniques in diagnosis of diseases. Medical laboratory technologist do these tests by analysing different specimens like, blood, body fluids, tissues, urine, stool, sputum, semen etc.

At the end of programme, the candidates shall be able to:

1. Perform all the diagnostic techniques.
2. Use discretely the essential laboratory services.
3. Manage all types of clinical diagnostic methods.
4. Handle and operate the modern equipments and instruments in laboratory test.
5. Develop leadership qualities to function effectively as a leader in the laboratory environment.
6. Render services to the laboratory set up and to communicate effectively with the doctors, patients and the hospital management.
7. Development of skill and competency in data processing, reporting and maintenance of records & Laboratory investigations.
8. Apply safety precautions, quality assurance, biomedical waste management, automation in in the laboratory.

7. Paper Style for Core Papers: Total Marks: 70

Q-1: 14 marks: Objective type Question (Equal distribution from each unit)

Q-2: 14 marks (Unit 1)

Q-3: 14 marks (Unit 2)

Q-4: 14 marks (Unit 3)

Q-5: 14 marks (Unit 4)

8. Standard of Passing:

a. Candidate must obtain 40 % marks in theory papers and practical papers separately.

b. There will be a separate head of passing for theory papers and practical. If candidate fails in one of the heads, he / she has to reappear only for the failed head.

9. Qualification of the Examiners: All examiners on the University panel for theory and practical should have Master degree in the subject/ relevant subject. There will be two examiners (Preferably one internal and one external) for practical examination in each subject.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Post Graduate Diploma in Medical Laboratory Technology (PGDMLT)

Course Structure of Semester 1

Semester-1							
Course Code	**Title of The Course**	**Course Credit**	**Hrs. Per Week**	**Internal Exam Marks**	**External Exam Marks**	**Total Marks**	**Duration of External Exam (Hr.)**
Core Course							
PGDMLT-1001	Medical Laboratory Technology Fundamentals	04	04	30	70	100	03
PGDMLT-1002	Immunology	04	04	30	70	100	03
PGDMLT-1003	Medical Microbiology	04	04	30	70	100	03
Elective Course (Any One)							
PGDMLT-1004A	Basics of Microbiology	04	04	30	70	100	03
PGDMLT-1004B	Basics of Biochemistry						
Practical Course							
PGDMLT-1005	Practical Based on Paper PGDMLT-1001 (Medical Laboratory Technology Fundamentals)	02	04	15	35	50	06
PGDMLT-1006	Practical Based on Paper PGDMLT-1002 (Immunology)	02	04	15	35	50	06
PGDMLT-1007	Practical Based on Paper PGDMLT-1003 (Medical Microbiology)	02	04	15	35	50	06
PGDMLT-1008A	Practical Based on Paper PGDMLT-1004A (Basics of Microbiology)	02	04	15	35	50	06
PGDMLT-1008B	Practical Based on Paper PGDMLT-1004B (Basics of Biochemistry)						
Skilled Based Elective Course (Any One)							
PGDMLT-1009A	Instrumentation and Techniques	02	02	20	30	50	02
PGDMLT-1009B	MOOC/ Swayam						
Total		26	34	200	450	650	

PGDMLT-1001: MEDICAL LABORATORY TECHNOLOGY FUNDAMENTALS

Semester: I	
Course (subject) Code	PGDMLT-1001
Subject Title	Medical Laboratory Technology Fundamentals
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • Basics of clinical laboratory and its types, Ethics and Law of clinical laboratory, organization and Accreditation of Laboratory • Laboratory safety and waste management • Different types of solutions, its preparation and laboratory calculation • Quality Laboratory process, Quality control and QC chart preparation as well as Westguard multi-rule chart for QC

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	**Basics In Medical Laboratory Technology**	**15 Hr.**
1.1	Introduction, Functional Components of Clinical Laboratory, Various Types of Clinical Laboratories, Role of Medical Laboratory Technologist	
1.2	Code of Conduct, Ethics, Medico-Legal Aspects of Clinical Practice	
1.3	Commonly Requested Laboratory Tests in India and Other Developing Countries	
1.4	Organization of Clinical Laboratory	
1.5	Accreditation, Certification of Laboratories and Accrediting Agencies: ISO-Standard; NABL/NABH-Aims, Objectives, Scope, Qualification Norms	
Unit-2	**Laboratory Accidents and Safety**	**15 Hr.**
2.1	Laboratory Hazards- Physical, Chemical and Biological, Accidents and Safety Measures in Clinical Laboratory	
2.2	Code of Safe Laboratory Practice	
2.3	First Aid in Laboratory	
2.4	Biosafety Level and Biosafety Programme	
2.5	Biomedical Waste Management	
Unit-3	**Laboratory Solutions and Reagents**	**15 Hr.**
3.1	Introduction, Reagent Grade Water, General Laboratory Wares	
3.2	Expression of Solution Concentration	
3.3	Preparation of Laboratory Solutions	
3.4	Sources of Error in Preparation of Solution	
3.5	Units of Measurements, SI Units	
Unit-4	**Quality Control in Medical Laboratory**	**15 Hr.**
4.1	Quality Laboratory Process Analytical Variables- Central Tendency, Standard Deviation, Co-Efficient of Variation, Accuracy, Precision, Sensitivity and Specificity	
4.2	Sources of Common Errors in Medical Laboratory	
4.3	Quality Control Issue by Laboratory Types	
4.4	Quality Control Charts: Levy-Jenning Chart and Cusum Chart	
4.5	Westguard Multi-rule Charts	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Text Book of Medical Laboratory Technology (Volume-1)/3rd	P. B. Godkar D. P. Godkar	Bhalani Publishing House
2	Text Book of Medical Laboratory Technology/1st	Ramnik Sood	JAYPEE Brothers, Medical Publishers(P)LTD
3	Medical Laboratory Technology - (Volume 1)/3rd	Kanai L Mukherjee Anuradha Chakravarthy	Mcgraw Hill Education (India) Private Limited
4	District Laboratory Practice in Tropical Countries (Volume 1)/2nd	Monica Cheesbrough	Cambridge University Press.
5	Medical Microbiology and Parasitology/4th	B. S. Nagoba Asha Pichare	ELSEVIER
6	Medical Laboratory Science: Theory & Practice	J. Ochei A. Kolhatkar	Mcgraw Hill Education (India) Private Limited
7	Handbook of Quality Assurance in Laboratory Medicine	S. Tambwekar	BI Publication Private Limited

