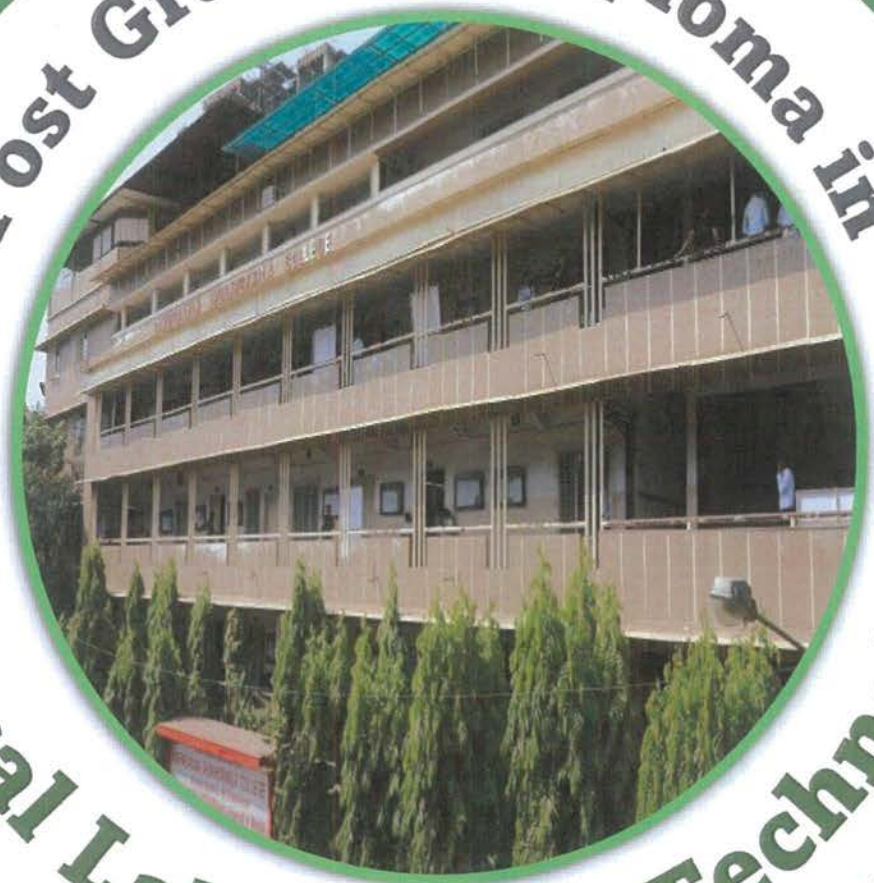
Post Graduate Diploma in Medical Laboratory Technology



Hindi Vidya Prachar Samiti's

RAMNIRANJAN JHUNJHUNWALA COLLEGE of Arts, Science & Commerce

Opposite Ghatkopar Railway Station, Ghatkopar(W), Mumbai 400086, INDIA.

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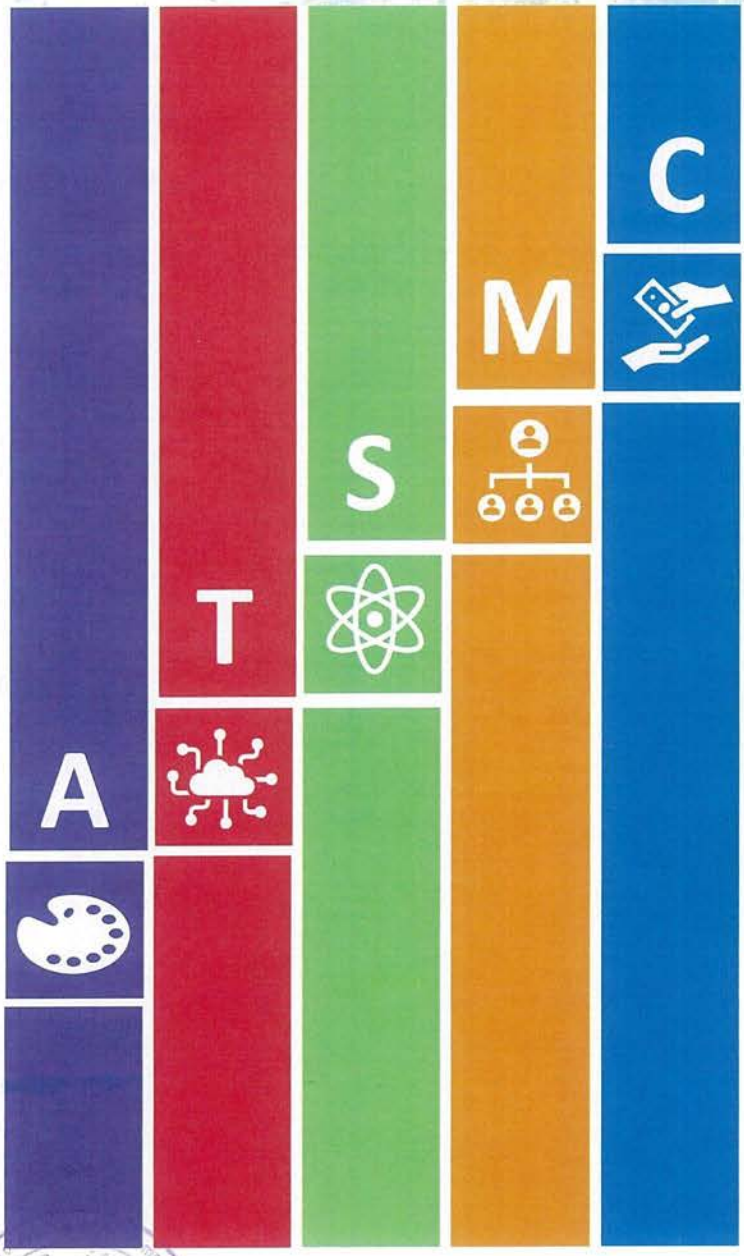
AY 2020-21 Onwards

Hindi Vidya Prachar Samiti's
RAMNIRANJAN JHUNJHUNWALA COLLEGE (AUTONOMOUS)

(Also known as R. J. College of Arts, Science & Commerce as per UGC Notification)

Affiliated to UNIVERSITY OF MUMBAI II Recognized by UGC under 2f & 12B
NAAC Accredited 'A GRADE' with CGPA 3.50

Knowledge is all Ambrosia



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Medical Laboratory Technology

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Mumbai 400 086, Maharashtra, INDIA.

PRINCIPAL
RAMNIRANJAN JHUNJHUNWALA COLLEGE
OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

Hindi Vidya Prachar Samiti's
RAMNIRANJAN JHUNJHUNWALA COLLEGE OF ARTS, SCIENCE & COMMERCE
(Autonomous)

University of Mumbai

Affiliated to
University of Mumbai
Syllabus for the Post Graduate Diploma
Program: Post Graduate Diploma in
Medical Laboratory Technology

Program Code: RJSPGDMLT
From academic year 2023-2024

Post Graduate Diploma in Medical Laboratory Technology
(Program Code: RJSPGDMLT)

Post Graduate Diploma in Medical Laboratory Technology is a full time postgraduate course. The course provides candidates with skills to become professional medical officers and technicians in the laboratory. Students can get hands-on experience with essential techniques in microbiology, molecular biology, pathology and many more. This program is mainly designed to fill the space of lab professionals.
Medical Laboratory Technology is a crucial part of the healthcare system, they play a crucial role in the diagnosis of a disease by collecting and analyzing the samples accurately.

Course Learning Outcomes:
The learner at the end of the course will be able to

- Apply knowledge and technical skills associated with medical laboratory technology in the study and diagnosis of various diseases.
- Perform routine clinical laboratory procedures in Haematology, Chemistry, Microbiology and Immunohematology.
- Handle laboratory equipment with accuracy and speed.
- Confidently collect, record, analyze and interpret technical data and information on laboratory instrumentation.
- Apply problem solving techniques in the identification and correction of systematic errors, instrument failures, and verify the accuracy of laboratory results.
- Handle advanced lab equipment, perform accurate medical laboratory tests, and eventually work as Laboratory Technicians.

The successful completion of this professional training will enable students to take up jobs as Medical Technologists in any of the clinical laboratories.

