

# **Curriculum for B Sc MLT**

## **3rd Semester**

**Finalised by BOS-MLT on 18.03.2009**

# Applied Microbiology

## BMT – 203

### THEORY

1. Laboratory strategy in the diagnosis of various Infective syndromes : Samples of choice, Collection, transportation and processing of samples for laboratory diagnosis of the following complications:
  - a) Septicemia and bacteraemia
  - b) Upper Respiratory tract infections
  - c) Lower Respiratory tract infections
  - d) Wound, skin, and deep sepsis
  - e) Urinary tract infections
  - f) Genital Tract infections
  - g) Meningitis
  - h) Gastro intestinal infections
  - i) Enteric fever
  - j) Tuberculosis (Pulmonary and Extra-pulmonary)
  - k) Pyrexia of unknown origin
  
2. Antibiotic susceptibility testing in bacteriology
  - a. Definition of antibiotics
  - b. Culture medium used for Antibiotic susceptibility testing
  - c. Preparation and standardization of inoculum
  - d. Control bacterial strains
  - e. Choice of antibiotics
  - f. MIC and MBC : Concepts and methods for determination
  - g. Various methods of Antibiotic susceptibility testing with special reference to **Stokes method** and **Kirby-Bauer method**
  - h. Tests for production of ***β-lactamase***
  
3. Bacteriological examination of water, milk, food and air
  - a. Examination of water
    - a) Collection and transportation of water sample
    - b) Presumptive coliform count
    - c) Eijkman test
    - d) Counts of faecal Streptococci**
    - e) Counts of Clostridium perfringens**
    - f) Membrane filtration tests
    - g) Interpretation of results
  
  - b. Examination of Milk and milk products
    - a) Basic Concepts regarding gradation of milk
    - b) Various tests for Bacteriological examination

- c. Examination of food articles
    - a) Basic Concepts regarding classification of food like frozen food, canned food, raw food, cooked food etc.
    - b) Various tests for Bacteriological examination with special reference to food poisoning bacteria
  - d. Examination of Air
    - a) Significance of air bacteriology
    - b) Settle plate method
    - c) Types of air sampling instruments
    - d) Collection processing and reporting of an air sample
4. Sterility testing of I/v fluids
- a. Collection, transportation and processing of I/v fluids for bacterial contamination
  - b. Recording the result and interpretation
5. Nosocomial Infection :
- a) Introduction, sources and types of nosocomial infections.
  - b) Bacteriological surveillance of hospital environment.
  - c) Role of microbiology laboratory in control of nosocomial infections
6. Epidemiological markers:
- a. Serotyping,
  - b. Phage typing and
  - c. Bacteriocine typing.
7. Preservation methods for microbes
- a. Basic concepts of preservation of microbes
  - b. Why do we need to preserve bacteria
  - c. Principle and procedures of various preservation methods with special reference to lyophilization.

# Applied Microbiology

BMT – 213

## PRACTICALS

1. Inoculation of different culture media
2. Isolation of pure cultures
3. Processing of following clinical samples for culture and identification of pathogens:
  - Blood
  - Throat swab
  - Sputum
  - Pus
  - Urine
  - Stool for Salmonella, Shigella and Vibrio cholerae
  - C.S.F. and other body fluids
4. Antimicrobial susceptibility testing
  - a. Introduction and terms used
  - b. Preparation and standardization of inoculum
  - c. To demonstrate reference bacterial strains
  - d. Choice of antibiotics
  - e. To determine MIC and MBC a known bacteria against a known antibiotic
  - f. To perform antibiotic susceptibility testing of clinical isolates by using
    - a) **Stokes method** and
    - b) **Kirby-Bauer method**
  - g. To perform any one test to demonstrate the production of ***β-lactamase***
5. Collection, transportation and processing of :
  - a. water,
  - b. milk ,
  - c. food and
  - d. air samples for bacteriological examination
6. To demonstrate sterility testing of intravenous fluid with positive and negative controls
7. Demonstration of serotyping and bacteriocin typing
8. Demonstration of lyophilization
9. To learn 'How to dispose of bacterial cultures'

# Applied Haematology-1

## BMT-205

1. Quality assurance in haematology.
  - a. Internal and external quality control including reference preparation
  - b. Routine quality assurance protocol
2. Basic concepts of automation in haematology
3. Bone marrow examination
  - a. Composition and functions
  - b. Aspiration of bone marrow (Adults and children)
  - c. Processing of aspirated bone marrow (Preparation staining of smear)
  - d. Brief knowledge about examination of aspirated bone marrow (differential cell counts and cellular ratios)
  - e. Processing and staining of trephine biopsy specimens
4. Red cell anomalies
  - a. Morphological changes such as variation in size shape & staining character.
5. Disorder of leucocytes.
  - a. Abnormal morphology i.e. shift, left & variation in counting.
6. L.E.cell phenomenon.
  - a. Definition of L.E.cell.
  - b. Demonstration of L.E.cell by various methods.
  - c. Clinical significance.
7. Safety precautions in haematology
- 8.
9. Physiological variations in Hb, PCV, TLC and Platelets
10. Investigations of a case suffering from bleeding disorders
11. Quantitative assay of coagulation factors
  - a. Principle
  - b. Procedure
12. Routine examination of urine
13. Routine examination of seminal fluid
14. Routine examination of CSF and other body fluids *i.e.* pleural, peritoneal and synovial fluid etc.
15. Biomedical waste management in haematology laboratory

