

**CURRICULUM  
FOR  
FIRST SEMESTER OF  
THREE-YEAR  
DIPLOMA COURSES IN  
POLYTECHNICS  
OF  
UNION TERRITORY OF  
JAMMU AND KASHMIR**

**CURRICULUM**

**FOR**

**FIRST SEMESTER**

**DIPLOMA IN**

**MEDICAL LAB TECHNOLOGY**

**(ML)**

**SUBJECT SCHEME**

Course code	Subjects	Time in Hours				Credits			
		Theory	Tutorial	Practical	Total	Theory	Tutorial	Practical	Total
HS 101	Language and Communication Skill	3	—	—	3	3	0	—	3
ML 101	Basic Chemistry	3	—	—	3	3	0	—	3
ML 102	Anatomy and physiology-I	3	—	—	3	3	0	—	3
ML 103	Clinical Microbiology-I	3	—	—	3	3	—	—	3
ML 104	Haematology-I	3	—	—	3	3	0	—	3
ML 105	Clinical Biochemistry-I	3	—	—	3	3	—	—	3
HS 109	Language and Communication Skill Lab	—	—	2	2	—	—	1	1
ML 106	Basic Chemistry Practical	—	—	2	2	—	—	1	1
ML 107	Anatomy and physiology-I practical	—	—	2	2	—	—	1	1
ML 108	Clinical Microbiology-I Practical	—	—	2	2	—	—	1	1
ML 109	Haematology-I Practical	—	—	2	2	—	—	1	1
ML 110	Clinical Biochemistry-I Practical	—	—	2	2	—	—	1	1
HS 110	Self-Learning/Life Skills	2	—	—	2	2	—	—	2
	<b>Total</b>	<b>20</b>		<b>12</b>	<b>32*</b>	<b>20</b>		<b>6</b>	<b>26</b>

**\*Note: one class per week shall be utilized for sports, seminars, debates etc.**

<b>PROGRAM : THREE YEARS DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course Code : HS 101	Course Title: Language and Communication skills
Semester : 1 <sup>st</sup>	Credits: 3
Periods per week: <b>3 (L:3 T:0 P:0)</b>	

**Course Objectives:** This course is designed to introduce students to various kinds of technical and professional communication. During the course, you will become familiar with technical communication, receive feedback from and provide feedback to others on writing drafts and revisions, discover the role good listening, speaking, reading, and writing skills plays in effective technical communication. The students will learn and experience ways to communicate effectively, particularly audience awareness and communication through technology and also learn ways to groom their personality. The students will find these vignettes beneficial for keening and honing learning skills in their interpersonal communication as well as communication at workplace, and dispose them of wallowing in unhappy isolation. Above all, it will develop requisite skills among the students which in turn will enhance the employability of students. We hope the students will enjoy it with facility and felicity

**Prior learning requirements: NIL**

## **COURSE CONTENT**

### **UNIT 1: COMMUNICATION: THEORY AND PRACTICE (12 Hours)**

- Basics of communication: Introduction, meaning and definition, process of communication etc.
- Types of communication: formal and informal, verbal, non-verbal and written. Barriers to effective communication.
- 7 C's for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).
- Art of Effective communication,
  - Choosing words
  - Voice o Modulation o Clarity
  - Time
  - Simplification of words
- Technical Communication

### **UNIT 2: SOFT SKILLS FOR PROFESSIONAL EXCELLENCE (12Hours)**

- Introduction: Soft Skills and Hard Skills.
- Importance of soft skills.
- Important types of soft skills : Interview skills, Presentation skills, Group Discussion
- Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.
- Case Studies

### **UNIT 3: READING COMPREHENSION**

**(12 Hours)**

Comprehension, vocabulary enhancement, and grammar exercises based on reading of the following texts:

#### **Section-1**

Malgudi Days: R.K. Narayan  
The Room on Roof: Ruskin Bond  
"The Gift of the Magi" by O. Henry "  
The Cock –fight by Amin Kamil

#### **Section-2**

Night of the Scorpion by Nissim Ezekiel,  
Stopping by Woods on a Snowy Evening by Robert Frost,  
Where the Mind is Without Fear by Rabindranath Tagore,  
Ode to Tomatoes by Pablo Neruda,

### **UNIT 4: PROFESSIONAL WRITING**

**(12 Hours)**

- The art of precis writing,
- Letters: business and personal,
- Drafting e-mail, notices, minutes of a meeting, Job Application, CV/Resume writing etc.
- Filling-up different forms such as banks and on-line forms for placement etc.

