

# **Mangalayatan University**

**Beswan, Aligarh-202145**



## **Curriculum**

**B.Voc in Medical Lab Technology**

**Institute of Vocational Studies**

**2025**

**Total Program Credits for B.Voc**

| S.N.  | Semester | Credits |
|-------|----------|---------|
| 1     | I        | 24      |
| 2     | II       | 24      |
| 3     | III      | 22      |
| 4     | IV       | 20      |
| 5     | V        | 22      |
| 6     | VI       | 20      |
| Total |          | 132     |

**Induction Program**

Conduction of induction program as per UGC/Regulatory Body's guideline.

| I – Year      |             |                                         |                             |         |
|---------------|-------------|-----------------------------------------|-----------------------------|---------|
| Semester-I    |             |                                         |                             |         |
| S. No.        | Course Code | Course Title                            | Course Type                 | Credits |
| 1             | BVOMLT-101  | Functional English                      | General Academic Component  | 2       |
| 2             | BVOMLT-102  | Fundamentals of Microbiology            | General Academic Component  | 4       |
| 3             | BVOMLT-103  | Biomolecules                            | General Academic Component  | 4       |
| 4             | BVOMLT-104  | Cell Biology and Biodiversity-I         | General Academic Component  | 4       |
| 5             | BVOMLT-105  | Special Laboratory Techniques-I)        | Skill Development Component | 3       |
| 6             | BVOMLT-106  | Routine Laboratory Techniques-I         | Skill Development Component | 3       |
| 7             | BVOMLT-107  | General & Human Anatomy , Physiology –I | Skill Development Component | 4       |
| Total Credits |             |                                         |                             | 24      |

**Course Structure**

| <b>Semester-II</b>   |                    |                                          |                             |                |
|----------------------|--------------------|------------------------------------------|-----------------------------|----------------|
| <b>S. No.</b>        | <b>Course Code</b> | <b>Course Title</b>                      | <b>Course Type</b>          | <b>Credits</b> |
| 1                    | BVOMLT-201         | Microbial Physiology - Metabolism        | General Academic Component  | 4              |
| 2                    | BVOMLT-202         | Professional Communication               | General Academic Component  | 2              |
| 3                    | BVOMLT-203         | Enzymology and Bioenergetics             | General Academic Component  | 4              |
| 4                    | BVOMLT-204         | Ecology and Biodiversity-II              | Skill Development Component | 4              |
| 5                    | BVOMLT-205         | Special Laboratory Techniques-II         | Skill Development Component | 3              |
| 6                    | BVOMLT-206         | Routine Laboratory Techniques-II)        | Skill Development Component | 3              |
| 7                    | BVOMLT-207         | General & Human Anatomy , Physiology –II | Skill Development Component | 4              |
| <b>Total Credits</b> |                    |                                          |                             | 24             |
|                      |                    |                                          |                             |                |
| <b>Semester-III</b>  |                    |                                          |                             |                |
| <b>S. No.</b>        | <b>Course Code</b> | <b>Course Title</b>                      | <b>Course Type</b>          | <b>Credits</b> |
| 1                    | BVOMLT-301         | Pathogenic Microbiology                  | General Academic Component  | 4              |
| 2                    | BVOMLT-302         | Environmental Studies                    | General Academic Component  | 2              |
| 3                    | BVOMLT-303         | Metabolism                               | General Academic Component  | 4              |
| 4                    | BVOMLT-304         | Clinical Pathology and Biochemistry      | Skill Development Component | 4              |
| 5                    | BVOMLT-305         | Microbiology and Serology                | Skill Development Component | 4              |
| 6                    | BVOMLT-306         | Hematology and Blood Banking-I)          | Skill Development Component | 4              |
| <b>Total Credits</b> |                    |                                          |                             | 22             |

| <b>Semester-IV</b>   |                    |                                          |                             |                |
|----------------------|--------------------|------------------------------------------|-----------------------------|----------------|
| <b>S. No.</b>        | <b>Course Code</b> | <b>Course Title</b>                      | <b>Course Type</b>          | <b>Credits</b> |
| 1                    | BVOMLT-401         | Immunology                               | General Academic Component  | 4              |
| 2                    | BVOMLT-402         | Biochemical Techniques                   | General Academic Component  | 4              |
| 3                    | BVOMLT-403         | Parasitology and Blood Cell Disorders-I  | Skill Development Component | 4              |
| 4                    | BVOMLT-404         | Histology-Cytology –I)                   | Skill Development Component | 4              |
| 5                    | BVOMLT-405         | Clinical Biochemistry and Microbiology-I | Skill Development Component | 4              |
| <b>Total Credits</b> |                    |                                          |                             | 20             |

**Exit Option-Advance Diploma in Medical Lab Technology**

| <b>III – Year</b>    |                    |                                          |                             |                |
|----------------------|--------------------|------------------------------------------|-----------------------------|----------------|
| <b>Semester-V</b>    |                    |                                          |                             |                |
| <b>S. No.</b>        | <b>Course Code</b> | <b>Course Title</b>                      | <b>Course Type</b>          | <b>Credits</b> |
| 1                    | BVOMLT-501         | Pathogenic Microbiology                  | General Academic Component  | 4              |
| 2                    | BVOMLT-502         | Parasitology and Blood Cell Disorders-II | General Academic Component  | 4              |
| 3                    | BVOMLT-503         | Histology-Cytology –II                   | General Academic Component  | 4              |
| 4                    | BVOMLT-504         | Medical Genetics and Microbiology-II     | General Academic Component  | 4              |
| 5                    | BVOMLT-505         | INTERNSHIP-I /Professional Training      | Skill Development Component | 6              |
| <b>Total Credits</b> |                    |                                          |                             | 24             |

| <b>Semester-VI</b>   |                    |                                               |                             |                |
|----------------------|--------------------|-----------------------------------------------|-----------------------------|----------------|
| <b>S. No.</b>        | <b>Course Code</b> | <b>Course Title</b>                           | <b>Course Type</b>          | <b>Credits</b> |
| 1                    | BVOMLT-501         | Food and Industrial Microbiology              | General Academic Component  | 4              |
| 2                    | BVOMLT-502         | Clinical Laboratory Operations and Management | General Academic Component  | 4              |
| 3                    | BVOMLT-503         | INTERNSHIP-II /Professional Training          | Skill Development Component | 6              |
| 4                    | BVOMLT-504         | Project Work                                  | Skill Development Component | 6              |
| <b>Total Credits</b> |                    |                                               |                             | 22             |

## **Functional English BVOMLT 101**

### **Unit I Communication:**

Introduction, Definition, Nature and Scope of Communication, Importance and Purpose of Communication, Process of Communication; Encoder and Decoder, Message, Types of Communication; Verbal and Non-Verbal Communication Personal Appearance, Gestures, Postures, Facial Expression, Eye Contacts, Body Language (Kinesics), Time language, Silence Inter and Intra Personal Communication.

### **Unit II Language Skills:**

Four Language Skills; Receptive Skills, Productive Skills, Listening: Listening-concept and cycle, Barriers to Effective Listening, Physical Barriers, Psychological Barriers, Linguistic Barriers, Listening for general content, Listening for filling up information.