PGDMLT-1002: IMMUNOLOGY

Semester: I	
Course (subject) Code	PGDMLT-1002
Subject Title	Immunology
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course the students will • Know the basics of immunity and the cells involved in Immune system, Various immunological diseases and their mechanisms, Different types of vaccines • Get knowledge of Antigen and antibody and performance of various antigen-antibody reactions

Course Content

Unit No.	Content	Teaching Hours
Unit-1	**Immunity**	**15 Hr.**
1.1	Introduction	
1.2	Classification of Immunity: Innate, Acquired, Active, Passive, Cell Mediated and Humoral	
1.3	Organs and Cells of Immune System	
1.4	Vaccine: Types and Vaccination Schedule in India	
Unit-2	**Antigen and Antibody**	**15 Hr.**
2.1	Antigen: Definition, Characteristics, Properties Classification of Antigen Types of Antigen- Haptens and Epitopes	
2.2	Antibody: Definition, Characteristics, Properties Structure and Types Monoclonal And Polyclonal Antibody	
Unit-3	**Antigen – Antibody Reactions**	**15 Hr.**
3.1	Factors Affecting Antigen – Antibody reactions	
3.2	Precipitation and Agglutination Reaction	
3.3	Immunochromatographic Technique	
3.4	ELISA and RIA	
3.5	Immunofluorescence	
Unit-4	**Immunological Disorder**	**15 Hr.**
4.1	Hypersensitivity	
4.2	Mechanism and Classification of Autoimmune Disorder	
4.3	Immunodeficiency Disorder	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Immunology/7th ed.	Owen,Judith A. ,PuntStanford,Sharon A.,Jones,Patricia P., Kuby	Macmillan Higher education Pub.
2	Immunology	B. S. Nagoba, D. V. Vedpathak	BI Publication Pvt LTD
3	Text book of Medical Microiology/5th	R. Ananthnarayan C. K. Jayram Paniker	Orient Longman, Madras.
4	Immunology/2nd	P. Lydyard A. Whelan M. W. Fanger	BIOS Scientific Publishers Limited
5	Essential Immunology/6 th	I.M. Roitt	ELBS, London
6	A Hand book of Practical Immunology/1st	G.P. Talwar	Vikas Publishing House.
7	Medical Laboratory Technology/ 4th	Sood R.	Jaypee Brothers.
8	Textbook of Medical Laboratory Technology	P. B. Godkar, D.P. Godkar	Bhalani Pub.

PGDMLT-1003: MEDICAL MICROBIOLOGY

Semester: I	
Course (subject) Code	PGDMLT-1003
Subject Title	Medical Microbiology
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • The pathogenic bacteria that have ability to cause diseases and also techniques to perform microbiological examination of different clinical samples. • The prominent human viral infections – their pathogenesis, diagnosis and role of a clinical laboratory. This is important due to recent prominent viral diseases and their detection. • The mycological examination of various clinical samples may require simple technology and instruments but give an effective clinical picture in differential diagnosis. Definitive diagnosis of mycological examination is always based on direct examination of samples. • Modern developments have contributed to increased epidemiological aspects of protozoological diseases. The given unit helps to understand the basic human parasites, their mode of entry, mechanism of action, pathogenesis and laboratory diagnosis. • Antimicrobial Sensitivity Test to find drug of choice • Hospital Acquired Infection

Course Content

Unit No.	Content	Teaching Hours
Unit-1	**Collection and Processing of Clinical Specimens**	**15 Hr.**
1.1	Collection, Transportation and Examination of Clinical specimen: Urine, Sputum, Pus, Feces, Blood, CSF	
1.2	Collection, Transportation and Examination of Clinical specimen for Viral Diseases	
1.3	Collection, Transportation and Examination of Clinical specimen for Fungal Diseases	
1.4	Antimicrobial Sensitivity Test: Disc Diffusion and MIC	
Unit-2	**Diagnostic Bacteriology**	**15 Hr.**
2.1	Identification of bacteria by Morphological, Cultural and Biochemical characteristics: *Staphylococcus aureus, Streptococcus pneumoniae, Bacillus cereus, Escherichia coli, Klebsiella spp., Proteus vulgaris, Salmonella spp., Pseudomonas aeruginosa*	
2.2	Identification of bacteria by Automated Method: BACTEK and VITEK	

2.3	Causative agent and Laboratory diagnosis of Bacterial Diseases: Diphtheria; Cholera; Syphilis; Typhoid; Tuberculosis; Food Poisoning; Urinary Tract Infection	
2.4	Hospital Acquired Infection	**15 Hr.**
Unit-3	**Diagnostic Virology**	
3.1	General Lab Diagnosis of Viral Infections	
3.2	Causative agent and Laboratory diagnosis of AIDS	
3.3	Causative agent and Laboratory diagnosis of Hepatitis	
3.4	Causative agent and Laboratory diagnosis of Other Viral Diseases: Dengue; Chikungunya; SARS	
Unit-4	**Diagnostic Mycology and Parasitology**	**15 Hr.**
4.1	Mycoses: Cutaneous, Sub Cutaneous and Superficial Mycosis	
4.2	Laboratory Diagnosis of Mycotic Infections	
4.3	General Laboratory Diagnosis for Parasitic Infection	
4.4	Causative agent and Laboratory diagnosis of Malaria and Amoebic Dysentery	

Reference Books:

Sr. No.	Title/ Edition	Authors	Publiser
1	Textbook of Medical Laboratory Technology /3rd	Praful B Godkar	Bhalani Publisher
2	Textbook of Medical Laboratory Technology/3rd	Ramnik Sood	Jaypee
3	Laboratory Practice in Tropical countries – Vol 1 & 2	Monica Cheesbrough	Cambridge Univ Press
4	Prescott's Microbiology/11th	Willey, Sandman & Wood	McGraw Hill
5	Clinical Microbiology & Parasitology (For DMLT students)/3rd edition	Nanda Maheshwari	Jaypee
6	Instant Notes in Microbiology/3rd edition	Simon Baker	Taylor & Francis
7	Medical Microbiology/16th	David Greenwood	Elsevier
8	Medical Parasitology/5th	D R Arora	CBS publishers
9	Textbook of Medical Parasitology/8th	Sougata Ghosh	Jaypee

PGDMLT-1004A: BASICS OF MICROBIOLOGY

Semester: I	
Course (subject) Code	PGDMLT-1004A
Subject Title	Basics of Microbiology
Course Type	Core Elective
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • Role of scientists in Microbial Evolution, Types of microorganisms with Bacterial Structure and Normal flora of human body along with their role • Working Principle and components of different types of microscopes. • Dyes, stains, Mordants, fixatives and intensifier including their importance and application in laboratory. • Different sterilization techniques required in Microbiology laboratory as well as characteristics and mechanism of actions of disinfectant. • Microbiological medias used for cultivation, isolation, identification and preservation of bacteria