**Course Outcome:**

After completion of this course the student will be able to:

**UNIT 1**

- Develop Verbal, Non Verbal Communication such as proper use of body language and gestures.
- Develop the latest trends in basic verbal activities such as presentation and other forms of oral communication.

**UNIT 2**

- Learn Soft as well as hard skills.
- Master their life skills.

**UNIT 3**

- Comprehend different words in the context which in turn will enhance their Vocabulary and grammar.
- Read Correctly.

**UNIT 4**

- Develop writing skills including proper use of Language, & Vocabulary.
- Learn different formats of writing skills.

**Recommended Books:**

- 1) J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980
- 2) Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition 2018)
- 3) M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.
- 4) John Nielson. Effective Communication Skills. Xlibris, 2008.
- 5) Oxford Dictionary
- 6) Roget's Thesaurus of English Words and Phrases
- 7) Collin's English Dictionary

**UNIT WISE TIME AND MARKS DISTRIBUTION**

<b>UNIT NO</b>	<b>TIME (HOURS)</b>	<b>MARKS</b>
01	12	25
02	12	25
03	12	25
04	12	25
<b>TOTAL</b>	<b>48</b>	<b>100</b>



<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 101</b>	Course Title : Basic Chemistry
Semester : <b>1<sup>st</sup></b>	Credits: 03
Periods per Week: 3 (L:3 T:0 P:0)	

**Course Objective**

The role of chemistry and chemical products in every field of life is expanding greatly. Now a days various products of chemical industries are playing important role in the medical field and the number of such products is increasing. Chemistry is one of the important subjects for diploma students in Medical Lab. Technology for developing in them scientific temperament and understanding other subjects in their profession Efforts should be made to teach the subject through demonstration and with the active involvement of students.

**Prior learning requirements:**

**The students shall have basic knowledge regarding**

- i) **Basic concepts of Chemistry**
- ii) **S.I units**
- iii) **Bio Molecules**

## COURSE CONTENTS

1. Basic concepts (08 hrs)  
S.I units of pressure, volume, temperature, density, specific gravity  
Atomic mass (A), molar mass, mole concept and its applications, molar volume of gases  
Solution, strength of solutions, molarity (M), molality (m), normality (N), mass fraction, mole fraction and parts per million.
2. Equilibrium, Acids and Bases. (08 hrs)  
Concept of pH and pH scale  
Various concept of acids/bases; strong acids/bases, weak acids/bases, dissociation constants of acids/bases. Neutralization, acid base titration, choice of indicators for acid base titration  
Hydrolysis of salts, common ion effect, buffer solutions (acidic and basic),  
buffer action of a buffer solution, applications of buffers
3. **Carbohydrates** (10 hrs)  
Definition  
Optical Activity and mutarotation  
Composition and sources  
Classification  
Reactions

Important monosaccharides, disaccharides, polysaccharides

Breakage of glucose, fructose, galactose, lactose, maltose

Importance of carbohydrates

4. **Lipids** (08 hrs)

Definition

Classification

Introduction to fatty acids, phospholipids, triglycerides, sterol, ergosterol,

Cholesterol

Reactions of fats

Importance of lipids

5. **Proteins** (07 hrs)

Definition

Classification

Composition, molecular weight and hydrolysis

Name of various amino acids

Structure and properties of proteins

Importance of proteins

6. **Enzymes** (07 hrs)

Definition

Classification

Chemical nature of enzymes

Properties of Enzymes

Factors affecting enzyme activity

Enzyme Inhibitors

Enzymes of Diagnostic Importance

### **Course outcome**

After completion of this course the student will be able to:

#### **Unit 1 students shall be able to ;**

- Understand and describe the expression of S.I units
- Understand the basic concepts of Normality, Molarity, Molality, Percent solutions (W/V,V/V) and its applications.