**Unit III Vocabulary:**

Chosen list of general commonly used everyday words Synonyms, Antonyms, Homonyms, Homographs, Homophones.

**Unit IV Removing grammatical Errors I:**

Difference between Mistakes and errors, Wrong use of preposition, wrong use of tenses, misplaced modifiers, confused adverbs, confused adjective, confused nouns and other words.

**Unit V Removing grammatical Errors II:**

Subject-Verb Agreement, Indefinite and Unnecessary articles, Correct order of words, confusion of number, negatives and questions, un-English expressions, Incorrect/Omission/unnecessary prepositions.

**Books Recommended:**

1. *You can win*, Shiv Khera, Macmillan Publishers, India
2. *Listening Skills: Year1/2 and P2/3 Bk.3*, Graeme Beals, Jean Edwards, Prim-Ed Publishing
3. *A Practical Course for developing speaking skills in English*, Gangal J. K., PHI
4. *A Practical Course for developing writing skills in English*, Gangal J. K., PHI
5. *Little Red Book: Modern Writings Skills*, Terry O'Brien, Rupa Publications

## **Fundamentals of Microbiology BVOMLT-102**

### **UNIT I**

Introductory Microbiology

History, development, scope and applications of Microbiology. Methods of Microbiology isolation of pure cultures, theory and practice of sterilization.

Microscopic examination of micro-organism, brightfield microscopy, dark field microscopy, phase contrast microscopy, electron microscopy.

Staining of microbes, theory of Gram staining. Nature of Microbial World : Prokaryotes and eukaryotes, growth pattern in microbes

### **UNIT II**

Morphology and Structure of Microorganisms Morphology & fine structure of bacteria, fungi, actinomycete and algae .Organization of cell wall, cell membrane, flagella and capsules in bacteria. Morphogenesis in bacteria, formation of spores and cysts .Animal Viruses : Morphology, cultivation and viral disease cycle. Bacterio phages : Morphology, multiplication, detection and enumeration. Bio transformation of (a) D- Sorbitol to L-Sorbose. (b) Antibiotics. (c) Steroids.

### **UNIT III**

Recombinant DNA Technology, genetic engineering and gene cloning in micro-organisms. Strategies of genetic engineering. Restriction enzymes, vectors, plasmids .Genetic engineering for human welfare : (a) Production of pharmaceuticals. (b) Insect pest control. (c) Use of Genetically Engineered Micro-organisms (GEMs) for control of pollution

### **UNIT IV**

Microbial Ecology and Biotic Interactions Rhizosphere & Rhizoplane micro-organisms, reasons for increased microbial activity in rhizosphere.

Biogeochemical Cycling—Carbon cycle, Nitrogen cycle, Phosphorus & Sulphur cycle. Symbiotic & non-symbiotic Nitrogen fixation bio fertilisers & bio pesticides.

Sewage (waste-water) treatment, chemical characteristics, microbiological characteristics, waste water treatment processes.

## **Bio molecules BVOMLT-103**

### **UNIT I**

Amino Acids & Proteins : Introduction to Bio-chemistry. Water as a biological solvent. Dissociation of water. Buffer solution. Henderson Hasselbalch equation. Amino Acids : Common structural features. Stereoisomerism and RS system of designating optical isomers. Classification based on the nature of "R" groups. Amino acids present in proteins and non-protein amino acids. Specialized role of amino acids. Physical and Chemical properties of amino acids. Titration of amino acids. Peptide Bonds : Rigid and planar nature of a peptide bond. Folding of peptide chains into regular repeating structures (helix, pleated sheets). turn in polypeptides. Chemical synthesis of polypeptides. Biologically active peptides. Proteins : Levels of protein structure. Determination of primary structure of proteins. Forces stabilizing structure and shape of proteins. Native proteins and their conformations. Behaviour of proteins in solutions. Salting in & salting out of proteins. Denaturation of proteins.

Structural and functional diversity of proteins, fibrous proteins (keratins, collagen & elastin), globular proteins (hemoglobin, myoglobin) and conjugated proteins.

### **UNIT II**

#### **Structure, Functions and Classification of Carbohydrates**

Carbohydrates : Definition and classification of carbohydrates.

Fischer and Haworth structures of carbohydrates. Stereoisomerism, and mutarotation. Anomeric forms of monosaccharides. Derivatives of monosaccharides (glycosides, deoxysugars, amino sugars and other derivatives of biological importance). Oligosaccharides (structure of maltose, lactose, sucrose, cellobiose, trehalose, raffinose).

Characteristic reactions of monosaccharides : Reactions with hydrazine, hydrogen cyanide, hydroxylamine; reduction and oxidation of sugars; periodic acid oxidation; action of alkali upon sugars; acylation and methylation of sugars.

Homo-and hetero-polysaccharides (structures of amylose, amylopectin, starch, inulin, pectins, dextrans, glycogen, cellulose, chitin). (GAGs) as components of connective tissue. Polysaccharides of bacterial cell wall.

### **UNIT III**

**Structure, Functions and Classification of Lipids** Lipids : Definition and classification of fatty acids (saturated and unsaturated). Essential fatty acids. Important reactions of functional groups present in fatty acids. Characteristics of fatty acids and fats (saponification, iodine, acid, acetyl and peroxide values). Refractive index, m. p., b. p. and their relation to molecular size. Properties of glycerol. Fats as source of energy. Waxes. Structures, characteristics and functions of lipids : Triacylglycerols, phospholipids : lecithins (Phosphatidyl Cholines), lysolecithins, cephalins (Phosphatidyl ethanolamines), Phosphatidyl serines, phosphatidyl inositol, sphingomyelins, plasmalogens), cerebrosides, gangliosides, sulfatides. Lipoproteins—Composition, classification and biological



functions. Liposomes.

Terpenes and Steroids—Terpenes of biological significance e.g. carotenes, phytol. Cholesterol and other animal sterols. Colour reactions of sterols. Sterols of yeast and fungi (Mycosterols). Phytosterols. Steroidal hormones. Bile acids. Structure and properties of Eicosanoids - Prostaglandins, Leukotrienes, Thromboxanes, Prostacyclins.

Structure, sources and biochemical functions of fat soluble vitamins.

#### **UNIT IV**

**Physical and Chemical Properties of Nucleic Acids** Nucleic Acid and Porphyrins : Nucleic Acids : Structure and properties of purine and pyrimidine bases. Nucleosides and nucleotides. Biologically important nucleotides. Double helical model of DNA and forces responsible for it. Shorthand representation of polynucleotides. Denaturation of DNA. Physical and chemical properties of nucleic acids. Methods for isolation, purification and characterization of nucleic acids. Chemical and enzymatic hydrolysis of nucleic acids. Sequencing of polynucleotides.

Porphyrins : Porphyrin nucleus and classification of porphyrins. Heme and other metalloporphyrins occurring in nature. Detection of Porphyrins spectrophotometrically and by fluorescence. Chemical nature and physiological significance of bile pigments.

