

Shivaji University, Kolhapur



“A” Re accredited by NAAC
(2014) With CGPA 3.16

**Faculty of Interdisciplinary Studies
Structure, Scheme and Syllabus for
Bachelor of Vocation (B. Voc.)
Diploma in Medical Laboratory Technology
Laboratory Technology**

Part I- Sem. I & II

(Subject to the modifications that will be made from time to time)
Syllabus to be implemented from, 2020-2021 onwards.

**STRUCTURE AND SYLLABUS OF
DIPLOMA IN MEDICAL LABORATORY
TECHNOLOGY**

TITLE : Diploma in Medical Laboratory
Technology (DMLT)
Syllabus (Semester Pattern)

YEAR OF IMPLEMENTATION: Syllabus will be implemented from 2020-2021

DURATION : Diploma in Medical Laboratory Technology (DMLT)
Part I and II (Two Years)
Certificate course in medical laboratory technology (Part I
Sem I- 6 Months)
Diploma in Medical Laboratory Technology
(DMLT) (part I Sem II- One Year)

PATTERN OF EXAMINATION : Semester Pattern

- **Theory Examination** - At the end of semester as per Shivaji University Rules
- **Practical Examination** -
 - i) In the 1st and 3rd semester of DMLT there will be internal assessment of practical record, related report submission and project reports at the end of semester
 - ii) In the second semester of DMLT there will be internal practical examination at the end of semester.
 - iii) In the 2th and 4th semester of DMLT there will be external practical examination at the end of semester

MEDIUM OF INSTRUCTION : English.

STRUCTURE OF COURSE : DMLT Part – I and II.
Two Semester Per Year, One General Papers per year / semester Four Papers per Year/ Semester
Two Practical papers per Year / Semester.

SCHEME OF EXAMINATION :

A) THEORY-

- The theory examination shall be at the end of the each semester.
- All the general theory papers shall carry 40 marks and vocational theory papers shall carry 50 marks.
- Evaluation of the performance of the students in theory shall be on the basis of semester examination as mentioned above.
- Question paper will be set in the view of entire syllabus preferably covering each unit of the syllabus.

- **Nature of question paper for Theory examination:** Excluding Spoken English and Communication

Q. No. 1: Multiple choice questions (ten questions)

Q. No. 2: Long answer type questions (any two out of four)

Q. No. 3: Short Notes (any four out of six)

B) PRACTICALS:

Evaluation of the performance of the students in practical shall be on the basis of semester examination (Internal assessment at the end of Semester I and III and external examination at the end of Semester II and IV as mentioned separately in each paper

Standard of Passing:

As per the guidelines and rules for Diploma (Attached Separately – Annexure I).

Eligibility Criteria:

1. The Eligibility for admission is 10+2 or equivalent, in any stream (Arts/Commerce/Science) from any recognized board or University.
 2. The candidates after with 10+2 year ITI course in any branch/trade also eligible for course.
 3. The candidates graduate from any faculty or engineering degree/diploma holders are also eligible.
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Structure of the Course**Diploma– I (Diploma) Semester – I**

Sr. No	Paper No.	Title	Theory /Practical/Project	Marks (Total)	Distribution of Marks Theory Practical	
General Education Component :						
1	101	Business Communication- I	Theory /Practical	50	40	10
2	102	Basic of Medical Laboratory Technology	Theory/Practical	50	40	10
Skill Component:						
3	103	Biochemistry	Theory	50	50	--
4	104	Human Anatomy and Physiology	Theory	50	50	--
5	105	Hematology	Theory	50	50	--
6	106	Laboratory Work : Biochemistry	Practical	50	--	50
7	107	Laboratory Work: Human Anatomy and Physiology	Practical	50	--	50
8	108	Laboratory Work : Hematology	Practical	50	--	50
9	109	Project	-	50	--	50

Diploma- I (Diploma) Semester – II

Sr. No.	Paper No.	Title	Theory /Practical /Project	Marks (Total)	Distribution of Marks	
					Theory	Practical
General Education Component :						
1	201	Business Communication- II	Theory /Practical	50	40	10
2	202	Blood Banking and Services	Theory /Practical	50	40	10
Skill Component:						
3	203	Microbiology	Theory	50	50	--
4	204	Histotechnology	Theory	50	50	--
5	205	Parasitology	Theory	50	50	--
6	206	Laboratory Work : Microbiology	Practical	50	--	50
7	207	Laboratory Work: Histotechnology	Practical	50	--	50
8	208	Laboratory Work: Parasitology	Practical	50	--	50
9	209	Industrial Visit/Study Tour	-	50	--	50

Scheme of Teaching : Diploma– Part I (Diploma) Semester – I

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	101	Business Communication- I	4	2	6
2	102	Basic of Medical Laboratory Technology	4	2	6
3	103	Biochemistry	4	-	4
4	104	Human Anatomy and Physiology	4	-	4
5	105	Hematology	4	-	4
6	106	Laboratory Work : Biochemistry	-	4	4
7	107	Laboratory Work: Human Anatomy and Physiology	-	4	4
8	108	Laboratory Work : Hematology	-	4	4
9	109	Project	-	-	-
			20	16	36

Scheme of Teaching : Diploma– Part I (Diploma) Semester – II

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	201	Business Communication- II	4	2	6
2	202	Blood Banking and Services	4	2	6
3	203	Microbiology	4	-	4
4	204	Histotechnology	4	-	4
5	205	Parasitology	4	-	4
6	206	Laboratory Work : Microbiology	-	4	4
7	207	Laboratory Work: Histotechnology	-	4	4
8	208	Laboratory Work: Parasitology	-	4	4
9	209	Industrial Visit/Study Tour	-	-	-
		Total-	20	16	36