#### **Unit -2**

- Understand the concept of pH, pH Value and pH indicators
- Understand and describe the Acidic /Basic reaction
- Understand use and preparation of buffer solutions and buffering capacity
- Understand use of pH meter and Ph Indicators for measurement pH

#### **Unit-3**

- Understand and define Carbohydrates ,their reaction and breakdown of various sugars .

#### **Unit-4**

- Understand and define lipids and their importance

#### **Unit-5**

- Understand and define proteins, their properties and importance

#### **Unit-6**

- Understand and define Enzymes, their properties and diagnostic importance

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	15
2	08	15
3	10	25
4	08	15
5	07	15
6	07	15
<b>Total</b>	<b>48</b>	<b>100</b>

<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
<b>Course code : ML 102</b>	<b>Course Title : Anatomy and Physiology-I</b>
<b>Semester : 1<sup>st</sup></b>	<b>Credits: 03</b>
<b>Periods per Week: 3 (L:3 T:0 P:0)</b>	

**Course Objective**

The students are supposed to have basic knowledge of structure of body, their anatomical parts, physiological functions. After studying this subject, the students shall be able to understand various parts of body and their anatomical positions along with functions.

**Prior learning requirements:**

The students have basic knowledge regarding

- i) Human Body
- ii) Various systems of human body

**COURSE CONTENTS**

- 1. Introduction to human body, its anatomy and physiology (04 hrs)
- 2. Elementary tissues of body and their classification along with brief description (06 hrs)
- 3. Skeletal system (06 hrs)
  - The skeleton, important bones and their brief description
  - Articulation of bones – joints
- 4. **Digestive system** (14 hrs)
  - Various organs of digestion and their functions (stomach, small intestine) and accessory organs (liver, pancreas and salivary glands)
  - Process of digestion of food
  - Absorption and assimilation of food
  - Vitamins and minerals

5. **Respiratory system** (07 hrs)  
Organs of respiration and their histology  
Respiration (definition and mechanism)  
Gas exchange in the lungs  
Regulation of respiration  
Basal metabolic rate
6. **Excretory System** (07 hrs)  
Organs of excretion (kidneys, ureter, bladder)  
Formation of urine and its composition

**Course outcome:**

After completion of this course the student will be able to:

**Unit-1**

- Understand the Anatomy and Physiology of Human body

**Unit-2**

- Understand the Elementary tissues

**Unit-3**

- Understand the importance of bones and joints

**Unit-4**

- Understand the function of various important organs of digestive system
- Understand the importance of Vitamins and minerals

**Unit-5**

- Understand and describe the organs of respiratory system and its regulations

**Unit-6**

- Understand the organs of excretory system

### RECOMMENDED BOOKS

- 1) Basic Anatomy and Physiology by N Muruges; Sathya Publishers, Madurai
- 2) Ross and Wilson Anatomy and Physiology by Anne Waugh and Kathleen JW Wilson; Curchill Living Stone; London
- 3) Anatomy and Physiology by Pears; JP Brothers, New Delhi
- 4) Anatomy and Physiology by Sears; ELBS, London

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	07	10
2	07	10
3	06	10
4	12	35
5	08	20
6	08	15
<b>Total</b>	<b>48</b>	<b>100</b>



<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 103</b>	Course Title : Clinical Microbiology-I
Semester : <b>1<sup>st</sup></b>	Credits: 03
Periods per Week: 3(L:3 T:0 P:0)	

### Course Objective

The students undergoing training of medical laboratory technology are given the knowledge of basic morphological features of bacteria, their staining characters, sterilization methods, preparation of culture media. They are also taught safety measures in microbiology.