#### **Cell Biology and Biodiversity–I BVOMLT-104**

##### **UNIT I**

Microscopy and Organization of Cell -I Methods in Cell Biology : Principles of light and electron microscopes, fixation & fixatives, staining techniques. Organisation of Cell : Extra nuclear and nuclear. Plasma : Structure, Osmosis, active and passive transport, endocytosis and exocytosis Endoplasmic reticulum: Structure, types and associated enzymes. Mitochondria Structure, mitochondrial enzymes and the role of mitochondria in respiration and mitochondrial DNA. Golgi complex : Structure and functions. .

##### **UNIT II**

Microscopy and Organization of Cell -II Ribosomes : Types of ribosomes, their structure and functions. Lysosomes : Polymorphism and their function Centrosome : Structure and functions. Nucleus : Structure and functions of nuclear membrane, nucleolus and chromosomes. An elementary idea of cell transformation in Cancer. An elementary idea of cellular basis of immunity.

##### **UNIT III**

Systematic study of Animals - I Detailed study of the following animal types : Protozoa : Amoeba, Paramecium and Plasmodium. Protozoa (Porifera) : Sycon, Cnidaria (Coelenterata): Obelia

Classification upto orders with brief ecological note and economic importance (if any) of the following: Protozoa : Entamoeba, Trypanosoma, Giardia, Noctiluca, Eimeria, Opalina Vorticella, Balantidium and Nyctotherus. Parazoa (Porifera) : Grantia, Euplectella, Hyalonema and Spongilla. Cnidaria (Coelenterata) : Hydra, Sertularia, Plumularia, Obelia, Tubularia, Bougainvillea, Porpita,

Velella, Physalia, Rhizostoma, Millipora, Aurelia, Alcyonium, Tubipora, Zoanthus, Metridium, Madrepora, Favia, Fungia and Astrangia.

#### **UNIT IV**

Systematic study of Animals - II Detailed study of the following animal types : Platyhelminthes: Fasciola, Taenia, Aschelminthes : Ascaris, Parasitic adaptations in Helminths. Annelida : Pheretima. Classification upto orders with brief ecological note and economic importance (if any) of the following: Platyhelminthes : Dugesia, Schistosoma and Echinococcus. Aschelminthes: : Ascaris, Oxyuris, Wuchereria. Annelida: Nereis, Polynoe, Eunice, Arenicola, Aphrodite, Amphitrite, Chaetopterus, Tubifex and Pontobdella.

#### **Special Laboratory Techniques-I) BVOMLT-105**

##### **Unit I**

Acid Phosphates (ACP), Alkaline Phosphates (ALP), Amino acids, Bilirubin, Cholesterol, Creatinine, Creatine Phosphokinase (CPK), SGOT, SGPT, Uric Acid, Urea, TSH

HSS/N0301/N0302/N0304

Biochemical Test Profile (Quantitative determination of Urine)

Amylase, Calcium, Chlorides, Creatinine, Sodium, Potassium, Glucose, Proteins, Urea nitrogen, uric acid

HSS/N0301/N0302/N0304

##### **Unit II**

Biochemical Test Profile – II (Quantitative determination of CSF)

Chlorides, Glucose, Proteins HSS/N0301/N0302/N0304 Sterilization Techniques Definition & Methods, principles, bacteriological filtration, irradiation, tyndalization HSS/N0301/N0302/N0304 Elementary Knowledge of Chemistry- I

##### **Unit III**

Elementary Knowledge of Inorganic Chemistry

Structure of atom, atomic weight, molecular and equivalent weight. Acids, bases and salts. pH indicators (pH meter, pH paper, universal indicator). Molar solutions, normal solutions, buffer solutions, percent solutions, saturated solutions, standard solutions

HSS/N0301/N0302/N0304/ N9602

Elementary Knowledge of Organic Chemistry

Organic compounds, aliphatic, aromatic, alcohol, ethers, phenols, acids, etc.

HSS/N0301/N0302/N0304/ N9602 Elementary Knowledge of Chemistry- II

## **Unit IV**

### Elementary Knowledge of Physical Chemistry

Osmosis, osmotic pressure, diffusion, hypotonic, hypertonic and isotonic solutions. Definition and classification of some colloids and crystalloids.

HSS/N0301/N0302/N0304/ N9602

### Elementary Knowledge of Analytical Chemistry

Principles, instrumentation, working, uses, care, maintenance : balances,- monopan, twopan, toppan, centrifuges, pH meter, colorimeter, spectrophotometer, fluorimeter, flame photometer, ion selective electrodes, urinometer, chromatograph, electrophoresis, densitometer.

HSS/N0301/N0302/N0304/ N9602

## **Routine Laboratory Techniques-I BVOMLT-106**

### **Unit I**

Human Healthcare and Safety Regulations Basic causes of accidents, common types of laboratory accidents. First aid in laboratory HSS/N0301/N0303/N9606 Human health and Homeostasis, medical care in India, Medical Laboratories of developing countries, Importance of Biomedical Waste. NABL and SOP HSS/N0301/N0303/N9606 Organization of Laboratory Functional components of clinical laboratories,( cleanliness, precautions to be taken WRT patients ,reports, analysis. Communication between physician ,patients, and the medical laboratory professional, basic needs of clinical laboratory technician, awareness of soft skills,. HSS/N0301/N0303/N9606 Basic Laboratory Equipments Identification, use, maintenance and care of common laboratory glassware and equipments, handling of all glassware ,use, principle and care of centrifuge, colorimeter, oven, incubator, microscope, Newber's chamber, Autoclave.etc . HSS/N0301/N0302/N0303/N0307/N 9606 Automation Semiautoanalysers HSS/N0303

### **Unit II**

Introduction to Hematology and Routine tests Components of blood and their functions, Hematopoietic systems of the body HSS/N0302/N0304 Hematological Diseases Anemia and various types of anemias, Thalassemias, Polycythemia, Leukemia, hemolytic disease of new born, multiple myeloma, parasitic infections of blood HSS/N0301/N0302/N0304

### **Unit III**

#### Specimen Collection

Specimen collection for hematological studies

HSS/N0301/N030 2/N0303

#### **Unit IV**

Laboratory Preparation in Hematology Cleaning of Laboratory glassware in hematology HSS//N0303

### **General & Human Anatomy , Physiology –I BVOMLT-107**

#### **Unit I**

Introduction to: Anatomy, epithelial tissue, muscular tissue, nervous tissue. Skeletal System, Structure of bones, types of bones, Bones of cranium, face vertebral column upper and lower limbs.

HSS/N0302/N030 4/N0305

Circulation System: Structure of heart, names and position of main blood vessels.

HSS/N0302/N030 4/N0305

Lymphatic System: Lymph vessels, lymph nodes and lymphoid organs, their structure & functions.