Advanced Diploma– II Semester – III

Sr. No	Paper No.	Title	Theory /Practical/Project	Marks (Total)	Distribution of Marks Theory Practical	
General Education Component :						
1	301	Fundamentals of Financial Accounting-I	Theory/Practical	50	40	10
2	302	Computer Fundamentals	Theory/Practical	50	40	10
Professional Component :						
3	303	Clinical Biochemistry	Theory	50	50	--
4	304	Pathology	Theory	50	50	--
5	305	Immunology	Theory	50	50	--
6	306	Laboratory Work : Clinical Biochemistry	Practical	50	--	50
7	307	Laboratory Work: Pathology	Practical	50	--	50
8	308	Laboratory Work : Immunology	Practical	50	--	50
9	309	Project	-	50	--	50

Advanced Diploma– II (Diploma) Semester –IV

Sr. No.	Paper No.	Title	Theory /Practical /Project	Marks (Total)	Distribution of Marks	
					Theory	Practical
General Education Component :						
1	401	Fundamentals of Financial Accounting- II	Theory /Practical	50	40	10
2	402	Soft Skills & Personality Development	Theory /Practical	50	40	10
Skill Component:						
3	403	Laboratory Management and quality control	Theory	50	50	--
4	404	Clinical Mycology and Virology	Theory	50	50	--
5	405	General Pharmacology and Statistics	Theory	50	50	--
6	406	Laboratory Work : Laboratory Management and quality control	Practical	50	--	50
7	407	Laboratory Work: Clinical Mycology and Virology	Practical	50	--	50
8	408	Laboratory Work: General Pharmacology and Statistics	Practical	50	--	50
9	409	Industrial Visit/Study Tour	-	50	--	50

Scheme of Teaching : Advanced Diploma– Part I Semester – III

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	301	Fundamental of Financial Accounting-I	4	2	6
2	302	Computer Fundamental	4	2	6
3	303	Clinical Biochemistry	4	-	4
4	304	Pathology	4	-	4
5	305	Immunology	4	-	4
6	306	Laboratory Work : Clinical Biochemistry	-	4	4
7	307	Laboratory Work: Pathology	-	4	4
8	308	Laboratory Work : Immunology	-	4	4
9	309	Project	-	-	-
			20	16	36

Scheme of Teaching :Advanced Diploma– Part II Semester – IV

Sr. No.	Paper No.	Title	Distribution of Workload (Per Week)		
			Theory	Practical	Total
1	401	Fundamental and Financial accounting-II	4	2	6
2	402	Soft Skills and personality development	4	2	6
3	403	Laboratory Management and quality control	4	-	4
4	404	Clinical Mycology and Virology	4	-	4
5	405	General Pharmacology and Statistics	4	-	4
6	406	Laboratory Work : Laboratory Management and quality control	-	4	4
7	407	Laboratory Work: Clinical Mycology and Virology	-	4	4
8	408	Laboratory Work: General Pharmacology and Statistics	-	4	4
9	409	Industrial Visit/Study Tour	-	-	-
		Total-	20	16	36

Eligibility for Faculty

M.Sc./M. L.T. with NET / SET/Ph.D.
M. A (English) with NET/SET for English

Eligibility for Laboratory Assistant:

Staffing Pattern

Laboratory Assistant

B.Sc./DMLT/MLT

In 1st Year of DMLT - 1 Full Time and 1 Part Time
Lecturer and 1 CHB Lecturer for English

For 1st Year of DMLT Part-time

CREDIT SYSTEM

FOR Diploma– Medical Laboratory Technoogy

Credit system:

Education at the Institute is organized around the semester-based credit system of study. The type of credit will be credit by theory and practical examination. The prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow a student to progress at an optimum pace suited to his/her ability or convenience, subject to fulfilling minimum requirements for continuation. A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the programme. Also a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree.

All programmes are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

Course credits assignment:

Each course has a certain number of credits assigned to it depending upon its lectures and laboratory contact hours in a week. This weightage is also indicative of the academic expectation that includes in-class contact and self-study outside of class hours.

- a. One credit would mean equivalent to 15 periods for lectures, practicals/workshop.
- b. For internship/ field work, the credit weightage for equivalent hours shall be equal of that for lecture / practical.

The credits for each of the year of Diploma Course will be as follows:

Level	Awards	Normal calendar duration	Skill Component Credits	General Education Credits
Year 1	Diploma	Two Semesters	36	24
Year 2	Diploma	Four Semesters	36	24
Total			72	48

Subject wise credit assignment for Diploma- Part I (Diploma) Semester – I

Sr No	Paper No.	Title	Theory/ Practical/ Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	101	Business Communication- II	Theory /Practical	50	40	10	3	2
2	102	Basic of Medical Laboratory Technology	Theory /Practical	50	40	10	3	2
3	103	Biochemistry	Theory	50	50	--	3	--
4	104	Human Anatomy and Physiology	Theory	50	50	--	3	--
5	105	Hematology	Theory	50	50	--	3	--
6	106	Laboratory Work : Biochemistry	Practical	50	--	50	--	3
7	107	Laboratory Work: Human Anatomy and Physiology	Practical	50	--	50	--	3
8	108	Laboratory Work : Hematology	Practical	50	--	50	--	3
9	109	Project	--	50	--	50	--	2

Subject wise credit assignment for Diploma– Part I (Diploma) Semester – II

Sr No	Paper No.	Title	Theory/ Practical/ Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	201	Business Communication-II	Theory /Practical	50	40	10	3	2
2	202	Blood Banking and Services	Theory /Practical	50	40	10	3	2
3	203	Microbiology	Theory	50	50	--	3	--
4	204	Histotechnology	Theory	50	50	--	3	--
5	205	Parasitology	Theory	50	50	--	3	--
6	206	Laboratory Work : Microbiology	Practical	50	--	50	--	3
7	207	Laboratory Work: Histotechnology	Practical	50	--	50	--	3
8	208	Laboratory Work: Parasitology	Practical	50	--	50	--	3
9	209	Industrial Visit/Study Tour	- -	50	--	50	--	2

**For Project/Industrial visit /study tour /internship, the workload includes self-study outside of class hours i.e.4 lectures per week.*