### Prior learning requirements:

#### The students have basic knowledge regarding

- **Microorganisms in general and bacteria in particular**
- **Concept of sterilization and disinfection.**

### COURSE CONTENTS

1. Introduction to Microbiology	(02 hrs)
Definition, history, importance of microbiology	
2. Morphology of bacteria	(06 hrs)
Anatomical structure of a bacterial cell including spores, flagella and capsules	
3. Bacterial growth and nutrition of bacteria	(03 hrs)
Bacterial growth curve and bacterial nutrition	
4. Classification of bacteria	(04 hrs)
Morphology	
Oxygen Requirement	
Gram's Reaction	

5. Microscopy - principle and care, working of compound microscope (05 hrs)

Principle of (i)dark field microscope(ii) fluorescent microscope (iii) phase contrast microscope and (iv) electron microscope

6. Sterilization (08 hrs)

- Definition
- By dry heat,
- Moist heat,
- Autoclave & hot air oven- their structure, functioning, controls and sterilization indicators,
- By filtration

7. Antiseptics and disinfectants (03 hrs)

Definitions, types, use of disinfectants and antiseptics

8. Bacterial culture and culture techniques (05 hrs)

Inoculations of culture media, aerobic culture, isolation of pure and mixed cultures..

9. Culture media (08 hrs)

Ideal culture media and its types (Liquid and Solid media, Defined and Synthetic media, Basal, Enriched, Selective, Enrichment, Indicator, and Transport media)

10. Staining techniques (04 hrs)

Methods of smear preparation, Gram stain, Ziehl-Neelson's (Z-N) stain, India Ink Preparation

**Course Outcome:**

After completion of this course the student will be able to:

**Unit-1**

- Know historical background of Microbiology, Inventions and discoveries
- Develop understanding and importance of Microbiology

**Unit-2**

- Understand and describe the bacterial cell, including cell wall and its appendages, Morphological features of bacteria.

**Unit-3**

- Understand bacterial growth and minimum nutrition required for the growth of bacteria

**Unit-4**

- Understand the types of bacteria ,based on morphology, oxygen requirements ,Staining characters and nutritional requirements .

**Unit-5**

- Understand the sterilization process, purpose and different methods of sterilization by physical means.

**Unit-7**

- Understand sterilization by Chemical means .

**Unit-8**

- Understand and perform various bacterial culture techniques .

**Unit-9**

- Understand and describe the various culture media used for growth and study of bacteria.

**Unit-10**

- Understand and perform the various staining procedures for the identification of bacteria.

**RECOMMENDED BOOKS**

1. Textbook of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
2. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
3. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth – Heinemann; Oxford
4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill, New Delhi
6. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesbrough; Cambridge University Press; UK
7. Text Book of Microbiology by Ananthanarayan and Paniker; Orient Longman, Hyderabad
8. Text book of Medical Microbiology by Cruickshank Vol. I and II

**SUGGESTED DISTRIBUTION OF MARKS**

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	02	04
2	06	10
3	03	05
4	04	10
5	05	10
6	08	17
7	03	05
8	05	12
9	08	15
10	04	12
<b>Total</b>	<b>48</b>	<b>100</b>

<b>PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 104</b>	Course Title : Haematology-I
Semester : <b>1<sup>st</sup></b>	Credits: 03
Periods per Week: 3 (L:3 T:0 P:0)	

**Course Objective**

The training in Haematology is imparted to enable the students to know the principle of tests, methodology of routine as well as advanced procedures being carried out in the laboratory by using routine as well as sophisticated instruments. Stress is also given in use of safety measures in the laboratory.

**Prior learning requirements:**

**The students have basic knowledge regarding**

- **Cells ( Erythrocytes ,Leukocytes and Thrombocytes)**

## COURSE CONTENTS

### Theory

- .1 Introduction to Haematology
  - Various glassware/plasticware used in Haematology labs.( Hbtube, Hb pipette, RBC pipette, WBC pipette, ESR pipette/Tube)(06 hrs)
- .2 Haemopoiesis (16 hrs)
  - Erythropoiesis, leucopoiesis, thrombopoiesis
  - Definition, composition, and functions of blood
  - Factor effecting/Contributing haemopoiesis
- .3 Anticoagulants (05 hrs)
  - Definition and various types of anticoagulants
  - Color coded Blood collection tubes
- .4 Collection and preservation of blood (9hrs)
  - Collection of blood venous and capillary
  - Various equipment used for collection of blood samples
  - Safety measures at the time of sampling and collection
  - Preservation / Transportation of blood samples in Haematology
- .5 Diluting fluids of (Hb, WBC , Platelets, RBC ) (05 hrs)
  - Uses and composition.
- .6 Romanow-sky stains (07hrs)
  - Theory and preparation
  - Choice of slide and spreader
  - preparation of blood film, Characteristics of good film preparation
  - Staining procedure, Effects of pH on staining