HSS/N0302/N030 4/N0305

Digestive systems.: Parts of gastrointestinal tract and associated glands.(names)

HSS/N0302/N030 4/N0305

Respiratory System:.. Parts of Respiratory System.(diagram ,Name, function)

HSS/N0302/N030 4/N0305

#### **Unit II**

Basics of Physiology- I Blood. Composition and function of blood, haemopoiesis, blood coagulation. Blood groups, body fluid. Cardiovascular Systems. Circulation of blood. function of heart and blood vessels. Control of heart rate, blood volume.(Diagram of heart and Functions in details)

HSS/N0302/N030 4/N0305 Respiratory system.: Function of lungs, (theory) Respiration disorders like anoxia. dyspnea . (Theory) lung function tests.(theory) HSS/N0302/N030 4/N0305 Digestive Systems:.. Digestion of food in mouth, stomach & small intestines. Absorption of food, function of liver. ( formation of bilirubin & other functions in detail) HSS/N0302/N030 4/N0305

Basic English Grammar Use of Articles and Prepositions, Tense, Transformation of  
HSS/N9603/N960

#### **Unit III**

Sentences, Parts of Speech, Idioms and Phrases, Vocabulary a) Synonyms b) Antonyms c) One Word Substitution d) Homophones & Homonyms, Punctuations, Common Errors, Spelling in English

4/N9605/N9607

Composition Formal & Informal Writing, Precise, Essay Writing, Report Writing, HSS/N9603/N9604/N9605/N9607 Reading Comprehension HSS/N9603/N9604/N9605/N9607

#### **Unit IV**

Human Values and Professional Ethics Introduction Need, basic guidelines, content and process for Value Education, Self Exploration- its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- basic Human Aspirations, Right, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Happiness and Prosperity .A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels Implications of Harmony on Professional Ethics Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: at the level of individual: as socially and ecologically responsible engineers, technologists and managers, at the level of society: as mutually enriching institutions and organizations

### **Microbial Physiology -Metabolism BVOMLT-201**

#### **UNIT I**

Microbial Nutrition, Cultivation, Isolation and Preservation

Microbial Nutrition: Requirements for Growth. Physical requirement (Temperature, pH, osmotic pressure), chemical requirements (C, N, S, P, O). Culture Media : Chemically defined media, complex media, anaerobic growth media, selective & differential media, and enrichment culture. Cultivation of Aerobes and Anaerobes .Microbial Growth : Growth in population, bacterial growth curve, mathematical nature and expression, measurement of growth in bacteria, Factors affecting growth in microorganisms, continuous cultures and synchronous cultures.

#### **UNIT II**

Enzymes and their Regulation: Chemical and physical properties of enzymes. Nomenclature of Enzymes. Mechanism of enzymes action. Inhibition of enzyme action. Regulation of enzymes.

#### **UNIT III**

Microbial Metabolism-I Respiration and fermentation. Glycolysis, Pentose Phosphate pathway, The Entner Doudoroff pathway, Fermentation. Tricarboxylic acid cycle. Catabolism of lipid, proteins. Glyoxylate cycle. Beta oxidation.

#### **UNIT IV**

Microbial Metabolism –II Microbial Utilization of Energy & Biosynthesis : Transport of nutrient by bacteria. Biochemical mechanisms of generation of ATP. Synthesis of Amino Acids : Glutamate, lysine, glutamine, serine, arginine family. Structures and biosynthesis of cell wall peptidoglycan. Biosynthesis of Carbohydrates (gluconeogenesis) & Phospholipids. Replication of DNA molecules, Transcription & Translation (process of protein synthesis) Bacterial Genetics : Conjugation, Transformation, Transduction (generalized transduction, specialized transduction), The Regulation of Gene Expression : Lac operon, tryptophan operon.

### **Professional Communication (BVOMLT-202)**

#### **UNIT 1**

Recognizing and Understanding Communication Styles: Passive Communication, Aggressive Communication, Passive-Aggressive Communication, Assertive Communication, Verbal and Non Verbal Communication, Barriers and Gateways to Communication.

#### **UNIT 2**

Listening Skills: Types of Listening (theory / definition), Tips for Effective Listening Academic Listening- (lecturing), Listening to Talks and Presentations, Basics of Telephone communication

Writing Skills: Standard Business letter, Report writing, Email drafting and Etiquettes, Preparing Agenda and writing minutes for meetings, Making notes on Business conversations, Effective use of SMS, Case writing and Documentation.

#### **UNIT 3**

Soft Skills: Empathy (Understanding of someone else point of view), Intrapersonal skills, Interpersonal skills, Negotiation skills, Cultural Aspects of Communication.

#### **UNIT 4**

Group Communication: The Basics of Group Dynamics, Group Interaction and Communication, How to Be Effective in Groups, Handling Miscommunication, Handling Disagreements and Conflicts, Constructive Criticism.

#### **REFERENCE BOOKS**

-Mckay, M., Davis, M. & Fanning, P.(2008). Messages: The Communication Skills Book, New Harbinger Publications

-Perkins, P.S., & Brown, L. (2008). The Art and Science of Communication: Tools for effective communication in the workplace, John Wiley and Sons

- Krizan et al (2010). Effective Business Communication, Cengage Learning.
- Scot, O. (2009). Contemporary Business Communication, Biztantra, New Delhi.
- Chaney & Martin (2009). Intercultural Business Communication, Pearson Education

## **Enzymology and Bioenergetics BVOMLT-203**

### **UNIT I**

Enzymes General Characteristics : Introduction to enzymes. General characteristics of enzymes. Prosthetic group. Holoenzymes, apoenzyme and cofactors. Coenzymes and their biochemical functions, assay of enzyme activity, units of enzyme activity. Active sites(s) of enzymes. IUB system of nomenclature and classification of enzymes. Enzymes as catalysts. Theories of enzymes catalysis : Proximity and orientation effects, acid base catalysis, covalent catalysis. Role of metals in enzyme catalysis.

### **UNIT II**

Enzyme Purification and Chromatography Techniques

Enzyme Purification : Need for purification. Preliminary fractionation procedures and precipitation techniques, Chromatography methods : Gel filtration—, adsorption—, ion exchange—and affinity chromatography. Types of support materials. Selection of appropriate conditions and elution procedures. Criteria of enzyme purity.

Enzyme Kinetics Enzyme Kinetics : Factors affecting velocity of enzyme catalysed reactions : Enzyme concentration, pH and

### **UNIT III**

temperature. Michaelis –Menten equation. Determination of  $K_m$  and its significance. Enzyme inhibition. Various types of enzyme inhibitions. Determination of  $K_i$  value. Enzyme inhibitors and their importance. Introduction to multi substrate enzymes. Allosteric enzymes and enzyme regulation. Isoenzymes and their clinical significance. Bioenergetics :

### **UNIT IV**

Bioenergetics Biological systems and concept of free energy, Endergonic processes and role of ATP & other high energy compounds. Biological oxidations. Redox potential. Enzymes and co-enzymes involved in oxidations and reductions. Mitochondrial electron transport chain and oxidative phosphorylation. Mechanism of oxidative phosphorylation.

## **Ecology and Biodiversity-II BVOMLT-204**

### **UNIT I**

Study of the following permanent stained preparations :

L.S. and T.S. Sycon, gemmules, spicules and sponginfibres of a sponge. T.S. Hydra (Testis and ovary region).

T.S. Fasciola (Different regions). T.S. Ascaris (Male & female).

T.S. Pheretima (Pharyngeal and typhlosolar regions); setae, septal nephridia, spermathecae and ovary of Pheretima, Trachea, mouth parts of Periplaneta Radula and osphradium of Pila. T.S. Star fish (Arm).

