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VEER NARMAD SOUTH GUJARAT UNIVERSITY
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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 કોર્સ ચલાવતી તમામ કોલેજોનાં આચાર્યશ્રીઓ તથા ડિપાર્ટમેન્ટનાં વડાશ્રીને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ થી અમલમાં આવનાર શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ થી અમલમાં આવનાર PGDMLT નો અભ્યાસક્રમ NEP-2020 પ્રમાણે રીવાઈઝડ કરવા બાબતે મેડીકલ ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૬/૦૭/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૨ અન્વયે નીચે મુજબ વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરેલ છે. જે વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરની અપેક્ષાએ વિદ્યાશાખા વતી મંજુર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલ તા.૨૯/૦૭/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૦૭ થી સ્વીકારી મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

મેડીકલ ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૬/૦૭/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૨

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ થી અમલમાં આવનાર PGDMLTનો સેમ.–૧ નો NEP-2020 મુજબ પેટાસમિતિ ધ્વારા તૈયાર કરેલ અભ્યાસક્રમ મંજુર કરી વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૨૯/૦૭/૨૦૨૨ની ઠરાવ ક્રમાંકઃ ૦૭

:: **આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૨–૨૩ થી અમલમાં આવનાર PGDMLT નો અભ્યાસક્રમ NEP-2020 પ્રમાણે રીવાઈઝડ કરવા અંગે મેડીકલ ટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૬/૦૭/૨૦૨૨ની સભાનાં ઠરાવ ક્રમાંકઃ૨ અન્વયે કરેલ ઉપરોકત મુજબની ભલામણ વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી મંજુર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.**

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./ PGDMLT/સિલેબસ/પરિપત્ર/૧૬૯૫૪/૨૦૨૨
તા.૩૦–૦૭–૨૦૨૨

ઈ.ચા. કુલસચિવ

પ્રતિ,

૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન PGDMLT કોર્સ ચલાવતી તમામ કોલેજોનાં આચાર્યશ્રીઓ. તથા ડિપાર્ટમેન્ટનાં વડાશ્રી. .....આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.

૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.

૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

૪) અનુસ્નાતક વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

Veer Narmad South Gujarat University
Surat

Syllabus of

Post Graduate Diploma in Medical Laboratory Technology
(P.G.D.M.L.T.)

(As per CBCS NEP- 2020)

Effective from 2022 - 2023

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 and Immunohaematology	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 and Immunohaematology)	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 AND IMMUNOHAEMATOLOGY

Semester: I	
Course (subject) Code	PGDMLT-1002
Subject Title	Immunology and Immunohaematology
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 • Know Various Blood group systems • Learn about Blood Centre and Blood Banking techniques (Transfusion Medicine)

Course Content

Unit No.	Content	Teaching Hours
Unit-1	**Introduction To Immunology**	**15 Hr.**
1.1	Immunity: Introduction, Types of Immunity,	
1.2	Organs And Cells of Immune System	
1.3	Immunological Disorder: Hypersensitivity, Auto-Immunity, Auto-Immune Disorders, Immunodeficiency	
1.4	Vaccine: Introduction & Types of Vaccine, Vaccination Schedule in India	
1.5	Complement: Introduction & Functions of Complement System.	
Unit-2	**Immunoassays**	**15 Hr.**
2.1	Antigen: Definition, Characteristics, Properties of Antigen, Classification of Antigens	
2.2	Antibody: Definition, Characteristics, Structure and Types of Antibodies	
2.3	Monoclonal And Polyclonal Antibody	
2.4	Antigen Antibody Reactions- Definition, Mechanism and Factors Affecting Antigen –Antibody Reactions	
2.5	Principle, Procedure and Clinical Applications of Various Antigen Antibody Reactions: Precipitation; Flocculation; Agglutination; Immunochromatographic Technique	
Unit-3	**Introduction To Immunohaematology**	**15 Hr.**
3.1	Human Blood Group Antigen and Their Inheritance	
3.2	ABO Blood Group System: Sub Groups, Source of Antigens, Types of Antibodies, Techniques of ABO Blood Grouping	
3.3	RH Blood Group System: Nomenclature, Types of Antigens, Mode of Inheritance, Types of Antibodies, Techniques of RH Blood Grouping	
3.4	Other Blood Group Systems: MNS, Kell, Kidd, Duffy	
3.5	Bombay Blood Group	
Unit-4	**Blood Banking Techniques**	**15 Hr.**
4.1	Screening and Phlebotomy of Blood Donor	

4.2	Blood Components Preparation: Red Cell Concentrate, Fresh Frozen Plasma, Cryoprecipitate, Platelet Concentrate, Single Donor Platelet	
4.3	Compatibility Testing	
4.4	Transfusion Reaction and its investigation	
4.5	Mechanism and investigation of HDN	

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.
7	Compendium of Transfusion Medicine, Practice of Safe Blood Transfusion	R. N. Makroo	Career Expert Publications
8	Technical Manual, 2014 (Online PDF)	Martha Rae Coombs et. al	American Association of Blood Banks
9	Blood Transfusion in Clinical Medicine. 12th edition,	PL Mollison CP Engelfriet ContrerasMarcela	Blackwell Science
10	Essential of Blood Banking and Transfusion Medicine/2nd	Ganga S Pilli	CBS Publishers and Distributors PVT LTD
11	Transfusion Medicine Technical Manual (Online PDF)	Saran R. K	Directorate General of Health Service, Ministry of Health & Family Welfare

