



# PM POLYTECHNIC

A Unit of Puran Murti Educational Society  
Approved by AICTE, Ministry of HRD, Govt. of India,  
Affiliated to State Board of Technical Education, Panchkula, Haryana

## SCHEME FOR FIRST SEMESTER (Medical Lab Technology)

Sr. No.	Subject	Study Scheme			EVALUATION SCHEME						Total Marks
					INTERNAL ASSESSMENT		EXTERNAL ASSESMENT (EXAMINATION)				
					Theory	Practical	Written Paper		Practical		
					Max. Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
1.1	*Communication Skills-I	3	-	2	25	25	100	3	50	3	200
1.2	Basic Chemistry	3	-	2	25	25	100	3	50	3	200
1.3	Anatomy and Physiology-I	3	-	2	25	25	100	3	50	3	200
1.4	Clinical Microbiology-I	3	-	4	25	25	100	3	50	3	200
1.5	Haematology-I	3	-	4	25	25	100	3	50	3	200
1.6	Clinical Biochemistry-I	3	-	4	25	25	100	3	50	3	200
	# Student Centred Activities	-	-	4	-	25	-	-	-	-	25
<b>Total</b>		<b>18</b>	<b>-</b>	<b>22</b>	<b>150</b>	<b>175</b>	<b>600</b>	<b>-</b>	<b>300</b>	<b>-</b>	<b>1225</b>

\* Common with other diploma programmes

# Student Centered Activities will comprise of co-curricular activities like extension lectures, library studies, games, Hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C.,NSS, Cultural Activities, Civil Defence/Disaster Management activities etc.



## SYLLABUS: Polytechnic (DMLT)

Department:—Medical Lab Technology 1<sup>st</sup> Semester

Subject: Communication skills (Theory)

Subject Code: 120011

### DETAILED CONTENTS

#### Unit No.1 Communication skills

- Topic No.1: Verbal & non verbal communication
- Topic No.2: Process of communication
- Topic No.3: Barriers to communication; overcoming strategies
- Topic No.4: Listening & Speaking Skills & Sub Skills

#### Unit No.2 Grammar and usage

- Topic No.5: Punctuation
- Topic No 6: Articles-A, AN, The
- Topic No.7: Framing Questions
- Topic No.8: Verbs- classification: Main verb, Auxiliary verb, transitive verb and intransitive verbs
- Topic No.9: Word Formation

#### Unit no. 3 Writing Skills

- Topic No.10: Writing Paragraphs
- Topic No.11: Picture Composition

#### Unit no. 4 Reading Skills

- Topic No. 12: Unseen Comprehension passages

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment			External Assessment (Examination)			
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks		Hrs
3	-	-	25	-	100	3	-		-

#### RECOMMENDED BOOKS:

1. Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2. High School English Grammar and Composition by Wren & Martin; S. Chand & Company Ltd., Delhi.
3. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.

#### SUGGESTED DISTRIBUTION OF MARKS:

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	12	25
2.	12	25
3.	10	20
4.	14	30
<b>Total</b>	<b>48</b>	<b>100</b>



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**Subject: Communication skills (Practical)**

**Subject Code: 120011(P)**

**LIST OF EXPERIMENTS:**

- 1: Introducing oneself
- 2: Introducing other selves
- 3: Greetings
- 4: Thanking and wishing well
- 5: Leave taking
- 6: The things I like most
- 7: The things I dislike most

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		Total Marks
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75





## DETAILED CONTENTS

### Unit No.1 Basic concepts

- Topic No.1: S.I.units of pressure, volume, temperature, density, specific gravity
- Topic No.2: Matter, element, compound and mixtures, atom, molecule, ion, symbols and formulae
- Topic No.3: Atomic mass (A), molar mass, mole concept and its applications
- Topic No.4: Solution, strength of solutions, molarity (M), molality (m), normality (N), mass fraction, mole fraction and parts per million.