### **UNIT II**

Preparation of the following slides :

Temporary preparation of Paramecium, mouth parts of Periplaneta (cockroach), radula of Pila & appendages of Prawn.

Preparation of permanent whole mount stained in borax carmine of Hydra, Obelia, Sertularia, Plumularia and Bougainvillea.

### **UNIT III**

Dissections of the following animals :

Pheretima : Digestive, reproductive and nervous systems.

Periplaneta : Digestive and nervous systems; mouth parts and trachea. Pila : Pallial complex, digestive and nervous systems

### **UNIT IV**

ECOLOGY : Study of animal adaptations with the help of specimens, charts and models. Study of Zoogeographical regions and their fauna. Study of biotic components of an ecosystem. Study of different types of nests in birds.

Study & preparation of zoogeographical charts.

## **Special Laboratory Techniques-II BVOMLT-205**

### **Unit I**

Basic Microbiology Classification, morphology and physiology of bacteria, anatomy of bacterial cell, growth requirement of bacteria growth curve, nutrients required. Gram positive & Gram negative Bacteria. Normal flora of human body.



## **Special Laboratory Techniques-II BVOMLT-205**

### **Unit I**

Basic Microbiology Classification , morphology and physiology of bacteria, anatomy of bacterial cell, growth requirement of bacteria growth curve, nutrients required. Gram positive & Gram negative Bacteria. Normal flora of human body.

HSS/N0301/N0302/ N0304

### **Unit II**

Introduction to serology Antigens, antibodies, structure and classes of antibodies, monoclonal antibodies and its uses. Collection and preparation of specimen, HSS/N0301/N0302/ N0304

### **Unit III**

Serological Tests Serological test for syphilis (STS),Agglutination- 4 tests ,C-reactive protein test ( CRP) ,Rheumatoid arthritis test (RA) ,Sero diagnosis of streptococcal infection .HBsAg, HIV-1( Rapid Tri Dot test) Widal test, Tuberculin test HSS/N0301/N0302/ N0304

### **Unit IV**

Staining Techniques Gram positive & Gram negative Bacteria. Difference between cocci & bacteria, virus( definition ,properties & example) Sputum test for AFB HSS/N0301/N0302/ N0304

## **Routine Laboratory Techniques-II) BVOMLT-206**

### **Unit I**

Routine Hematological Tests

Determination of hemoglobin concentration ,determination of hematocrit , enumeration of formed elements ,calculations of red blood cell indices - MCV, MCH,and MCHC, Automated systems in hematology ,study of blood smear , Reticulocyte count, Erythrocytesedimentation rate ( ESR ) Eosinophil count , platelet count

### **Unit II**

Urine Examination

Urine analysis, routine examination of urine, rapid chemical tests of Urine

Clinical significance, specimen collection, laboratory investigation, Clinical significance, specimen collection, laboratory investigation

### **Unit III**

Stool Examination

Gross examination, physical examination of stool, determination of pH, chemical examination of feces, microscopic examination of stool specimen

Clinical significance, specimen collection, laboratory investigation, Clinical significance, specimen collection, laboratory investigation

#### **Unit IV**

##### **Semen Examination**

Semen analysis, routine examination of semen, quantitative determination of semen fructose, interpretative semen analysis, examination for the presence of sperms

##### **Sputum Examination**

Indication, collection, container, transport, preservation for different types of sputum analysis.

Physical examination and its significance, chemical examination and its significance.

Microscopic examination and its significance.

### **General & Human Anatomy, Physiology –II BVOMLT-207**

#### **Unit I**

Endocrine System: Various endocrine glands. Thyroid. Parathyroid. Adrenal glands pituitary pancreas.

Thymus and sex glands.( detail function of each gland & clinical significance)

Reproductive System. Male & female Reproductive organs.(name & function)

Nervous System.: Parts of brain, spinal cord, peripheral nerves.(function)

Basics of Human Physiology-II

#### **Unit II**

Excretory Systems:. Structure & function of kidney and urinary bladder .Mechanism of urine formation. disorders of kidney.

Reproductive Systems: Physiology of reproductive organs.

Nervous System: Neurone & its function,.

#### **Unit III**

##### **Basics of Computer Skills**

Data, information, properties , Types of information. Computing files , internet, server. Introduction to computer: Introduction to associated terms like CPU, storage devices , peripherals output & input devices etc.

MS WORD: Basic. Making new document, editing. formating the text (text: border, color, spacing, copying the text, undo, Redo, repeate) Formatting: Paragraph alignment,( line spacing, paragraph spacing, paragraph indents) Borders paragraph border, shading. Spelling and grammar,

COLUMNS: typing text by defining columns, converting text to column & columns to text

TABLES: selecting the table, insertion of raw .columns text , merging the cell converting table to text and text to table insert date ,time, foot notes header footer, end notes. MS WINDOW: making new file, folders. Saving data

## **Pathogenic Microbiology BVOMLT-301**

### **UNIT I**

Infectious Diseases Brief introduction to terminology of Infections diseases, Frequency of disease, Recognition of Infectious disease, Infections, Disease cycle, Virulence and mode of transmission, Emerging and reemerging Infectious diseases, Global travel & Health considerations, Nosocomial Infections.

### **UNIT II**

Microbes of Medical Importance Nomenclature and classification of microbes of medical importance. Origin of the Normal Flora, Germfree and Gnotobiotic Life, Distribution and occurrence of Normal Flora of Skin, Eye, Respiratory Tract, Mouth, Intestinal Tract & Genitourinary Tract.

### **UNIT III**

Mode of Microbial Infections Microbial adherence, Passive Penetration into body, Active Penetration into body, Events in Infection following penetration, Microbial virulence factors.

### **UNIT IV**

Antimicrobial Drugs Development of chemotherapy, General characteristics of antimicrobial drugs, Determining level of antimicrobial activity, Mechanism of action of antimicrobial agents, factors influencing the effectiveness of antimicrobial drugs, Antibacterial drugs viz. sulfonamides, Quinolones, Penicillins, Cephalosporins, Tetracyclines, Erythromycin, Chloramphenicol, Drug Resistance, Antifungal and Antiviral drugs.

## **Environmental Studies (BVOMLT-302)**

### **UNIT 1**

The Multidisciplinary Nature of Environmental Studies Definition, Scope and Importance, Need for public awareness Natural Resources Renewable and Non-Renewable Resources, Natural Resources and Associated Problems- a) Forest Resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people Role of individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles

### **UNIT 2**

Ecosystems- Concept of ecosystem, Structure and function of ecosystem, Producers, Consumers and Decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

### **UNIT 3**

Biodiversity and its conservation- Introduction- Definition: genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, Aesthetic and option values, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to bio-diversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of bio-diversity: In-Situ and Ex-situ conservation of biodiversity

### **UNIT 4**

Social Issues and the Environment- From Unsustainable to Sustainable development, Urban problems related to energy, Re-settlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issues and possible solutions, Climate changes, global warming, acid rain, ozone layer depletion, Consumerism and waste products, Environment Protection Act, Issues involved in enforcement of environmental legislation, Public awareness

### **UNIT 5**

Human Population and the Environment Population growth, variation among nation, Population explosion- Family Welfare Programme, Environment and Human Health, Human Rights, Value Education, Role of Information Technology in Environment and Human health

### **REFERENCE BOOKS**

-Environmental Studies by Kumarasamy K., A. Alagappa Moses, M. Vasanthy from Bharathidasan University Publications 2004, Trichy

-Environmental Studies by Rajamannar EVR College Publications 2004

### **Metabolism BVOMLT-303**

#### **UNIT I**

Carbohydrate Metabolism Digestion & Absorption of Carbohydrates : Metabolic Pathways of Carbohydrates, Glycolysis and alcoholic fermentation, The Pentose Phosphate Pathway, Glucuronate and glyoxylate pathway, TCA cycle, Glycogenolysis & Glycogenesis, Gluconeogenesis, Biosynthesis of starch, Biosynthesis of Ascorbic acid.