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	**Introduction of Microbiology**	**15 Hr.**
1.1	Contributions of Louis Pasteur and Robert Koch	
1.2	Bacteria: Cell Structure and Morphological Classification	
1.3	Virus: General Structure, Morphology and Characteristics	
1.4	Fungi: General Properties and Classification	
1.5	Parasite: Types and Host Parasite Relationship	
1.6	Normal Flora of Human Body	
Unit-2	**Microscopy**	**15 Hr.**
2.1	Basic Terminologies: Refraction and refractive Index, Magnification, Numerical aperture, Resolution and Resolving Power	
2.2	Principles & Components of: Light microscope Dark field microscope and Phase contrast Microscope	
2.3	Principles & Components of: Fluorescent and Electron microscope	
2.4	Importance and applications of dyes, stains, fixatives, mordent and intensifiers.	
Unit-3	**Sterilization And Disinfection**	**15 Hr.**
3.1	Definition, Principles and application	
3.2	Physical Methods of sterilization: a) Heat b) Radiation c) Filtration	
3.3	Chemical methods of sterilization: Alcohol, Phenol & Phenolic compounds, Hypochlorite, ETO, β- propionolactone	
3.4	Ideal characteristics of Disinfectants	
3.5	Mode of action of Disinfectants	
Unit-4	**Bacteriological Media for Isolation and Cultivation**	**15 Hr.**
4.1	Bacteriological media: Principle, composition and use Nutrient Agar, Mac Conkey Agar, Eosin Methylene Agar, W.B. Agar, Blood Agar, Chocolate Agar, MSA, CLED Agar, Phenyl Alanine	

	Agar, Simon's Citrate Slant, Triple Sugar Iron Agar, 1% and 2% peptone, Glucose Phosphate Broth, Urea Broth, Sugar Fermentation Broth	
4.2	Methods of Cultivation: a) Broth, slant and Stab b) Enrichment technique	
4.3	Methods of Isolation	

Reference Book:

Sr. No.	Title/ Edition	Authors	Publiser
1	Elementary Microbiology, Fundamentals of Microbiology, Vol-1	Modi H.A.	Ekta Prakashan
2	Microbiology/8th	Prescott M, Harley John P.	Mc Graw Hill
3	A text book of Microbiology and immunology/2nd	Subhash Chandra Parija	ELSEVIER
4	Mackie and McCartney Medical Microbiology. A Guide to Laboratory Diagnosis and control of Infection/13th	Mackie and McCartney	
5	Textbook of Medical Laboratory Technology /3rd	Praful B Godkar	Bhalani Publisher

PGDMLT-1004B: BASICS OF BIOCHEMISTRY

Course Code	PGDMLT-1004B
Course Title	Basics of Biochemistry
Course Type	Core Elective
Teaching Time	15×4=60 Hours
Course Outcome	On completion of this course, students will get knowledge of • Introduction, Classification, Biological Functions of Biomolecules (like Carbohydrates, Lipids, Proteins, Nucleic acids). • Enzymes, Coenzymes and Isoenzymes. • Classification, Structure, daily requirements, dietary sources, biological functions and deficiency manifestation of vitamins. • Biochemical function, Dietary requirement, Source, Absorption and excretion of minerals & Electrolytes.

Course Content

Unit No.	Content	Teaching Hours
Uniit-1	**Biomolecules:** Introduction, Classification and Biological Functions	**15 Hr.**
1.1	Carbohydrate	
1.2	Protein	
1.3	Lipid	
1.4	Nucleic acid	
Unit-2	**Enzymology**	**15 Hr.**
2.1	Nomenclature and Classification of Enzyme	
2.2	Co-enzyme	
2.3	Factors affecting Enzyme activity	
2.4	Isoenzymes: LDH, CK and ALP	
Unit-3	**Vitamins**	**15 Hr.**
3.1	Introduction	
3.2	Classification	
3.3	Structure, daily requirements, dietary sources, biological functions and deficiency manifestation of fat-soluble vitamins	
3.4	Structure, daily requirements, dietary sources, biological functions and deficiency manifestation of water-soluble vitamins	
Unit-4	**Electrolyte and Minerals**	**15 Hr.**
4.1	General Functions and Classification of Minerals	
4.2	Biochemical function, Dietary requirement, Source, Adsorption and excretion of: Calcium, Phosphorus, Iron	
4.3	Bio chemical function, Dietary requirement, Source, Adsorption and excretion of: Sodium, Potassium and Chloride	

Reference Books:

Sr. No.	Title/ Edition	Authors	Publiser
1	Biochemistry/4th	Satyanarayana U. & Chakrapani U.	Arunabha Sen and Allied (P) Ltd.
2	Textbook of Biochemistry/4th	Vasudevan D.& Sreekumari S.	Jaypee Pub
3	Textbook of Medical Biochemistry/7th	Chatterjae M. N. and Shinde R.	Jaypee Brothers Publishers
4	Biochemistry/2nd	Rastogi S.C.	Tata McGrow Hill Publishing Company Limited

PGDMLT-1005: PRACTICALS BASED ON PAPER PGDMLT- 1001

(Medical Laboratory Technology Fundamentals)

Semester: I	
Course (subject) Code	PGDMLT-1005
Subject Title	Practicals Based on Paper PGDMLT- 1001(Medical Laboratory Technology Fundamentals)
Subject Outcome	At the end of the course, the students will able to • Calibrate and operate Laboratory Instruments • Sterilization, cleaning, handling and calibration of laboratory glass wares • Prepare various types of solutions • Provide First aid for different types of clinical laboratory hazards. • Prepare and interpret QC chart

Course Content

1. Study of Laboratory glasswares
2. Calibration of volumetric pipette
3. Cleaning and preparation of glassware for sterilization
4. Preparation of Solution (Molar, Normal and Percent)
5. Preparation of various dilutions from stock solution
6. Operation of - pH meter, Single pan Balance, Spectrophotometer/Colorimeter and Centrifuge
7. Measurement and adjustment of pH using pH meter.
8. Study of Laboratory Hazards and First Aid measures
9. Disposal of Biomedical waste
10. Preparation of Quality Control Charts: Levy-Jenin Chart

Sr. No.	Title/Edition	Authors	Publisher
1	Text Book of Medical Laboratory Technology (Volume-1)/3rd	P. B. Godkar D. P. Godkar	Bhalani Publishing House
2	Experimental Microbiology, Volume 1 & 2	Patel, R.J., and Patel,R.K	Aditya Pub
3	Medical Laboratory Technology - (Volume 1)/3rd	Kanai L Mukherjee Anuradha Chakravarthy	Mcgraw Hill Education (India) Private Limited
4	Medical Microbiology and Parasitology/4th	B. S. Nagoba Asha Pichare	ELSEVIER