### Unit No.2 Atomic structure and Chemical Bonding

- Topic No.5: Fundamental particles i.e. electron, proton and neutron
- Topic No.6: Heisenberg's uncertainty principle
- Topic No.7: Brief idea of modern concept of atom, quantum numbers (significance only), definition of shells, sub Shells and orbitals.
- Topic No.8: Difference between orbit and orbital shapes of S and p orbitals only.
- Topic No.9: Modern periodic law, periodic table, periods and groups
- Topic No.10: Definition and types of Ionic bond, covalent bond, orbital concept of covalent bonding, valence bond Theory

### Unit No.3 Water

- Topic No.11: Sources of water
- Topic No.12: Hard and soft water, types of hardness, action of soap on hard water
- Topic No.13: Disadvantages of hard water in domestic and industrial uses
- Topic No.14: Qualities of drinking water and purification of available water for drinking purposes

### Unit No.4 Equilibrium, Acids and Bases

- Topic No.15: Equilibrium state, equilibrium constant
- Topic No.16: Ionization of electrolyte in aqueous solution, ionic equilibrium, degree of ionization, self-ionization of Water and ionic product of water ( $K_w$ ).
- Topic No.17: Concept of pH and pH scale
- Topic No.18: 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
- Topic No.19: Hydrolysis of salts, common ion effect, buffer solutions (acidic and basic), Buffering action of a buffer Solution, applications of buffers.

### Unit No.5 Electrochemistry

- Topic No.20: Electronic concept of oxidation, reduction and redox reactions
- Topic No.21: Electrolytes and non electrolytes
- Topic No.22: Conductors and their types.
- Topic No.23: Electrolysis
- Topic No.24: Applications of electrolysis

### Unit No.6 Surfaces and Colloids

- Topic No.25: Adsorption and its types
- Topic No.26: Applications of adsorption
- Topic No.27: Colloidal state and types of colloids
- Topic No.28: Preparation and purification of colloids in brief
- Topic No.29: Gels and solution, emulsions
- Topic No.30: Cleaning action of soaps

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125



# PM POLYTECHNIC

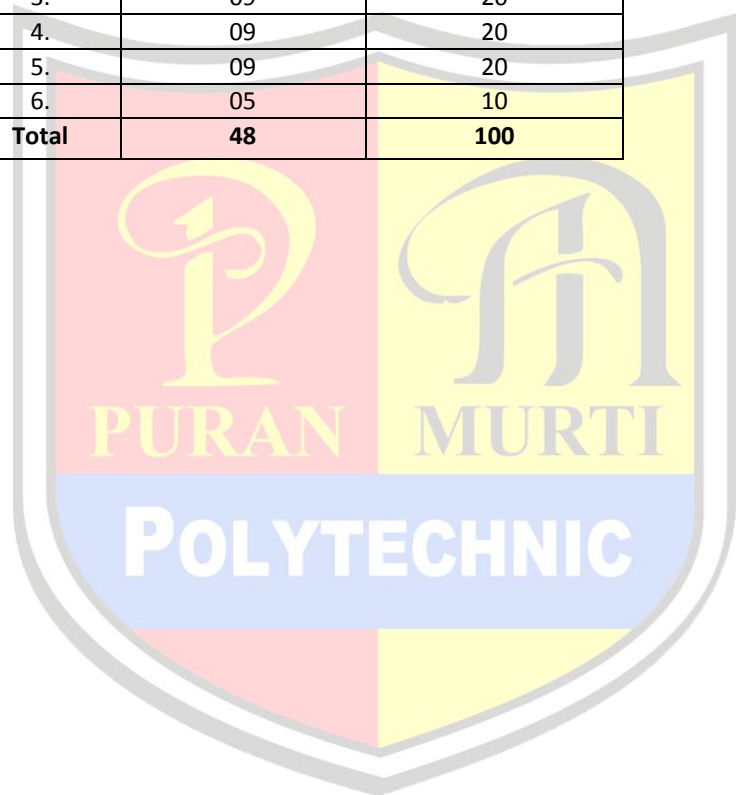
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## RECOMMENDED BOOKS:

1. Chemistry in Engineering by J.C. Kuricose And J. Rajaram, Tata McGraw Hill, Publishing Company Limited, New Delhi.
2. Engineering Chemistry by P.C.Jain and Monika Jain, Dhanapat Rai Publishing Company New Delhi.
3. Engineering Chemistry by Shashi Chawla.
4. Progressive Applied Chemistry – I by Dr. G.H. Hugar Eagle Prakashan Jalandhar

## SUGGESTED DISTRIBUTION OF MARKS:

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	08	15
2.	08	15
3.	09	20
4.	09	20
5.	09	20
6.	05	10
<b>Total</b>	<b>48</b>	<b>100</b>