**Course Outcome:**

After completion of this course the student will be able to:

**Unit-1**

- understand the role of Haematology lab in the diagnostic field .
- know the use of various glasswares , plastic wares and pipettes etc.

**Unit-2**

- understand and describe the formation of blood ,RBC'S,WBC'S and platelet s .
- understand the composition and function of blood .

**Unit -3**

- understand and define the various anticoagulants , their mechanism of action and uses.

**Unit-4**

- Know the procedure for collection ,preservation and transportation .
- Understand the safety measures while collecting blood

**Unit-5**

- Understand the composition and use of various diluting fluids .

**Unit-6**

- Understand and describe the preparation of Romanowsky stains and blood films.

### RECOMMENDED BOOKS

1. Medical Laboratory Technology Vol. 1 by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth Heinmann, Oxford
3. Medical Laboratory Manual for Tropical Countries by Monica Cheesbrough; Cambridge University Press, UK
4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Practical Haematology by JV Decei; ELBS with Curchill Living Stone; UK
6. Medical Laboratory Science Theory and Practical by J Ochei and A Kolhatkar, Tata McGraw Hill Publishing Company Ltd., New Delhi 2000 Ed.
7. Medical Lab. Technology by Satish Gupte, JP Publishers

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	06	10
2	16	28
3	05	10
4	09	22
5	05	10
6	07	20
<b>Total</b>	<b>48</b>	<b>100</b>



<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 105</b>	Course Title : Clinical Biochemistry-I
Semester : <b>1<sup>st</sup></b>	Credits: 03
Periods per Week: 3 (L:3 T:0 P:0)	

### Course Objective

The students are imparted basic training of theoretical and practical aspects in the field of clinical biochemistry. The students are made to learn the technique of collection of clinical samples and their processing along with recording of data. The student will also obtain the basic knowledge of chemistry and metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained. The students are also given basic training in safety measures, quality control and automation.

### Prior learning requirements:

The students shall have basic knowledge regarding

- Chemistry and metabolism of various metabolites

### COURSE CONTENTS

- .1 Introduction to biochemistry (04 hrs)
- Definition
  - Importance of biochemistry
    - SI Units and their use
    - Volumetric apparatus and their calibration
- .2 Important instruments; principle, working, handling and care of (16hrs)
- Balance (Analytical, electrical/electronic)
  - Centrifuge
  - Colorimeter
  - Spectrophotometer
  - Ion specific electrolyte analyzer
    - Glucometer
    - Distillation Plant/Deionizer apparatus

- Water bath
- Mixers (Roller mixer, Rotator mixer, Vortex mixer, combined magnetic stirrer/hot plate)

.3 Blood fractions (05hrs)

- Separation of Serum
- Separation of Plasma
- Different protein precipitating reagents
- Preparation of protein free filtrate (PFF)

.4 Blood glucose/ sugar estimation, screening test and glucose tolerance test (GTT) (11hrs)

- Metabolism of Glucose
- Principle and methods of estimation
- Reference values
- Renal threshold
- Importance and Performance of ST/GTT
- Clinical importance of blood sugar, ST/GTT

.5 Blood urea (8 hrs)

- Formation and excretion of urea
- Principle and procedures of different methods of urea estimation
- Reference values
- Clinical Importance

.6 Serum Creatinine (4 hrs)

- Principle and procedure of various estimation methods
- Reference values
- Clinical importance

.7 Uric Acid (4 hrs)

- Principles and procedures various estimation methods
- Reference values
- Clinical Importance

**Course Outcome:**

After completion of this course the student will be able to:

**Unit-1**

- Understand and define the cl.biochemistry and its importance
- Develop understanding regarding calibration of various apparatus also the use of S.I units in clinical biochemistry .