PGDMLT-1006: PRACTICALS BASED ON PAPER PGDMLT- 1002

(Immunology)

Semester: I	
Course (subject) Code	PGDMLT-1006
Subject Title	Practicals Based on Paper PGDMLT- 1002 (Immunology and Immunohaematology)
Subject Outcome	At the end of the course, the students will be able to perform • Various immunological tests like Widal, RA, CRP, ASO, RPR, HIV antibodies, HBsAg, HCV rapid test for diagnosis of diseases by detecting antigen or antibody •

Course Content

1) ICT/Dot immunoassay/ Flow through assay for HIV Ab
2) ICT/Dot immunoassay/ Flow through assay for HBsAg
3) ICT/Dot immunoassay/ Flow through assay for HCV Ab
4) Slide / Tube/ Strip / Cassette/ Dot immunoassay test for typhoid
5) Slide test/ Flow through /Spot/ Dot immunoassay for Syphilis
6) Latex test for Rheumatoid arthritis
7) Latex test for C-Reactive protein
8) Latex test for Anti Streptolysin O (ASO)
9) ELISA for detection of HIV Ab (Demonstration)
10) ELISA for detection of HBsAg (Demonstration)

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Immunology/7th ed.	Owen,Judith A. ,PuntStanford,Sharon A.,Jones,Patricia P., Kuby	Macmillan Higher education Pub.
2	Text book of Medical Microiology/5th	R. Ananthnarayan C. K. Jayram Paniker	Orient Longman, Madras.
3	Immunology/2nd	P. Lydyard A. Whelan M. W. Fanger	BIOS Scientific Publishers Limited
4	Essential Immunology/6 th	I.M. Roitt	ELBS, London
5	A Hand book of Practical Immunology/1st	G.P. Talwar	Vikas Publishing House.
6	Medical Laboratory Technology/ 4th	Sood R.	Jaypee Brothers.
7	Textbook of Medical Laboratory Technology	P. B. Godkar, D.P. Godkar	Bhalani Pub.

PGDMLT-1007: PRACTICALS BASED ON PAPER PGDMLT- 1003

(Medical Microbiology)

Semester: I	
Course (subject) Code	PGDMLT-1007
Subject Title	Practicals Based on Paper PGDMLT- 1003 (Medical Microbiology)
Subject Outcome	At the end of the course, the students will get knowledge of • Isolation and identification of pathogens from clinical samples: urine, stool, sputum, pus, CSF • Antibiotic Susceptibility Test • Identification of fungi from clinical specimen • Identification of malarial parasites in stained Blood smear and by immunochromatographic test • Identification of stool and blood parasites

Course Content

1) Processing of Blood sample for bacterial culture
2) Processing of Urine sample for bacterial culture
3) Processing of Stool sample for bacterial culture
4) Processing of CSF sample for bacterial culture
5) Processing of Sputum sample for bacterial culture
6) Processing of Pus sample for bacterial culture
7) Antimicrobial Susceptibility Test
8) Examination of Fungi from clinical specimen by direct microscopic method
9) Detection of malarial parasites by immunochromatographic test / Blood smear
10) Study of parasites present in:
    - Stool: *Giardia lamblia, Entamoeba histolytica, Taenia species & Ascaris lumbricoides*
    - Blood: *Plasmodium spp., Microfilaria & Leishmania donovani*

Reference Book:

Unit No.	Title/ Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology – 3rd edition	Praful B Godkar	Bhalani Publisher
2	Textbook of Medical Laboratory Technology – 3rd edition	Ramnik Sood	Jaypee
3	Clinical Microbiology/ 2nd	B.S. Nagoba	BI Publications
4	Short Text Book of Medical Microbiology-including Parasitology/ 10th	Satish Gupte	Jaypee

PGDMLT-1008A: PRACTICALS BASED ON PAPER PGDMLT- 1004A

(Basics of Microbiology)

Semester: I	
Course (subject) Code	PGDMLT-1008A
Subject Title	Practicals Based on Paper PGDMLT- 1004A (Basics of Microbiology)
Subject Outcome	At the end of the course, the students will get knowledge of • Cultivate and study of morphological and growth characteristics of microorganisms. • Perform differential and special staining techniques for identification of causative agents. • Identify fungi based on morphological and growth characteristics • Check the effect of various physical and chemical agents on bacterial growth

Course Content

1) Examination of living Bacteria
    a. Wet mount preparation
    b. Hanging – drop technique
    c. Semisolid stab agar test
2) Observation of Bacteria by staining techniques: a) Simple Staining b) Negative Staining.
3) Differential Staining Techniques: a) Gram Staining b) Acid fast Staining.
4) Special Staining Techniques: a) Spirochaete Staining b) Metachromatic Granules Staining. c) Spore Staining d) Capsule Staining
5) Study of Cultural and Growth Characteristics on Bacteriological Media: Nutrient Agar, Mac Conkey Agar, Eosin Methylene Agar, W.B. Agar, Blood Agar, Chocolate Agar, MSA
6) Study of some important biochemical reactions:
    a) Indole Test, Methyl red Test, V.P. Test, Citrate Utilization Test, H_2S Production (2% peptone), TSI slants, Sugars Fermentation Test
    b) Test for enzyme activity-Oxidase, Catalase, Coagulase, Urease
7) Bactericidal effect of Antiseptic and Disinfectant on microbial growth

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Text Book of Medical Laboratory Technology (Volume-1)/3rd	P. B. Godkar D. P. Godkar	Bhalani Publishing House
2	Experimental Microbiology,Volume 1 & 2	Patel, R. J., and Patel, R. K	Aditya Pub

PGDMLT-1008B: PRACTICALS BASED ON PAPER PGDMLT-1004B

(Basics of Biochemistry)

Course Code	PGDMLT-1008B
Course Title	Practicals Based on Paper PGDMLT-1004B (Basics of Biochemistry)
Course Outcome	• Understanding Good laboratory practices in a biochemistry laboratory. • Identification of biomolecules (carbohydrates, lipids, protein and non-protein nitrogenous substance) by qualitative analysis.