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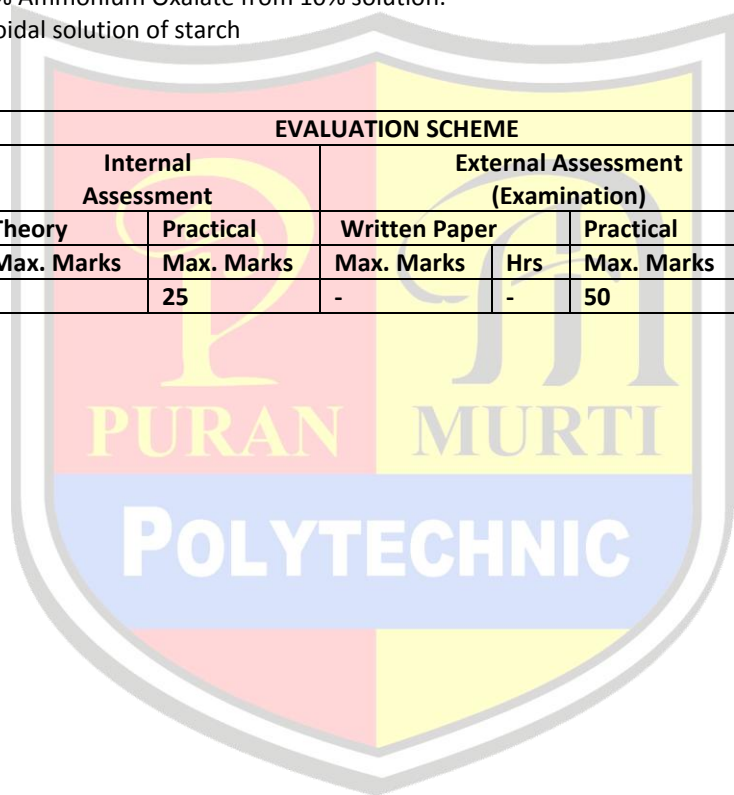
**Subject: Basic Chemistry (Practical)**

**Subject Code: 121912(P)**

## LIST OF PRACTICALS

1. Preparation of standard solutions.
2. To prepare N/10 Sodium carbonate
3. To prepare M/10 oxalic acid solution
4. To prepare 5N/10 HCl from given 12 N 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. To prepare colloidal solution of starch

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		Total Marks
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75





## DETAILED CONTENTS

### Unit No.1 Introduction

Topic No.1: Introduction to human body, anatomy and physiology definition, structure and functions of animal cell.

### Unit No.2 Tissue

Topic No.2: Elementary tissues of body and their classification along with brief description

### Unit No.3 Skin

Topic No.3: Skin (Structure and functions)

### Unit No.4 Skeletal system

Topic No.4: The skeleton, important bones and their brief description

Topic No.5: Articulation of bones – joints

### Unit No.5 Digestive system

Topic No.6: Various organs of digestion and their functions (stomach, small intestine) and accessory organs (liver, Pancreas and salivary glands)

Topic No.7: Process of digestion of food

Topic No.8: Absorption and assimilation of food

Topic No.9: Vitamins and minerals

### Unit No.6 Respiratory system

Topic No.10: Organs of respiration and their histology

Topic No.11: Respiration (definition and mechanism)

Topic No.12: Gas exchange in the lungs

Topic No.13: Regulation of respiration

Topic No.14: Basal metabolic rate

### Unit No.7 Excretory System

Topic No.15: Organs of excretion (kidneys, ureter, bladder)

Topic No.16: Formation of urine and its composition

Topic No.17: Structure of nephron

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125

### 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; London Stone.
3. Anatomy and Physiology by Pears; JP Brothers, New Delhi
4. Anatomy and Physiology by Sears; ELBS, London

### SUGGESTED DISTRIBUTION OF MARKS:

Unit No.	Time allotted (Hrs)	Marks Allotted (%)
1	04	06
2	06	12
3	04	06
4	06	12
5	14	34
6	07	15
7	07	15
<b>Total</b>	<b>48</b>	<b>100</b>



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**Subject: Anatomy and Physiology (Practical)**

**Subject Code: 121913(P)**

### LIST OF EXPERIMENTS

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

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		75
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	







## DETAILED CONTENTS

### Unit No.1 Bacteriology

- Topic No.1: Staphylococi
- Topic No.2: Streptococci and pneumococci
- Topic No.3: Enterobacteriaceae - (E coli, Salmonella, Shigella)
- Topic No.4: Pseudomonas
- Topic No.5: Proteus
- Topic No.6: Vibrio Cholerae
- Topic No.7: Neisseria
- Topic No.8: Treponema Pallidium
- Topic No.9: Mycobacterium tuberculosis

