Syllabus for

DIPLOMA IN BLOOD BANK TECHNICIAN COURSE
(TWO YEARS COURSE)

B.N.S. Kumar
Secretary
In view of representation from the Faculty the Syllabus for the 1st year in all Para medical courses is modified accordingly and kept on website.

**DIPLOMA IN BLOOD BANK TECHNICIAN COURSE**  
**(TWO YEARS COURSE)**

<table>
<thead>
<tr>
<th>Paper-I</th>
<th><strong>BASIC HUMAN SCIENCES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Basics of Anatomy</td>
<td></td>
</tr>
<tr>
<td>B) Basics of Physiology</td>
<td></td>
</tr>
<tr>
<td>C) Basics of Biochemistry</td>
<td></td>
</tr>
<tr>
<td>D) Basics of Bio-statistics</td>
<td></td>
</tr>
</tbody>
</table>

| Paper-II |
| A) Basics of Pathology |
| B) Basics of Blood Banking |
| C) Basics of Microbiology |
| D) Basics of Central Sterilization Services. |

| Paper-III |
| A) Hospital Awareness |
| B) Familiarization of different tables/tubes in surgical department, Surgical Awareness, preparation of patient for surgery. |
| C) Patient related services. |
| D) Communication & Computer Skills & Visual Aids, |
| Paper-I | A) Introduction to Transfusion Medicine & Blood Banking (Blood Transfusion Technology), Material and equipment used in blood banking.  
B) Functions of blood transfusion service.  
C) Screening of donor and blood collection  
D) Blood group system. |
| --- | --- |
| Paper-II | A) Serological techniques in blood transfusion.  
B) Preservation, storage & transportation of blood.  
C) Transfusion of blood and blood component, Investigations of transfusion reactions.  
D) Screening for diseases transfusion by blood: Blood transfusion transmitted diseases. |
| Paper-III | A) Quality control in blood transfusion laboratory.  
B) Investigations for hemolytic diseases of newborn (HDN)  
C) Record keeping and computerization in blood transfusion services, Disposal of bio-wastes.  
Basics of Anatomy

1. Introduction to Human Anatomy
2. Cell- Tissues Properties, Different Tissues
3. Digestive System & Hepatobiliary System
4. Respiratory System
5. Cardio Vascular System
6. Lymphatic System
7. Bones and Joints
8. Nervous System
9. Endocrine System
10. Sense Organs
11. Excretory System
12. Reproductive System

Basics of Physiology

1. Introduction to Human Physiology
2. Blood
3. Cardio Vascular System
4. Lymphoid System
5. Digestive System
6. Respiratory System
7. Nervous System
8. Endocrine System
9. Excretory System
10. Reproductive System
11. Sense Organs
Basics of Bio – Chemistry

1. Introduction to Basics of Bio-chemistry including code of ethics for Medical Lab Technicians and Medical Lab Organization.

2. Reception, Registration and bio-chemical parameters investigated.

3. Glassware and plastic ware used in a bio-chemical laboratory.
   a. Glassware:
      1) Types of glass and composition.
      2) Types of glassware used, their identification, application & uses.
      3) Cleaning, drying, maintenance and storage of glassware.

   b. Plastic ware: Brief outline

4. Instrumental methods of Bio-chemical analysis.
   a. Colorimetry:
      Visual and photoelectric methods, instrumentation, principle & laws involved construction, operation, care and maintenance, applications.

   b. Spectrophotometry
      Principle and theory, types, construction, & applications

5. Basic lab operations like
   a. Separation of solids from liquids
      1. Centrifugation: Principle, Different types of centrifuges care and maintenance, applications.
      2. Filtration using funnel.
      3. Weighing : Different types of balances used, care and maintenance.
      4. Evoporation
      5. Distillation
      6. Refluxing
      7. Drying different salts and dessication.
6. Water Chemicals and related substances
   a. Purity of chemicals
   b. Corrosives
   c. Hygroscopic Subsantance

7. Prevention, Safety and first aid in lab accidents.

8. Collection of Specimens
   a. **Blood**: Types of Specimens, Collection, Precautions during collection, processing and preservation.
   b. **Urine**: Types of Specimens, Collection, Precautions during collection, Processing and Preservation.


10. Units of measurements

11. **Solutions**: Types based on solute and solvent, Types based on method of expressing concentration, calculations.