Title: Post Graduate Diploma in Medical Laboratory Technology
Eligibility: Bachelor's Degree in Microbiology, Botany, Zoology, Biochemistry, Life Science, Biotechnology, Nutrition, any medical and paramedical sciences, B VOC in MLT.
Duration of the Course: One Year and 3 months internship, Blended teaching
Fee Structure: Tuition fee 35,000 + 150 RFID + Examination Fees 1000+ Application form fees Rs 150/-
Intake capacity: 50 students
Faculty: Drawn from Academia, Hospitals, Research Institutions

Standard of Passing:

a. Candidates who secures minimum 50% marks in each paper be declared to have passed the examination in that subject.
b. A candidate who fails to secure 50% marks in a paper will be allowed to reappear in that paper.
c. Candidates can carry forward at his/her option the marks in the paper in which he/she has passed, in such a case student is entitled for award of class.
d. Candidates who secure a minimum of 50% marks in each paper and an aggregate of 60% and above marks on the whole shall be declared to have passed the examination in the First Class.
e. Candidates who secures a minimum of 50% marks in each paper and an aggregate of 70% and above marks on the whole shall be declared to have passed the examination in First Class with Distinction.

Medium of Instruction : English

Field Visit : Pathology Laboratory, Blood bank

Scheme of Examination Semester I

Paper	Title of Paper	Maximum Marks	Minimum Marks	Credits	Course Code
I	Human Anatomy and Physiology - I	100	50	12	RJSPGDMLT101
II	Hematology and Blood Banking - I	100	50	12	RJSPGDMLT102
III	Clinical Pathology	100	50	12	RJSPGDMLT103
IV	Biochemistry (Medical and Clinical)	100	50	12	RJSPGDMLT104
PI	Human Anatomy and Physiology - I	50	25	06	RJSPGDMLTP101
PII	Hematology and Blood Banking - I	50	25	06	RJSPGDMLTP102
PIII	Clinical Pathology	50	25	06	RJSPGDMLTP103
PIV	Biochemistry (Medical and Clinical)	50	25	06	RJSPGDMLTP104
	TOTAL	600	300	72	

Scheme of Examination Semester II

Paper	Title of Paper	Maximum Marks	Maximum Marks	Credits	Course Code
I	Bacteriology, Immunology and Serology	100	50	12	RJSPGDMLT201
II	Histopathology and Cytopathology	100	50	12	RJSPGDMLT202
III	Advanced Techniques and Future Trends in Laboratory Science	100	50	12	RJSPGDMLT203
IV	Laboratory Management and Ethics, Parasitology, Mycology and Virology	100	50	12	RJSPGDMLT204
PI	Bacteriology, Immunology and Serology	50	25	06	RJSPGDMLTP201
PII	Histopathology and Cytopathology	50	25	06	RJSPGDMLTP202
PIII	Advanced Techniques and Future Trends in Laboratory Science	50	25	06	RJSPGDMLTP203
PIV	Laboratory Management and Ethics, Parasitology, Mycology and Virology	50	25	06	RJSPGDMLTP204
	TOTAL	**600**	**300**	**72**	

FIRST SEMESTER

Curriculum for Post Graduate Diploma in Medical Laboratory Technology

First semester

Teaching and Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
04	--	02	03	100	--	50#	50@	200

NOTE:

- **Two tests each of 25 marks to be conducted**
- Total of test marks for all theory subjects are to be converted out of 50 and to be entered in the mark sheet under the head Sessional Work. (SW)

RATIONALE:

1. The purpose of including this subject is to provide the P. G. D. M. L. T. students with a knowledge of the structure and function of a healthy human body and the changes which take place when disease interferes with normal processes.
2. This branch of laboratory science deals with study of blood, its components and changes it undergoes during illness.
3. While blood banking is a science which deals with collecting, testing and transfusing blood and its products for replacement of lost blood.
4. Biochemistry (medical) is a study of chemical components of the human body. Estimation of chemical molecules is essential to know disease processes at molecular level and thus biochemistry helps us to identify abnormal function at earlier stages of diseases and it is also useful for prognostic purposes.
5. It is a basic subject in laboratory science which deals with examination of various body fluids / Excreta for presence of multiple factors like chemical, biological and physical as cause or effect of illness.

OBJECTIVES: The student will be able to:

1. Identify various systems in Human Body
2. Use common anatomy terms
3. Describe working of various systems in Human Body and Organs
4. Learn about normal formation & function of various types of blood cells, coagulation mechanism & various factors that cause the significant changes in the no. of specific cells & related clinical conditions.
5. Learn theoretical aspects of immuno-hematology and basic blood bank procedures.
6. Learn aspects of normal chemical nature & chemical behavior of human sales & how changes in these aspects lead to various clinical conditions.
7. Learn the normal composition of various body fluids & feces & also the changes in their composition in various clinical conditions.

Course Code	Paper Title	Credits
RJSPGDMLT101	Human Anatomy and Physiology - I	12

Unit I - Introduction of* human anatomy *& cardiovascular system

1. Different system of Human body
2. Cell- Structure & function; Body Tissue – their functions
3. Common anatomical terms (Anterior/Ventral, lateral, medial, median, posterior/dorsal etc.)
4. Anatomical Position & Planes (Supine, prone, recumbent, lithotomy) planes- coronal, sagittal.
5. Structure of Heart & its coverings, major Blood vessels- arteries & veins; Structure of Blood vessels
6. Cardiac cycle, cardiac output; Blood pressure, factors affecting it.
7. Cardiovascular disease- hypertension, Congestive Cardiac Failure, Transplant, Ischemic heart disease

Unit II Respiratory System & Central Nervous System:

1. Respiratory tract structure, Lung's structure, Mechanism of respiration, Vital Capacity.
2. Respiratory Diseases – Tuberculosis, Cystic fibrosis, Pneumonia, Asthma, Respiratory failure, Carcinoma
3. Brain – Coverings; Parts of brain, function, Spinal cord, peripheral nerves, Autonomic nervous system- sympathetic parasympathetic.
4. Diseases- Stroke, Alzheimer's disease, epilepsy, Myasthenia Gravis Parkinson's disease.

Unit: III Digestive Systems (G. I. T) & Genito Urinary System and Skin

1. Teeth, Tongue, Salivary Glands, Tonsils, Stomach, Intestine: small, large; Rectum, Anal Canal, Liver, Pancreas, Gallbladder
2. Digestion & Absorption of proteins, fats & carbohydrates.
3. Diseases- Dental Caries, periodontal diseases, Gastric ulcer, Carcinoma, Celiac disease, Inflammatory Bowel disease, Liver-Cirrhosis & Encephalopathy Cholelithiasis, Pancreatitis.
4. Structure and functions of the Skin
5. Kidney –Ureter, Bladder; Structure & Function of Neuron, Mechanism of urine formation
6. Formation of erythropoietin and some common kidney diseases. Maintenance of acid base balance and electrolyte balance. Normal body temperature and mechanism of its maintenance.
7. Diseases- Urolithiasis, Renal failure & transplant, Hypo & hyperpyrexia.
8. Testis- Vas deferens, prostate, Seminal vesicles, Ovaries, uterus, vagina Diseases - Menopause, carcinoma.

Unit: IV Endocrine System: & Musculoskeletal System:

1. Syndromes resulting from hypo and hyper activity of thyroid, parathyroid, adrenal, pituitary, pancreas.
2. Physiology of reproduction, menstruation, pregnancy and lactation.
3. Development of Bone tissue (osteogenesis)
4. Types of bones and joints
5. Development of bone Rickets, osteomalacia and osteoporosis
6. Muscle-Definition & types of muscle.