### Unit No.2 Bacterial pathogenicity

- Topic No.10: Introduction of pathogenicity & infection.
- Topic No.11: Sources of infection
- Topic No.12: Mode of spread of infection
- Topic No.13: Types of infection

### Unit No.3 Nosocomial Infection

- Topic No.14: Introduction
- Topic No.15: Common types and source of nosocomial infection
- Topic No.16: Control of nosocomial infections

### Unit No.4 Laboratory diagnosis of infectious diseases

- Topic No.17: Respiratory tract infections (Throat Swab and Sputum sample)
- Topic No.18: Wound infections
- Topic No.19: Urinary tract infections
- Topic No.20: Enteric fever
- Topic No.21: Intestinal infection

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment			External Assessment (Examination)			
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
3	-	-	25	-	100	3	-	-	125

### TEXT BOOKS:

1. Basic Anatomy and Physiology by N Muruges; Sathya Publishers, Madurai

### REFERENCE BOOKS:

1. Anatomy and Physiology by Pears; JP Brothers, New Delhi

### SUGGESTED DISTRIBUTION OF MARKS:

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	08	16
2	06	12
3	14	30
4	10	20
5	10	22
<b>Total</b>	<b>48</b>	<b>100</b>



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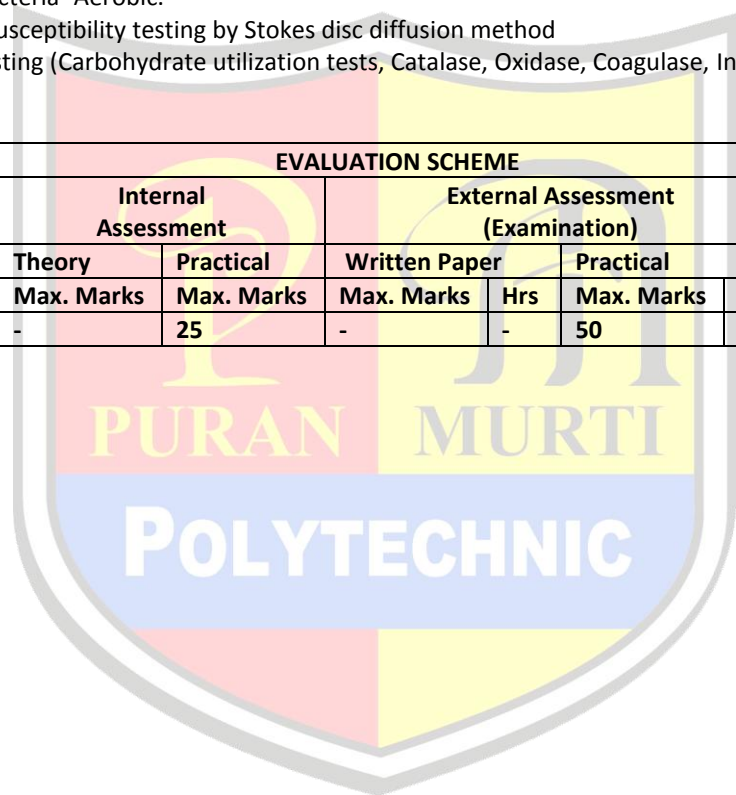
**Subject: Clinical Microbiology (Practical)**

**Subject Code: 121914(P)**

## 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
9. Cultivation of Bacteria- Aerobic.
10. Antimicrobial susceptibility testing by Stokes disc diffusion method
11. Biochemical testing (Carbohydrate utilization tests, Catalase, Oxidase, Coagulase, Indole, MR & VP, Citrate.

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks		Hrs
-	-	2	-	25	-	-	50	3	75





## Detailed Contents

### Unit No.1 Introduction to haematology

Topic No.1: Various glassware/plasticware used in haematology labs.

### Unit No.2 Apparatus and Instruments used in hematology lab

Topic No.2: Water bath

Topic No.3: Blood cell counter

Topic No.4: Blood Mixer

Topic No.5: Centrifuge

### Unit No.3 Haemopoiesis

Topic No.6: Erythropoiesis, leucopoiesis, thrombopoiesis

Topic No.7: Definition, composition and functions of blood

### Unit No.4 Anticoagulants

Topic No.8: Definition and various types of anticoagulants

Topic No.9: mode of action and their preparation with merits and demerits of each

### Unit No.5 Collection and preservation of blood

Topic No.10: Collection of blood; venous and capillary

Topic No.11: Various equipments used for collection of blood samples

Topic No.12: Safety measures at the time of sampling and collection

Topic No.13: Preservation of processed blood samples in hematology

### Unit No.6 Diluting fluid (Hb, TLC, Platelets, RBC count)

Topic No.14: Diluting fluid (Hb, TLC, Platelets, RBC count)

