First Year Curriculum Syllabus for B.Voc. Degree Programme in

Medical Laboratory Technology

(Dr Babasaheb Ambedkar Technological University, Lonere)

Semester I Structure

Sr. No.	Course Code	Name of the Course	Teaching Scheme			Evaluation Scheme			Credits	Total Marks
			L	T	P	IA	MSE	ESE		
General Education										
		Theory								
1	BVMLC101	Human Anatomy	3	0	0	25	0	25	3	50
2	BVMLC102	Bimolecular	3	0	0	25	0	25	3	50
3	BVMLC103	General Microbiology	3	0	0	25	0	25	3	50
4	BVMLC104	Laboratory Instrumentation-I	3	0	0	25	0	25	3	50
		Total							**12**	**200**
Skill Components										
		Lab/Practical								
5	BVMLL105	Bimolecular	0	0	1	25	0	25	1.5	50
6	BVMLL106	General Microbiology	0	0	1	25	0	25	1.5	50
On-Job-Training (OJT) (Any One)										
			Evaluation Sheet							
			IA			**ESE**				
7	BVMLE117	Human Biology Lab/ Dept./ Research centers/ Medical college	50			150			15	200
8	BVMLE118	Biochemical Techniques training centers/ laboratories/ Departments/ Medical college								
		Total							**18**	**300**

Semester II Structure

Sr. No.	Course Code	Name of the Course	Teaching Scheme			Evaluation Scheme			Credits	Total Marks
			L	T	P	IA	MSE	ESE		
General Education										
		Theory								
1	BVMLC201	Human Physiology	3	0	0	25	0	25	3	50
2	BVMLC202	Enzymology	3	0	0	25	0	25	3	50
3	BVMLC203	Medical Microbiology	3	0	0	25	0	25	3	50
4	BVMLC204	Hematology	3	0	0	25	0	25	3	50
		Total							**12**	**200**
Skill Components										
		Lab/Practical								
5	BVMLL205	Enzymology	0	0	1	25	0	25	1.5	50
6	BVMLL206	Hematology	0	0	1	25	0	25	1.5	50
		On-Job-Training (OJT) (Any one more OJT to be opted from the OJT mentioned in the semester I)								
			Evaluation Sheet							
			IA			**ESE**				
7	BVMLE217	Hematology/Pathology lab/Modern diagnostic centers/ hitech labs/ Departments/ Medical college	50			150			15	200
8	BVMLE218	Microbiology lab/ Industrial research labs/ Research centers/ Incubation centers/ Departments/ Medical college								
		Total							**18**	**300**

Semester

I

Syllabus

Subject Name: Human Anatomy		
Course Code :BVMLC101	**Semester: I**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit : 03		

	Content	**Hours**
Unit – I	**Cell**	06
	Cell- Structure, components & function. Eukaryotic cell structure, Cell organelles Cell wall, plasma membrane, nucleus, Cytoplasm, Microsomes, Ribosome, Endoplasmic reticulum, Golgi apparatus, mitochondria, lysosomes, centrosomes, microtubules. Eukaryotic cell division-mitosis and meiosis Transport between cell and their surroundings, Movements related microfilaments.	
Unit – II	**Tissue and Membranes**	06
	Body Tissue – Structure and function – Epithelium, Connective, Muscular, Nervous, Membranes, Lymphatic system. Membranes-synovial, mucous, serous.	
Unit – III	**Introduction to anatomy**	06
	Definition of anatomy and its division, Common anatomical terms (Anterior/Ventral, lateral, Medial, median, posterior/dorsal etc.) Anatomical Position & Planes (Supine, prone, recumbent, lithotomy) planes- coronal, sagittal.	
Unit – IV	**Bone**	06
	Structure of bone, Classification of bones with examples ,Formation of bone, General pattern of blood supply, Function of bone.	
Unit – V	**Axial Skeleton**	06
	The skull- Bones of cranium-Sutures of cranium, frontal bone, parietal bones, Temporal bones, occipital bone, sphenoid bone, ethmoid bone, cranial fossae, fontanelles, sinuses of the skull,Bones of face-maxilla, mandible.Bones of Upper limb, bones of wrist and hand, bones of thorax, ribs,Vertebral column- Classification of vertebrae, Structure of typical vertebrae, structure of other vertebrae.	
Unit – VI	**Appendicular Skeleton**	06
	Limbs and girdle, Bones of pelvic girdle, difference between female and male pelvis, bones of lower limb, bones of foot, functions of appendicular skeleton Joints and types of joints.	