Course Content

1) General scheme for identification of Biomolecules.
2) Qualitative analysis of Carbohydrates
3) Qualitative analysis of Proteins
4) Qualitative analysis of Lipids and Cholesterol
5) Qualitative analysis of Non Protein Nitrogenous Substances

Reference Book

Sr. No.	Title/Edition	Authors	Publisher
1	Practical Clinical Biochemistry: Methods and Interpretation/4th	Ranjan Chawla	JaypeeBrothers

PGDMLT-1009: INSTRUMENTATION AND TECHNIQUES

Semester: I	
Course (subject) Code	PGDMLT-1009
Course Type	Skilled Based Elective Course
Teaching Time	15×2=30 Hours
Subject Title	Instrumentation and Techniques
Subject Outcome	At the end of the course, the students will get knowledge of • Working Principle, components, operation and use of various equipments like, potentiometer, centrifuge, distillation unit and weighing balance, colorimeter, spectrometer, flame photometer and turbidometer. • Principle, types and application of Electrophoretic and Chromatographic techniques

Course Content

Unit No.	Content	Teaching Hours
Unit-1	**Laboratory Instruments**	**7 Hr.**
1.1	pH Meter	
1.2	Centrifuge	
1.3	Colorimeter	
1.4	Spectrophotometer	
Unit-2	**Electrophoresis**	**8 Hr.**
2.1	Principle	
2.2	Factors Affecting Electrophoresis	
2.3	Support Media	
2.4	Types of Electrophoresis: PAGE & SDS	
Unit-3	**Chromatography**	**7 Hr.**
3.1	Introduction	
3.2	Types and Application	
3.3	Paper Chromatography	
3.4	Thin Layer Chromatography	
Unit-4	**Advance Diagnostic Techniques**	**8 Hr.**
4.1	Protein Blotting Technique	
4.2	Nucleic Acid Blotting Technique	
4.3	NAAT – PCR	
4.4	Autoanalyser: Haematology Cell Counter, Biochemistry Analyser	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Analytical Biochemistry: (Biochemical Technique)	P. Ashokan	Chinna Pub., Nelvisharani, Vellor
2	Textbook of Medical Laboratory Technology/3rd	P.B. Godkar	Bhalani Publishering
3	Medical Laboratory Science: Theory & Practice	Ochei J. & Kolhatkar A	Tata McGraw Hill Pub.
4	Practical Biochemistry: Principles & Technique/5th	Wilson K. & Walker J	Cambridge University Press

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Post Graduate Diploma in Medical Laboratory Technology (PGDMLT)

Course Structure of Semester 2

Semester-2							
Course Code	**Title of The Course**	**Course Credit**	**Hrs. Per Week**	**Internal Exam Marks**	**External Exam Marks**	**Total Marks**	**Duration of External Exam (Hr.)**
Core Course							
PGDMLT-2001	Haematology	04	04	30	70	100	03
PGDMLT-2002	Clinical Pathology	04	04	30	70	100	03
PGDMLT-2003	Clinical Biochemistry	04	04	30	70	100	03
Elective Course (Any One)							
PGDMLT-2004A	Immunohaematology and Histo-Cytology	04	04	30	70	100	03
PGDMLT-2004B	Parasitology						
Practical Course							
PGDMLT-2005	Practical Based on Paper PGDMLT-2001 (Haematology)	02	04	15	35	50	06
PGDMLT-2006	Practical Based on Paper PGDMLT-2002 (Clinical Pathology)	02	04	15	35	50	06
PGDMLT-2007	Practical Based on Paper PGDMLT-2003 (Clinical Biochemistry)	02	04	15	35	50	06
PGDMLT-2008A	Practical Based on Paper PGDMLT-2004A (Blood Banking and Histo-Cytological Techniques)	02	04	15	35	50	06
PGDMLT-2008B	Practical Based on Paper PGDMLT-2004B (Parasitology)						
Skilled Based Elective Course (Any One)							
PGDMLT-2009A	Training in Pathology Laboratory	02	02	20 (Training report based)	30 (Certificate based)	50	
PGDMLT-2009B	MOOC/ Swayam						
Total		26	34	200	450	650	

PGDMLT-2001: HAEMATOLOGY

Semester: II	
Course (subject) Code	**PGDMLT 2001**
Subject Title	**Haematology**
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • Blood, its functions and Formation • Haemoglobin and its abnormal forms resulting in diseases • Detailed study of Red Cells, White cells, Platelets and their clinical significance • Coagulation and its disorders

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	**Introduction to Haematology**	**15 Hr.**
1.1	Definition, composition and functions of blood	
1.2	Anticoagulants and Blood collection	
1.3	Erythropoiesis	
1.4	Leucopoiesis	
1.5	Thrombopoiesis	
Unit-2	**Haemoglobin and Haemoglobinopathies**	**15 Hr.**
2.1	Definition, structure of Hb and its types	
2.2	Hb Estimation: (a) Colorimetric Method, (b) Sahli's Method, and (c) Specific Gravity Method.	
2.3	Clinical significance: Normal and abnormal values	
2.4	Haemoglobinopathies: Abnormalities of Haemoglobin Molecule. Sickle Cell Anaemia &Thalassemia	
2.5	Tests for Haemoglobinopathies	
Unit-3	**Red Blood Cells and Anemias**	**15 Hr.**
3.1	Morphology of normal and abnormal Red Blood Cells	
3.2	RBC count and Reticulocyte count	
3.3	Erythrocyte Sedimentation Rate (ESR) and Haematocrit: Pack Cell Volume (PCV)	
3.4	Blood cell indices	
3.5	Anemia: Definition and classification of anemia; factor causing anemia a) Iron & Vit B-12 deficiency anaemia. b) Aplastic anaemia c) Haemolytic anaemia d) G_6PD deficiency anaemia	
Unit-4	**White Blood Cells and Coagulation**	**15 Hr.**
4.1	Total and Differential White Blood Cell Count	
4.2	Introduction and general Classification of Leukaemias. Acute & Chronic Myeloid Leukaemias	
4.3	Haemostasias, Coagulation Cascade and Coagulation disorders test – Bleeding time (BT), Clotting time (CT), Prothrombin time (PT), Activated Partial Thromboplastin Time (APTT), D-dimer, Fibrinogen	
4.4	Coagulation disorders-Haemophilia	

4.5	Platelet count and platelet disorder-Von Willebrand Disease	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Practical Haematology. The English Language Book Society/ 8th	Dacei J.A & Lewis S.M.	Elseiver
2	Clinical Haematology, Kothari's Indian Edition.	Wintrobe M. M.	Wolters Kluwer
3	Textbook of MLT/ 3rd edition,	Godkar P. B.	Bhalani Publications.
4	Clinical Pathology, Haematology and Blood Banking Microbiology (For DMLT students)/4th edition	Nanda Maheshwari	Jaypee
5	Textbook of Haematology/ 2nd	Dr. Tejinder Singh	Arya Publications

PGDMLT-2002: CLINICAL PATHOLOGY

Semester: II	
Course (subject) Code	**PGDMLT-2002**
Subject Title	**Clinical Pathology**
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	The students are imparted basic training of theoretical and practical in the field of clinical pathology. The training in this subject enables the students • To carry out routine clinical laboratory investigation (urine, stool, sputum etc.). • Made to learn collection of clinical samples and their processing • Pathological sample analysis reporting and recording of data.

