Shri Rawatpura Sarkar University, Raipur
Faculty of Science
BACHELOR OF VOCATIONAL TRAINING IN MEDICAL LABORATORY TECHNOLOGY

B.Voc MLT Semester III

Examination Scheme in UGC CBCS Pattern
(Effective from the session: 2022-23)

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	**T**	**P**		Continuous Evaluation	Sem End Exam	Total	
1	SBV03301T	Clinical Biochemistry	4	-	-	4	30	70	100	3
2	SBV03302T	Basics Immunology and Serology	4	-	-	4	30	70	100	3
3	SBV03303T	Clinical Hematology	4	-	-	4	30	70	100	3
4	SBV03304T	Blood Banking	4	-	-	4	30	70	100	3
5	SBV03391P	Lab Course I – (Practical)	-	-	4	2	15	35	50	4
6	SBV03392P	Lab Course II – (Practical)	-	-	4	2	15	35	50	4
7	SBV03393P	Lab Course III – (Practical)	-	-	4	2	15	35	50	4
	Total					**22**			**550**	

Course Title	**CLINICAL BIOCHEMISTRY**				
Course Code	SBV03301T				
Course Credits	**L**	**T**	**P**	**C**	
	4	**-**	**-**	**4**	
Prerequisites	**Introductory Biochemistry/ Basic Biology**				
Course Objectives	The module gives an introduction to clinical biochemistry. It gives emphasis on normal & abnormal body processes. It also gives insight about routine biochemical tests and profile testing.				
Course Contents	**UNIT – 1** Normal and abnormal Biochemical processes of the body. Basic physiology and biochemistry of the body, Interrelated metabolic processes of the body Function of various organs and their clinical assessment, Biochemical changes in the body under pathologic conditions. **UNIT – 2** Routine Biochemical tests Phosphatases, transaminases, lactic dehydrogenase, creatinine kinase, electrolytes, blood gases and bicarbonate, determination of serum/plasma bicarbonate. **UNIT – 3** Biochemical Test Profile Liver tests, Renal tests, Endocrine function tests, Lipid profile, Transaminase, LDH,CPK, CPK-MB, SGPT/SGOT, Amylase , GTT. **UNIT – 4** Principles of analytic techniquesBasic steps in analytical chemistry,Titrimetry, Photometry, electro chemistry, immunochemistry, separation and analysis of organic compounds. **UNIT – 5** 5.1 Hormonal Studies and clinical endocrinology Principle: Thyroid, Pancreas, Adrenal and sexual glands, hormones and its diagnostic significance. 5.2 Electrophoresis - Introduction and types, Protein and DNA electrophoresis.				
Course Outcomes	**1**: Analysis of biochemical reactions and their clinical assessments. **2**: Acquire the knowledge of clinical biochemistry experiments. **3**: Understand of liver test, renal test, endocrine function tests, lipid profile, Lactate dehydrogenase, etc. **4**: Develop the knowledge about Hormones and clinical endocrinology with the diagnostic significances. **5**: Developed the concept of molecular biology and purification of molecules for molecular diagnosis				
Textbooks And Reference Books	1. Clinical Chemistry, Princile, Techniques and Correlations, Michael Bishop, Sixth Edition, Lippincott W(2015).				

Course Title	**BASIC IMMUNOLOGY AND SEROLOGY**				
Course Code	SBV03302T				
Course Credits	**L**	**T**	**P**	**C**	
	4	**-**	**-**	**4**	
Prerequisites	**Introductory Immunology**				
Course Objectives	The module is designed to provide introduction to hematology. It also gives insight about blood collection and routine tests performed in hematology section with result interpretation.				
Course Contents	**UNIT – 1** Introduction to immunology: Types of immunity – Innate, Addaptive, Active, Passive. Structure & functions of the immune organs: Thymus, bone marrow, lymph nodes, spleen, and Lymphatic tissues. **UNIT – 2** Humoral and Cell mediated Immune Response: T cell, B cell and other immune cells and their function ,Major Histocompatibility Complex, HLA. **UNIT – 3** Antigens: Types & structure. Antigenicity and immunogenicity. Antibodies: Structure and classes of antibodies, IgG,IgA,IgD,IgE and IgM, monoclonal antibodies. Antigen-Antibody reactions: Agglutination, Precipitation, cross reactivity. **UNIT – 4** 4.1 Hypersensitivity: Reaction and types. Immunodeficiency: Primary and secondary immunodeficiency. 4.2 Immunodiagnosis: ELISA , RIA and Immunofluorescence Assay, Detection of specific antibody, Flow Cytometry, HLA Typing and Matching, Lymphoproliferative Assay. **UNIT – 5** Complement system: Classical complement pathway, Alternative complement pathway, Regulation of complement activation , Biological effects of complement.				
Course Outcomes	1. Understand about the basics of immunology, immune system, their types, local immunity and herd immunity. 2. Understand about the lymphoid organs, primary lymphoid organs and secondary lymphoid organs and their role in immune system. 3. Understand the humoral and cell mediated immune responces and complement system with pathways, regulation and their biological effects. 4. Perceive the antigens and antibody, their classifications, structures and functions in immune system. 5. Analyse the techniques, agglutination, precipitation, immunofluorescence, ELISA and RIA techniques of antigen- antibody reaction.				
Textbooks And Reference Books	1. Textbook of immunology, Kubey Seventh Edition (2013) 2. Medical Laboratory Technology by K L Mukherjee Volume-I 3. Text book of Basic Immunology by Dulsy Fatima 4. Clinical Diagnosis & Management by Laboratory methods (20thedition) by John BernardHenry				