Reference Books

Name of Authors	**Title of the Book**	**Publisher**
Ross & Wilson	Anatomy and physiology in health illness	LBS, Churchill Livingstone, Medical division of Longman Group (FE) Ltd.
C.C. Chattejee	Human physiology	Medical Allied Agency Calcuttla

Subject Name: Biomolecules		
Course Code :BVMLC102	**Semester: I**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit : 03		
Content		**Hours**
Unit – I	**The Foundations of Biochemistry**	06
	Cellular and chemical foundations of life, Water: unique properties, weak interactions in aqueous systems, ionization of water, buffering action in biological system, water as a reactant and fitness of the aqueous environment.	
Unit – II	**Amino Acids**	06
	Structural features and classification; Physical properties, optical properties (Stereoisomerism); Chemical properties (acid base properties, titration curve) of amino acids; Uncommon amino acids and their functions.	
Unit – III	**Carbohydrates and Glycobiology**	06
	Monosaccharide's - structure of aldoses and ketoses; Ring structure of sugars, conformations of sugars, mutarotation, anomers, epimers and enantiomers; Structure of biologically important sugar derivatives, oxidation and reduction of sugars; Formation of disaccharides, reducing and non-reducing disaccharides; Polysaccharides – homo- and heteropolysaccharides, structural and storage polysaccharides; Structure and role of glycoconjugates -proteoglycans, glycoproteins and glycolipids (gangliosides and lipopolysaccharides); Carbohydrates as informational molecules.	
Unit – IV	**Lipids**	06
	Building blocks of lipids - fatty acids, glycerol, ceramide; Storage lipids triacyl glycerol and waxes; Structural lipids in membranes – glycerophospholipids; Galactolipids and sulpholipids, etherlipids, sphingolipids and sterols, structure, distribution and role of membrane lipids.	
Unit – V	**Nucleic Acids**	06
	Nucleotides - structure and properties of bases, pentoses, nucleosides; Nucleic acid structure – Watson-Crick model of DNA, forms of DNA; Structure of major species of RNA - mRNA, tRNA and rRNA;	
Unit – VI	**Vitamins and Minerals**	06
	Vitamins: Structure and active forms of water soluble and fat soluble vitamins; Deficiency diseases and symptoms, hypervitaminosis **Minerals**: Sources and daily allowance. Biological roles of magnesium, sodium, potassium and phosphate trace elements. Metabolism of iron: Absorption, storage, transport and excretion. Iron deficiency and overload. Genetic errors of metabolism: Representative examples– Galactosemia, Phenylketonuria, Alkaptonuria, Albinism.	

Reference Books		
Name of Authors	**Title of the Book**	**Publisher**
Nigam.	Lab Manual of Biochemistry	Tata McGraw-Hill Education, USA
Nelson, D.L. and Cox, M.M.	Lehninger: Principles of Biochemistry	W.H. Freeman and Company (New York)
Donald, V. and Judith G.V	Biochemistry	John Wiley & Sons Asia Pvt. Ltd. (New Jersey)
Nicholas C.P. and Lewis S	Fundamentals of Enzymology	Oxford University Press Inc. (New York)