#### **UNIT II**

Lipid Metabolism Digestion & Transport of Lipids : -Oxidation of fatty acids including odd chain fatty acids.  $\alpha$  -and  $\omega$ - oxidation of fatty acids Degradation of triglycerides and phospholipids. Formation and utilization of ketone bodies. Biosynthesis of saturated and unsaturated fatty acids. Biosynthesis of triglycerides and phospholipids, biosynthesis of cerebrosides; sulfatides and gangliosides. Biosynthesis of Cholesterol. Biosynthesis of Prostaglandins, Thromboxanes, Leukotrienes, Lipoxins and Prostacyclins.

### **UNIT III**

Protein Metabolism Digestion of Proteins : General Reactions of Amino Acids : Deamination, transamination and decarboxylation. Urea cycle. Catabolism of Carbon Skeletons of Amino Acids : Glycine and Alanine, Serine and threonine, Phenylalanine and Tyrosine, Tryptophan, Histidine, Leucine, Valine and Isoleucine, Cysteine and Methionine, Lysine, Glutamic acid and Glutamine, Aspartic acid and Asparagine. Biosynthesis of Nutritionally Non-Essential Amino Acids : Glutamate and Glutamine, Aspartate and Asparagine, Proline, Alanine, Cysteine & Selenocysteine, Tyrosine, Serine, Glycine.

### **UNIT IV**

Nucleic Acids Nucleic Acids : Degradation of purines and pyrimidines. Biosynthesis of purines, pyrimidines and nucleotides. Catabolism of Heme & Formation of Bile pigments. Biosynthesis of porphyrins and heme. Conjugation of bilirubin and its clinical significance.

## **Clinical Pathology and Biochemistry BVOMLT-304**

### **Unit I**

Miscellaneous Body Fluids Lab Examination of Miscellaneous Body Fluids Cerebrospinal fluid ,Laboratory investigation ,Serous fluids, Synovial fluid. HSS/N0301/N0302/ N0304 Routine Biochemical Tests Phosphates, transaminases, lactic dehydrogenase , Creatine kinase , Electrolytes ,Blood gases and bicarbonate, Determination of serum / plasma bicarbonate HSS/N0301/N0302/N 0304

### **Unit II**

Biochemical Test Profile Normal & Abnormal Biochemical processes of the body (Basic physiology and biochemistry of the body) Basic physiology and biochemistry of the body , interrelated metabolic processes of the body. HSS/N0301/N0302/N 0304 Biochemical Test Profile Liver tests ,Renal tests, Endocrine function tests, Lipid profile, Transaminase, LDH, CPK, CPK-MB, SGPT/SGOT/ Amylase.GTT HSS/N0301/N0302/N 0304

### **Unit III**

Analytical Techniques Basic Steps of Analytic Techniques Basic steps in analytical chemistry, titrimetry photometry, Electrochemistry, Immuno - chemistry, Separation and analysis of organic compounds HSS/N0301/N0302/ N0304

Principles of Analytic Techniques Principles of analytical chemistry, titrimetry, photometry, Electrochemistry, Immunochemistry. HSS/N0301/N0302/ N0304

#### **Unit IV**

Biochemical Processes Normal & Abnormal Biochemical processes of the body (Biochemical changes in the body under pathological conditions) Biochemical changes in the body under pathological conditions. HSS/N0301/N0302/ N0304 Normal & Abnormal Biochemical processes of the body (Functions of various organs and their clinical assessment)

Functions of various organs and their clinical assessment HSS/N0301/N0302/ N0304

### **Microbiology and Serology BVOMLT-305**

#### **Unit I**

Laboratory Diagnosis of Mycotic and Emerging Infections

Introduction to Microbiology Disease oriented microbiology, culture & sensitivity test, aerobic, anaerobic techniques HSS/N0301/N0302/N 0304 Laboratory Diagnosis of Mycotic infections Introduction to Fungi and parasitic fungi, specimen collection, Laboratory diagnosis of mycotic infections, Diagnostic mycology HSS/N0301/N0302/N 0304 Emerging / New infections in human being HSS/N0301/N0302/N 0304

#### **Unit II**

Diagnostic Microbiology Diagnostic Microbiology & Micro Techniques Role of microbiology laboratory, specimen handling , laboratory records, safety Regulations, Basic procedures of Diagnostic Rapid and automation methods in Diagnostic Microbiology, Culture environments of microbes , Quality control in microbiology, Quick reference of media and biochemical tests HSS/N0301/N0302/N 0304 Lab Diagnosis of parasitic infections

Collection and handling of faecal specimen, Laboratory techniques in parasitological investigation of stool, Processing of specimens other than stool, Lab identification of human parasites

HSS/N0301/N0302/N 0304

Serology

#### **Unit III**

Serology : Introduction & Serological Lab Procedures Principles of immunologic reactions, serodiagnosis. Collection and preparation of specimen, Serological test for syphilis (STS), Agglutination tests ,C-reactive protein test ( CRP) ,Rheumatoid arthritis test (RA) ,Serodiagnosis of streptococcal infection ,Sero diagnostic tests for miscellaneous disorders, Immunologic test for pregnancy RIA, ELISA HSS/N0301/N0302/N 0304 Parasitology Introduction, Protozoa, Helminths, Medical Entomology HSS/N0301/N0302/N 0304

## **Unit IV**

Bacteriology Bacteriology Gram positive - streptococcus, staphylococcus, bacillus, mycobacterium, corynebacterium, Gram negative - E-coli, Klebsiella, Salmonella, shingela, Vibrio, Pseudomonas HSS/N0301/N0302/N 0304 Diagnostic & Systemic Bacteriology Staphylococcus, Streptococcus, spirochaetes, mycoplasma, rickettsiae etc, Systematic grouping of pathogenic bacteria , Laboratory identification of infectious agents, Diagnosis of anaerobic infections , identifying characteristics of common pathogenic bacteria ,Antimicrobial susceptibility test. IMViC, Urease, catalase, geletine liquification, coagulase, oxidase, sugar fermentation, antibiotic sensitivity test. HSS/N0301/N0302/N 0304

## **Hematology and Blood Banking-I) BVOMLT-306**

### **Unit I**

Special Hematological tests & factors in Hemoglobin synthesis & automation  
Screening of sickle cell anaemia, Estimation of foetalhaemoglobin, Haemoglobin electrophoresis, Osmotic fragility test, Heinz body preparation, Laboratory diagnosis of protozone blood parasites, Lupus erythematosus (LE) cell preparation, Preparation of bone marrow smear for microscopic examination , Cytochemical tests.  
Autoanalysis- Electrolyte acid base balance  
Acid base balance  
Interpretation of lab findings in Haematology  
Anaemias, Leukaemias, Miscellaneous disorders.

