# Syllabus and Curriculum
# of
# Diploma in Lab Technician course

**(To be implemented From 2016 - 17 session)**

Uttar Pradesh State Medical Faculty, Lucknow.

# Index

## OBJECTIVES OF THE COURSE

To prepare a **Lab technician** who –

- Can perform all types of pathological tests.
- Can perform all types of Biochemistry tests.
- CanCan perform all types of Microbiology tests.
- Can help in processing of Histo-cytopathology.
- Can perform blood bank techniques.

# Outline of Curriculum
# of
# Diploma in Lab Technician course

## FIRST YEAR

**THEORY ( Classes: 9 AM to 12 Noon)**

| **First paper : Syllabus covers -** |
|---|
| 1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).<br>2. Only basics of relevant Pathology, Pharmacology & Microbiology. |

| **Second paper : Syllabus covers -** |
|---|
| 1. Clinical Hamatology & Clinical Microbiology-I.<br>2. Clinical Biochemistry-I.<br>3. Hand hygiene & prevention of cross infection.<br>4. Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR). |

FIRST YEAR

**PRACTICAL ( Classes: 1 PM to 4 PM)**

Practical classes will be after lunch; from 1 PM to 4 PM.

Students must present in the hospital/ Lab for practicals.

(for curriculum, please see p.no.-21 to 23)

**Following subjects must be taught; though there will not be any exam from these-**

1. Basic Computer skills.
2. Basic English.
2. **Soft skills like -** Interpersonal relationship skills & moral education.

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## ELIGIBILITY CRITERIA FOR ADMISSION & DURATION OF THE COURSE

**COURSE DURATION:-**

- It is 2 years, **full time** Diploma Course.

**ELIGIBITY:-**

- Candidate must have passed 12th with

  Physics, Chemistry, Biology

  Or

  Physics, Chemistry, Maths

  with 35% marks in Intermediate exams.

  (From UP board or any other recognised board).

- Candidate must have completed age of 17 years of age as on 31st December of admission year. There is no maximum age limit for the admission.

## SCHEDULE OF EXAMINATION

**FIRST YEAR**

| Paper | Subjects | Mark | Internal Assessment Marks | Total Marks | Pass Marks | Duration of Exam. |
|---|---|---|---|---|---|---|
| **First Paper Theory** | 1. General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).<br><br>2.Only basics of relevant Pathology, Pharmacology & Microbiology. | 75 | 25 | 100 | 50 | 3 Hours |
| **Second Paper Theory** | 1.Clinical Hamatology & Clinical Microbiology-I.<br><br>2. Clinical Biochemistry-I.<br><br>3.Hand hygiene & prevention of cross infection.<br><br>4.Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR). | 75 | 25 | 100 | 50 | 3 Hours |
| **Practical** | Oral & Practical | 75 | 25 | 100 | 50 | 3 Hours |

## SCHEDULE OF COURSE

(List of holidays, Total hours, Subject wise allottement of hours)

- **List of Holidays:-**

| | |
|---|---|
| Sundays | - 52 days |
| Summer vacation | - 10 days |
| Winter vacation | - 10 days |
| Gazetted holidays | - 23 days |
| Preparatory holidays | - 10 days |
| Total Holidays | - 105 days |

- **Total Hours :-**

| | |
|---|---|
| Theory classes per day | - 3 Hours |
| Practical classes per day | - 3 Hours |
| Total hours per day | - 6 Hours |
| Total days & hours in One year (after deduction of holidays) | - 260 days or - 1560 Hours |