Subject Name: General Microbiology		
Course Code :BVMLC103	**Semester: I**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit : 03		
Content		**Hours**
Unit – I	**Introduction to Microbiology**	06
	Introduction to Microorganisms, Discovery of Microorganisms, Contribution of Antonie van Leeuwenhoek, Roberts Koch, Louise Pasteur, Study of compound Microscope, components, magnification, care, use Principle & working of electron Microscope, types of Electron Microscopy (Transmission, Scanning).	
Unit – II	**Structure of Bacterial cell**	06
	General Characteristics of microorganisms, Classification of Microorganisms, Structure & Function of Bacterial Cell & its arrangement. Cellular organelles – Cell wall, Cell membrane, Flagella, pilli, capsule, nucleic acid, plasmid, spore Bacterial growth curve, replication.	
Unit – III	**Staining and Culture methods**	06
	Staining: Principle, reagents and procedure of Gram staining, Acid-Fast Staining, Endospore staining, Capsule staining, Inoculation on Different types of culture media in Petriplates, slopes, Broth. Subculture & Preservation of Pure culture. Anaerobic Culture methods with recent advances.Antibiotic sensitivity test – Principle and procedure.	
Unit – IV	**Culture Media**	06
	Culture Media: Classification and types of culture media, **Composition**, **Preparation & uses of Solid** Media: Nutrient agar, Mac Conkeys Agar, XLD, DCA, Blood Agar, TCBS, Blood Telluride Agar, Chocolate agar, Lownstein Jansen media, Loeffer serum slope. **Composition, Preparation & uses of Liquid Media**: Peptone Water, Nutrient Broth, Bile Broth, Glucose Broth, Transport Media**.**	
Unit – V	**Quantitation of microorganisms & Biochemical Test**	06
	Quantization of Microorganisms: colorimeter, Spectrophotometer, Total count, viable count, Bacteriophage typing methods. **Identification of bacteria**: IMVIC tests, Carbohydrate fermentation test, catalase test, oxidase test.	
Unit – VI	**Sterilization & Disinfection procedures in Microbiology laboratory**	06
	Sterilization: Definition, Mode of action of Physical methods of Sterilization Thermal and non-thermal methods: Flaming, Incineration, Heat, Hot Air Oven, Autoclave, UV- Radiation, Filtration. **Disinfections**: Mode of action & uses of Chemical disinfectants –Phenol, Alcohol, Halogen, Heavy metals, and Quaternary ammonium salts, Aldehyde, Gaseous.	

Reference Books		
Name of Authors	**Title of the Book**	**Publisher**
P. Chakraborthy	A Text Book Of Microbiology	Calcutta New Central Book Agency.
R. Anantnaryan	Text Book of Microbiology	Hyderabad Orient Longman
Praful B. Godkar Darshan B. Godkar	Text Book Of medical lab. Technology	Bhalani Publication House

Subject Name: Laboratory Instrumentation-I		
Course Code :BVMLC104	**Semester: I**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: -- 50**	
Credit :03		

Content		Hours
Unit – I	**Laboratory glassware, and chemicals**	06
	Glass - composition, properties, varieties, grades of glassware's. General laboratory wares Glass and plastic- PVC, polycarbonate, Teflon Cleaning of laboratory glass wares. Preparation of cleaning solutions Grades of chemicals, storage and handling of chemicals and reagents.	
Unit – II	**Basic laboratory containers for sample collection**	06
	Diagram and types of containers for collection of blood, sputum, urine and stool.Collection technique of blood, sputum, urine, stools. Transportation and disposal of blood, sputum, urine and stool.	
Unit – III	**Basic laboratory instrument**	06
	Basic principles and usage of Instruments, Centrifuge Analytical Balance Water Bath pH – meter.	
Unit – IV	**Basic laboratory instrument in microbiology**	06
	Basic principles, working and usage of Instruments:-Microscope, Autoclave Incubator Hot air oven, Laminar Air flow Colony counter, Anaerobic jar.	
Unit – V	**Basic laboratory instrument in biochemistry**	06
	Basic principles, working and usage of Instruments: Distillation plant, Homogenizer, Calorimeter Glucometer Analyzer.	
Unit – VI	**GLP & Quality control in laboratory**	06
	Quality control &quality assurance in the laboratory, Quality control chart, Importance of quality control. Laboratory safety - General principles, Laboratory hazards and safety measures, Universal safety precautions. First aid in the laboratory.GLP.	

Reference Books

Name of Authors	Title of the Book	Publisher
Barrow, G. M.	Physical Chemistry	Tata McGraw-Hill, India
Castellan, G. W.	Physical Chemistry 4th Ed	Narosa, India
Pattabhi. V. and Gautham.N.	Biophysics	Narosa Publishing House, India
Puri, Pathan& Sharma	- Physical Chemistry.	

Lab- Biomolecules	
Course Code : **BVMLL105**	Semester: **I**
Weekly Practical's: PR: **01**Tut: **00**	Scheme of Marking TH: **--**
PR Exam Duration: **02 hrs**	Scheme of Marking PR: **25,** IA: **25,** Total: **50**
Credit:1.5	

Content

Suggestive list of Practical

1. Estimation of protein by Biuret method.
2. Estimation of protein by Lowry's method.
3. Estimation of protein by Xanthoprotein test.
4. Qualitative test for lipid (Lineman Burchard Rexn.)
5. Qualitative detection of fat by unsaturation test.
6. Estimation of total protein in serum by Biuret method.
7. Estimation of lipid by Formaldehyde-H_2SO_4 test.
8. Estimation of uric acid in blood.
9. Estimation of carbohydrates by Benedict's test.
10. Estimation of carbohydrates by Fehling's test.
11. Study of pepsin in gastric juice.
12. Estimation of serum albumin by Dye-binding method.
13. Precipitation test for polysaccharide.
14. Laboratory safety methods
15. Estimation of cholesterol