Subject wise credit assignment for Diploma– Part II (Diploma) Semester – III

Sr No	Paper No.	Title	Theory/ Practical/ Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	301	Fundamentals of financial Accounting I	Theory /Practical	50	40	10	3	2
2	302	Computer Fundamentals	Theory /Practical	50	40	10	3	2
3	303	Clinical Biochemistry	Theory	50	50	--	3	--
4	304	Pathology	Theory	50	50	--	3	--
5	305	Immunology	Theory	50	50	--	3	--
6	306	Laboratory Work : Clinical Biochemistry	Practical	50	--	50	--	3
7	307	Laboratory Work: Pathology	Practical	50	--	50	--	3
8	308	Laboratory Work : Immunology	Practical	50	--	50	--	3
9	309	Project	- -	50	--	50	--	2

Subject wise credit assignment for Diploma– Part II (Diploma) Semester – IV

Sr No	Paper No.	Title	Theory/ Practical/ Project	Marks (Total)	Distribution of Marks		Credits	
					Theory	Practical	Theory	Practical
1	401	Fundamental of financial accounting II	Theory /Practical	50	40	10	3	2
2	402	Soft Skills & Personality Development	Theory /Practical	50	40	10	3	2
3	403	Laboratory Management and quality control	Theory	50	50	--	3	--
4	404	Clinical Mycology and Virology	Theory	50	50	--	3	--
5	405	General Pharmacology and Statistics	Theory	50	50	--	3	--
6	406	Laboratory Work : Laboratory Management and quality control	Practical	50	--	50	--	3
7	407	Laboratory Work: Clinical Mycology and Virology	Practical	50	--	50	--	3
8	408	Laboratory Work: General Pharmacology and Statistics	Practical	50	--	50	--	3
9	409	Industrial Visit/Study Tour	- -	50	--	50	--	2

Evaluation system:

Standard of passing

The maximum credits for Diploma in Diploma in Medical Laboratory Technology semester course (of four semesters) will be $30 \times 4 = 120$ credits.

To pass in each paper students are required to obtain 4 grade points in each paper, it means 18 to 20 Marks for 50 Marks Theory / Practical papers, 14.08 to 16 for 40 Marks Theory papers and 04 marks for 10 Marks Practical papers.

1. Assessment of Project / Industrial visit /study tour /Internship Report

- i) The Project/Industrial visit/study tour/Internship report must be submitted

by the prescribed date usually two weeks before the end of academic session of the semester.

ii) It is desirable that the topics for Project/Industrial visit/study tour/Internship report shall be assigned by the end of previous semester.

iii) The Project/Industrial visit/study tour/Internship report and its presentation shall be evaluated by the coordinator of the course and concerned faculty.

2. Grade point for Theory/Practical/ Project / Industrial visit /study tour /Internship Report

• Table –I: for 50 Marks Theory or Practical

Grade Point	Marks out of	Marks obtained	Grade	Description of performance
0	50	0.0 to 2.5	D	Unsatisfactory
1	50	2.6 to 5.0		
1.5	50	5.1 to 7.5		
2	50	7.6 to 10.0		
2.5	50	10.1 to 12.5		
3	50	12.6 to 15.0		
3.5	50	15.1 to 17.5		
4	50	17.6 to 20.0		
4.5	50	20.1 to 22.5	C	Fair
5	50	22.6 to 25.0	B	Satisfactory
5.5	50	25.1 to 27.5		
6	50	27.6 to 30.0	B+	Good
6.5	50	30.1 to 32.5		
7	50	32.6 to 35.0	A	Very Good
7.5	50	35.1 to 37.5		
8	50	37.6 to 40.0	+	Excellent
8.5	50	40.1 to 42.5		
9	50	42.6 to 45.0	O	Outstanding
9.5	50	45.1 to 47.5		
10	50	47.6 to 50.0		

• **Table No-II: for 40 Marks Theory and for 10 Marks Practical**

Grade Point	Marks out of	Marks obtained	Grade	Description of performance
0.00	40	0.0 to 2.0	D	Unsatisfactory
1	40	2.08 to 4.0		
1.5	40	4.08 to 6.0		
2	40	6.08 to 8.0		
2.5	40	8.08 to 10.0		
3	40	10.08 to 12.0		
3.5	40	12.08 to 14.0		
4	40	14.08 to 16.0		
4.5	40	16.08 to 18.0	C	Fair
5	40	18.08 to 20.0	B	Satisfactory
5.5	40	20.08 to 22.0		
6	40	22.08 to 24.0	B ⁺	Good
6.5	40	24.08 to 26.0		
7	40	26.08 to 28.0	A	Very Good
7.5	40	28.08 to 30.0		
8	40	30.08 to 32.0	A ⁺	Excellent
8.5	40	32.08 to 34.0		
9	40	34.08 to 36.0	O	Outstanding
9.5	40	36.08 to 38.0		
10	40	38.08 to 40.0		
Grade Point	Marks out of	Marks obtained	Grade	Description of performance
0.00	10	0.0 to 0.5	D	Unsatisfactory
1	10	0.52 to 1.0		
1.5	10	1.02 to 1.5		
2	10	1.52 to 2.0		
2.5	10	2.02 to 2.5		
3	10	2.52 to 3.0		
3.5	10	3.02 to 3.5		
4	10	3.52 to 4.0		
4.5	10	4.02 to 4.5	C	Fair
5	10	4.52 to 5.0		
5.5	10	5.02 to 5.5	B ⁺	Satisfactory
6	10	5.52 to 6.0	B	Good
6.5	10	6.02 to 6.5		
7	10	6.52 to 7.0	A	Very Good
7.5	10	7.02 to 7.5		
8	10	7.52 to 8.0	A ⁺	Excellent
8.5	10	8.02 to 8.5		
9	10	8.52 to 9.0	O	Outstanding
9.5	10	9.02 to 9.5		
10	10	9.52 to 10.0		

Calculation of SGPA and CGPA-

1. Semester Grade Point Average (SGPA) = $\frac{\Sigma (\text{course credits in passed courses X earned grade points})}{\Sigma (\text{Course credits in registered courses})}$