# SCHEDULE OF COURSE

## Subject wise allottement of hours

### FIRST YEAR

**Theory (780 Hours)  Practical (780 Hours)**

| | | |
|---|---|---|
| **First Paper Theory** | 1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body). | 180 Hrs |
| | 2.Only basics of relevant Pathology, Pharmacology & Microbiology. | 80 Hrs |
| **Second Paper Theory** | 1.Clinical Haematology & Clinical Microbiology-I. | 280 Hrs |
| | 2. Clinical Biochemistry-I. | 100 Hrs |
| | 3.Hand hygiene & prevention of cross infection. | 30 Hrs |
| | 4.Basics life support (BLS) & Cardio-pulmonary resuscitation (CPR). | 40 Hrs |
| **Third Paper Practical** | As described in curriculum | 780 Hrs |
| **Theory: Other Subjects** (These subjects must be taught; though there will not be any exam from these) | **1**.Basic Computer skills. | 30 Hrs |
| | **2**.Basic English. | 30 Hrs |
| | **3**.Soft skills like - Interpersonal relationship skills & moral education | 10 Hrs |

# Details of Curriculum for First Year
# Diploma in Lab Technician

| **PAPER 1st Theory** | Topics | Hours. |
|---|---|---|
| **1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).** | **1.** General Orientation about parts of human body. Various terms used in Anatomy. Total numbers of bones, their names & location. Basic idea about organzation of body ,from cell to organ systems. | 06 Hrs |
| | **2.** Structure of Animal cell, Cell organelles & their functions | 06 Hrs |
| | **3.** Human tissue, types, structure & functions. | 10 Hrs |
| | **4.** Osteology: Names, location, identification and basic details of all bones. (Details of skull bones is not required). | 20 Hrs |
| | **5.** Joints: types, basic structure & examples. | 06 Hrs |
| | **6.** Skin & appendages. | 02 Hrs |
| | **7.** GIT: : Location, Gross structure, various parts & their functions.<br>Details of process of food ingestion, digestion, absorption & defaecation. (Microscopic structure is not required.) | 15 Hrs |
| | **8.** Respiratory tract: Location, Gross structure, various parts & their functions. Details of breathing mechanism, different respiratory volumes. (Microscopic structure is not required.) | 15 Hrs |
| | **9.** Urinary tract: Gross structure, various parts & their functions. (Microscopic structure is not required.)<br>Process of urine formation & voiding. | 10 Hrs |
| | **10.** Male reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.) | 05 Hrs |
| | **11.** Female reproductive system: Only gross structure & functions of different parts. (Microscopic structure is not required.)<br>Menstrual cycl | 05 Hrs |

# Details of Curriculum for First Year
# Diploma in Lab Technician

| PAPER 1st Theory | Topics | Hours. |
|---|---|---|
| **1.General Anatomy & Physiology (Cytology, Histology, Osteology and only basics of all organ systems of body).** | **12.** Endocrine system: Hormones secreted by Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal cortex, Adrenal medulla, Gonads & functions of different hormones. (Details of structure of these glands not required). | 10 Hrs |
| | **13.** Gross structure of brain & spinal cord. Functions of different parts of brain & spinal cord.(Details not required.) | 20 Hrs |
| | **14.** Blood: Composition & Functions. Details about Plasma, RBCs, WBCs, Platelets, Clotting system. | 20 Hrs |
| | **15.** Gross structure & functions of sensory Organs - Eye, Ear, Nose, Tongue.(Details not required). | 10 Hrs |
| | **16.** Basic gross structure of heart, vessels opening into heart & Leaving the heart. Arterial & Venous tree of body. | 10 Hrs |
| | **17.** Lymphatic system: Structure & Functions. | 10 Hrs |
| | **18.** Inumune system: Components & various mechanisms of defense. | 10 Hrs |