### Unit No.7 Romanowsky stains

Topic No.15: Theory and preparation

Topic No.16: Choice of slide and spreader

Topic No.17: preparation of blood film

Topic No.18: Characteristics of good film preparation

Topic No.19: Staining procedure

Topic No.20: Effects of pH on staining

STUDY SCHEME		EVALUATION SCHEME								Total Marks
		Internal Assessment			External Assessment (Examination)					
Hrs/week		Theory	Practical	Written Paper		Practical				
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs		
3	-	-	25	-	100	3	-	-	125	

#### TEXT BOOKS:

1. Medical Laboratory Technology Vol. 1 by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi

#### REFERENCE BOOKS:

1. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai.
2. Medical Laboratory Science Theory and Practical by J Ochei and A Kolhatkar, Tata McGraw Hill Publishing Company Ltd. New Delhi 2000 Ed

#### SUGGESTED DISTRIBUTION OF MARKS:

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	06	10
2	08	16
3	09	24
4	05	10
5	08	16
6	04	08
7	08	16
<b>Total</b>	<b>48</b>	<b>100</b>



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**Subject: Haematology (Practical)**

**Subject Code: 121915(P)**

### LIST OF PRACTICALS

1. Demonstration of various parts of centrifuge; its functioning and care
2. Demonstration of various parts of microscope its functioning and care
3. Preparation of various anticoagulants
4. Collection of venous and capillary blood
5. Preparation of the stains and other reagents
6. Preparation of peripheral blood film (PBF)
7. To stain a peripheral blood film by Romanowsky stain

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		Total Marks
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75





## DETAILED CONTENTS

### Unit No.1 Introduction to biochemistry

- Topic No.1: Definition
- Topic No.2: Importance of biochemistry
- Topic No.3: SI Units and their use
- Topic No.4: Volumetric apparatus and their calibration

### Unit No.2 Cleaning and storage of laboratory, glass and plastic ware

- Topic No.5: Cleaning and care of laboratory glass and plastic ware
- Topic No.6: Different cleaning agents (soaps, detergents, chromic acid)
- Topic No.7: Methods of cleaning and storage

### Unit No.3 Important instruments; principle, working, handling and care of

- Topic No.8: Balance
- Topic No.9: Centrifuge
- Topic No.10: Colorimeter
- Topic No.11: Spectrophotometer
- Topic No.12: Ion selective electrodes, concept of flame photometer
- Topic No.13: Glucometer
- Topic No.14: Distillation Plant

### Unit No.4 Blood fractions

- Topic No.15: Separation of Serum
- Topic No.16: Separation of Plasma
- Topic No.17: Different protein precipitating reagents
- Topic No.18: Preparation of protein free filtrate (PFF)

### Unit No.5 Collection and preservation of clinical specimens for bio-chemical analysis

- Topic No.19: Blood
- Topic No.20: Urine
- Topic No.23: Stool
- Topic No.24: Other Body Fluids

STUDY SCHEME		EVALUATION SCHEME						Total Marks
		Internal Assessment		External Assessment (Examination)				
Hrs/week		Theory	Practical	Written Paper		Practical		
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs
3	-	-	25	-	100	3	-	-
								125

#### TEXT BOOKS:

1. A Procedure Manual for Routine Diagnostic Tests Vol. I by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi

#### REFERENCE BOOKS:

1. Biochemistry Estimations by F.J.Baker

#### SUGGESTED DISTRIBUTION OF MARKS:

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	04	08
2	08	16
3	22	48
4	10	20
5	04	08
<b>Total</b>	<b>48</b>	<b>100</b>



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**Subject: Clinical Biochemistry (Practical)**

**Subject Code: 121916(P)**

### LIST OF PRACTICALS

1. Cleaning of glass ware
2. Handling and maintenance of Balance, Centrifuge, Colorimeter, Ion Selective electrode and glucometer , distillation plant/deionizer
3. Collection of blood by various methods including vacutainer system
4. Separation of serum and plasma
5. Preparation of different protein precipitating agents, PFF preparation

STUDY SCHEME			EVALUATION SCHEME						Total Marks
			Internal Assessment		External Assessment (Examination)				
Hrs/week			Theory	Practical	Written Paper		Practical		Total Marks
L	T	P	Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
-	-	2	-	25	-	-	50	3	75