Note: Any 10 practical's are to be performed

Lab- General Microbiology	
Course Code : **BVMLL106**	Semester: **I**
Weekly Practical's: PR: **01**Tut: **00**	Scheme of Marking TH: **--**
PR Exam Duration: **02 hrs**	Scheme of Marking PR: **25,** IA: **25,** Total: **50**
Credit:1.5	

Content

Suggestive list of Practical

1. Microscopy:
    a) Components and setting of the compound Microscope
    b) Focusing of object
    c) Use of low & high power objectives of Microscope
    d) Use of oil immersion lens
    e) Care and maintenance of the Microscope
2. Perform monochrome staining and study different arrangements of bacteria
3. Perform hanging drop technique to study motility of bacteria
4. Perform Gram staining
5. Perform Acid fast staining of Sputum sample
6. Perform Negative staining
7. Prepare Nutrient agar
8. Prepare Mac Conkey's Agar
9. Prepare Blood Agar
10. Prepare Chocolate Agar
11. Prepare nutrient broth
12. Prepare bile broth
13. Perform inoculation on solid and liquid media
14. Perform antibiotic sensitivity test
15. Perform Indole, Methyl red, VP and Citrate utilization test
16. Perform carbohydrate fermentation test & catalase test

Note: Any 10 practical's are to be performed

Semester I - On-Job-Training (OJT) (Any One)

Group GSD1 of On Job Training

Subject Name: Human Biology Lab/ Dept./ Research centers/ Medical college	
Course Code : **BVMLE117**	Semester: **I**
Weekly Skilling Hours: PR: **24** Tut: **00**	Scheme of Marking TH: **00,** IA: **00,** Total: **00**
PR Exam Duration: **06 Hours**	Scheme of Marking PR: **200,** IA: **00,** Total: **200**
Credit:**15**	**ChooseanyonefromspecifiedGroupGSD1**

Subject Name: Biochemical Techniques training centers/ laboratories/ Departments/ Medical college	
Course Code : **BVSWE118**	Semester: **I**
Weekly Skilling Hours: PR: **24** Tut: **00**	Scheme of Marking TH: **00,** IA: **00,** Total: **00**
PR Exam Duration: **06 Hours**	Scheme of Marking PR: **200,** IA: **00,** Total: **200**
Credit:**15**	**ChooseanyonefromspecifiedGroupGSD1**

Semester

II

Syllabus

Subject Name: Human Physiology		
Course Code :BVMLC201	**Semester: II**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit :03		

Content		Hours
Unit – I	**Cardio Vascular System:**	06
	Structure of Heart & its coverings, major Blood vessels- arteries & veins Structure of Blood vessels Cardiac cycle, cardiac output Blood pressure, factors affecting it.Cardiovascular disease- hypertension, Congestive, Cardiac Failure, Transplant, Ischaemic heart disease.	
Unit – II	**Respiratory System:**	06
	Respiratory tract structure, Lungs structure, Mechanism of respiration, Vital Capacity. Respiratory Diseases – Tuberculosis, Cystic fibrosis, Pneumonia, Asthma, Respiratory failure, Carcinoma.	
Unit – III	**Central Nervous System**	06
	Brain – Coverings Parts of brain, function, Spinal cord, peripheral nerves, Autonomic nervous system- sympathetic Parasympathetic. Diseases- Stroke, Alzheimer's disease, epilepsy, Myasthenia Gravis Parkinson's disease.	
Unit – IV	**Digestive Systems (G. I. T)**	06
	Teeth, Tongue, Salivary Glands, Tonsils, Stomach, Intestine: small, large Rectum, Anal Canal, Liver, Pancreas, Gall Bladder Digestion & Absorption of proteins, fats & Carbohydrate. Diseases- Dental Caries, periodontal diseases, Gastric ulcer, Carcinoma, Celiac disease, Inflammatory Bowel disease, Liver-Cirrhosis & Encephalopathy Cholelithiasis, Pancreatitis.	
Unit – V	**Genito Urinary System**	06
	Kidney –Ureter, Bladder Kidney – Structure & Function of Nephron Mechanism of urine formation of erythropoietin and some common kidney diseases. Maintenance of acid base balance and electrolyte balance. Normal body temperature and and mechanism of its Diseases- Urolithiasis, Renal failure & transplant, Hypo & hyperpyrexia. Testis- Vas deferens, prostate, Seminal vesicles, Ovaries, uterus, vagina Diseases- Menopause, carcinoma.	
Unit – VI	**Sensory organs**	06
	Skin-Structure and function, Eye- Structure and function, Ear- Structure and function, Tongue – Structure and function, Nose – Structure and function.	