Course Code	Paper title	Credits
RJSPGDMLT102	**Hematology and Blood Banking - I**	**12**

Unit I Introduction and Haemoglobin

1. Composition of blood, its formation, and functions.
2. Collection of blood: - Different routes, difference between capillary and venous sample
3. Anticoagulants: - Different types, method of preparation and uses
4. Normal and abnormal values and Physiological variations
5. Estimation by (a) Colorimetric Method, (b) Chemical Method, (c) Specific Gravity Method, (d) Gasometric Method and Clinical importance

Unit II Red Blood Cells and White Blood Cells

1. Total Count: - Normal, abnormal values, and Physiological variations, Haemocytometer - method and calculation
2. Anemia – Classification and Sickle cell anemia – Slide Preparation
3. Haematocrit – Normal and abnormal values
4. Red Cell indices – Normal and abnormal values
5. Erythrocyte Sedimentation Rate
6. Westergrens & Wintrobe's Method
7. Factors affecting values, Limitations and Significance
8. Differential Count: - Normal, abnormal values and physiological variation
9. Preparation of peripheral blood smear, Staining by different methods, Methods of examinations and reporting
10. Total White Blood Cell Count: - Normal and abnormal values, Haemocytometer - method and calculation
11. Reticulocytes: - Methods, Normal values and significance
12. Osmotic Fragility test

Unit: III Haemostasias, Coagulation Mechanism and Bone Marrow and Blood Banking

1. Coagulation Factors; Coagulation Test – Bleeding time, clotting time, Whole Blood Coagulation time, Tourniquet test, Clot retraction test, Prothrombin time (PT), Activated Partial ThromboPlastin time (APTT) and L. E. Cell test
2. Bone Marrow: - Smear Preparation, Staining, Examination and Report
3. An elementary knowledge of use of isotopes in hematology
4. Introduction: Immuno-hematology
5. Human blood group antigen and their inheritance
6. ABO blood group system: - Sub groups, Source of antigens, Types of antibodies
7. Rh blood group system – Nomenclature, Types of antigens, Mode of inheritance, Types of antibodies

Unit: IV Other Systems for blood

1. Other blood group systems such as MNS, Kell, Bombay Blood group - complete knowledge of theory and genetics.
2. Preparation and Preservation of grouping antisera
3. Technique of blood grouping and cross matching
4. Coomb's test (a) Direct and Indirect test, (b) Titration of antibodies - complete and incomplete

5. Blood transfusion technique - Preparation and properties of anticoagulant solution, Criteria for selection of donor, Screening test for donor, Method of collection of blood, Clearing and assembling of blood transfusion apparatus 6. Investigation of transfusion reaction. Hemolytic disease of newborn, Exchange transfusion, Transfusion transmitted diseases 7. Cell preparation and transfusion of various components of blood 8. Serum immunoglobulin and their significance in blood banking 9. Organization, operation, administration of bank and maintenance of records, Govt. Regulations (FDA)	

Course Code	Paper Title	Credits
RJSPGDMLT103	**Clinical Pathology**	**12**
Unit I Examination of Urine and stool 1. Indication, Collection, Container, Transport, Preservation of urine for different types of urine analysis and Preservation for different types of fecal analysis 2. Physical examination and its significance 3. Chemical examination and its significance 4. Microscopic examination and its significance		
Unit II Examination of Sputum 1. Indication, Collection, Container, Transport, Preservation for different types of sputum analysis 2. Physical examination and its significance 3. Chemical examination and its significance 4. Microscopic examination and its significance		
Unit: III Semen Analysis 1. Indication, Collection, Container, Transport, Preservation for different types of semen examination 2. Physical examination and its significance 3. Chemical examination and its significance 4. Microscopic examination and its significance		
Unit: IV Examination of CSF and Other Body Fluids 1. Other Body Fluids Like Pleural Fluid, Pericardial Fluid, Peritoneal Fluid, Synovial Fluid, Ascitic Fluid. 2. Indication, Collection, Container, Transport, Preservation for different types of CSF / Fluid analysis 3. Physical examination and its significance 4. Chemical examination and its significance 5. Microscopic examination and its significance		

Course Code	Paper Title	Credits
RJSPGDMLT104	Biochemistry (Medical and Clinical)	12
Unit I Biochemistry 1. Elementary knowledge of inorganic chemistry; Structure of atom, atomic weight, molecular weight and equivalent weight; Acids, bases and salts; pH indicators - pH meter - pH measurement; Molar solutions; Normal solutions; Buffer solutions; Percent solution; Saturated solution; Standard solutions 2. Elementary knowledge of organic chemistry (Organic compounds, aliphatic, aromatic, alcohol, ethers, phenols, acids etc.) 3. Elementary knowledge of Physical Chemistry - Osmosis, osmotic pressure, diffusion, hypotonic, hypertonic and isotonic solutions; Definition and classification of some colloids and crystalloids		
Unit II Elementary knowledge of analytical chemistry ➢ Principles, Instrumentation, working, uses, care, maintenance of: 1. Balances: mono-pan, two-pan, top-pan 2. Centrifuges and pH meter 3. Colorimeter, Spectrophotometer and Fluorometer, 4. Flame-photometer, Ion selective electrodes and Urinometer, 5. Chromatograph, Electrophoresis and Densitometer		
Unit: III Clinical Biochemistry 1. **Carbohydrates:** Dietary Sources, digestion, absorption, basic metabolism, regulation of blood glucose & its importance, glucose tolerance test, glycosylated Hb, other parameters and related disorders. 2. **Lipids:** Dietary sources digestion, absorption, basic metabolism, lipid profile (cholesterol, triglyceride, lipoproteins, phospholipids) and its significance in various disorders. 3. **Proteins:** Dietary sources digestion, absorption, fate of amino acids, nitrogen equilibrium, formation and detoxification of ammonia, formation of urea, formation of non-protein nitrogenous products e.g. uric acid, creatinine, disorders related to protein and nitrogen metabolism. 4. **Enzymes**: Classification, properties, factors affecting enzyme activity, isoenzymes and coenzymes. Clinical enzymology: Therapeutic, diagnostic and analytical uses of enzymes with normal values of serum enzymes. 5. **Hormones:** Chemical nature and biochemical functions. 6. **Minerals and Electrolytes:** Na, K, Cl, Ca, Mg, I2 P, Fe and iron binding capacity.		
Unit: IV: Therapeutic drug monitoring, Acid Base balance and Organ Profiles 1. **Therapeutic drug monitoring:** Barbiturate Phenobarbital, Phenytoine, lithium, lead, salicylate, mercury, digitalis. 2. **Acid Base Balance**: Regulation of blood pH, Henderson Hasselbalch equation, renal, respiratory and buffer system importance of arterial blood gasses.		

3. **Organ Profiles - Liver** function test; Kidney function test; Thyroid function test; Cardiac function test; Pancreas function test; Hypertension profile; Diabetic profile; Gastric function test	

Paper	*List of Practical*
RJSPGDMLTP101	1. Surface Anatomy for each system 2. TPR-BP Measurement. 3. Bones/ Dummy Models/ Charts/ Discussion/ Seminar. 4. Cardiac resuscitation, First Aid. 5. Visit to the Anatomy Museum.
RJSPGDMLTP102	1. Hemoglobin Estimation – Sahali's Method 2. RBC Count and Total WBC and Differential WBC Count 3. Absolute Eosinophil Count and Reticulocyte count 4. E.S.R. determination and Platelet Count 5. Bleeding time and clotting time 6. Prothrombin time / Partial Thromboplastin time 7. L. E. Cell Preparation 8. Sickle Cell Preparation 9. Osmotic Fragility Test 10. Bone Marrow Smear Preparation, Staining and Examination 11. ABO Grouping –Slide technique, Tube technique, Reverse and forward grouping 12. Cross matching – Major and Minor 13. Rh typing - Rapid tube test, Saline antiD 14. One stage albumin technique, Two-stage albumin technique, 15. Coombs antihuman globulin technique 16. Coombs test - Direct coombs and Indirect coombs 17. Antibody titre - Technique and significance
RJSPGDMLTP103	1. Routine examination of urine 2. Routine examination of stool 3. Routine examination of sputum 4. Routine examination of semen 5. Routine examination of CSF / Fluid
RJSPGDMLTP104	1. Principals and working of laboratory instruments 2. Importance and methods of cleaning of glass apparatus 3. Calibration of apparatus and glass-wares 4. Preparation and standardization of volumetric solutions. 5. Basic titration such as acid Vs alkali, Silver Nitrate Vs Sodium Chloride 6. Preparation of buffer solution and measurement of their pH 7. Verification of Beer-Lambert's Law 8. Estimation of Blood sugar / glucose 9. Estimation of Urea, Plasma protein and Bilirubin 10. Estimation of serum Uric acid; Creatinine 11. Estimation of serum Cholesterol; HDL Cholesterol and Triglyceride 12. Estimation of serum Calcium; serum Inorganic Phosphorus