Course Title	**CLINICAL HEMATOLOGY**				
Course Code	SBV03303T				
Course Credits	**L**	**T**	**P**	**C**	
	4	**-**	**-**	**4**	
Prerequisites	**Introductory Biochemistry/ Basic Biology**				
Course Objectives	The module gives an introduction to fundamentals of basic and modern Pathology. It gives emphasis on routine body fluid examination.				
Course Contents	**UNIT – 1** 1.1 Introduction Specimen collection & laboratory Lab preparations in Hematology. 1.2 Routine Hematological tests: Determination of hemoglobin concentration and hematocrit. 1.3 Calculations of red blood cell Automated systems in hematology. indices :MCV, MCH and MCHC. **UNIT – 2** Automated systems in hematology :Study of blood smear, Reticulocyte count, and erythrocyte sedimentation rate (ESR), Eosinophil count, Platelet count. **UNIT – 3** Blood Coagulation :Mechanism of blood coagulation , Coagulation Factors ,Lab methods used in investigation of Coagulation Disorders ,Bleeding Time, Clotting Time , Prothrombin Time ,Activated partial thromboplastin time, ,Platelet Function Test ,Clot Retraction ,Plasma Recalcification Time ,Prothrombin Consumption Index , Estimation Of Fibrinogen ,Clot Lysis Time ,Hemophilia And Its Laboratory Parameters. **UNIT – 4** Anemia : Introduction, Classification and Lab diagnosis of : Iron Deficiency Anemia Hemolytic Anemia ,Megaloblastic Anemia ,Sickle cell Anemia **UNIT – 5** Abnormal Conditions Of Blood Cell - Polycythemia Vera, Leukocytosis ,Monocytosis , Leucopenia, Neutropenia,Lymphopenia , Agranulocytosis ,Infectious mononucleosis LEUKEMIA : Definition,FAB classification of leukemia Acute and Chronic Leukemia, Leukemoid blood reactions.				
Course Outcomes	1:Learn basic principles and introduction pathology 2:Understand the composition of body fluids, blood, sputum and semen. 3:Understand the physical and chemical examination of urine. 4:Physical and chemical examination of Semen and Urine 5:Learn stool examination to diagnose the obtrusion in digestive system.				
Textbooks And Reference Books	1. ABC of Clinical Heamatology Second Edition by Drew Provan, BMJ books (2003). 2. Text book of Medical Laboratory Technology by P. B. Godker 3. Medical Laboratory Technology by Mukherjee				

Course Title	**BLOOD BANKING**				
Course Code	SBV03304T				
Course Credits	**L**	**T**	**P**	**C**	
	4	**-**	**-**	**4**	
Prerequisites	**Introductory Biochemistry/ Basic Biology**				
Course Objectives	The module gives an introduction to basic procedures and techniques used in a blood bank. The module also gives insights about blood typing, compatibility testing and complications in case of blood transfusion.				
Course Contents	**UNIT – 1** Blood bank : Introduction & routine laboratory procedures. **UNIT – 2** Blood collection: Procedures, processing & component preparation. **UNIT – 3** Blood donor Management : Donor motivation & selection,phlebotomy,post donation care and outdoor blood donation camps. **UNIT – 4** 4.1 Lab reagents : Preparation, Reporting of heam agglutination reaction. 4.2 Blood Transfusion: Principles & Practice. **UNIT – 5** Transfusion reaction: Hemolytic disease of the newborn				
Course Outcomes	1. Understand basic initial blood bank laboratory procedure. 2: Understand the reagent preparation for blood bank laboratory. 3: Develop the skill of phlebotomy in blood banking. 4: Acquire the knowledge about principle of blood transfusion. 5: Understand the hemolytic disease in new born.				
Textbooks And Reference Books	1. Blood Banking & Transfusion Medicine, Sally V. Rudmann, Second edition, Elsevier Health Sciences (2005) 2. Medical Laboratory Technology, Kanai L Mukherjee, Second Edition,McGraw Hill Education (2015)				