# Details of Curriculum for First Year
# Diploma in Lab Technician

| **PAPER 1st Theory** | Topics | Hours. |
|---|---|---|
| **2.Only basics of relevant Pathology, Pharmacology & Microbiology.** | 1. Basic steps of Acute & chronic inflammation and Healing of wound. | 05 Hrs |
| | 2. Basics of Necrosis & apoptosis. | 02 Hrs |
| | 3. Basics of Shock. | 02 Hrs |
| | 4. Basics of Disorders of blood coagulation system. | 08 Hrs |
| | 5. Basics of Disorders of Immune system of body. | 05 Hrs |
| | 6. Modes of disease transmission & prevention of infection. | 05 Hrs |
| | 7. Sterilization & methods of sterilization used in hospitals. | 10 Hrs |
| | 8. Basic idea about types of Bacteria, Virus, Fumgi. | 20 Hrs |
| | 9. Routes of drug administration. | 02 Hrs |
| | 10. Adverse effects & side effects of drugs. | 02 Hrs |
| | 11. Basic idea of Analgesics : Opioid & NSAIDs. | 02 Hrs |
| | 12. Basic idea of Drugs use in Cough & expectoration. | 01 Hrs |
| | 13. Basic idea of Drugs used in B.asthma & COPD. | 02 Hrs |
| | 14. Basic idea of Drugs used in GIT. | 03 Hrs |
| | 15. Basic idea of Anti Microbials. | 15 Hrs |
| | 16. Basic idea of Anti H-1 Histaminics & Corticosteroids. | 01 Hrs |
| | 17. Drugs used in anaemia. | 02 Hrs |

# Details of Curriculum for First Year
# Diploma in Lab Technician

| PAPER 2nd Theory | | Topics | Hours. |
|---|---|---|---|
| **1.Clinical Hematology & Clinical Microbiology-I.** | 1 | Introduction to pathology. | 03 Hrs |
| | 2 | Composition of blood -1.(RBC,WBC,Platelet) | 05 Hrs |
| | 3 | Composition of blood -2. (Plasma & Plasma Protein) | 04 Hrs |
| | 4 | Routine Instruments in haematology | 20 Hrs |
| | 5 | Collection and Preservation of Blood. | 05 Hrs |
| | 6 | Use of autoanalyser in haematology. | 05 Hrs |
| | 7 | Making of stains in haematology. | 03 Hrs |
| | 8 | Preparation of thick & thin smears. | 03 Hrs |
| | 9 | Leishman stain (PPreparation & method of staining) | 03 Hrs |
| | 10 | Other stains in haematology (Preparation & Method of staining). | 03 Hrs |
| | 11 | Anti coagulant vials-their preparation and use. | 03 Hrs |
| | 12 | Erythocytes & abnormal erythrocytes | 03 Hrs |
| | 13 | Reticulocyte count. | 03 Hrs |
| | 14 | Platelet count. | 03 Hrs |
| | 15 | Absolute Values. | 02 Hrs |
| | 16 | Hemoparasites | 02 Hrs |
| | 17 | ESR,PCV | 05 Hrs |
| | 18 | Osmotic fragility Test. | 05 Hrs |
| | 19 | LE Cell 1 | 03 Hrs |
| | 20 | Coagulation Disorders. | 07 Hrs |
| | 21 | Lab Diagnosis of Bleeding Disorders. | 05 Hrs |
| | 22 | Formation & Composition of Urine | 05 Hrs |
| | 23 | Collection & Preservation of Urine. | 02 Hrs |
| | 24 | Abnormal constituents of urine. | 03 Hrs |
| | 25 | Urinometer & Esbach's Albuminometer | 05 Hrs |
| | 26 | Physical & Chemical examination of urine. | 10 Hrs |
| | 27 | Microscopic examination of urine. | 10 Hrs |
| | 28 | Liver function test. | 05 Hrs |
| | 29 | Renal Function Test. | 05 Hrs |
| | 30 | Examination of body fluids -1. (Pleural,Peritoneal & Synovial.) | 05 Hrs |
| | 31 | Examination of body fluids -2.CSF | 05 Hrs |
| | 32 | Semen Examination. | 05 Hrs |
| | 33 | Investigations for Aneamia. | 10 Hrs |
| | 34 | Hemolytic Aneamia, Foetal Hb. | 05 Hrs |
| | 35 | Bone Marrow indications,contra indications & aspiration. | 15 Hrs |
| | 36 | Introduction to leukemia | 05 Hrs |
| | 37 | Chronic leukemia & acute leukemia. | 05 Hrs |
| | 38 | Use of auto analyser in Haematology | 10 Hrs |