Reference Books

Name of Authors	Title of the Book	Publisher
Ross & Wilson	Anatomy and physiology in health illness	LBS, Churchill Livingstone, Medical division of Longman Group (FE) Ltd.
C.C. Chattejee	Human physiology	Medical Allied Agency Calcuttla
B.D. Chaurasia	Human Anatomy	CBS, New Delhi

Subject Name: Enzymology		
Course Code :BVMLC202	**Semester: II**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit :03		
Content		**Hours**
Unit – I	**Introduction to enzymes and features of catalysis**	06
	General characteristics of enzymes; nature of enzymes - protein and non-protein (ribozymes –RNaseP, self-splicing introns, abzymes).Co-factor and prosthetic group, apoenzyme, holoenzyme. Classification and nomenclature of enzymes. Enzyme assays-discontinuous, continuous, coupled assays; Enzyme activity, specific activity, units to express enzyme activity. Features of enzyme catalysis, factors affecting the rate of chemical reactions, collision theory, activation energy and transition state theory. Catalysis, reaction rates and thermodynamics of reaction. Catalytic power and specificity of enzymes (concept of active site), Fischer's lock and key hypothesis, Koshland's induced fit hypothesis.	
Unit – II	**Enzyme kinetics**	06
	Relationship between initial velocity and substrate concentration, equilibrium constant, steady state kinetics, mono-substrate reactions. Michaelis-Menten equation, Lineweaver-Burk plot, Eadie-Hofstee and Hanes plot. Determination of KM and Vmax, Kcat, specificity constant. Effect of pH and temperature on the activity of enzymes. Types of bisubstrate reactions (sequential – ordered and random, ping pong reactions), examples. Differentiating bisubstrate mechanisms (diagnostic plots, isotope exchange).	
Unit – III	**Enzyme inhibition**	06
	Reversible inhibition (competitive, uncompetitive, non-competitive and mixed) and irreversible inhibition. Substrate inhibition. Structural analogs (allopurinol, methotrexate and trimethoprim). Mechanism based inhibitors (β-lactam antibiotics, difluoromethyl ornithine), clinical importance of enzyme inhibitors.	
Unit – IV	**Mechanism of action of enzymes**	06
	General features - proximity and orientation, strain and distortion, acid-base and covalent catalysis (chymotrypsin, lysozyme). Metal activated enzymes and metalloenzymes, transition state analogues. Coenzymes in enzyme catalyzed reactions. Structure, vitamin precursors, types of reaction involved in: TPP, FAD, NAD, pyridoxal phosphate, biotin, coenzyme A, tetrahydrofolate and lipoic acid.	
Unit – V	**Regulation of enzyme activity**	06
	Control of activities of single enzymes and metabolic pathways, feedback inhibition, allosteric modulation (aspartate transcarbamylase), regulation by reversible covalent modification (glycogen phosphorylase and glycogen synthase). Proteolytic cleavage (zymogens- chymotrypsinogen, trypsinogen, procaspases). Regulation of multi-enzyme complex, properties (pyruvate dehydrogenase). Isoenzymes - properties and physiological significance (lactate dehydrogenase, hexokinase and glucokinase).	

Unit – VI	**Applications of enzymes**	06
	Enzymes as reagents (glucose oxidase, cholesterol oxidase);Marker enzymes in diagnostics (SGPT, SGOT, creatine kinase, alkaline and acid phosphatases);Enzyme linked immunoassay (ALP and HRP);Enzyme therapy (streptokinase);Enzymes in research (Taq polymerase, restriction endonucleases). Immobilized enzymes and industrial applications of enzymes.	