2. Cumulative Grade Point Average = $\frac{\Sigma (\text{course credits in passed courses X earned grade points}) \text{ of all Semesters}}{\Sigma (\text{Course credits in registered courses}) \text{ of all Semesters}}$
(CGPA)

3. At the end of each year of Diploma Program, student will be placed in any one of the divisions as detailed below:

SGPA and CGPA Table

Grade Point	Grade	Description of performance
0.00 to 3.49	D	Unsatisfactory
3.5 to 4.49	C	Fair
4.5 to 5.49	B	Satisfactory
5.5 to 5.99	B	Good
6.0 to 6.99	A	Very Good
7.0 to 8.49	A ⁺	Excellent
8.5 to 10.00	O	Outstanding

- Ist Class with distinction: CGPA > 7.0 and above
- Ist Class: CGPA > 6.0 and < 7.0
- IInd Class: CGPA > 5.0 and < 6.0
- Pass Class: CGPA > 4.0 and < 5.0
- Fail: CGPA < 4.0

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology

English Compulsory Semester-I

Paper 101

Business Communication- I

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes

Total Marks – 50

Theory – 4 Lectures / Week

Theory - 40 Marks

Practical – 2 Lectures/Week/Batch of 20 student

Practical – 10 Marks

Units Prescribed for Theory:

Unit 1: Use of English in Business Environment

- 1 Business Vocabulary: Vocabulary for banking, marketing and for maintaining public relations
- 2 What is a sentence?
- 3 Elements of a sentence
- 4 Types of sentence: Simple, compound, complex

Unit 2: Writing a Letter of Application and CV/ Resume

- 1 Structure of a letter of application for various posts
- 2 CV/ Resume and its essentials

Unit 3: Presenting Information/Data

- 1 Presenting information/data using graphics like tables, pie charts, tree diagrams, bar diagrams, graphs, flow charts

Unit 4: Interview Technique

- 1 Dos and don'ts of an interview
- 2 Preparing for an interview
- 3 Presenting documents
- 4 Language used in an interview

Practical: Based on the theory units

10 Marks.

Reference Books:

1. Sethi, Anjanee & Bhavana Adhikari. *Business Communication*. New Delhi: Tata McGraw Hill

2. Tickoo, Champa& Jaya Sasikumar. *Writing with a Purpose*. New York: OUP, 1979.
3. Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi: Student Aid Publication, 2008.
4. Herekar, Praksh. *Business Communication*. Pune: Mehta Publications, 2007.
5. Herekar, Praksh. *Principals of Business Communication*. Pune: Mehta Publications, 2003.
6. Rai, Urmila& S. M. Rai. *Business Communication*. Himalaya Publishing House, 2007.
7. Pradhan, N. S. *Business Communication*. Mumbai: Himalaya Publishing House, 2005.
8. Pardeshi, P. C. *Managerial Communication*. Pune: Nirali Prakashan, 2008.

**Pattern of Question Paper
Diploma Part-I Semester I,
Business Communication-I
Paper: 101**

Time: 2 hours

Total Marks: 40

- | | | |
|------|--|----------------|
| Q. 1 | Do as directed. Question items on Unit 1 to be asked. | 10 |
| | (10 out 12) | |
| Q. 2 | Write a letter of application. | 10 |
| | OR | |
| | Draft a CV/ Resume for a particular post. | |
| Q. 3 | Present a given information or data using a table/ chart/ pie diagram, etc | 10 |
| | (Any one diagram to be drawn.) | |
| Q. 4 | Fill in the blanks in the given interview. | 10 |
| | Practical Evaluation: | 10Marks |
| | Oral and Presentation based on the units prescribed. | |

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-I

Paper-102: Basics of medical Laboratory Technology

Work Load - 6 Lectures / Week, 1 Lecture = 60 minutes	Total Marks – 50
Theory – 4 Lectures / Week Marks	Theory - 40
Practical – 2 Lectures/Week/Batch of 20 student Marks	Practical – 10

Unit I: Introduction to Clinical laboratory and management

1. Introduction of the clinical laboratory, components & department of clinical Laboratory. 2. Basic principles of laboratories:
2. Laboratory quality control. Collection and handling of specimens. Laboratory safety & biohazards: Safety manuals of a clinical laboratory, Management of physical, chemical & biological hazards of clinical laboratory.
3. Maintenance of cleanliness of the laboratory: maintenance of cleanliness, Personal Health and hygiene, cleaning of laboratory glassware, cleaning pipette.
4. Proper clinical waste disposal. Components, uses and management of First Aid Box in the laboratory

Unit II: Training of technician, Sterilization & disinfection

1. Scope of medical laboratory technology, Role of technician in clinical laboratory, basic ethics of laboratory technician. Training of clinical laboratory technicians.
2. Sterilization & disinfection: Introduction of sterilization & disinfection. Differences between sterilization & disinfection, different methods and procedure of sterilization. Different disinfectants & their procedure of disinfection.
3. Procedure for sterilization of glassware's, infected materials, plastic materials, culture media & solutions.
4. Process of sterilization in autoclave & hot air oven.
5. Concept of septic & aseptic conditions.

Unit III: Common Laboratory Equipment's

1. Incubator, Hot Air Oven, Water Bath, Centrifuge, Autoclave, Spectrophotometer, Balance.
2. Microscope – Fundamentals of Microscopy, Resolution & Magnification Light Microscopy,
3. Glassware – Description of Glassware, its use, handling and care,
4. Colorimeter,
5. Blood cell counter.

Unit IV: Manual Vs Automation in Clinical Laboratory

1. Types of analyzers - Semi-auto analyzer, Batch analyzer, Random Access autoanalyzers.
2. Steps in the automated systems
3. Responsibilities of a technician in the maintenance of the analyzers.

Practicals:

1. Laboratory management – Sample Collection, Labeling,
2. Transport, Screening, Reporting and Dispatch of Reports.
3. Principles and uses of various laboratory equipment's
4. Cleaning of laboratory glasswares.
5. Washing of hands using seven step rules.
6. Preparation of First Aid Box.
7. Sterilization of glasswares using hot air oven.
8. Sterilization of materials using autoclave.
9. Preparation of 70% ethanol.