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| PAPER 2nd Theory | Topics | | Hours. |
|---|---|---|---|
| 1.Clinical Hematology & Clinical Microbiology-I. | 39 | General introduction & terms used in Microbiology | 03 Hrs |
| | 40 | Safety measures in Microbiology | 03 Hrs |
| | 41 | Universal precautions | 03 Hrs |
| | 42 | Bio-Waste Disposal | 03 Hrs |
| | 43 | Growth & nutrition of Bacteria | 03 Hrs |
| | 44 | Care and Handling of Microscopes | 03 Hrs |
| | 45 | Use, Care and maintenance of common Lab equipments like centrifuges-I | 12 Hrs |
| | 46 | Use, Care and maintenance of common Lab equipments like centrifuges-II | 10 Hrs |
| | 47 | Principles & methods of sterilization | 05 Hrs |
| | 48 | Antiseptics and disinfectants | 02 Hrs |
| | 49 | PH, Buffer & reagents-I | 01 Hr |
| | 50 | PH, Buffer & reagents-II | 01 Hr |
| | 51 | Routine bacteria Culture media-I | 02 Hrs |
| | 52 | Routine bacteria Culture media-II | 02 Hrs |
| | 53 | Media for bacterial identification-I | 02 Hrs |
| | 54 | Media for bacterial identification-II | 02 Hrs |
| | 55 | Media for Drug Sensitivity Testing | 02 Hrs |
| | 57 | Classification of staining methods smear preparation | 02 Hrs |
| | 58 | Gram stains and other routine stains in Microbiology | 02 Hrs |
| | 59 | Z.N. Stains and other stains for Mycobacterium | 02 Hrs |
| | 60 | Leishman staining | 01 Hr |
| | 65 | Mechanism of drug resistance in bacteria . | 02 Hrs |
| | 66 | Anti bacterial sensitivity testing-I | 02 Hrs |
| | 67 | Anti bacterial sensitivity testing-II | 02 Hrs |

# Details of Curriculum for First Year
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| PAPER 2nd Theory | Topics | | Hours. |
|---|---|---|---|
| **2.Clinical Biochemistry-I.** | 1 | Introduction of Biochemistry | 05 Hrs |
| | 2 | Biochemistry Use in Medicine | 05 Hrs |
| | 3 | Units of Measurement | 05 Hrs |
| | 4 | Measurement of Volumetric Apparatus (Pipettes, Flasks & Cylinders) | 05 Hrs |
| | 5 | Laboratory Hazards | 05 Hrs |
| | 6 | Laboratory Safety | 05 Hrs |
| | 7 | Laboratory Design & Administration | 10 Hrs |
| | 8 | Sample Collection | 10 Hrs |
| | 9 | Universal Precautions | 05 Hrs |
| | 11 | Concept and Calculations Molecular Weight | 03 Hrs |
| | 12 | Concept and Calculations Equivalent Weight | 03 Hrs |
| | 13 | Basic Principles of Centrifugation | 03 Hrs |
| | 14 | Mole, Molar, Buffer & Normal Solution | 03 Hrs |
| | 15 | Definitions of Acid Base | 03 Hrs |
| | 16 | Calorimeter | 10 Hrs |
| | 17 | Preparation of Anticoagulants | 05 Hrs |
| | 18 | Preservation of Anticoagulants | 05 Hrs |
| | 19 | PH & Buffer | 05 Hrs |
| | 20 | Water Purification | 05 Hrs |
| | 21 | Sterilization | 05 Hrs |