	13. and serum Chloride 14. Estimation of serum Sodium and Potassium (by flame photometer) 15. Estimation of serum Transaminases (SGOT & PT) 16. Estimation of serum Amylase; serum Acid phosphatase and serum Alkaline phosphatase

Skills to be developed in practical

Intellectual Skills: - Select method for testing; Choose appropriate chemicals for test; Choose proper equipment/apparatus

Motor Skills: - Accuracy in measurement; Follow proper procedure for the test; Check the instruments/apparatus/machine for any error

Learning structure in RJSPGDMLT101:

Application

- Understanding & getting familiarized with the various facts of Anatomy & physiology so as to acquire a strong foundation to apply these principles in advanced

Procedures

- Systematic study of all the organs
- Study of physiological changes in diseased condition

Principles

- Principles of various functions of organs
- Principles of patho- physiology

Concepts

- Functions of these organs, interrelationship
- Physiological changes in diseases

Facts

- Kidney, heart, GI, liver and other systems

Learning structure in RJSPGDMLT102:

Application

- To develop skills of diagnostic study of blood and its components as well as to acquire the technique of blood collection, testing and its transfusion

Procedures

- Diagnostic procedure for blood, Blood banking procedures and techniques

Principles

- Principles of Haematology and Blood Banking, Principles of Diagnosis

Concepts

- Various components of blood – haemoglobin, RBC, WBC, Platelets, Eosonophill cells etc. Bone marrow, Blood Groups, Serum etc. Change in blood components due to illness.

Facts

- Blood, Bone marrow, Blood Banks, Blood-collection, testing and transfusion; Illness, Diseases

Learning structure in RJSPGDMLT103:

Application

- Use skill of clinical biochemistry techniques for pathology tests and analyse the results and provide reports

Procedures

- Procedures of Analytical techniques, Procedures for detection & estimation of bio-molecules in clinical specimen

Principles

- Principals of inorganic, organic & analytical chemistry Principles of bio-molecules in clinical specimens

Concepts

- Inorganic, organic and analytical chemistry; Clinical bio-chemistry

Facts

- Bio-chemistry

Learning structure in RJSPGDMLT104:

Application

- To develop the pathological skills of examination of urine, stool, sputum, semen, CSF and fluid

Procedures

- Procedures of pathological examination of urine, stool, sputum, semen, CSF and fluid

Principles

- Physical, chemical & microscopic principles of collection, transportation, preservation, identification, examination and estimation of various parameter of urine, stool, sputum, semen, CSF and fluid

Concepts

- Physical, chemical & microscopic characteristics and indicators of urine, stool, sputum, semen, CSF

Facts

- Urine, stool, sputum, semen, CSF and fluid

FIRST SEMESTER SEMINAR AND PROFESSIONAL
Teaching and Examination Scheme:

RATIONALE:

- This subject of conducting seminar is intended to equip the students with the necessary basic skills of Communications as well as to develop their ability to express the subject knowledge which they have acquired during the tenure of first semester of the program.
- This also helps to develop the confidence amongst the students which certainly help them in future to build their career as self-developer and entrepreneur.
- Professional practice is a visit to the Hospital as per the need of the subject and submission of the project as assigned.

OBJECTIVE: The student will be able to:

1. Communicate with patients
2. Prepare report for seminar
3. Make good Presentation

Content:

The concerned teachers should teach the students the technique of presentation of seminar as well as explain the pros and cons of the same; so that students will get the correct idea of subject presentation with dignity and decorum, in the presence of a group of intellectuals and study class. The teacher may invite the other available experts at the time of delivery of seminar by students, as an observer.

The selection of topics by students may be made from the subjects of semester I of the course with the consent of the concerned teacher. Students should collect the necessary data on the selected topics and discuss the same with the teacher before presentation.

The duration for delivering the seminar is 10 minutes for each student. The seminar should be delivered by the students for minimum two times and the marks are to be assigned out of 50 for each attempt (by internal examiner) and thereafter average of the two is taken and to be considered as the oral marks for seminar (out of maximum marks 50).

Learning structure in RJSPGDMLT101-104:

Application

- To develop Communication skills and confidence as well as to promote the attitude of the students towards self developer and entrepreneur

Procedures

- Methods of collection of data, scrutiny and selection for presentation., Presentation methods by (1) Oral, (2) Poster, (3) Slides and (4) any other aids/means, Procedures of speech & communication technique

Principles

- Principles of data collection, scrutiny and selection for presentation Principles of oral communication and speech

Concepts

- Subject data, diagrams, slides, posters/charts, transparencies, communication skills

Facts

- Subjects, Presentation Aids, communication skills

Books Learning Resources for semester I :-

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
1	Anatomy & Physiology in health and illness	Ross & Wilson	1998	6th	ELBS, Churchill Livingstone, Medical Division of Longman group (FE) Ltd.
2	Anatomy (3-Vol)	Sameer Mitra	2002	6th	Academic Publisher
3	Cunningham's Manual of Practical Anatomy	Cunningham's	15th	1986	ELBS, Oxford University.
4	D. Penington, ct. al.	Clinical Hematology in Medical practice	4th	1984	CBS Publishers & Distributor,
5	G. Guru	Blood Bank Operations	1st	1991	NCERT, New Delhi.
6	G. Guru	Clinical Biochemistry	1st	1989	Secretary, National Council of Educational Research & Training, New Delhi.
7	Gray's Anatomy	Gray	--	--	--
8	Human Anatomy (3-Vol)	B.D. Chaurasia	1995	3rd	CBS. New Delhi
9	Human Physiology (Vol. I, IV)	C.C. Chatterjee	1992	11th	Medical Allied Agencies Calcutta
10	Indian Society				Dr. Dilip

	for Blood Banking	Blood Banking Training Manual	1st	1995	Wani, Janakalyan Bldg. ,Pune.
11	John B. Miale	Laboratory Medicine - Haematology	5th	1977	Mosby Company
12	John Dacie & S. M. Lewis	Practical Hematology	8th	1995	Churchill Livingston
13	K. Choudhary	Biochemical Techniques	1st	1989	Medical Publishers, New Delhi.
14	K. Mukharji	Medical Laboratory Techniques, Vol - I, II & III	5th	1988	Tata McGraw Hill, Delhi.
15	M. A. Siddique	Handbook of Biochemistry	8th	1993	Vijay Bhagat Scientific Book Co., Patna.
16	Maxwell M. Wintrobe	Clinical Hematology	8th	1981	Lea & Febiger - Philadelphia
17	P.B. Godkar	Textbook of Medical Laboratory Technology	2nd	2003	Bhalani Publication.
18	Principles & practice of medicine	Davidson	1991	16th	--
19	S. Ramkrishnan	Textbook of Medical Biochemistry	1st	1980	Orient Longman Ltd., Madras.
20	Surface Anatomy	Dr. Halim	--	--	--
21	G. Guru	Pathological Technology : Clinical	1st	1988	Sec - National Council of Educational Research & Training, New

		Pathology			Delhi
22	S. S. Kelkar	Clinical pathology	1st	1993	Vora medical Publications, Mumbai
23	A. C. Sonnenwirth & Leonard Jarett	Gardwohl's Clinical Laboratory Methods & Diagnosis - Vol - I & II	8th	1980	C. V. Mosby Co., USA
24	J. Bernard Henry	Clinical Diagnosis & Management by Laboratory Methods	17th	1984	W. B. Saunders Co., London.
25	P.B. Godkar	Text Book of Medical Laboratory Technology	2nd	2003	Bhalani Publication.