Reference Book:

1. Maithi, Text book of medical laboratory Technology.
2. V.H Talib, A hand book of Medical laboratory Technology, CBS Publishers & distributors, New Delhi.
3. Fichbach, 2005 Manual of Lab and Diagnostic Tests, Lippincott Williams Wilkins, New York.
4. Gradwohls, 2000 Clinical Laboratory Methods and Diagnosis (Ed) Ales C. Sonn Enwirth and Leonard Jarret, M.D.B.O, New York.
5. J. Ochei and Kolhatka, 2002 Medical Laboratory Science Theory And Practice, Tata McGraw Hill, New Delhi.
6. Kanai L. Mukharjee, 2007 Medical Laboratory Technology Vol. 1 Tata McGraw Hill

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-III
Semester-I
Paper-103: Biochemistry

Work Load - 6

Total Marks – 50

Theory – 6 Lectures / Week

Unite I: Introduction of basic Biomolecules

1. Carbohydrates: Classification, Glucose and Glycogen Metabolism
2. Proteins: Classification of proteins and functions
3. Lipids: Classification of lipids and functions

Unite II: Enzymes and Vitmines

1. Enzymes Definition, Nomenclature, Classification, Factors affecting enzyme activit, Active site, Coenzyme, Enzyme Inhibition, Units of enzyme, Isoenzymes, Enzyme pattern in diseases.
2. Vitamins & Minerals: Fat soluble vitamins(A,D,E,K) – Water soluble vitamins – B-complex vitamins- principal elements(Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and sulphur)- Trace elements – Calorific value of foods – Basal metabolic rate(BMR) – respiratory quotient(RQ) Specific dynamic action(SDA) – Balanced diet – Marasmus – Kwasoirkar

Unite III: Nucleic acid and Hormones

1. Nucleic acid- DNA, RNA Structure, Gene coding, Transcription & Translation Genetic Disorders
2. Hormones : Types and biochemical functions.

Unite IV: Minerals electrolyte

1. Minerals and Electrolytes: Na, K, Cl ,Ca, Mg, I2, P, Fe and iron binding capacity
2. Acid-Base Balance: Regulation of blood pH, renal, respiratory and buffer system, importance of arterial blood gases.

Reference Books:

1. Teitz, *Clinical Chemistry*. W.B. Saunders Company Harcourt (India) Private Limited New Delhi.
2. Vasudevan D. & Sree Kumari S., *Text Book of Bio Chemistry for Medical Students*, Jaypee Brothers, New Delhi.
3. Biochemistry, U. Satyanarayan, Books and Allied (P) Ltd. Kolkata-India
4. Das Debajyothi, *Biochemistry*, Academic Publishers Calcutta.
5. Text book of Medical Laboratory Technology, P.B. Godkar 2nd Edn. 2003 Bhalani Publication.
6. Handbook of Biochemistry, M. A. Siddique 8th Edn.1993 Vijay Bhagat Scientific Book Co., Patna.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-I

Paper-104: Human Anatomy and Physiology

Work Load - 6

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Introduction to anatomy and cardiovascular System

- 1. Introduction to anatomy:** Scope of Anatomy and Physiology – Definitions and Terms in Anatomy and Physiology structure and function of human cell – Elementary tissues of human body.
- 2. Cardio Vascular System:** Brief account on composition blood – function of blood elements – blood group and Rh typing, Coagulation of blood. Structure and functions of various parts of the heart & its function & Blood pressure.

Unit II: Respiratory and Digestive system

- 1. Respiratory System:** Structure & function of lungs, Physiology of breathing, Lung volume & capacity.
- 2. Digestive System:** Name and various parts of digestive system Liver, Spleen, gall bladder, Pancreas, Buccal Cavity, tongue, tonsil, Pharynx, Oesophagus, Stomach, intestine etc. – Physiology of digestion and absorption.

Unit III: urinary and Reproductive System

- 1. Urinary System:** Structure and function of kidneys, its role in urine formation, ureter, urinary bladder, Mechanism of Micturition.
- 2. Reproductive System:** Anatomy & Physiology of Male & Female reproductive system, menstrual cycle, Contraceptives.

Unit IV: Nervous and Endocrine system

- 1. Nervous System:** Elementary knowledge of structure – functions of nervous system – Brain, Spinal Cord & Nerves.
- 2. Endocrine System:** Endocrine glands their hormones and functions – Thyroid, Parathyroid, suprarenal, Pituitary and Thymus.

Reference Book:

1. Solon on E.A. (2008) Introduction to Human Anatomy and Physiology 3rd Ed. Saunders: St Louis.
2. Chaurasia, B.D. & Garg, K., (2012) Human Anatomy Regional and Applied CBS Publications: New Delhi
3. T.S. Ranganathan – A text book of Human Anatomy
4. Fattana, Human anatomy (Description and applied) Saunder's & C. P. Prism Publishers, Bangalore – 1991
5. W. F. Ganong - Review of Medical Physiology Human Physiology (Vol. I, IV) C.C. Chatterjee 1992. 11th Edn. Medical Allied Agencies, Calcutta.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-I
Paper-105: Hematology

Work Load - 6

Total Marks – 50

Theory – 6 Lectures / Week

Unit I: Composition of Blood

1. Introduction - Composition of blood, its formation and functions.
2. Collection of blood - Different routes, difference between capillary and venous sample.
3. Anticoagulants - Different types, method of preparation and uses.

Unit II: Erythrocytes

1. Haemoglobin - Normal and abnormal values and Physiological variations; Estimation by (a) Colorimetric Method, (b) Sahli's Method, and (c) Specific Gravity Method. Clinical importance.
2. Red Blood Cells : Total Count - Normal, abnormal values, and Physiological variations, Haemocytometer - method and calculation; Anemia – Classification, Sickle cell anemia – Sickling test, Haematocrit – Normal and abnormal values,
3. Red Cell indices – MCV, MCH & MCHC & its Importance

Unit III: leucocytes

1. White Blood Cells: Differential Count :- Normal, abnormal values and physiological variation; Preparation of peripheral blood smear, Staining by different methods, Methods of Examinations and reporting;
2. Total White Blood Cell Count : Normal and abnormal values
3. Haemocytometer: method and calculation.