### **Unit II**

Haemostasis& Bleeding Disorders  
Introduction to Haemostasis& coagulation  
Haemostasis, Mechanism of blood coagulation, Fibrinolysis.  
Laboratory Investigation & Bleeding Disorders  
Laboratory preparation for coagulation tests , Routine coagulation tests, (prothrombin time , plasma recalcification time ,partial thromboplastin time , activated partial thromboplastin time, thrombin time ,Laboratory diagnosis of bleeding disorders .

### **Unit III**

Immuno haematology& Blood Transfusion  
Principles of Immuno haematology& Clinical of Blood Transfusion  
Principles of immune ohaematology,Human blood group systems,(basic ABO blood group systems, Clinical significance of blood transfusion.  
Collection & Processing of blood for transfusion  
Preparation for blood collection, Blood collection, Transportation of blood after collection , storage of blood, Preparation and use of blood components.

### **Unit IV**

Routine Lab Procedures in Blood Bank  
Routine Lab procedures in Blood Bank

Specimen collection for blood bank, General laboratory reagents in blood bank . Preparation of laboratory reagents in blood bank ,Reporting of haemagglutination reaction, ABO blood grouping Rh blood typing Antihuman globulin (AHG) or cross matching  
Transfusion reactions &Haemolytic Disease of a new born  
Blood transfusion process, Transfusion reaction ,Haemolytic disease of the newborn .

## **Immunology BVOMLT-401**

### **UNIT I**

Introduction to Immunology Introduction and history of Immunology, Nonspecific Defense; Physical Barriers, Chemical Barriers, Phagocytosis, Inflammation, Fever, Types of Immunity, Active & Passive Immunity, Immunological memory, Primary & Secondary Lymphoid organs, Mucosa Associated Lymphoid tissue (MALT), Cutaneous Associated Lymphoid Tissue (CALT), Lymphocyte Traffic, Cells of immune system, Antigens; factors affecting Immunogenicity, epitopes, haptens.

### **UNIT II**

Humoral Immunity Humoral Immune Response, Antibodies / Immunoglobulins, Structure, function and type of antibodies, Antigenic-combining regions of antibodies, factors influencing antibody production, Genetic model, Multigene Organisation, generation of antibody diversity.

### **UNIT III**

Cell Mediated Immunity Cell Mediated Immune System, Mechanism of CMI, Types of effector T Cells, Helper T-cells, Suppressor, T-cells, cytotoxic T cells, Killer T cells, Cytokines, Lymphokines, Colony Stimulating factors, Tumour Necrosis factor, Interferons, Accessory cells (Macrophages), the Complement System, Classical and Alternate pathway, HLA, Monoclonal antibody technology and its applications, Interactions between B and T lymphocytes.

### **UNIT IV**

Antigen-Antibody Interactions Antigen-Antibody Interactions : Precipitation reaction, Immunodiffusion test, counter current Immuno electrophoresis, complement fixation tests, Widal test, Wasserman's test, Weil Felix reaction, Western Blotting, Types of vaccines

## **Biochemical Techniques BVOMLT-402**

### **UNIT I**

Spectroscopic Techniques Spectroscopic Techniques: Beer-Lambert's Law. Light absorption and its transmittance. Determination and application of extinction coefficient. Applications of following spectroscopic techniques in elucidating structure of Biomolecules- Visible, U.V., infra-red and fluorescence spectroscopy. ORD, C.D. and N.M.R.

### **UNIT II**



### Electrophoretic Techniques Electrophoretic Techniques :

Principles and applications of the following electrophoresis techniques. Paper and gel electrophoresis, high voltage electrophoresis, SDS-PAGE : Discontinuous electrophoresis, isotachopheresis, isoelectric focussing and immune electrophoresis. Centrifugation Techniques : Various centrifugation techniques and their applications in Biochemistry. Preparative and analytical ultra- centrifugation procedures. Application of partial specific volume, diffusion coefficient and viscosity measurements in the study of macromolecules of biochemical importance.

### UNIT III

#### Chromatographic Techniques Chromatographic Techniques :

General principles of chromatography and the application of following chromatographic procedures in isolation and purification of biomolecules : Absorption, partition, paper and thin layer chromatography. Gas liquid chromatography. High performance liquid chromatography (HPLC), Ion exchange and Exclusion chromatography. Affinity chromatography

### UNIT IV

#### Radio Isotopic Techniques Radio Isotopic Techniques :

Nature of isotopes and radioisotopes. Radioactive decay. Properties of radioactive emissions. Units of radioactivity. Techniques used to measure radioactivity; GM counter and liquid scintillation counting and gamma counter. Labelling of Biochemical compounds and autoradiography. Use of radioactive tracers in the study of

enzyme reaction mechanisms and metabolic pathways. Radioimmuno assay. Biological hazards of radiation and safety measures in handling radioisotopes

## Parasitology and Blood Cell Disorders-I BVOMLT-403

### Unit I

Medical Parasitology

HSS/N0301/N0302/ N0304

### Unit II

Common Intestinal worms

HSS/N0301/N0302/N0304

### Unit III

Malarial parasites, Filarial parasites

HSS/N0301/N0302/N0304

### Unit IV

Lab. diagnosis of Parasitic infections

## **Histology-Cytology –I) BVOMLT-404**

### **Unit I**

Introduction to Histology

Introduction to Histology & Cytotechnology

Basic terminology, Laboratory equipment for histology and cytology, Use and care of frequently used equipment, Preparation of reagent solutions

### **Unit II**

Tissue Processing

Lab techniques in histology: Tissue Processing

Logging of specimen, preparation of tissues , processing of tissues , Frozen section technique , Handling and embedding of small tissue fragments.

### **Unit III**

Staining Procedures

Lab techniques in histology: Staining Procedures

Routine staining procedure in histotechnology , special stains and staining techniques , stains for particular substances

### **Unit IV**

Instrumentation in Histocytotechnology

Instrumentation in Histocytotechnology

Autoanalyser, Tissue Processor, Microtome

## **Clinical Biochemistry and Microbiology-I BVOMLT-405**

### **Unit I**

Metabolic Disorders & Deficiency Diagnostic Test profile Other than biochemical tests profiles i.e. ANC, Arthritis, Cardiac, Hypertension, Anaemia. HSS/N0301/N0302/ N0304

### **Unit II**

Clinical Endocrinology Hormonal studies & Clinical Endocrinology Thyroid, Pancreas, Adrenal & Sexual glands, hormones & it's diagnostic significance. HSS/N0301/N0302/ N0304

### **Unit III**

Body Fluid Specimen Processing Specimen processing for biochemical analysis Blood, Urine, Cerebrospinal fluid, Body fluids HSS/N0301/N0302/N0304 Automation in Clinical Biochemistry

Laboratory Classification of automated systems , steps of automation in biochemical analysis, some commonly used automated analysers of biochemical laboratories HSS/N0301/N0302/N0304

#### **Unit IV**

Blood Banking Blood Banking Organization, operation, administration of bank and maintenance of records, government regulation (FDA) HSS/N0301/N0302/N0304

### **Pathogenic Microbiology BVOMLT-501**

#### **UNIT I**

Pathogenic Microbes, Diagnosis, Prevention and Control

Introduction to important diseases caused by Streptococcus, Pneumococcus, Neisseria, Corynebacterium, Bacillus, Clostridium, enterobacteriaceae (Proteus, Shigella, Salmonella), Vibrio, Yersinia, Hemophilus, Mycobacterium, The operative pathogenic mechanisms, laboratory diagnosis, prevention and control of these diseases.