SECOND SEMESTER

Curriculum for Post Graduate Diploma in Medical Laboratory Technology

SECOND SEMESTER

Teaching and Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
04	--	02	03	100	--	50#	50@	200

NOTE:

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of test marks for all theory subjects are to be converted out of 50 and to be entered in the mark sheet under the head Sessional Work. (SW)**

RATIONALE:

- Bacteriology is a study of bacteria responsible for human illness. They are ubiquitous. Study of bacteriology helps in identification of infections / communicable diseases caused by them. It also helps in finding suitable anti-microbial agent for treatment
- Immunology and serology are closely associated subjects and are important from a diagnostic point of view. Immunology is the study of antigen or antibody produced in response to external invaders while serology is in vitro study of these changes.
- Histopathology is a study of tissues, which are deranged due to disease processes. This subject leads us to final diagnosis at cellular level.
- Cytopathology is a study of exfoliated cells from surfaces of various passages, organs and viscera to find out local or distant pathology at the earliest stage of development.
- This section of the study course will open a window for the future. Science is advancing every minute. New concepts are formed, new techniques are evolved for better, accurate and precise diagnosis of diseases. Study of this subject today will make our tomorrow comfortable
- Laboratory management is a specialty that requires comprehension of economics, accounting, finance, operation, statistics, technology, human relations and marketing. This subject is a key subject for successful laboratory practice.
- Ethics are a must for a decent lifestyle. Ethics exists in every subject, every religion and every profession.
- These are the microbes of various morphological features. They are responsible for a variety of diseases. They may cause trivial infections such as amoebiasis, ringworm and influenza to dreaded and fatal diseases like cerebral malaria, cerebral cryptococcosis to AIDS.
- Study of these microbes helps in pinpointing etiologic agents of infectious disease as well as for epidemiology and vaccine preparation.
- This subject of conducting Group discussion is intended to equip the students with the

necessary basic skills of Communications as well as to develop their ability to express their own views about the subject knowledge which they have acquired during the entire tenure of two semesters of the programme. This also helps to build the confidence amongst the students which certainly help them in future to make their excellent career as self-developer.

OBJECTIVE:

- To understand the morphology of bacteria, sterilization and disinfections techniques, immunity, antigen-antibody reaction and serological reaction. To develop the skill of various clinical testing techniques.
- To study the derangement of tissue due to diseases at cellular level, and to study the exfoliation of cells from surfaces of various passages, organs and viscera
- To study and gain knowledge of latest and advanced pathological techniques to have precise and accurate diagnostic
- To acquire the skill of successful Pathological Laboratory management and its ethics
- To develop the skill of laboratory diagnosis of various parasites, Pathogenic fungi and viruses
- Prepare report for the subjects for group discussion.\Manage to deliver the topics within stipulated time.\
- Work in Group and Develop leadership qualities.

Course Code	Paper Title	Credits
RJSPGDMLT201	**Bacteriology, Immunology and Serology**	**12**
***Unit I* - Microbiology** 1. Introduction to microbiology – Classification, morphology and physiology of bacteria. 2. Normal flora of the human body. Common methods of sterilization and disinfections; Cultivation of bacteria 3. Bacterial growth requirement – Aerobic and anaerobic and mycobacteria 4. Common media - Classification, preparation, sterilization and uses. 5. Culture methods – sample collection transportation, steps in processing the sample, choice of medium, methods of plating, and subcultures		
Unit II - Bacteriology 1. Pyogenic cocci – Morphology, pathogenicity and method of isolation for *Staphylococcus, Streptococcus* and *Niesseriae* 2. Gram Negative Bacilli – Morphology, pathogenicity and method of isolation for *Escherichea coli, Klebsiella, Proteus, Pseudomonas, Salmonellae, Shigella, Vibrio etc.* 3. Gram positive Bacilli and Anaerobes - Morphology, pathogenicity and method of isolation for *Corynebacteria* & *Bacillus* spp.; *Clostridial* and Non- *Clostridial* anaerobes		
***Unit: III* - Mycobacteria** 1. Mycobacteria - Morphology, pathogenicity and method of isolation for *M. tuberculosis*, atypical Mycobacteria and *M. leprae; Actinomyces, Nocardia, Rickettsia, Chlamydia* etc.		

2. Spirochaetes - *Treponema, Leptospira* and other miscellaneous microbes of medical importance, Kahn test, Rose-Waller test and antimicrobial susceptibility test 3. Preservation of stock cultures	
Unit: IV **Immunology and Serology** 1. Immunity - Introduction, types of immunity - Antigen, Antibody and Complement 2. Antigen antibody reaction and common serological reaction 3. Humoral and cell mediated immunity 4. Autoimmunity and Auto-immune diseases 5. Immune deficiency diseases and its investigation (HIV). 6. Common Lab. animals - use, care, different routes and site of injection.	

Course Code	Paper Title	Credits
RJSPGDMLT202	**Histopathology and Cytopathology**	**12**
Unit I **Histopathology** 1. Introduction & importance of histopathology 2. Cell, tissue and their functions. Methods of specimen collection (biopsies) and examination of tissues and cells. 3. Tissues Fixative - Simple Fixative and their properties; Micro anatomical fixative; Histochemical fixative 4. Tissue Processing - Collection of specimens; Labeling and fixation; Dehydration; Clearing; Impregnation; Embedding		
Unit II **Section Cutting and Staining** 1. Section Cutting - Microtome and microtome knives, sharpening and care; Technique of section cutting; Mounting of sections; Frozen sections and Cryostat 2. Dyes and their properties - Theory of staining; Types of staining; Basic staining – Hematoxylin and Eosin (H&E); Mounting of sections. 3. Common special stains PAS, Masson trichrome, Fleugens, Geimsa and PTAH 4. Decalcification – Fixation; Decalcification; Detection of end point; Neutralisation and processing		
Unit: III **Cytopathology -I** 1. Introduction – cytology and cytopathology; Method of specimen collection and transportation 2. For gynecological samples; Method of specimen collection, transportation and preservation of non-gynecological samples 3. Fixation and fixative - Common fixative and Special purpose fixative 4. Fluid specimen - Preservation prior to processing 5. Preparation for microscopy		
Unit: IV **Cytopathology - II** 1. The Papanicolaou stain - Main characteristics and modification; 2. Preparation of stain and solutions; Factors influencing staining reaction and mounting of cell sample 3. Other routine and special stains - Stains for histologic sections and Stains for hormonal evaluation 4. Stains for sex chromatin, pigments, microorganism, parasites, carbohydrates, lipids and nucleic acid		

Course Code	Paper Title	Credits
RJSPGDMLT203	**Advanced Techniques and Future Trends in Laboratory Science**	**12**
Unit I – Biochemistry application in **Advanced Techniques** 1. Electrophoretic techniques; Immunological Methods; Chromatographic technique 2. Radio-isotopic Technique; Automation in Biochemistry – wet and dry chemistry 3. Rapid diagnostic technique - Glucometer, Cholesterol strip		
Unit II **Microbiology - Rapid Diagnostic Technique and Clinical Pathology**		

1. ELISA and its modification 2. Gel Immuno-electrophoretic technique 3. Electron-microscopy: - Transmission & Scanning; Fluorescence microscopy and Phase contrast microscopy and its modification 4. Hospital infection and it's laboratory investigation 5. Laboratory investigation of immunocompromised host and HIV Patient 6. Rapid test in urine analysis and urine culture – Dip stick / Multi stick and Dip slide culture etc. 7. Rapid test for stool analysis and stool culture – Occult blood etc and Rotavirus etc. 8. Rapid test for semen analysis – Total count etc. 9. Other recent advances in clinical pathology.	
***Unit: III* Haematology & Blood Banking and Histopathology & Cytology** 1. Automatic venipuncture and evacuated tubes; Automation in hematology (Cell counter and coagulometer); Cell separation and cell component; Plasmapheresis 2. Automatic Tissue Processor; Automatic Stainer and Screener; Flow Cytometry; Immunochemistry Technique; Chemiluminescent assay and Rate Nephelometry	
***Unit: IV* - Molecular Diagnostic Technique and Tele Pathology** 1. Polymerase Chain Reaction (PCR) 2. Southern hybridisation analysis 3. Dot blot hybridisation analysis 4. Computerized medical application for data and image acquisition: Future of laboratory medicine	