12. **Carbohydrates**: Definitions, Biological importance, Acid value, iodine value, saponification value.

13. Amino acids and Proteins Definition, Biological importance, Classification, Qualitative tests.

14. **Diagonistic tests**: Blood sugar, Glucose tolerance test, Blood urea, Serumuric acid, Serum creatinine.

15. **Vitamins and Minerals**

   a. **Vitamins**: Water Soluble vitamins, Fat Soluble vitamins, Sources, Daily requirements, Deficiency diseases.

   b. **Minerals**: Sources, Daily requirements, Deficiency diseases.
Basics of Pathology

Introduction to Pathology in brief

1. Urine – Analysis – Physical Examination – specific gravity PH, reaction, colour.
   Chemical Examination – Sugar Albumin, bile salts, bile Pigments etc.
   Microscopic, Sediment for RBC, WBC, Epithelial cells, casts, crystals, parasites.

   Preparation of Reagents, procedure and principle of tests.

2. Sputum Analysis – Physical Examination, Preparation and staining smear for Microscopic Examination.


4. Body Fluids – Differential count of Peritoneal, pericardial, pleural fluids and CSF, charging chamber, Identifying and counting the cells.
I. **Introduction to Microbiology in brief**

Definition, History

II. **Microscopy**

a) Principle working and maintenance of compound Microscope.

**History**

**Types of Microscope:** (a) Light Microscope, (b) DGI, (c) Fluroscent, (d) Phase contrast.

(e) **Electron Microscope**: a) Transmission, b) Scanning, Principles of operational mechanisms of various types of Microscopes.

III. Sterilization and disinfection – classification and Methods of sterilization.

**Sterilization: Definition, types and principles of sterilization methods:**

(a) Heat (dry heat, moist heat with special reference to autoclave, (b) Radiation, (c) Filtration, efficiency testing to various sterilizers.

**Antiseptics and Disinfectants:**

Definition, types and properties, mode of action, uses of various disinfectants, precautions while using the disinfectants, qualities of a good disinfectants, testing efficiency of various disinfectants.
1) Principle and Methods of sterilization by heat
   a) By Dry Heat, flaming, Red Heat, Hot air oven, incineration.
   b) By Merit Heat-pasteurization, Inspissation, tyndalisation, autoclave.

2) Filtration Methods

3) Ionising Radiation – Disinfection, Mode of action and uses of important chemical disinfections – Phenol and Phenolic compounds, alcohols, halogens, dyes and acids and alkalies.

4) Gaseous Methods of sterilization.

IV. Cleaning, drying & Sterilization of Glassware disposal of contaminated material i.e. clinical infective material inoculated culture media. Handling and Disposal of Biomedical waste.

V. **Biomedical waste management in a Microbiology Laboratory** : types of the waste generated, segregation, treatment, disposal.

VI. Morphology and classification of Bacteria Sp. of cell, capsule, flagella, spore, Anaerobic Methods of cultivation of Bacteria.
A. Hospital Awareness

A brief idea of hospital as an organization management different units of a hospital effective communication skills, communication channel

Maintenance of records
Effective leadership
General patient care
Medical terminologies
Vital signs
Unit preparation
Transporting & Transferring patients
Sterilization Techniques
Control of infection
Medication – Oral & parenteral
Admission – Discharge procedure
Bandages

Practicals: Posted in ward & taught clinically

A. Surgical Department

Familiarization of different tubes

1. Drainage tube
2. Post Operative Exercises
3. Post OP Management of Patient
4. Shock of Management
5. Changing Surgical Dressing.

1. Preoperative preparation of patient
2. Preanesthetic preparation
3. Assisting in operation
4. Anaesthesia
5. CSSD
1. Recovery room
2. Movement of papers
3. Scheduling of theaters
4. Supplying of articles
5. Specific area practices
   As scrubnurse
   As circulating nurse
### Communication and Computer Skills, Audio & Visual Aids.