#### **UNIT II**

Prevention and Control of Viral Diseases Morphology, pathogenesis, life cycle, laboratory diagnosis, prevention and control of viral diseases viz. Rabies, Polio, Small pox, Herpes, Measles, Influenza and AIDS.

#### **UNIT III**

Human Mycotic Infections Introduction to Human mycotic infections viz Cryptococcosis, Dermatophytosis, Blastomycosis, Opportunistic Mycosis; Candidiasis and Aspergillosis.

#### **UNIT IV**

Mechanisms and Control of Parasitic Infections Life cycle, pathogenic, mechanisms and control of parasitic infections viz. amoebiasis, Kalaazar, toxoplasmosis, ascariasis, filariasis, hook worm infections.

### **Parasitology and Blood Cell Disorders-II BVOMLT-502**

#### **Unit I**

Descriptive study of RBC abnormalities Descriptive study of RBC abnormalities

HSS/N0301/N0302/ N0304

#### **Unit II**

Disorders related to RBC Disorders related to RBC

HSS/N0301/N0302/ N0304

#### **Unit III**

Normal white cell count & physiological variation Normal white cell count & physiological variation  
HSS/N0301/N0302/ N0304

#### **Unit IV**

Disorders related to WBC Disorders related to WBC

HSS/N0301/N0302/ N0304

### **Histology-Cytology –II BVOMLT-503**

#### **Unit I**

Exfoliative Cytology-Specimen Preparation

Diagnostics Exfoliative cytology: Preparation of specimen Preparation of specimens for cytological evaluation

#### **Unit II**

Exfoliative Cytology- Staining Techniques Diagnostics Exfoliative cytology: Cytological Stains and Staining Techniques Cytological stains and staining techniques ,

#### **Unit III**

Exfoliative Cytology- Benign and Malignant Cells

Diagnostics Exfoliative cytology: Characteristics of Benign and malignant cells  
Charecteristics of benign and malignan cells

#### **Unit IV**

Advanced Instrumentation in Laboratory Technology

### **Medical Genetics and Microbiology-II BVOMLT-504**

#### **Unit I**

Genetics Genetics: Genetics disorders, Karyotyping, Electrophoresis and Hybridization techniques

Introduction to Medical Genetics (Structures of DNA RNA). Genetic of common diseases.

HSS/N0301/N0302/ N0304

#### **Unit II**

CLIA techniques CLIA techniques HSS/N0301/N0302/ N0304 Care and handling of laboratory animals

Introduction, general care and handling, ethics and legality in use of laboratory animals

HSS/N0301/N0302/ N0304

#### **Unit III**

Immunology and Virology Immunology Immunity/Immune system, innate immunity, adaptive immunity, cells and oragans involved in immune system

HSS/N0301/N0302/ N0304

Virology General characteristics of Viruses, Chemotherapy of Viral diseases, classification of viruses, On cogenic Viruses, RNA/DNA Viruses ,AIDS, Miscellaneous viruses, Structure of viruses, lysogenic cycle, lytic cycle, smallpox, polio, HIV, Hepatitis B

HSS/N0301/N0302/ N0304

#### **Unit IV**

Toxicology Toxicological investigation & Therapeutic drug monitoring Analytical Techniques, drug screening, heavy metals

HSS/N0301/N0302/N 0303 / N0304/N0305/ N0306/ N0307/ N9602/N9606

### **BVOMLT-505 INTERNSHIP-I /Professional Training**

### **Food and Industrial Microbiology BVOMLT-601**

#### **UNIT I**

Food as a substrate for microorganisms, Nutritive value of food stuffs, effect of Hydrogen ion concentration (pH), moisture requirement on food, Important food borne diseases viz. Staphyococcal intoxication, Botulism. Salmonellosis, Shigillosis, Qualitative and Quantitative analysis of food components (proteins, fats, lipids, carbohydrates), Microbiological examination of food products including dairy products, food poisoning caused by bacteria and fungi.

#### **UNIT II**

Contamination, Preservation and Spoilage of Food

Contamination, preservation and spoilage in various foods viz. cereals & cereal products (cereal grains, flour, bread, pasta, macroni), sugars & sugars products (Maple, Syrup, Honey, Candy), Vegetables & Fruits, Meat (Fresh meat, fresh beef, hamburger, fish), Milk and Milk products (cheese, butter).

#### **UNIT III**

Production Strains Isolation and Screening Techniques

Production strains Isolation & screening techniques, preservation and genetic modification of Industrial Microorganisms, Fermentation Media, characteristics of ideal production media, common substrates used in ideal fermentations, Batch and continuous fermentations.

#### **UNIT IV**

Fermentation Products

Yeasts (Baker's) and its uses, fermentation of Beer, Wine and Alcohol, Production of organic acids viz. acetic acid, lactic acid, propionic and butyric acid and mixed acids. Mass transfer in aerobic fermentation.

## **Clinical Laboratory Operations and Management BVOMLT-602**

### **Unit I**

Reagent preparation: The metric system, preparation of molar, normal, percent solutions Buffers, Acid, Base, pH ( Definition and examples) Lab calculations and graphs.

200 Marks (Theory = 100 Marks Practica l= 100 Marks)

HSS/N9602

Clinical sample collection e.g. Blood, Urine, Stool examination, Saliva sample, Sputum sample, Semen analysis etc.

HSS/N0301/N0302

Preparing and maintaining Lab records: Labeling of sample, ;.( making, entries storage, annexes), management of histopathology records.

HSS/N0304/N0305/N9 603 / N9604/N9605

Reporting results : a. Basic format of a test report, b. Release of examination results c. Alteration in reports

HSS/N0304/N0305

Quality Management system : Internal and External quality control

HSS/N0306/N0307/ N9606

Biomedical waste management in a clinical laboratory : Disposal of used samples, reagents and other biomedical waste

HSS/N9609

Calibration and Validation of Clinical Laboratory instruments

HSS/N0303

Ethics in Medical laboratory Practice : Pre-Examination procedures, Examination procedures, Reporting of results, Preserving medical records, Access to Medical laboratory Records

HSS/N0304/N0305/ N9603 / N9604 /N9605

Audit in a Medical Laboratory HSS/N0304/N0305 Documentation HSS/N0304/N0305

**BVOMLT-603    INTERNSHIP-II /Professional Training**

**BVOMLT-604    Project Work**