Unit IV: Reticulocytes and Coagulation Mechanism

1. Reticulocytes : Methods, Normal values and significance.
2. Haemostasis and Coagulation Mechanism- Coagulation Factors, Coagulation Test
–
(a) Bleeding time, (b) Clotting time, (c) Whole Blood Coagulation time, (d)
(b) Tourniquet test, (e) Clot retraction test (f) Prothrombin time (PT).

Reference Book:

1. Roitt's Essential Immunology by Ivan Roitt & Peter J Delves, Oxford, Blackwell science publication London. 10e.

2. Elgert: Immunology understanding the immune system, John Willy & Sons, Inc. Publication, New York 1996.
3. Abbas et al. Cellular & Molecular Immunology (3rd Ed.) W.B. Saunders Company, 2000.
4. Kuby Immunology 4 Ed.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-I

Paper- 106: Laboratory work - Biochemistry

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Objectives of practical:

- (1) Demonstration of Kidney function test. Gastric function test & liver function test.
- (2) Demonstration of Enzyme Analysis -Acid and Alkaline phosphates, SGOT/SGPT. Lactic dehydrogenase, CPK.
- (3) Lipid profile.
- (4) Estimation of Blood/ serum-Glucose, G.T.T. Urea, creatinine, uric Acid, Cholesterol. BillRubin.protin & A/G Ratio, Glycosylated Hb.
- (5) Demostration of semi automated, Fully automated Biochemical Analyzers.
- (6) Demonstration/ Exposure to Radioimmuno assay laboratory.
- (7) Visit to Laboratory

References:

1. Evangelin Jones, Manual of Practical Medical Biochemistry.
2. Wolters Kluwer, South Asian Edition of Clinical Chemistry, Principles, Techniques and Correctionaltions.
3. Willey, Basic Technique in Medical Biochemistry and Molecular Biology.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-I

Paper- 107 Laboratory work – Human Anatomy and Physiology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Objectives of practical:

4. Demonstration of parts of body and land marks on the surface.
5. The skeletal system
6. Identification of models like those of Brain, Heart, embryology, Kidney.
7. The microscope, its usage, cleaning & maintenance
8. Identification of blood cells under Microscope. RBC, various types of WBC, pallets, Reticulocytes
9. Preparation of anti- coagulants
10. Demonstration of blood pressure recording and pulse
11. Ruling area of Neubaur chamber

References:

1. S.R. Kale and R. R. Kale, Practical human anatomy and physiology
2. BD Chaurasis Human Anatomy: Regional and applied Dissection and clinical.
3. Everest publications- A practical Book on Human Anatomy and Physiology
4. V. D. Sharma and S. K. Panday, Human Anatomy and Physiology, Practical Note book.

SHIVAJI UNIVERSITY, KOLHAPUR

Diploma in Medical Laboratory Technology Part-I Semester-I

Paper- 108: Laboratory work – Hematology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Objectives of practical:

1. Collection of blood samples
2. Estimation of hemoglobin percentage
3. Determination of RBC
4. Determination of WBC
5. Differential leucocytes count
6. ESR
7. Demonstration of PCV
8. Determination of bleeding time and clotting time

References:

1. K Sri Nageswari and A. Kthari, Practical Manual of Haematology, Jaypee.
2. Dr. B. K. Prasad, Practical Physiology and Hematology.
3. R. P. Jayaswal, Hematology Manual
4. Dr. Tejinder Singh, Text and Practical Hematology.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-I

Paper- 109: Project or Visit to Clinical Laboratory

No. of Lecture: 04 Lecture/ week

Total Marks: 50

1. Visit to pathological Laboratory
2. Introduction to different laboratory instruments, its structure and function.
3. Collection of data regarding patient's blood investigations.
4. Observation of laboratory procedures.

References:

1. Nanda Maheshwari, Clinical Pathology Hematology and Blood banking
2. R. P. Jayaswal, Basics of Medical Laboratory Science
3. P. Deshmukh, Principle of Good Laboratory Practice
4. Drew Provan, Oxford handbook of Clinical and Laboratory Investigation.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II
Paper 201: Business Communication-II

Work Load - 6

Theory – 4 Lectures / Week

Practical – 2 Lectures/Week/Batch

Total Marks – 50

Theory - 40 Marks

Practical – 10
Marks

Units Prescribed for Theory:

Unit I

Group Discussion

- 1 Preparing for a Group Discussion
- 2 Initiating a Discussion
- 3 Eliciting Opinions, Views, etc.
- 4 Expressing Agreement/ Disagreement
- 5 Making Suggestions; Accepting and Declining Suggestions Summing up.

Unit II

Business Correspondence

- 1 Writing, Memos, e-mails, complaints, inquiries, etc.
- 2 Inviting Quotations
- 3 Placing Orders, Tenders, etc.