## Applied Haematology-1 BMT-215

### Practical

1. To prepare a bone marrow smear and stain by Leishman's, May Grunwald Giesma and Perl's stain.
2. To process a bone marrow trephine biopsy cut sections and stain with H &E, Reticulin stain and PAS staining
3. To identify morphologically the.
  - (i) Immature Erythroid series cells.
  - (ii) Immature Myeloid and other WBC series cells.
4. To study the RBCs abnormal morphological forms.
  - (i) Variation in size, shape & Staining character
  - (ii) Red cell inclusion.
5. To collect blood & test it for the presence of L.E.cell from a suspected DLE patient.
6. Preparation of various additive reagents used in mixing experiments
  - a. Correction studies / mixing experiments to pin point the defect in case of prolonged
    - i. PT
    - ii. APTT
    - iii. Thrombin time
7. Macroscopic, Microscopic and chemical examination of urine
8. Cytological examination of CSF and other body fluids
9. Macroscopic, Microscopic examination (including sperm count) of seminal fluid

# Analytical Biochemistry

## BMT-209

### 1) Spectrophotometry and colorimetry

- a) Introduction
- b) Theory of spectrophotometry and colorimetry
- c) Lambert's law and Beer's law
- d) Applications of colorimetry and spectrophotometry

### 2) Photometry

- a) Introduction
- b) General principles of flame photometry
- c) Limitations of flame photometry
- d) Instrumentation
- e) Applications of flame photometry

### 3) Chromatography

Introduction, definition, types of chromatography

- a) **Paper Chromatography** : Introduction, principle, types ,details for qualitative and quantitative analysis, application
- b) **Thin layer chromatography**: Introduction, experimental techniques, application of TLC, limitations, High performance thin layer chromatography
- c) **Column chromatography**: Introduction, principle column efficiency, application of column chromatography
- d) **Gas chromatography**: Introduction principle, instrumentation, application
- e) **Adsorption chromatography** : Introduction, adsorbents, procedure, limitation, application
- f) **Ion exchange chromatography**: Introduction, Definition and principle, cation and anion exchangers, application
- g) **Gel Chromatography**: Introduction Principle and method, application and advantages

### 4) Electrophoresis: Introduction, principle, Instrumentation, types of electrophoresis - paper and gel electrophoresis ,application

### 5) Atomic Absorption spectroscopy

- a) Introduction
- b) Principle
- c) Differences and advantages between atomic absorption spectroscopy and flame emission spectroscopy
- d) Disadvantages
- e) Instrumentation
- f) Applications

# **Analytical Biochemistry Lab.**

## **BMT-219**

### **(PRACTICAL)**

- a) To demonstrate the principle, working & maintenance of spectrophotometer.
- b) To demonstrate the principle, working & maintenance of colorimeter.
- c) To demonstrate the principle, working & maintenance of flame photometer.
- d) To demonstrate the principle, procedure of paper chromatography.
- e) To demonstrate the principle & procedure of Gas chromatography.
- f) To demonstrate the principle & demonstration of TLC.
- g) To demonstrate the principle & procedure of column chromatography.
- h) To demonstrate the principle & procedure of Electrophoresis.



## Fundamentals of Computers-I

### **BMT-201 Semester-III**

**Introduction to computer:** introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

**Input output devices:** input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).

**Processor and memory:** The Central Processing Unit (CPU), main memory.

**Storage Devices:** sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

**Introduction to MS-Word:** introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

**Introduction to Excel:** introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

**Introduction to power-point:** introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

## **Fundamentals of Computers-I**

**BMT-211**

**Practicals:**

**Learning to use MS Office: MS WORD, MS EXCEL & MS PowerPoint.**

## **Basic Cellular Pathology** **3<sup>rd</sup> Sem. (BMT-207)**

### **Study of Various Systems:-**

1. **Alimentary System:** - Diseases of mouth, Diseases of Oesophagus- Oesophageal varices.
2. **Digestive System:-** Gastritis, Peptic ulceration, Appendicitis microbial diseases, food poisoning, hernia, Intestinal abstrictions & malabsorbtion.
3. **Accessory Digestive glands:** - **Salivary glands-** mumps, **liver** – hepatitis, liver failure, cirrhosis. **Pancreas-** pancreatitis. **Gall Bladder-** Gall stones, jaundice and cardiovascular diseases.
4. **Circulatory System:-** Diseases of Blood vessels- Atheroma, Arteriosclerosis, heart block. Disorders of Blood Pressure-Hyper & Hypotension.
5. **Respiratory System:** - Upper respiratory tract infection, Bronchi, Asthma, Pneumonia, Lung abscess, Tuberculosis, Lung Collapse.
6. **Urinary System:** - Glomerulonephritis, Nephrotic syndrome, Renal failure, Renal calculi, Urinary obstruction, Urinary tract infection.
7. **Reproductive system:-** Sexually transmitted diseases, Pelvic inflammatory disease, disorder of cervix(CIN), Disease of ovaries, ectopic pregnancy, prostatitis, Infertility
8. **Nervous System:** - Neuronal damage, ICP, Cerebral Infarction, head injury, Alzheimer's disease, dementia.
9. **Endocrine System:-** Pituitary:- Hyper & Hypo secretions  
Thyroid: - Goiter  
Adrenal: - Cushing Syndrome, Addison Disease  
Pancreas: - Diabetes
10. **Sense Organs:-** Ear:- Otitis  
Eye: - Cataract

# **Basic Cellular Pathology**

## **3<sup>rd</sup> Sem. (BMT- 217)**

### ***PRACTICAL***

1. To study squamous cell from cheek cells
2. To study stained slide preparation from organs of digestive system
3. Study of stains slides of liver, pancreas ,gall bladder
4. Study of various types of microscope
5. To study stained slide preparation from organs of circulatory system
6. To study stained slide preparation from organs of Respiratory system
7. To study stained slide preparation from organs of Nervous system
8. To study stained slide preparation from organs of Urinary system
9. To study stained slide preparation from organs of Endocrine system