Reference Books

Name of Authors	**Title of the Book**	**Publisher**
Nelson, D.L. and Cox, M.M.	Lehninger: Principles of Biochemistry	W.H. Freeman and Company (New York)
Stryer, L., Berg J., Tymoczko J., Gatto G.	Biochemistry	W.H. Freeman (New York)
Nicholas C.P. and Lewis S.	Fundamentals of Enzymology	Oxford University Press Inc. (New York)
Donald, V. and Judith G.V.	Biochemistry	John Wiley & Sons Asia Pvt. Ltd. (New Jersey)

Subject Name: Medical Bacteriology		
Course Code :BVMLC203	**Semester: II**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit :03		
Content		**Hours**
Unit – I	**Host Parasite Relationship**	06
	Presence of normal flora on human body, Name of various bacteria, fungi, parasites present on human body, Host – parasite interaction, Importance of normal flora, Koch's postulates.	
Unit – II	**Spirochetes**	06
	Morphology,Cultural Characteristics, Pathogenicity and Laborator Diagnosis of Treponema pallidum Morphology, Cultural Characteristics, Pathogenicity and Laboratory Diagnosis of Leptospira.	
Unit – III	**Pathogenic Cocci**	06
	Gram Positive cocci: Morphology, Cultural Characteristics, Pathogenicity, and Laboratory Diagnosis of Pyogenic cocci (staphylococcus aureus, Streptococcus pyogenes and pneumococ Gram Negative cocci: Morphology, Cultural Characteristics, Pathogenicity and Laboratory Diagnosis of Neisseria (Meningococci and Gonococci).	
Unit – IV	**Pathogenic Bacilli**	06
	Gram negative bacilli: Morphology, Cultural Characteristics, Pathogenicity and Laboratory Diagnosis of Escherichia Coli, Pseudomonas, Salmonella, Shigella, and Vibrio cholera, Helicobacter pylori Gram positive Bacilli: Morphology, Cultural Characteristics, Pathogenicity and Laboratory Diagnosis of Corynebacterium diptheriae.	
Unit – V	**Gram Positive Anaerobes and Acid fast bacilli**	06
	Gram positive anaerobes: Morphology, Cultural Characteristics, Pathogenicity and Laboratory Diagnosis of Clostridium tetani, Clostridium welchii. Acid fast Bacilli: Morphology, cultural Characteristics, Pathogenicity and Laboratory Diagnosis of Mycobacterium tuberculosis, Mycobacterium leprae.	
Unit – VI	**Diagnostic Bacteriology**	06
	Collection, Storage, Processing and Disposal of Urine, and Stool Sample. Collection, Storage, Processing and Disposal of CSF, Pus, Throat swab sample. Collection, Storage, Processing and Disposal of Sputum sample. Collection, Storage, Processing and Disposal of Blood sample.	

Reference Books		
Name of Authors	**Title of the Book**	**Publisher**
Dr. N.C. Dey and Dr. T. K. Dey	Medical Bacteriology	Allied agency Calcutta
R.Ananthnarayan	Text book of Microbiology	Tata Mc Graw Hill Publishing company New Delhi
RamnikSood	Medical Lab. Tech.	Jaypee Brothers Medical Publishers(p)Ltd
J. Ochci A. Kolhatkar	Medical Lab. Science Theory and Practice	Tata Mc Graw Hill Publishing company New Delhi

Subject Name: Hematology		
Course Code :BVMLC204	**Semester: II**	
Weekly Teaching Hours: TH: 03 Tut: 00	**Scheme of Marking TH: 25 IA: 25 Total: 50**	
TH Exam Duration: 02 Hours	**Scheme of Marking PR: --**	
Credit :03		
Content		**Hours**
Unit – I	**Blood & it's formation**	06
	Definition of blood, Formation of blood, formation of RBC & erythrocyte sedimentation rate Bleeding time & clotting time, Different types of blood group, Rh factor.	
Unit – II	**RBC**	06
	RBCs, formation, morphology, cytoskeleton, anisocytosis, poikilocytosis, metabolism, role of 2, 3- BPG and oxygen dissociation curve. Anaemia and its classification, Morphological and etiological, pathogenesis, laboratory investigations and management, Iron deficiency anaemia, metabolism of iron, pathogenesis, laboratory investigations and management, principle and procedure of special test Megaloblastic anaemia, pernicious anaemia, pathogenesis, laboratory investigation.	
Unit – III	**Hemoglobin**	06
	Haemoglobin, its synthesis and types, normal and abnormal hemoglobins, extravasccular and intravascular hemolysis.Haemolyticanaemia, pathogenesis and laboratory investigations, principle and procedure of special test, G-6-PD.	
Unit – IV	**WBC and platelates**	06
	Leukopoiesis Stages of Leukocyte Maturation, Features of Cell Identification, leucocytosis and leucocytopenia , neutrophilia , eosinophilia, basophilia, monocytosis, lymphocytosis, neutropenia, lymphopenia, causes and significance, toxic granulation, Morphological alterations in neutrophil, effect of HIV on blood cell parameter.	
Unit – V	**Platelets & Blood coagulation**	06
	Overview of hemostasis and coagulation, Stages of platelets development, Primary and Secondary hemostasis, Role of platelets, Role of coagulation factors, Coagulation inhibitory system, Fibrinolysis	
Unit – VI	**ABO blood group & Rh factor**	06
	General blood picture, estimation of iron, TIBC, Transferrin, Ferritin, Plasma haemoglobin,Vit.B12, Folic acid, FIGLU test, Schiling test, Parietal cell antibodies,G-6-PD, Osmotic fragility test, Heinz bodies, Perls Prussian staining, Platelet count, Platelet aggregation test, PT, INR APTT, Mixing experiments in PT and APTT, Thrombin time.	