**Unit-2**

- Understand the principle ,working ,handling and care of various important instruments

**Unit -3**

- Develop understanding of blood fractions and their separation techniques .

**Unit-4**

- Understand the metabolism of glucose .
- Understand the principle , procedure and clinical importance of Glucose Estimation.

**Unit-5**

- Understand the formation and excretion of urea .

**Unit-6**

- Understand the principle ,procedure and clinical importance of Creatinine .

**Unit -7**

- Understand the principle ,procedure and clinical importance of uric acid

### RECOMMENDED BOOKS

1. A Procedure Manual for Routine Diagnostic Tests Vol. I by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. Biochemistry Estimations by F.J.Baker

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	04	09
2	12	25
3	05	11
4	11	22
5	08	11
6	04	11
7	04	11
<b>Total</b>	<b>48</b>	<b>100</b>

<b>PROGRAM: THREE YEARS DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course Code : HS 109	Course Title: Language and Communication skills Lab
Semester : <b>1<sup>st</sup></b>	Credits: <b>01</b>
Periods per week: <b>2 (L:0 T:0 P:2)</b>	

**Course Content:**

**Unit 1: Listening Skills**

Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

**Unit 2: Introduction to Phonetics**

Sounds: Consonant, Vowel, Diphthongs. Syllable division, word stress, intonation, voice etc.

**Unit 3: Speaking Skills**

Introducing oneself and others

Standard and formal speech: Group discussion, oral presentations, public speaking etc.

Conversation practice and role playing, mock interviews etc.

**Unit 4: Building vocabulary**

Antonyms and Synonyms, Prefix and Suffix, Phrasal verbs, idioms and phrases. Word exercises and word games to enhance self-expression and vocabulary.

**Recommended Books:**

1. James Hartman & et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University Press, 2006.
2. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)

<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 106</b>	Course Title : Basic Chemistry Practical
Semester : <b>1<sup>st</sup></b>	Credits: 01
Periods per Week: (L: T:0 P:2)	

### LIST OF PRACTICALS

- .1 Preparation of standard solutions.
- .2 To prepare N Sodium carbonate
- .3 To prepare M oxalic acid solution
- .4 To prepare 5N HCl from given 12 N HCl, HCl
- .5 To determine strength of given solution of sodium hydroxide by titrating against standard solution of oxalic acid using phenolphthalein indicator
- .6 To determine strength of given solution of sulphuric acid by titrating against standard solution of sodium carbonate using methyl orange indicator.
- .7 Preparation of 20% H<sub>2</sub> SO<sub>4</sub> solution.
- .8 Preparation of 10% KOH solution.
- .9 Preparation of 1% Ammonium Oxalate from 10% solution.
- .10 Detection of carbohydrates.
- .11 Detection of protein.
- .12 Detection of Enzymes

### Course Outcome

After completion of this course the student will be able to:

- Prepare all the solutions with clear understanding

<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 107</b>	Course Title : Anatomy and Physiology Practical -I
Semester : <b>1<sup>st</sup></b>	Credits: 01
Periods per Week: 2(L:0 T:0 P:2)	

**LIST OF PRACTICALS**

1. Study of various parts of body through demonstration
2. Study of tissues of body through demonstration
3. Study of various parts of skin (demonstration from models)
4. Study of various bones and joints through demonstration
5. Study of parts of digestive system through demonstration
6. Study of parts of respiratory system through demonstration
7. Study of parts of excretory system through demonstration

**Course Outcome:**

After completion of this course the student will be able to:

- Understand the human Anatomy and physiology with clear understanding .