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	**Urine Analysis**	**15 Hr.**
1.1	Formation, Composition, Indication, Collection, Preservation & Transportation of Urine specimen	
1.2	Physical Examination	
1.3	Chemical Examination	
1.4	Microscopic Examination	
1.5	Pregnancy test	
Unit-2	**Analysis of Pathological Specimen: Stool, Sputum & Semen**	**15 Hr.**
2.1	Introduction, Indications and Composition	
2.2	Collection, Preservation and Transportation of specimen	
2.3	Physical Examination	
2.4	Chemical Examination	
2.5	Microscopic Examination	
Unit-3	**Cerebrospinal Fluid (C.S.F) Analysis**	**15 Hr.**
3.1	Formation, Composition, Indication, Collection, Preservation & Transportation of CSF specimen	
3.2	Physical Examination	
3.3	Chemical Examination	
3.4	Microscopic Examination	
3.5	Correlation of Abnormal C.S.F. findings in various diseases.	
Unit-4	**Body Fluid Analysis: Collection, Physical, Chemical and Microscopic**	**15 Hr.**
4.1	Fluid Effusion: Transudate & Exudate	
4.2	Pleural	
4.3	Peritoneal	
4.4	Pericardial	
4.5	Synovial fluid	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology/ 3rd	Godkar P. B.	Bhalani Publishing house.
2	Medical Laboratory Science: Theory & Practice,	Ochei J. & Kolhatkar	Tata McGraw Hill Pub.
3	Medical Laboratory Technology, Vol. II/ 2nd	Mukharjee K. L.	Tata MacGraw Hill.
4	Textbook of Pathology/ 5th	Mohan H.	Jaypee Brothers Medical publishers (P) LTD.
5	Medical Laboratory Technology, 4th ed.	Sood R.	Jaypee Brothers.
6	Essential of Clinical Pathology/ 2nd	Kawthalkar S. M.	Jaypee Brothers.

PGDMLT-2003: CLINICAL BIOCHEMISTRY

Semester: II	
Course (subject) Code	**PGDMLT-2003**
Subject Title	**Clinical Biochemistry**
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • Regulation and significance of blood glucose level, Metabolic changes occur in Diabetes and its diagnostic profile tests • Plasma proteins, its functions and separation methods and clinical significance • Clinical significance of serum cholesterol level, types of lipoproteins and its metabolism and its pathological variation • Different tests to check the function of Kidney, Liver, Heart and Thyroid

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	**Carbohydrate**	**15 Hr.**
1.1	Definition, Classification and Function	
1.2	Regulation of blood glucose	
1.3	Blood Glucose Estimation and GTT	
1.4	Glycosylated Haemoglobin and its determination	
1.5	Diabetes mellitus and Diabetic profile test	
Unit-2	**Protein and Enzyme**	**15 Hr.**
2.1	Definition, Classification and Function	
2.2	Plasma Proteins estimation, its clinical significance and A:G ratio	
2.3	Electrophoretic pattern of protein fractions in health and disease	
2.4	Introduction to Clinical Enzymology	
2.5	Iso-Enzyme: LDH, CK and ALP	
Unit-3	**Lipid and Lipoprotein**	**15 Hr.**
3.1	Definition, Classification and Function	
3.2	Factors influencing and Pathological variations of blood cholesterol level	
3.3	Lipoprotein: Introduction, Classification and Separation	
3.4	Metabolism and Clinical Disorder of Lipoprotein	
3.5	Lipid Profile Tests- Cholesterol, Triglyceride & Lipoproteins	
Unit-4	**Diagnostic Biochemistry**	**15 Hr.**
4.1	Determination of Electrolytes: Sodium, Potassium, Chloride & Calcium	
4.2	Determinations of Enzymes: SGPT, SGOT, ALP, Lipase, Amylase	
4.3	Determination of Vitamins: B_{12}, D_3	
4.4	Determination of Hormones: T_3, T_4 & TSH	
4.5	Organ function test - Renal, Liver, Cardiac, Thyroid: Function and Classification	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Biochemistry/ 8th	Chatterjae M. N. and Shinde R. (2012)	JaypeeBrothers Publishers
2	Textbook of Medical Laboratory Technology/ 3rd	Godkar P. B. (2014)	Bhalani Publishing house
3	Textbook of Biochemistry/ 4th	Vasudevan D. & Sreekumari S. 2005	JaypeePublishers
4	Biochemistry/4th	Satyanarayana U. & Chakrapani U.	Arunabha Sen and Allied (P) Ltd.

PGDMLT-2004 A: IMMUNOHAEMATOLOGY AND HISTO-CYTOLOGY

Semester: II	
Course (subject) Code	**PGDMLT 2004 A**
Subject Title	**Immunohaematology and Histo-Cytology**
Course Type	Elective
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • Know Various Blood group systems • Learn about Blood Centre and Blood Banking techniques (Transfusion Medicine) • Tissue processing method, Microtomy and staining of tissue sections • Specimen collection, smear preparation and staining for cytological examination

Course Content:

Unit No.	**Content**	**Teaching Hours**
Unit-1	**Blood Group System**	**15 Hr.**
1.1	ABO Blood group System	
1.2	Rh Blood group System	
1.3	Techniques of ABO and Rh grouping	
1.4	Other Blood Group System	
Unit-2	**Blood Collection and Component Preparation**	**15 Hr.**
2.1	Screening and Phlebotomy of Donor	
2.2	Storage and Transportation of Doner	
2.3	Mandatory Screening Tests: HIV-1 & HIV-2, HBsAg, HCV, RPR and Malaria	
2.4	Component Preparation: RCC, FFP, Cryoprecipitate, Platelet Concentrate, Single Donor Platelet	
Unit-3	**Compatibility Testing and Transfusion Reaction**	**15 Hr.**
3.1	Compatibility Testing	
3.2	Selection of Blood components for Transfusion	
3.3	Transfusion reaction: Types and Investigation	
3.4	Mechanism and Investigation of HDN	
Unit-4	**Histological & Cytological Techniques**	**15 Hr.**
4.1	Tissue Processing, Wax Impregnation and Embedding	
4.2	Types of Microtomes	
4.3	H & E staining	
4.4	FNAC	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Compendium of Transfusion Medicine, Practice of Safe Blood Transfusion	R. N. Makroo	Career Expert Publications
2	Technical Manual, 2014 (Online PDF)	Martha Rae Coombs et. al	American Association of Blood Banks
3	Blood Transfusion in Clinical Medicine. 12th edition,	PL Mollison CP Engelfriet ContrerasMarcela	Blackwell Science
4	Essential of Blood Banking and Transfusion Medicine/2nd	Ganga S Pilli	CBS Publishers and Distributors PVT LTD
5	Transfusion Medicine Technical Manual (Online PDF)	Saran R. K	Directorate General of Health Service, Ministry of Health & Family Welfare
6	Textbook of MLT/ 3rd	Godkar P. B	Bhalani Publications.
7	Medical Laboratory Science: Theory & Practice	J. Ochei A. Kolhatkar	Mc Graw Hill Education (India) Private Limited
8	Techniques of Histopathology and Cytopathology	Sadhana Vishwakarma	Jaypee Brothers
9	Textbook of Pathology/ 5th	Mohan H.	Jaypee Brothers Medical publishers