Unit III

English for Negotiation

- 1 Business Negotiations

Unit IV

English for Marketing

- 1 Describing/ Explaining a Product/ Service
- 2 Promotion of a Product
- 3 Dealing/ bargaining with Customers
- 4 Marketing a Product/ Service: Using Pamphlets, Hoardings, Advertisement, Public Function/ Festival

Practical: Based On the theory

Reference:

1. Herekar, Praksh. Business Communication. Pune: Mehta publications, 2007

2. Herekar, Praksh.principals of Business Communication.
Pune : Mehta Publications, 2003
3. John David. Group Discussions. New Dellhi: Arihant Publications.
4. Kumar, Varinder. Business Communication. New Delhi: Kalyani Pubhshers, 2000
5. Pardeshl, P. C. Managerial Communication pune: Nirali Prakashan, 2008.
6. Pradhan, N, S Business Communication. Mumbai: Himalaya Publishing House, 2005
7. Rai, Urmila & S.M. Rai.Business Communication.
Mumbai: Himalaya Publishing House, 2007

Pattern of Question Paper
**Diploma Part - I Business
 Communication-II
 Semester-II**

Time : 2 hours

Total Marks: 40

- | | |
|---|----|
| Q. 1 Fill in the blanks in the following Group Discussion. (On Unit 5) (10 out 12) | 10 |
| Q. 2 Attempt ANY ONE of the following (A or B): (On Unit 6) | 10 |
| Q.3 Fill in the blanks with appropriate responses: (On Unit 7) | 10 |
| Q. 4 Attempt ANY ONE of the following (A or B): 10 (On Unit 8) (10 out 12) | 10 |

Practical Evaluation:

Marks 10

Oral and Presentation based on the units prescribed.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II

Paper 202: Blood Banking and Services

Work Load - 6

Total Marks – 50

Theory – 4 Lectures / Week

Theory - 40 Marks

Practical – 2 Lectures/Week/Batch

Practical – 10 Marks

Unit I: Blood Collection and Blood Grouping

1. Blood Collection (i) Collection of Blood (ii) Storage of Blood (iii) Anticoagulation use for collection of Blood (iv) Screening of doner
2. ABO & Rh Blood Group System – (i) ABO Grouping by Slide Method & Tube Method (ii) Antigen and type of Antibodies (iii) Rh system with slide method (iv) Type of Antibodies (v) One/Two stage Albumin Technique for Rh Factor .

Unit II: Blood Donation

1. Blood Donation Introduction -Blood donor requirements - Criteria for selection & rejection-Medical history & personal details -Self-exclusion-Health checks before donating blood-Screening for TTI.
2. Testing Donor Blood: Screening donor's blood for infectious agents - HIV, HCV, HBV, Trepanoma palladium, Plasmodium, HTLV-Bacterially contaminated Blood.

Unit III: Storage and Transport of blood

1. Storage, preservation & Transport of blood: Whole Blood - Platelets - Leucocytes - Plasma - Fresh Frozen Plasma
2. Anticoagulant & Preservatives

Unit IV: Blood Bank Refrigerator and Compatibility Testing

1. Changes in blood after storage
2. Lay out of a blood bank refrigerator
3. Compatibility Testing: Purpose - Single tube compatibility techniques using AHG reagent.- Emergency compatibility testing.

Practical:

1. Screening of donors.
2. Preparation of anticoagulant fluids
3. Grouping of blood.
4. Cross matching of blood samples.

Reference Book:

1. Blood Bank Operations, G. Guru 1st Edn.1991, NCERT, New Delhi.
2. Blood Banking Training Manual, Indian Society for Blood Banking, 1st Edn.1995,Dr. Dilip Wani, Janakalyan Bldg. , Pune.
3. Modern Blood Banking & Transfusion Practices by Denise & M. Harmening
4. Text Book of Blood Banking & Transfusion Medicine by Sally V. Rudmann.
5. Mollison's Blood Transfusion in Clinical Medicine by Klein, Mollison's.
6. Essentials of Blood grouping & Clinical Application by K. P. Ranganathan.
7. Blood Bank Technology by Williams & Williams.
8. Blood Transfusion- A guide to formation & Operation of transfusion devices by C. L. Bowley.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II
Paper 203: Microbiology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Unit I: Introduction to Microbiology

1. Introduction to Microbiology, Morphological classification of Bacteria.
2. Culture media, types of media, special media.

Unit II: Growth and staining of bacteria

1. Nutrition and growth of bacteria
2. Sterilization and Disinfection (Physical and Chemical methods)
3. Staining of Bacteria: Gram stain, Negative Stain, Ziehl – Neelsen, Albert and Spore Stain.
4. Composition and preparation of staining Reagents and their composition.

Unit III: Morphology and Pathogenicity Bacteria

- a) Gram positive cocci-Staphylococci, Streptococci,
- b) Gram negative cocci- Neisseria
- c) Gram positive bacilli- Corynebacterium, Actinomy, Listeria, Bacillus, Clostridia, Mycobacterium tuberculosis and Mycobacterium leprae.

Unit IV: Pathogenic Gram negative bacilli and Antimicrobial susceptibility test

1. Gram negative bacilli- Pseudomonas, Vibrio, Aerononas, Plesiomonas, Brucella, Haemophilus, Rickettsia, Mycoplasma Salmonella, Shigella, Vibrio
2. Antimicrobial susceptibility test.

Reference Book

1. Medical Microbiology by Patric R. Murray, Ken S. Rosenthal, Michael A. Pfaller.
2. Text Book of Microbiology by Chakraborty.
3. Microbiology An introduction by Tortora Funk, Case 12ed.
4. Mackie & Mc Carthey - Medical Microbiology,
5. Ananthansarayana, R., Jayaram Pumkar - Test Book of Microbiology.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II
Paper 204: Histotechnology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Unit I: Basics of Histotechnology

1. Cells, Tissues & their function.
2. Methods of examination of tissue and cells

Unit II: Fixation and Processing of tissue

1. Fixation of tissue: Simple fixatives, Cytological fixatives, Histochemical fixatives
2. Tissue processing: Collection of specimen, Labeling and fixation, Dehydration, Clearing Impregnation, Embedding.

Unit III: Sectioning and Staining

1. Section Cutting: Microtomes and microtomes knives, Techniques of section cutting, mounting of sections, frozen section.
2. Staining: Dyes and their properties, Basic theory of staining, Staining technique with haematoxyline and eosin, Common special stains.