Course Title	**LAB COURSE I: – (PRACTICAL)**				
Course Code	SBV03391P				
Course Credits	**L**	**T**	**P**	**C**	
	-	**-**	**2**	**2**	
Prerequisites	**Theoretical Knowledge of Medical Biochemistry**				
Course Objectives	This practical course is based on study of Human anatomical structure and blood smear, study of plasma are also included.				
Course Contents	1. Spots : Anatomical structures, Heart ,Kidney,Eye ,Skeleton 2. Preparation of blood smear. 3. Identification of different kinds of blood cells 4. Isolation of blood plasma 5. Blood clotting and anti-coagulation with EDTA 6. Height, weight measurement and BMI calculation				
Course Outcomes	1: Acquire the chemical and molecular Structure, function and interrelationship of bimolecular and human fluids. 2: Develop the knowledge on human specimens, extracted fluids aspects of metabolism, and their regulatory pathway mechanisms. 3: Obtain interpretive skill about biochemical properties collected from the human body specimens. 4: Understand the management of bio medical waste, safety and first aid.				
Textbooks And Reference Books	**1.** Medical Laboratory Technology, Kanai L Mukhajee, Second Edition, Mc Graw Hill. (2015)				

Course Title	**LAB COURSE II : – (PRACTICAL)**				
Course Code	SBV03392P				
Course Credits	**L**	**T**	**P**	**C**	
	-	**-**	**2**	**2**	
Prerequisites	**Theoretical Knowledge of Medical Biochemistry**				
Course Objectives	The practical course is designed to learn serological diagnosis of various diseases which includes WIDAL, HIV, HBSAG, HCV etc.				
Course	1. WIDAL test				

Contents	2. RA Test 3. CRP Test 4. Pregnancy Test & HIV 5. Latex Agglutination Test 6. HCV and HBsAG Test
Course Outcomes	1: Apply technical skills to draw blood by venipuncture, separate blood plasma and serum . 2: Analysis of the types of organisms grown on culture media, its isolation and identification. 3: Acquire knowledge about identification of bacteria based on morphological characteristics and by staining techniques 4: Perform antigen antibody reactions and use it to clinical settings at hospitals and diagnostic centres. 5: Understand about antibody titres and carry out routine WIDAL (Widely Investigated Diagnosed Assay Laboratory) tests.
Textbooks And Reference Books	1. Pathology practical books , Harsh Mohan, Second Edition,Jaypee Brothers Medical Publishers.(2007) 2. Practical Microbiology and Biotechnology , Aneja, Second Edition, New Age International Publishers.(2015

Course Title	**LAB COURSE III: – (PRACTICAL)**				
Course Code	SBV03393P				
Course Credits	**L**	**T**	**P**	**C**	
	-	**-**	**2**	**2**	
Prerequisites	**Theoretical Knowledge of Medical Biochemistry**				
Course Objectives	This practical course is based on blood group identification, blood transfusion reaction and some social issues.				
Course Contents	1. Basic steps of Phlabotomy 2. Red cell antigen preparation 3. Single tube compatibility techniques using AHG reagent 4. Forward and reverse blood grouping. 5. Preparation of concentrated (packed) Red cells. 6. Blood cross matching				
Course Outcomes	1: Acquire the technique of blood group identification. 2: Understand the forward and reverse grouping in basic procedures of blood banking. 3: Accumulate of knowledge about blood sample prior to transfusion. 4: Understand, appropriate precautions in blood banking. 5 Determine, about blood collection camp and motivation about blood donation.				
Textbooks And Reference Books	1. ABC of Clinical Haematology, Second Edition,Dr, BMJ Books.(2010) 2. Practical Microbiology and Biotechnology , Aneja, Second Edition, New Age International Publishers.(2015)				