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	**Diagnostic Bacteriology**	**15 Hr.**
1.1	Collection, Transportation and Examination of Clinical specimen: Urine, Sputum, Pus, Feces, Blood, CSF	
1.2	Antimicrobial Sensitivity Test: Disc Diffusion and MIC	
1.3	Causative agent, Pathogenesis and Laboratory diagnosis of Bacterial Diseases: Diphtheria; Cholera; Syphilis; Typhoid; Tuberculosis; Food poisoning; Urinary Tract Infection	
1.4	Hospital Acquired Infection	
Unit-2	**Diagnostic Virology**	
2.1	General Structure, Morphology & Characteristics of Viruses	**15 Hr.**
2.2	Classification of Virus	
2.3	Collection, Transportation and Examination of specimen	
2.4	Causative agent, Pathogenesis and Laboratory diagnosis of Viral Diseases: Dengue; Chikungunya; Common Cold; SARS; Hepatitis; AIDS	
Unit-3	**Diagnostic Mycology**	
3.1	General Properties of Fungi	
3.2	Classification of Fungi	**15 Hr.**
3.3	Mycoses: Cutaneous, Sub Cutaneous and Superficial Mycosis	

3.4	Laboratory Diagnosis of Mycotic Infections	
Unit-4	**Diagnostic Parasitology**	
4.1	Types of Parasites and Host, Host –Parasite Relationship	
4.2	Sources of Infection and Portal of Entry into the human body	
4.3	General Laboratory Diagnosis	**15 Hr.**
4.4	Examination of stool for Intestinal Parasitic Infection and Examination of blood for Parasitic Infection	

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	Evolution and history of microbiology: Discovery of microorganisms, Contributions of Louis Pasteur and Robert Koch	
1.2	Classification of microorganisms: a) General characteristics of prokaryotes & eukaryotes b) Morphological classification of bacteria	
1.3	Introduction to Bacterial cell structure	
1.4	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	**Pure Culture Study**	**15 Hr.**

4.1	Types of media: Principle, composition and use: Nutrient Agar, Mac Conkey Agar, Eosin Methylene Agar, CLED Agar, W.B. Agar, Kings Agar, MSA, PSA	
4.2	Methods of Cultivation: a) Broth, slant and Stab b) Enrichment technique	
4.3	Methods of Isolation	
4.4	Identification of bacteria by 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	
4.5	Methods of Preservation	

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	

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 and Immunohaematology)

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 • Determination of blood group, blood group antibody titer, Antiglobulin test and compatibility testing for blood transfusion

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. ABO (Forward) and RH grouping by slide method
10. ABO (Forward) and RH grouping by Tube method
11. Reverse grouping
12. Direct Antiglobulin Test (DAT)
13. Indirect antiglobulin test (IAT)
14. Tests for Weak D testing by albumin and Indirect Antiglobulin technique
15. Anti A/ Anti B titer
16. Cross matching by saline, albumin and IAT

Reference Books:

Sr. No.	Title/Edition	Authors	Publisher
1	Textbook of Medical Laboratory Technology	P. B. Godkar, D.P. Godkar	Bhalani Pub.
2	Compendium of Transfusion Medicine, Practice of Safe Blood Transfusion	R. N. Makroo	Career Expert Publications
3	Technical Manual, 2014 (Online PDF)/15th	Martha Rae Coombs et. al.	American Association of Blood Banks
4	Transfusion Medicine Technical Manual (Online PDF)	Saran R. K	Directorate General of Health Service, Ministry of Health & Family Welfare

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 Urine sample for bacterial culture
2) Processing of Stool sample for bacterial culture
3) Processing of CSF sample for bacterial culture
4) Processing of Sputum sample for bacterial culture
5) Processing of Pus sample for bacterial culture
6) Antimicrobial Susceptibility Test
7) Examination of Fungi from clinical specimen by direct microscopic mrthod
8) Detection of malarial parasites by immunochromatographic test / Blood smear
9) 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**	**P**ublisher
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 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
6) Pure culture study of: (i) *Bacillus cereus* (ii) *Staphylococcus aureus* (iii) *Escherichia coli* (v) *Klebseilla pneumoniae* (vi) *Proteus vulgaris* (viii) *Salmonella* species (ix) *Pseudomonas aeruginosa*
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	Balance	
1.2	pH Meter	
1.3	Centrifuge	
1.4	Water Distillation Apparatus	
Unit-2	**Spectroscopy**	**8 Hr.**
2.1	Colorimeter	
2.2	Spectrophotometer	
2.3	Flame Photometer	
2.4	Turbidometer	
Unit-3	**Electrophoresis**	**7 Hr.**
3.1	Principle	
3.2	Factors Affecting Electrophoresis	
3.3	Support Media	
3.4	Types Of Electrophoresis: PAGE & SDS	
Unit-4	**Chromatography**	**8 Hr.**
4.1	Introduction	
4.2	Principle	
4.3	Types	
4.4	Applications	

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