Unit IV: Autopsy

Autopsy Techniques (i) Processing of Tissues (ii) Preservation of Orange

Reference Book:

1. Hand Book of Histopathological and Histochemical Technique C.F.A. Culling
2. Introduction of Medical Labotaroy Technology F.J. Baker and R.E. Silverton.
3. Theory and Practice of Histological Technique. John D. Baneroft and Alan Steven,
4. An Introduction to Histotechnology. Geoffrey G. Brown.,
5. A Manual for Histologic Technician. Aun Preece, J
6. Hand book of MLT by V.H. Talib.
7. Hand book of MLT by R. Sood.
8. Hand book of MLT by Mukherjee.
9. WHO technical manual of Laboratory technology.
10. WHO technical manual of Blood banking transfusion medicine.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II
Paper 205: Parasitology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Unit I: Introduction to Parasitology

1. Introduction and types of parasites
2. Host and their types
3. Host-parasite interaction

Unit II: Morphology, Life-cycle, Pathogenicity and Laboratory diagnosis of protozoa

E. histolytica and Entamoeba coli and Giardia, Trichomonas, Toxoplasma, Plasmodia and Leishmania

Unit III: Morphology, Life-cycle, Pathogenicity and Laboratory diagnosis of some helminthes and nematodes

Hook worm, Round worm, Whip worm, Thread worm, Pin worm. (b) Tapeworm and *Echinococcus, Wucheria bancrofti and B. malayi.*

Unit IV: Morphology, Life-cycle, Pathogenicity and Laboratory diagnosis of Trematodes and Sporozoa

1. Morphology, Life-cycle, Pathogenicity and Laboratory diagnosis of Trematodes of Flukes :*Fasciola hepatica, Fasciola gigantica, Gestrodiscoides hominis*
2. Morphology, Life-cycle, Pathogenicity and Laboratory diagnosis of Sporozoa: Malaria Parasite and *Balatidium Coli.*

Reference Books

1. Parasitology - K. D. Chatterji ,11th Edn. 1976 Chatterji Medical Publisher, Kolkata
2. Medical Parasitology- V. Baveja and C.P. Baveja, 4th Edn. 2019, Arya Publishing Company.
3. Medical Parasitology- Arora D. R., 5th Edn. 2020, CBS publisher and distributor Pvt. Ltd.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II

Paper- 206: Laboratory work – Microbiology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Objectives of practical:

1. Identification of bacterial culture a. Colony characteristic. b. Morphological characteristic.
2. Types and preparation of media
3. Bacterial Staining: a) Gram staining technique b) Acid fast staining (Z-N).
4. Bacteria spore staining
5. Interpretation of biochemical reaction.
6. Antibiotic sensitivity test
7. Preparation of some stains solution.
8. Pathogenicity of some bacteria.

References:

1. Rajesh Bareja, Practical Medical Microbiology
2. Mackie and McCartney, Practical Medical Microbiology
3. Mukesh Kumar, Practical Manual for undergraduate Microbiology.
4. J. Cappuccino and N. Sherman, Microbiology A laboratory Manual.

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II

Paper- 207: Laboratory work – Histotechnology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Objectives of practical:

1. Embedding and preparation of blocks
2. Study the type of microtome
3. Section cutting and use and care of microtome
4. H & E staining
5. PAS staining
6. AFB staining [TB and leprosy}
7. Frozen section and care of cytosist
8. Preparation of fixative.

References:

1. B. Sheety and S. Poonja, Histology Practical Manual
2. N. Vasudeva and S. Mishra, Indebirs Sings Textbook of Human Histology with colour atlas and Practical Guide
3. S. R. Prasad, Practical Histology for Medical Students
4. Hina Sharma, Practical Manual of Histolgy

SHIVAJI UNIVERSITY, KOLHAPUR
Diploma in Medical Laboratory Technology Part-I
Semester-II

Paper- 208: Laboratory work – Parasitology

No. of Lecture: 04 Lecture/ week

Total Marks: 50

Objectives of practical:

1. Demonstration of gross specimen of- Hookworm, Roundworm, Whip worm, Thread worm, Pin worm and Tape worm,
2. Demonstration of following parasites / ova / cyst under microscope
3. *G. lamblia*, (b) *T. vaginalis*,
4. Demonstration of following parasites / ova / cyst under microscope: Malarial parasites and *Leishmania*
5. Demonstration of following parasites / ova / cyst under microscope: Roundworm and) Pin worm
6. Demonstration of following parasites / ova / cyst under microscope: Whipworm, Threadworm and Tapeworm
7. Study the life cycle and Pathogenicity of malarial parasite.
8. Study the life cycle and Pathogenicity of , *Wucheria bancrofti*
9. Study the life cycle and Pathogenicity of *Fasciola hepatica*.

References:

1. Elizabeth A. Zeibig, Clinical Parasitology
2. D. R. Arora and B. B. Arora, Medical Parasitology
3. Rajesh Karyakarate and Ajit Damale, Medical Parasitology
4. K. D. Chatterjee, Parasitology (Protozoology and Helminthology)

SHIVAJI UNIVERSITY, KOLHAPUR
Advanced Diploma in Medical Laboratory Technology
Part-I Semester-II

Paper- 209: Laboratory work – Industrial Visit or Study tour

No. of Lecture: 04 Lecture/ week

Total Marks: 50

1. Visit to pathological Laboratory
2. Introduction to different laboratory instruments, its structure and function.
3. Collection of data regarding patient's blood investigations.
4. Observation of laboratory procedures.

References:

1. Nanda Maheshwari, Clinical Pathology Hematology and Blood banking
2. R. P. Jayaswal, Basics of Medical Laboratory Science
3. P. Deshmukh, Principle of Good Laboratory Practice
4. Drew Provan, Oxford handbook of Clinical and Laboratory Investigation.

Practical Examination

- i. There will be a separate practical examination of 50 marks for each practical course.
- ii. Examination for two subjects will be conducted on two consecutive days separately.
- iii. The examination will be of three hours duration for each subject.
- iv. Student should submit duly certified Journal at the time of Practical Examination.
- v. Nature of Practical Question Paper for all the practical courses will be as follows-

Scheme of practical evaluation

Internal practical evaluation

Q.1: Prepare any one practical from the above	20 Marks
Q.2: Practical record book	20 Marks
Q.3: Viva – voce	10 Marks