<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 108</b>	Course Title : Clinical Microbiology Practical -I
Semester : <b>1<sup>st</sup></b>	Credits: 01
Periods per Week: 2(L:0T:0 P:2)	

**LIST OF PRACTICALS**

1. Demonstration of safety rules (universal precautions) in a microbiology laboratory
2. Preparation of cleaning agents and techniques of cleaning of glass and plastic ware.
3. Sterilization by autoclave and hot air oven
4. Sterilization by filtration (Seitz)
5. Handling and use of compound microscope
6. Staining techniques: Gram, Albert's, Ziehl – Neelson's
7. Demonstration of motility (Hanging drop method)
8. Preparation and sterilization of various culture media ( Nutrient agar, Nutrient broth, Blood agar, Chocolate agar, Mac-Conkey agar, Lowenstein-Jensen Media  
Aerobic and anaerobic culture methods

**Course Outcome:**

After completion of this course the student will be able to:

- Perform various culture techniques, Media preparation and staining procedures with clear understanding with appropriate safety measures .



<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 109</b>	Course Title : Heamatology Practical -I
Semester : <b>1<sup>st</sup></b>	Credits: 01
Periods per Week: 2 (L:0 T:0 P:2)	

### **LIST OF PRACTICALS**

1. Demonstration of color-coded blood collection tubes
2. Collection of venous and capillary blood
3. Preparation of the stains (Giemsa ,Leishmans etc)
4. Preparation of peripheral blood film (PBF)
5. To stain a peripheral blood film by Romanowsky stain

### **Course Outcome:**

After completion of this course the student will be able to:

- Perform blood collection ,blood film preparation and staining procedures with clear understanding.

<b>PROGRAM : THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY</b>	
Course code : <b>ML 110</b>	Course Title : Clinical Biochemistry Practical -I
Semester : <b>1<sup>st</sup></b>	Credits: 01
Periods per Week: 2 (L:0 T:0 P:2)	

**LIST OF PRACTICALS**

- Cleaning of glass ware
- Handling and maintenance of Balance, Centrifuge, Colorimeter, Ion Selective electro de and glucometer , distillation plant/deionizer
- Collection of blood by various methods including vacutainer system
- Separation of serum and plasma
- Preparation of different protein precipitating agents, PFF preparation
- Estimation of blood glucose/sugar (O-toluidine method and enzymatic method)
- Performance of ST/GTT
- Serum urea estimation
- Serum creatinine estimation
- Serum uric acid estimation

**Course Outcome**

After completion of this course the student will be able to:

- Operate with proper care and handling of various instruments and glassware .
- Perform all the basic preliminary tests like Glucose, urea , creatinine and uric acid with clear understanding and their Cl.importance.

<b>PROGRAM : THREE YEARS DIPLOMA IN MEDICAL LAB TECHNOLOGY</b>	
Course Code : HS 110	Course Title: - Self learning/Life skills
Semester : 1 <sup>st</sup>	Credits: <b>02</b>
Periods per week: <b>2(L:2 T:0 P:0)</b>	

**Course Objective:-**

**Self Learning /Life skills :-** The self-learning plays a very important role in the learning process and needs due credit Extra learning outside Institutional timing and online/digital learning needs encouragement. Apart from this participation in debates, seminars, sports and Extra- co curricula activities shall be given due importance and credit. Participation by student in such activities needs to be given due importance and credit. Apart from knowledge and skill, developing right attitude is of great significance in the real life situations. This can be better achieved by introducing the life skills and capability of handling the real life future challenges and situations. Activities in sports, Yoga and other activities plays a role in physical and psychological development and must form a part in the institutional processes. Prior learning of the student also needs to be given due credit.

The introduction of this course is to introduce these activities and award them on choice of student.

**Contents of the Course:**

- Concept and need of life skills
- Self-awareness
- Decision making
- Problem solving
- Effective communication
- Interpersonal relations
- Stress management
- Empathy
- Critical thinking

**Course Outcome:**

After completion of this course the student will be able to:

- Identify different skills required in personal and professional life.
- Develop Consciousness of self.
- Use critical thinking and decision-making skill to solve problems.
- Communicate effectively with others.
- Establish interpersonal relations
- Apply techniques to cope with emotions and stress.

**Implementation:-** At the start of the semester the HOD/Academic in-charge may register the student for course of life skill or may be given a choice to register for any online course activity . Such course and activity needs to be monitored, evaluated and shall be given credits as prescribed.