Reference Books		
Name of Authors	**Title of the Book**	**Publisher**
Dr. C.C. Chatterjee	Human Physiology Volume 1	Medical Allied Agency
John Dacie	Practical Hematology	Longman group Ltd, New York
Talib V. H.	Text book of Blood Banking & Transfusion Medicine	C.B.S Publishers & Distributors New Delhi

LAB –Hematology	
Course Code :**BVMLL205**	Semester: **II**
Weekly Practical: PR: **01**Tut: **00**	Scheme of Marking TH: **--**
PR Exam Duration: **02 hrs**	Scheme of Marking PR: **25,** IA: **25,** Total: **50**
Credit:1.5	

Contents

Suggested List of Experiments:

1. Determination of hemoglobin by various methods.
2. Determination of Total RBC count.
3. Determination of PCV
4. Determination of red cell indices
5. Demonstration of hypochromic microcytic slide.
6. General blood picture
7. Determination of G-6-PD
8. Differential Leucocyte Count.
9. Absolute leucocyte count
10. Demonstration of toxic granulation of neutrophil
11. To perform BT & CT
12. To perform ESR
13. To perform sickling test
14. Determination of Plasma Hemoglobin
15. To perform reticulocyte count.
16. Perform ABO blood grouping and Rh Typing

Note: Any 10 practical's are to be performed

LAB –Enzymology	
Course Code :**BVMLL206**	Semester: **II**
Weekly Practical: PR: **01** Tut: **00**	Scheme of Marking TH: **--**
PR Exam Duration:**02 hrs**	Scheme of Marking PR: **25,** IA: **25,** Total: **50**
Credit:1.5	

Contents

Suggested List of Experiments:

1. Colorimetric enzyme assay
2. Partial purification of enzyme
3. Determination of Km and Vmax using Lineweaver-Burk plot
4. Effect of pH on enzyme activity
5. Effect of temperature on enzyme activity
6. Determination of rate constant
7. Calculation of inhibitory constant for an enzyme
8. Continuous assay of an enzyme
9. Determination of amylase activity
10. Determination of urease activity
11. Estimation of AST
12. Estimation of ALP
13. Estimation of catalase

Note: Any 10 practical's are to be performed

Semester II - On-Job-Training (OJT) (Any One)

Group GSD2 of On Job Training

Subject Name: Hematology/Pathology lab/Modern diagnostic centers/ Hitech labs/ Departments/ Medical college	
Course Code : **BVMLE217**	Semester: **II**
Weekly Skilling Hours: PR: **24** Tut: **00**	Scheme of Marking TH: **00,** IA: **00,** Total: **00**
PR Exam Duration: **06 Hours**	Scheme of Marking PR: **200,** IA: **00,** Total: **200**
Credit:**15**	**Choose any one from specified Group GSD2**

Subject Name: Microbiology lab/ Industrial research labs/ Research centers/ Incubation centers/ Departments/ Medical college	
Course Code : **BVMLE218**	Semester: **II**
Weekly Skilling Hours: PR: **24** Tut: **00**	Scheme of Marking TH: **00,** IA: **00,** Total: **00**
PR Exam Duration: **06 Hours**	Scheme of Marking PR: **200,** IA: **00,** Total: **200**
Credit:**15**	**Choose any one from specified Group GSD2**