# Details of Curriculum for First Year
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| PAPER 2nd Theory | Topics | Hours. |
|---|---|---|
| **3.Hand hygiene & prevention of cross infection.** | 1. Hand hygiene & method of Hand washing. | 15 Hrs |
| | 2. Prevention of cross infection. | 15 Hrs |

| PAPER 2nd Theory | Topics | Hours. |
|---|---|---|
| **4.Basic life support (BLS) & Cardio-pulmonary resuscitation (CPR).** | 1. Code blue. | 05 Hrs |
| | 2. Details of basic life support (BLS) & Cardio-pulmonary resuscitation (CPR). | 35 Hrs |

# Curriculum
# for
# Practical :- First Year
# Diploma in Lab Technician

| | | Topics |
|---|---|---|
| **Practical** | 1 | Making of slide and staining. |
| | 2 | Asessing hemoglobin with different methods. |
| | 3 | Loading of Neubauer's chamber. |
| | 4 | TLC |
| | 5 | DLC |
| | 6 | ESR & PCV |
| | 7 | Reticulocyte count |
| | 8 | RBC Count |
| | 9 | Platelet Count |
| | 10 | Buffy coat preparation |
| | 11 | Coomb's Test - Direct & Indirect |
| | 12 | LE Cell |
| | 13 | Osmotic fragility Test |
| | 14 | PT/PC |
| | 15 | Blood grouping methods |
| | 16 | Uses of anti-coagulants |
| | 17 | Bone Marrow Aspirations |
| | 18 | Cell Count in Acute Leukemia |
| | 19 | Cell Count in Chronic Leukemia |
| | 20 | Examination of Malarial Parasite. |
| | 21 | Examination of Microfillaria. |
| | 22 | Fetal Hemoglobin |
| | 23 | Urine collection and preservation |
| | 24 | 24 hrs. Urine protein estimation |
| | 25 | Urine examination – Physical / Chemical |
| | 26 | Urine examination – Microscopy |
| | 27 | CSF examination. |
| | 28 | Semen examination |
| | 29 | Other body fluid examination |
| | 30 | Rh antibody titre |
| | 31 | Automation in haematology |

# Curriculum
# for
# Practical :- First Year
# Diploma in Lab Technician

| | Topics | |
|---|---|---|
| **Practical** | 32 | Normal & Molar |
| | 33 | Percentage |
| | 34 | Buffers |
| | 35 | Glucose |
| | 36 | Albumin |
| | 37 | Physical Examination |
| | 38 | Chemical Examination (Chloride, Sulphate, Urea, Ammonia,Phoshate) |
| | 39 | Physical Examination |
| | 40 | Chemical Examination (Protein, Glucose, Ketone Bodies, Bile Salt,Bile Pigment, Blood, Urobilinogen, Chyle, Phenyl Ketonuria, Alkeptonuria) |
| | 41 | Normal Value |
| | 42 | . Hyper Value & Hypo Value |
| | 43 | Normal Value |
| | 44 | Hyper Value |
| | 45 | Normal Value |
| | 46 | Hyper Value & Hypo Value |
| | 47 | Programming of Different Analytes |
| | 48 | Standardization |

# Curriculum
# for
# Practical :- First Year
# Diploma in Lab Technician

| | Topics | |
|---|---|---|
| **Practical** | 49 | Microscopy |
| | 50 | Preparation of load for autoclaving & hot air sterilization |
| | 51 | Autoclaving |
| | 52 | Use of hot air oven |
| | 53 | Disinfection |
| | 54 | Preparation of Buffer & reagents |
| | 55 | Preparation of Culture media (Selective medias) |
| | 56 | Preparation of Culture media (Special medias) |
| | 57 | Smear preparation |
| | 58 | Use of centrifuges |
| | 59 | Preparation of stains |
| | 60 | Gram's staining |
| | 61 | Zeihl Neelsen staining |
| | 62 | Leishman / romanowsky staining |
| | 63 | Albert's & other special staining |
| | 64 | Inoculation of culture media-I |
| | 65 | Inoculation of culture media-II |
| | 66 | Drug Sensitivity Testing-I |
| | 67 | Drug Sensitivity Testing-II |