PGDMLT-2004 B: PARASITOLOGY

Semester: II	
Course (subject) Code	**PGDMLT-2004B**
Subject Title	**Parasitology**
Course Type	Core Compulsory
Teaching Time	15×4=60 Hours
Subject Outcome	At the end of the course, the students will get knowledge of • Introduction to Protozoology • Morphology, life-cycle and laboratory diagnosis caused by protozoa. • Specimens required for various protozoal infestations. • General characteristics of helminths, their morphology, life-cycle and laboratory diagnosis. • Specimens required for various helminthic infections.

Course Content:

Unit No.	Content	Teaching Hours
Unit-1	**Protozoology: I: Morphology, life-cycle and laboratory diagnosis**	**15 Hr.**
1.1	Definition and general morphology of Protozoa	
1.2	Amoeba: *Entamoeba histolytica*	
1.3	Intestinal Flagellates: *Giardia lamblia*	
1.4	Genital Flagellates: *Trichomonas vaginalis*	
Unit-2	**Blood Protozoa: II: Morphology, life-cycle and laboratory diagnosis**	**15 Hr.**
2.1	*Leishmania donovani*	
2.2	*Plasmodium vivax*	
2.3	*Plasmodium falciparum*	
2.4	*Toxoplasma gondii*	
Unit-3	**Helminthology: I: Morphology, life-cycle and laboratory diagnosis of**	**15 Hr.**
3.1	General characteristics of helminths (Cestodes, Trematodes and Nematodes)	
3.2	*Taenia saginata and Taenia solium*	
3.3	*Echinococcus granulosus and Hymenolepis nana*	
3.4	*Schistosoma haematobium*	
Unit-4	**Helminthology: II: Morphology, life-cycle and laboratory diagnosis of**	**15 Hr.**
4.1	*Trichuris trichiura*	
4.2	*Enterobius vermicularis*	
4.3	*Ascaris lumbricoides*	
4.4	*Wuchereria bancrofti*	

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Medical Parasitology/5th	D.R. Arora and Brij Bala Arora	CBS Publishers and Distributors Pvt. Ltd.
2	Parasitology (Protozoology and Helminthology)/13th	K.D. Chatterjee	CBS Publishers and Distributors Pvt. Ltd.
3	Textbook of Medical Parasitology/8th	Sougata Ghosh	Jaypee
4	Short Text book of Medical Microbiology including Parasitology/ 10th	Satish Gupte	Jaypee

PGDMLT-2005: PRACTICALS BASED ON PAPER PGDMLT-2001

(Haematology)

Semester: II	
Course (subject) Code	PGDMLT-2005
Subject Title	Practicals Based on Paper PGDMLT-2001 (Haematology)
Subject Outcome	At the end of the course, the students will able to • Know the proper technique for blood collection • Manual techniques for Blood counts • Basic haematological tests used in clinical laboratory • Some screening tests for hematological disorders

Course content:

1. Venous Blood Collection
2. Haemoglobin estimation: Sahli's method and Cyanmethemoglobin method
3. Total R.B.C. Count
4. Total W.B.C. Count.
5. Platelet Count.
6. Differential Count.
7. Reticulocyte Count
8. Determination of E.S.R. (Westergren / Wintrobe method)
9. Determination of Haematocrit (Packed cell volume)
10. Determination of BT, CT and PT
11. NESTROF test
12. Sickling test- Slide Test
13. G_6PD Deficiency Test

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of MLT/ 3rd	Godkar P. B.	Bhalani Publications.
2	Clinical Pathology, Haematology and Blood Banking (For DMLT students)/ 4th	Nanda Maheshwari	Jaypee

PGDMLT-2006: PRACTICALS BASED ON PAPER PGDMLT-2002

(Clinical Pathology)

Semester: II	
Course (subject) Code	PGDMLT-2002
Subject Title	Practicals Based on Paper PGDMLT- 2002(Clinical Pathology)
Subject Outcome	At the end of the course, the students will be able to perform • Collection, Preservation & Transportation of of various pathological samples like, urine, stool, sputum, semen etc. • Physical, chemical and microscopic analysis of various pathological samples like, urine, stool, sputum, CSF, semen, body fluids etc. • Reporting and recording of data of Pathological sample analysis.

Course Content:

1. Routine Urine Analysis: Physical, Chemical, Microscopic Examination & Reagent Strip Method
2. Routine Stool Analysis: Physical, Chemical, Microscopic Examination.
3. Routine Sputum examination: Physical, Microscopic Examination.
4. Routine Semen Analysis: Physical, Chemical, Microscopic examination.
5. Routine Cerebrospinal Fluid Analysis: Physical, Chemical, Microscopic examination.
6. Routine Body fluid Analysis: Physical, Chemical, Microscopic examination.
   (i) Peritoneal (ii) Pleural (iii) Pericardial (iv) Synovial

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Text Book of Medical Laboratory Technology (Volume-1 & 2)/ 3rd	Godkar P. B.	Bhalani Publishing House
2	Essential of Clinical Pathology/ 2nd	S. M. Kawthalkar	Jaypee Brothers.
3	Medical Laboratory Technology - (Volume 2)/ 3rd	Kanai L Mukherjee Anuradha Chakravarthy	Mcgraw Hill Education (India) Private Limited
4	Medical Laboratory Technology/ 4th	Sood R.	Jaypee Brothers.