Course Code	Paper Title	Credits
RJSPGDMLT204	**Laboratory Management and Ethics, Parasitology, Mycology and Virology**	**12**
Unit I - Laboratory, Laboratory Planning and Application of Computers 1. Role of laboratory in human health and diseases, Human diseases and methods of diagnosis, Laboratory at different level (National / State / District), Duties and responsibilities of laboratory personnel; Laboratory services are a backbone of health care delivery system. 2. General principles; Laboratory goals; Operational data – Market potential, Selection of area, Competition, Laboratory trends, Space requirements, Designing of laboratory sections, Staff and their duties, Work schedule and workload assessment 3. *Application* of computers in laboratory practice - Introduction to Computers - Block diagram, Input and Output devices; Storage devices; Introduction to operating systems - Need of Operating systems (OS);		

Function of OS, Windows 2000 – Utilities and basic operations, Microsoft office 2000 – MS Word, MS Excel	
Unit II - Care of laboratory glassware, chemical equipment and instruments 1. General Principles; Care and Cleaning of Glassware; Making Simple Glassware in the Laboratory; Care of equipment and apparatus; Laboratory chemicals – Proper use, care, storage and labeling. 2. Specimen handling - Appropriate container, Method of collection, Method of transportation, Method of preservation and disposal of laboratory waste 3. Laboratory Safety - General principles of safety programme, First aid and safety measures for Mechanical, Electrical, Chemical, Radioactive and Biological hazards; Universal safety precautions 4. Quality control and quality assurance in following sections of laboratory- Biochemistry, Microbiology, Haematology and Blood Banking, Histopathology and Clinical Pathology	
***Unit: III* - Mycology and Virology** 1. MYCOLOGY- Morphology and classification of pathogenic fungi; Morphology and laboratory diagnosis of fungi causing superficial mycosis; Morphology and laboratory diagnosis of fungi causing deep mycosis; Morphology and laboratory diagnosis of fungi causing systemic mycosis; Morphology and laboratory diagnosis of fungi causing opportunistic fungal infections 2. VIROLOGY- Classification, general properties of viruses; Cultivation and propagation of human viruses; Bacteriophage and its significance; Morphology, pathogenicity and laboratory diagnosis of hepatitis viruses; Morphology, pathogenicity and laboratory diagnosis of HIV / AIDS virus. Oncogenic viruses.	
Unit: IV -Parasitology 1. PARASITOLOGY I- Morphology, Life-Cycle, Pathogenicity and Laboratory diagnosis of protozoa such as: - *Entamoeba histolytica* and *E. coli, Giardia, Trichomonas, Toxoplasma, Plasmodium and Leishmania* 2. PARASITOLOGY II- Morphology, Life-Cycle, Pathogenicity and Laboratory diagnosis of following helminths and nematodes: - Hookworm, roundworm, Whipworm, Thread worm, Pinworm. Tapeworm, *Echinococcus, Wuchereria bancrofti* and *B. malayi*	

Paper	*List of Practical*
RJSPGDMLTP201	1. Microscope - Construction, Care & use and practice of Gram staining technique 2. Morphology of bacteria - Size, Shape, Arrangement, Capsule, Spore, Flagella etc. 3. Practice of Z. N. staining and Hanging drop method for motility 4. Sterilization and disinfection - Chemical disinfectants, Operating room fumigation 5. Common Culture media - Liquid and solid :- Preparation, Sterilization, and uses 6. Biochemical reactions- Commonly used biochemical test including bacterial agglutination reaction 7. Antibiotic susceptibility testing Kirby-Bauer method 8. Agglutination, precipitation and complement fixation reaction 9. Widal test, Weil – Felix test, Bacterial slide Agglutination test, VDRL test, R.A. test, CRP test, ASO test, Pregnancy test (Latex agglutination test), Wasserman test, Mauntoux test. 10. Agar gell diffusion test (AGD), Counter immuno-Electrophoretic test (CIEP), Single Radial immuno-diffusion test (SRID) 11. Enzyme Linked Immuno Sorbent assay (ELISA)
RJSPGDMLTP202	1. Fixation, Processing, Embedding, Section cutting and preparation of slides 2. Sharpening of Knives 3. Preparation of fixative and decalcifying fluid 4. Preparation of adhesives to fix the sections on the slide 5. Collection, Preparation, Fixation and staining of cytological smears by Papanicolaou's staining method 6. First aid for chemical burns, poisonous gasses, Electrical Shock and Glass injuries 7. Use of bandages, splints and demonstration of Cardio-pulmonary resuscitation, external cardiac massage. 8. Use of Windows Utilities – Explorer, Setting etc. 9. File operation – Copy, Move, Delete, Rename etc. 10. Document Creation, editing, printing using MS Word Spreadsheets / charts, editing, printing, using MS Excel
RJSPGDMLTP203	Mycology: 1. Collection and processing of skin scraping / nail clippings / hair pieces / clinical material for demonstration of fungal elements 2. Microscopy for fungal elements: unstained perpetration: Lactophenol cotton blue.

	3. Microscopy for fungal elements : stained perpetration 4. Demonstration of common fungal media with and without growth Virology: 1. Instruments / Equipments and glassware used in 2. viral diagnostic laboratory 3. Inoculation of chick-embryo and other cell / tissue culture media. (Note: Both Practical's will be conducted with the help of audio, video-aids or by paying visit to virus culture laboratory.)
RJSPGDMLTP204	**Parasitology** 1. Collection, Preservation and Transportation of fecal material and its Physical, Chemical & Parasitic examination 2. Preparation of stained and unstained slide for detection of larvae / ova or cysts 3. Concentration methods for Ova & Cysts. 4. Demonstration of gross specimen of Hookworm, Roundworm, Whipworm, Thread worm, Pinworm and Tapeworm, 5. Demonstration of following parasites / ova / cyst under microscope : *G. lamblia, T. vaganalis, Malarial parasites, Leishmania*, Roundworm, Whipworm, Threadworm, Pinworm and Tapeworm.

Practical's Skills to be developed:

Intellectual Skills: Analysis and Interpretation

Motor Skills: Accuracy in measurement and Follow standard test procedure

Learning structure in RJSPGDMLT201:

Application

- To understand the morphology of bacteria, sterilization and disinfections techniques, immunity, antigen-antibody reaction and serological reaction. To develop the skill of various clinical testing techniques.

Procedures

- Morphological procedures for identification of bacteria. Sterilization and disinfection procedures. Bio-chemical test. Procedures for antibiotic susceptibility testing
- Procedures and methods for Widal test, Weill – Felix test, Bacterial slide Agglutination test, VDRL test, Kahn test, RA test, ASO test, CIEP test, SRID test, ELISA.

Principles

- Principles of identification of bacteria, size, shape, arrangement; capsule, spore flagella etc. Principles of sterilization and disinfection. Principles of Bio-chemical reactions
- Principles of Agglutination, Precipitation and compliment fixation reactions. Principles of various bacterial test.

Concepts

- Morphology and Physiology of bacteria, Aerobic and Anaerobic Mycobacteria, Pyogenic cocci.
- Immunity, Antigen, Antibody and compliment. Autoimmunity and diseases

Facts

- Bacterilogy; Immunology and Serology

Learning structure in RJSPGDMLT202:

Application

- To study the dearrangement of tissue due to diseases at cellular level, and to study the exfoliation of cells from surfaces of various passages, organs and viscera

Procedures

- Procedures of Histopathology, Cytopathology and Diagnosis Methods of collection of specimens

Principles

- Principles of fixation, processing, staining, smearing and decalcification of cells and tissues

Concepts

- Cells, Tissues, Gynecological and Non-Gynecological specimens, Harmones, local and distant pathology

Facts

- Deranged tissues, exfoliated cells, diseases, illness, organs, pathology

Learning structure in RJSPGDMLT203:

Application

- To study and gain knowledge of latest and advanced pathologiical techniques to have precise and accurate

Procedures

- Latest and advanced techniques / procedures for accurate and precise diagnosis such as techniques of rapid diagnosis, molecular diagnosis, Tele-pathology

Principles

- Principles of Bio-chemistry, Microbiology, Histopathology and Haematology

Concepts

- Various bacteria, microorganisms, viruses, immunocompramised host and HIV patients etc

Facts

- Various serious diseases and illness; detected and undetected viruses

Learning structure in RJSPGDMLT204:

Application

- To develop the skill of laboratory diagnosis of various parasites, Pathogenic fungi and viruses

Procedures

- Procedures for laboratory diagnosis of various parasites. Procedures of collection, preservation & transpiration of fecal material and physical, chemical & parasitic examination
- Procedures for identification pathogenic fungi (mycosis), Identification of viruses and bacteriophage

Principles

- Principles of identification and laboratory diagnosis of various etiological agents of communicable disease viz. E. hystolytica, G. lamblia, Lieshmania, Tape worm, Round worm etc.
- Principles of classification o pathogenic fungi – superficial, deep and systemic mycosis. Principles of classification and identification of human viruses including bacteriophage

Concepts

- E. hystolytica & E. coli, G. lamblia & Trichomonas, Plasmodia & Lieshmania, Tape worm, Thread worm, Round worm, Echinococus, B. malaya etc.
- Pathogenic fungi, Viruses, Bacteriophage: Viral infections such as hepatitis, rabies, measles, poliomyelitis, HIV/AIDS etc.