#### Communication
- Process
- Types of communication
- Strategies for effective Communication
- Barriers of communication

#### Soft Skills
- Presentation with the use of visual aids such as power point
- Conversation
- Extempore speech, usage of effective language for communication of health work.
- Case studies and situational analysis
- Survey and Reporting

#### Computer
- Computer basic
- MS – Office
- MS – Word
- MS – Excel
- MS – Power Point

#### Internet Concepts
- Browsing
- Down- Loading
- Use of Slide Projector
2nd Year

Paper-I

A) Introduction to Transfusion Medicine & Blood Transfusion Technology (Blood Banking)

B) Material and equipment used in blood banking.

C) Functions of blood transfusion service:
   a. Donor recruitment & monitoring.
   c. Collection of donor blood.
   d. Processing of donor blood.
   e. Blood Storage
   f. Transfusion.
   g. Lab-techniques.
   h. Quality control.
   i. Disposal of bio waste.
   J. Record keeping and computerization in blood transfusion services.

Screening of donor and blood collection:
   a. Donor motivation.
   b. Screening of donors.
   c. Types of blood donors.
   d. Donor identification and registration.
   e. Criteria for donor selection.
   f. Donor records.
   g. Hemoglobin estimation.
   h. Hematocrit.
   i. ABO grouping.
   J. Need for preliminary testing.
   k. Blood collection.

Blood group system:
ABO grouping system.
Rh blood grouping system.
Other blood grouping system
   a. Lewis Blood grouping system.
   b. MNSs blood grouping system.
   c. Kell blood grouping system.
   d. Kidd blood grouping system.
   e. Lutheran blood grouping system.
   f. P blood grouping system.
   g. li blood grouping system
Serological techniques in blood transfusion:

a. ABO grouping practical aspects.
b. Preparation of red cell suspension.
c. Rh(D) grouping.
d. Cross matching. (Compatibility testing)
e. Antibody testing. - Coombs test. (Direct & Indirect).
f. Antibody titration.
g. Screening for irregular antibodies.
h. Use of lectins Enzymes and LISS.
i. High and low frequency antigens.

Preservation, storage & transportation of blood:

a. Anticoagulants & preservatives.
b. Citrate based anticoagulants.
c. Heparin.
d. Ethylene diamine tetra-acetic acid (EDTA).
e. Optimal additive solutions (OAS)
f. Physical and biochemical changes on storage.
g. Freezing of Red cells for prolonged storage.
h. Storage of blood and blood components.
i. Transportation of blood and components.
j. Quality control on blood storage.

Indications for transfusion of blood and blood component:

a. Indications for transfusion of whole blood.
b. Indications for transfusion of platelets.
c. Indications for transfusion of PACKED cells.
d. Indications for transfusion of plasma and its components.
Screening for diseases transfusion by blood: Blood transfusion transmitted diseases:

a. Lab diagnosis of transfusion transmitted Hepatitis (TT H).
b. Lab diagnosis of Hepatitis B virus.
c. Lab diagnosis of non-A and non-B hepatitis.
d. Acquired immune deficiency syndrome. (AIDS).
e. Cytomegalovirus
f. Syphilis
g. Malaria.
h. Microfilaria.

Investigations of transfusion reactions:

a. Types of transfusion reactions.
b. Hemolytic transfusion reactions (HTR)
c. Acute extra vascular hemolytic reactions.
d. Non-hemolytic transfusion reactions.
e. Allergic reactions.
f. Record if transfusion reaction.
Investigations for hemolytic diseases of newborn:

*Antibodies associated with HDN.*
Rh hemolytic diseases.
Laboratory detection of Rh hemolytic diseases.
Antenatal tests to assess the severity of HDN.
Laboratory assessment of the severity of HDN.
Management of Rh HDN.
ABO hemolytic diseases.
Laboratory tests in newborn.
Other blood groups causing HDN.

**Quality control in blood transfusion laboratory.**

Quality
Laboratory quality control.
Quality control of reagents.
Quality control of equipment.
Quality control of techniques.
Good record keeping and documentation.
Standard operating procedures. (SOD)
Health and safety guidelines in laboratory.

**Record keeping and computerization in blood transfusion services.**

**Disposal of bio-wastes.**
PRACTICALS

1. Monitoring of vital signs, Spo2
2. ABG analysis
3. Types of Anesthesia required for different types of surgeries
4. A regular check of cannula and drains
5. Maintain records and reports
6. Transportation of patient to SICU
7. Suctioning of Endotracheal tube / Tracheostomy tube
8. After care of equipment
9. Mechanical ventilation – Settings and modes