PGDMLT-2007: PRACTICALS BASED ON PAPER PGDMLT-2003

(Clinical Biochemistry)

Semester: II	
Course (subject) Code	PGDMLT-2007
Course Title	Practicals Based on Paper PGDMLT-2003 (Clinical Biochemistry)
Course Outcome	At the end of the course, the students will be able to perform • Various Biochemical tests for Quantitative estimation of different biomolecules present in blood for diagnosis of various diseases/ metabolic disorders as well as to check normal function of kidney, liver, heart etc.

Course Content

1) Estimation of blood Sugar
2) Glucose Tolerance Test
3) Serum Total Protein, Albumin, Globulin and A: G Ratio
4) Microalbumin test
5) Serum Urea and Blood Urea Nitrogen (BUN)
6) Serum Creatinine
7) Serum Uric acid
8) Serum Total Cholesterol and HDL Cholesterol
9) Serum Triglyceride (TG)
10) Serum Potassium
11) Serum Sodium
12) Serum Calcium
13) Serum Chloride
14) Serum Total, Direct and Indirect bilirubin
15) Serum SGPT
16) Serum SGOT
17) Serum Amylase
18) Serum ALP

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Biochemistry/ 8th	Chatterjae M. N. and Shinde R. (2012)	JaypeeBrothers Publishers
2	Textbook of Medical Laboratory Technology/ 3rd	Godkar P. B. (2014)	Bhalani Publishing house

PGDMLT-2008 A: PRACTICALS BASED ON PAPER PGDMLT-2004A

(Blood Banking and Histo-Cytological Techniques)

Semester: II	
Course (subject) Code	PGDMLT 2008 A
Subject Title	Practicals based on paper PGDMLT – 2004A (Blood Banking and Histo-Cytological Techniques)
Subject Outcome	At the end of the course, the students will get knowledge of • Learn about Blood Bank and Blood Banking techniques (Transfusion Medicine) • Determination of blood group, blood group antibody titer, Antiglobulin test and compatibility testing for blood transfusion • Tissue processing method, Microtomy and staining of tissue sections • Specimen collection, smear preparation and staining for cytological examination

Course Content:

1) ABO (Forward) and RH grouping by slide method
2) ABO (Forward) and RH grouping by Tube method
3) Reverse grouping
4) Direct Antiglobulin Test (DAT)
5) Indirect antiglobulin test (IAT)
6) Tests for Weak D testing by albumin and Indirect Antiglobulin technique
7) Anti A titer
8) Anti B titer
9) Cross matching by saline, albumin and IAT
10) FNAC Smear staining by PAP staining
11) H & E Staining Technique
12) Histological technique: (Demonstration)

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Compendium of Transfusion Medicine, Practice of Safe Blood Transfusion	R. N. Makroo	Career Expert Publications
2	Technical Manual, 2014 (Online PDF)	Martha Rae Coombs et. al	American Association of Blood Banks
3	Essential of Blood Banking and Transfusion Medicine/2nd	Ganga S Pilli	CBS Publishers and Distributors PVT LTD
4	Transfusion Medicine Technical Manual (Online PDF)	Saran R. K	Directorate General of Health Service, Ministry of Health & Family Welfare
5	Textbook of MLT/ 3rd	Godkar P. B	Bhalani Publications.
6	Techniques of Histopathology and Cytopathology	Sadhana Vishwakarma	Jaypee Brothers
7	Textbook of Pathology/ 5th	Mohan H.	Jaypee Brothers Medical publishers

PGDMLT-2008B: PRACTICALS BASED ON PAPER PGDMLT-2004B

(Parasitology)

Semester: II	
Course (subject) Code	PGDMLT-2008B
Subject Title	**Practicals based on paper PGDMLT-2004B**
Subject Outcome	At the end of the course, the students will get knowledge of • Collection of specimens for various protozoal and helminthic infestations. • Performing laboratory diagnosis for various protozoal and helminthic infestations. • Morphological Identification of various protozoa and helminths.

Course Content:

1) Microscopic examination of stool by:
   (a) Saline Preparation
   (b) Iodine Preparation
2) Identification of ova and cysts of stool parasites using concentration methods.
3) Identification of malarial parasites by rapid diagnostic tests.
4) Identification of various morphological forms of malarial parasites from stained slides/ permanent slides/photographs.
5) Special Technique for the collection of eggs of *Enterobius vermicularis* (Demonstration).
6) Identification of morphological forms of parasites in stool sample by sample/charts/permanent slides/ photographs.
   i) Entamoeba histolytica
   ii) Giardia lamblia
   iii) Trichuris trichiura
   iv) Schistosoma haematobium
   v) Taenia spp.
   vi) Enterobius vermicularis

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Medical Parasitology/5th Edition	D.R. Arora and Brij Bala Arora	CBS Publishers and Distributors Pvt. Ltd.
2	Parasitology (Protozoology and Helminthology)/13th Edition	K.D. Chatterjee	CBS Publishers and Distributors Pvt. Ltd.
3	Textbook of Medical Parasitology/8th Edition	Sougata Ghosh	Jaypee
4	Short Text book of Medical Microbiology including Parasitology/ 10th Edition	Satish Gupte	Jaypee

PGDMLT-2009A: TRAINING IN PATHOLOGY LABORATORY

Semester: II	
Course (subject) Code	**PGDMLT-2009A**
Subject Title	**Training in Pathology Laboratory**
Course Type	Skilled Based Elective Course
Teaching Time	30 Hours
Subject Outcome	The students are imparted basic training of practical in the field of clinical Laboratory. At the end of training, the candidates shall be able to: • Use discretely the essential laboratory services. • Handle and operate the modern equipments and instruments in laboratory test. • Development of skill and competency in data processing, reporting and maintenance of records & Laboratory investigations. • Apply safety precautions, quality assurance, biomedical waste management, automation in in the laboratory.

Course Content:

Content	**Training Duration**
The student undertake training in different clinical pathology laboratories situated in hospital/ PHC/ CHC/ Private Laboratories/ Blood Banks, where the clinical diagnosis is the prime focus in the organization for 30 days duration. During the training tenure, the students are expected to gain actual pathological and clinical experience and try to make them familiar with the Laboratory/hospital environment. The students have to keep day-to-day record of their actual work done during hospital training and same is to compiled along with the information about the hospital / pathological laboratory (in which they have been placed). The students have to submit Laboratory certificate and project report. The concerned teachers are supposed to guide the students for the same. The credit is given based on the grade obtained in the Training Certificate (given by the Pathologist/ concerned authority of the Pathology Laboratory) and marks are given according to grade shown as below:	**30 Days**

Grade	OS	A^+	A	B^+	B	C^+	C	D^+	D	E^+	E
Marks	29-30	27-28	25-26	23-24	21-22	19-20	17-18	15-16	14-15	12-13	<12 (Fail)