Facts

- Parasitology; Mycology & Virology

SECOND SEMESTER GROUP DISCUSSIONS & SEMINAR
Teaching and Examination Scheme:

RATIONALE

This subject of conducting Group discussion is intended to equip the students with the necessary basic skills of Communications as well as to develop their ability to express their own views about the subject knowledge which they have acquired during the entire tenure of two semesters of the programme. This also helps to build the confidence amongst the students which certainly help them in future to make their excellent career as self-developer.

OBJECTIVES:

1. Prepare a report for the subjects for group discussion.
2. Manage to deliver the topics within stipulated time.
3. Work in a Group.
4. Develop leadership qualities.

Procedure:

- The concerned teachers should teach the students the technique of Group discussion on the selected topic of discussion. Teachers should convey the technique of Group discussion and also teach the skill of how to collect more advanced information on the selected topic during group discussion.
- The selection of topics by students for group discussion may be made from the subjects of semester I & II and any other allied subject of the course, with the consent of the concerned teacher.
- The Group discussion is to be made amongst the group of maximum 6 students and the entire group discussion process is to be observed by the teacher and the marks are to be assessed out of 50 marks for each participating student on the basis of his/her interaction and active participation during the group discussion. Time duration for Group Discussion is 30 minutes for each group.
- The above process of group discussion is to be carried out twice and the average of the marks obtained by the candidate is to be reported for a total 50 marks as Oral marks.

Learning structure in RJSPGDMLT201-204:

Application

- To develop Communication skills and confidence as well as to promote the attitude of the students

Procedures

- The method of expression and discussion regarding own views about the subject knowledge. The method of emphasising and elocution.

Principles

- Principles of data collection, scrutiny and selection. Principles of oral communication and discussion.

Concepts

- Subject data, communication skills, Group discussions and elocution.

Facts

- Subjects, communication skills and discussions in group.

Learning Resources Book for second semester

Sr. No.	Author	Title	Edition	Year of Publication	Publisher
01	L. Poller	Recent Advances in Blood Coagulation , Vol - IV	1st	1985	Churchill Livingstone
02	A. Paul & W. Martin	Computer System in Medical Laboratory Science,	1st	1984	Churchill Livingstone
03	G. D. Hsiung	Diagnostic Virology	3rd	1982	Yale University Press, London.
04	P. S. Gardner & I. McMillin	Rapid Viral Diagnosis	2nd	1980	Butterworth & Co., London.
05	Todd- Stanford	Clinical Diagnosis & Management	19th	2000	W.B. Saunder Co. U.S.A.
06	P.B.Godkar	TextBook of Medical Laboratory Technology	2nd	203	Bhalani Publication
07	K. Anand	Hospital Management	1st	1996	Vikas Publishing, New Delhi.
08	G. Guru	Laboratory Setup & procedures	1st	1989	NCERT, New Delhi
09	Malven & T. Penn	Guide to Managing a Clinical Laboratory	1st	1999	Clinical Laboratory Mgt. Association, USA
10	A. S. Koenrg	Medical Laboratory Planning & Design	1st	1985	College of American Pathologist,

					USA.
11	WHO, Geneva	Biosafety Manual for laboratories	2nd	1993	WHO Publication, Geneva.
12	T. R. Bowry	Immunology Simplified	2nd		ELBS - Oxford university press, London
13	C. F. A. Culling	Hand Book of Histotechnological & Histochemical Techniques	3rd	1974	Butterworth - London
14	G. G. Brown	An introduction to Histotechnology	3rd	1974.	Century - Croft , New York
15	L. G. Koss	Diagnostic Cytology, Vol - I & II	3rd	1979	J. B. Lippincott Co., Philadelhia.
16	P.B. Godkar	Text Book of Medical Laboratory Technology	2nd	2003	Bhalani Publication.
17	Bancroft	Text Book of Histopathology	--	--	
18	D. M. Weir	Immunology : An outline for students of medicine	5th		Edinburgh, Churchill, Livingston
19	E. G. Wachtel	Exfoliative Cytology	1st	1964	Butterworth, London
20	Earnest Jawetz	Medical Microbiology	18th		Prentice - Hall International Inc - USA
21	Eleanor M. Travers	Clinical Laboratory Management	1st	1997	Williams & Wilkins

22	Fair Brothers	Text book of Bacteriology	10th		William Heinemann Medical Books - USA
23	G. Guru	Microbiology	1st		NCERT, New Delhi.
24	G. Guru	Serology for Medical Laboratory Students	1st		NCERT, New Delhi.
25	G. Guru	Histotechnology	1st	1988	NCERT, New Delhi.
26	G. P. Talwar	A Hand book of Practical Immunology	1st		Vikas Publishing House,
27	Govt. Publication	Hospital Administration Manual	1st	1976	Govt. of Maharashtra
28	I. M. Roitt	Essential Immunology	6th		ELBS, London.
29	K. G. M. M. Aberti & C. P. Price	Recent Advances in Clinical Biochemistry	1st	1981	Churchill Livingstone
30	Laxmi Narayan	Technique	--	--	
31	M. K. Brenner & A. V. Hoffbrand	Recent Advances in Haemotology	1st	1993	Churchill Livingstone
32	Mackie - McCartney	Medical Microbiology – Vol.- I & II	13th		ELBS, Churchill Livingstone

33	R. Ananthnarayan & C. K. Jairam Panikar	Text book of Medical Microbiology	5th		Orient Longman, Madras.
34	R. S. Weinstein et. al.	Advances in Pathology and Laboratory Medicine, Vol _ II, III, IV, V & VI	1st	1992	Moshy Year Book, Chicago.
35	S. S. kelkar & D. M. Khare	General Immunodiffusion Techniques	1st		Popular Prakashan
36	Todd- Stanford	Clinical Diagnosis & Management	19th		W.B. Saunders. Co. U.S.A.
37	Tulip Diagnostic	Syphilis Serology	1st		Tulip Diagnostic, Germany
38	V. Paul, Strike & J. Wright	Medical Laboratory Statistics	1st	1981	Tringle West - Bristol

INTERNSHIP
PROJECT AND SEMINAR ON HOSPITAL TRAINING
Curriculum for Post Graduate Diploma in Medical Laboratory Technology

PROJECT AND SEMINAR ON HOSPITAL

Note: *08 HRS/day for 16 weeks: 6 days a week, training.

RATIONALE

1. The main aim of the hospital training is to expose the students to hospital environment so that many faceted developments of the students can be achieved under various skills of domains such as Personal, social, professional & lifelong learning.
2. The students will be benefited lot by this exposure to various pathological and clinical activities conducted in hospitals and laboratories and this hospital training experience will add values in their attitudes such as value for health, work commitment, hardworking, honesty, problem solving, punctuality, loyalty and independent study.
3. Seminar on the hospital training experiences is intended to equip the students with the necessary basic skills of Communications as well as to develop their ability to express the subject knowledge which they have acquired during the entire tenure of two semesters of classroom teaching and one semester of hospital training i.e., exposure to pathological laboratories / pathological department / hospitals / diagnostic centre environment.
4. This also helps to build the confidence amongst the students which certainly help them in future to make excellent career as self-developer and entrepreneur as well as for job opportunities.

OBJECTIVE:

1. To develop the students from all facets of various domains of skills such as Personal, social, professional & lifelong learning and make them a perfect human being with awareness of all social responsibilities.
2. To develop confidence as well as to promote the attitude of the students towards self-developer and entrepreneur and also to developed the skill of presentation art.

Training Details:

1. The students are placed in research & development, pathological / clinical departments of various health care industries / hospitals / diagnostic centers / pathological laboratories / organisations for four months duration.
2. During the hospital training tenure, the students are expected to gain actual pathological and clinical experience and try to make them familiar with the hospital environment.
3. 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) in a bound volume which is to be submitted as a project report.
4. The concerned teachers are supposed to guide the students for the preparation and

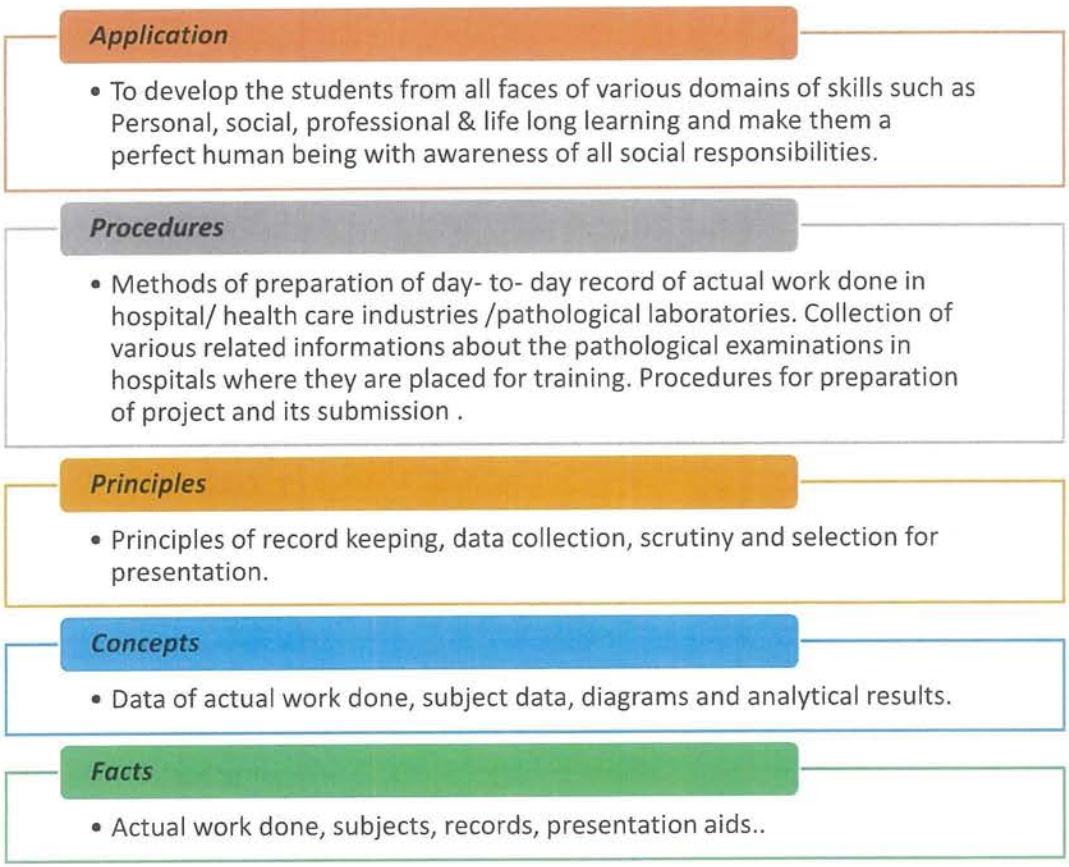
presentation of the project report.

Seminar:

1. The students are required to deliver seminar on the topic of their pathological laboratory experiences i.e., actual work done by them in those pathological laboratories / pathological department / hospitals / diagnostic centre during their tenure of hospital training of 4 months duration.

2. The duration or time allotted for students for delivering a seminar is 10 minutes only and in this stipulated time period he/she has to present his/her pathological laboratory experiences about the actual work done by him/her in pathological laboratory during hospital training

Learning structure in RJSPGDMLT PROJECT AND SEMINAR ON HOSPITAL:



LIST OF STUDENTS ENROLLED FOR THE POSTGRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

Sr No	Full Name	Roll no
1	KADAM PRIYANKA SANTOSH SNEHA	5001
2	KHAN UZMA ABDUL HALEEM UMME KULSUM	5002
3	KHAN ASMA KHATOON GULAM MUSTAFA ZAHIDA KHATOON	5003
4	MORE MUGDHA RAJESH RASHMI	5004
5	LEPKAR LEENA KASHINATH SUJITA	5005
6	SINGH SATYAM SHYAM NISHA	5006
7	TERAWKAR MANASI MAHESH MADHAVI	5007
8	PATIL TEJAL VASANT VRUSHALI	5008
9	RAHATE YASHIKA SUNIL SUNETRA	5009
10	KAMBLE SIMRAN SUBHASH AVANTIKA	5010
11	SINGH SUPRIYA JITENDRA SINGH JANKI DEVI	5011
12	MISHRA SHIVANI DHRUVRAJ KUSUM	5012
13	KHAN ALSA BEHRAM ZAHIDA	5013
14	GUPTA JYOTI KAMLESH RAJKUMARI	5014
15	PANDIT RASHMI RANVIR PUJA	5015
16	BARIA JEENAL SANJAYBHAI SHEETAL	5016
17	PATEL MITALI PATEL HASMUKH MANUBHAI PATEL MADHAVI HASMUKH	5017
18	PATIL DRASHTI DINESH PRABHAVATI	5018
19	KHAN SHABNAM KHATOON MOHD AKRAM SHAMSUNNISA	5019
20	KHAN SHAINEBANO ASHFAK AFROZ	5020
21	GAWDE VEDIKA TANAJI KASHIDA	5022
22	KHAN SAFIYA BANO SHARAFAT ULLAH FARZANA BEGAM	5023
23	PATEL VYOMA JAGDISH MANEKLAL PATEL JAYANA JAGDISH PATEL	5024

Ramniranjan Jhunjhunwala College of Arts, Science & Commerce Est. 1963 AUTONOMOUS NAAC Re-accredited 'A' Grade

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RAMNIRANJAN JHUNJHUNWALA COLLEGE
OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

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6	TERAWKAR MANASI MAHESH MADHAVI	5007
7	PATIL TEJAL VASANT VRUSHALI	5008
8	RAHATE YASHIKA SUNIL SUNETRA	5009
9	KAMBLE SIMRAN SUBHASH AVANTIKA	5010
10	SINGH SUPRIYA JITENDRA SINGH JANKI DEVI	5011
11	MISHRA SHIVANI DHRUVRAJ KUSUM	5012
12	KHAN ALSA BEHRAM ZAHIDA	5013
13	GUPTA JYOTI KAMLESH RAJKUMARI	5014
14	PANDIT RASHMI RANVIR PUJA	5015
15	BARIA JEENAL SANJAYBHAI SHEETAL	5016
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22	PATEL VYOMA JAGDISH JAYANA	5024
23	SINGH SATYAM SHYAM NISHA	5006

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OF ARTS, SCIENCE & COMMERCE (AUTONOMOUS)
Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA

CERTIFICATES

Hindi Vidya Prachar Samiti's

RAMNIRANJAN JHUNJHUNWALA COLLEGE OF ARTS, SCIENCE & COMMERCE

(Empowered Autonomous College)

AFFILIATED TO UNIVERSITY OF MUMBAI

CERTIFICATE

This is to certify that

KADAM PRIYANKA SANTOSH SNEHA

has secured

O Grade

and earned 48 Credits

in Postgraduate Diploma in MEDICAL LABORATORY TECHNOLOGY

in the examination held in September 2024 and result declared on 28th November, 2024.

Maj. Pravin Nayak
Controller of Examination

Dr. Himanshu Dawda
Principal

Certificate ID: PGDMLT-2023-24-01

Hindi Vidya Prachar Samiti's

RAMNIRANJAN JHUNJHUNWALA COLLEGE OF ARTS, SCIENCE & COMMERCE

(Empowered Autonomous College)

AFFILIATED TO UNIVERSITY OF MUMBAI

CERTIFICATE

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Ghatkopar (W), Mumbai-400 086, Maharashtra, INDIA