

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.



CIRCULAR NO.SU/SCIENCE & TECHNOLOGY STUDIES/SYLL./B.VOC./78/2022.

It is hereby informed to all concerned that, on the recommendation of Ad-hoc Board in Vocational Studies and Dean, Faculty of Science & Technology the Hon'ble Vice-Chancellor has **accepted the curriculum of following B.Voc. Courses under Choice Based Credit and Grading System** in his emergency powers under Section-12 [7] of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith:

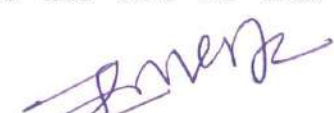
Sr.No.	Course Name	Semester
1	B.Voc in Software Development	(I & II)
2	B.Voc in Medical Laboratory Technology	(I & II)
3	B.Voc in Multimedia & Animation- Structure & syllabus [New]	(Sem-I to VI)
4	B.Voc in Multimedia & Animation [old]	(Sem-V & VI)
5	B.Voc in Organic Agriculture	(Sem-V & VI)
6	B.Voc in Bioproducts Technician	(Sem-I to VI)
7	M.Voc in Food Processing Technology	(Sem-I to IV)

This is effective from the **Academic Year 2020-21 and 2021-22** and onwards. This curriculum is also available on the University website www.bamu.ac.in.

All concerned are requested to note the contents of the circular and bring notice to the students, teachers and staff for their information and necessary action.

University campus,
Aurangabad-431 004.
Ref. No.SU/B.voc./Curri./2021-22

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**Deputy Registrar,
Academic [Syllabus]
Section.**

Date: 20.01.2022

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- 1] **The Principal All Affiliated Concerned Colleges, Dr.Babasaheb Ambedkar Marathwada University, Aurangabad.**
 - 2] **The Director, University Network & Information Centre, UNIC, with a request to upload the curriculum along with this Circular on University Website.**
- Copy to :-**
- 1] The Director, Board of Examinations & Evaluation, Dr.BAMU, A'bad
 - 2] **The Concerned Section, Examination Branch,**
 - 3] The Section Officer, [Eligibility Unit],
 - 4] **The Programmer [Computer Unit-1] Examinations, section, Dr.BAMU, A'bad**
 - 5] **The Programmer [Computer Unit-2] Examinations, section, Dr.BAMU, A'bad**
 - 6] The In-charge, [E-Suvidha Kendra],
 - 7] The B.Voc Section, Dr.BAMU,A'bad
 - 8] The Public Relation Officer,
 - 9] The Record Keeper,

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY
AURANGABAD**



SYLLABUS OF
BACHELOR OF VOCATIONAL
IN

**B.Vov in - Medical
Laboratory Technology
SEMESTER- I & I**

Choice Based Credit System

Effective form the Academic Year
2020-21 and 2021-22 & Onwards

2020-21



**Dr. Babasaheb
Ambedkar
Marathwada
University,
Aurangabad (MS)**



Uniform Curriculum Structure

Bachelor of Vocation

(B. Voc: Medical Laboratory Technology)

(University Department and all Affiliation College)

Choice Based Credit System

Approved
Bachhav

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Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

The Bachelor in Vocation programme is divided into six semester shaving 192 credits. Each semester has courses categorized under **General Education Components** and **Skill Development Components**.

Preamble:

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad propose to offer three year Bachelor programme in Vocation (B. Voc) program which are being run University Department and various affiliated colleges. The curriculum design of this program is undertaken in the following framework.

- a. Although there has been remarkable progress in all sectors of education in last couple of decades, the less regulated area of the education sector-vocational training- seems to have lost its significance /importance. This has led to the widening gap between the supply and demand for skilled manpower across various industries and R &D organization. This shortage of skill has translated directly into unemployment among an increasing number of graduates who pass-out every year and are forced to be retrained in order to become marketable.

These programme are designed to produce skilled manpower so that wide variety of options in job sectors would be available and it will improve the opportunities for the unemployed youths in the country in both the private and public sectors.

- b. According to study conducted by the Associated Chambers of Commerce and Industry of India (ASSOCHAM), there will be a deficit of 40 million working professionals by the year 2020 and the employers would face the difficulty of filling positions because of the dearth of suitable talent and skilled person.

These programme aim to provide concrete solution for these problems and would facilitate to improve

- i. **Quality of training**
 - ii. **High drop-out rates**
 - iii. **Linkages with Universities and Industry**
 - iv. **Inadequacy of resources**
- c. These programme are intended to offer practical training and skill needed to pursue an occupation straight away. it will provide options to the students to select the courses of their choices which are directly aligned to land a job in a chosen profession or a skilled trade. One of the end results of these programme is to enable an individual to attain self-employment.

Exit Options:

The programme allows exit of a student in an intermediate stage, on successful employment. Scopes will be there for further continuation of study. The otherwise exit options will be as follows-


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Exit Point	Duration	Diploma/Degree to be offered.
First Exit	After 6 months	Certificate in Vocation
Second Exit	After 1 year	Diploma in Vocation (D. Voc)
Third Exit	After 2 Years	Advance Diploma in Vocation (Adv. D.Voc)
Fourth Exit	After 3 years	Bachelor in Vocation (B.Voc)

Eligibility:

As per necessity of respective B. VOC Program

Admission / Promotion Process:

In response to the advertisement for registration, interested students will have to register themselves for a Common Entrance Test (CET) / Merit based admission process. Admission will be done on the basis of performance of students at Common Entrance Test (CET) / Marks scored in qualifying examination.

A candidate who has sought admission to Semester –I shall be admitted to Semester-II automatically. A candidate who has passed 75% of the paper at First Year (First and Second Semester together) examinations shall be allowed to take admission in Third semester. Similarly, a candidate who has passed 75% of the papers at the Second Year (Third & Fourth Semester together) examination shall be allowed to take admission to the Fifth semester. However, if a candidate has not passed the First & Second Semester examinations, he shall not be allowed to take admission to the Fifth Semester. Appearance in the First, third and Fifth Semester is compulsory to get next semester.

Choice Based Credit System (CBCS):

The choice based credit system is going to be adopted. This provides flexibility to make the system more responsive to the changing needs of our students, the professional and society. It gives greater freedom to students to determine their own pace of study. The credit based system also facilitates the transfer of credits.

- Students will have to earn 30 credit for the award of six month Certificate in Vocation
- Students will have to earn 64 credits for the award of one year Diploma in Vocation (D. Voc)
- Student we have to earn 128 credits for the award of two year Advance Diploma in Vocation (Adv. D. Voc.)
- Students will have to earn 192 credits for the award of three year Bachelor Degree in Vocation (B. Voc.)


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Credit-to-contact hour Mapping:

- a) One Credit would mean equivalent of 15 contact hours for theory lecture.
- b) For lab course/ workshop/internship/field work/project, the credit weightage for equivalent hours shall be 50% that for lectures/workshop.
- c) For self-learning, based on e-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures/workshops.

Attendance:

Students must have 75% of attendance in each course for appearing examination otherwise he/she will not be strictly allowed for appearing the examination of each course.

Evaluation Methods:

The assessment will be based on 20:80 ratios of continuous internal assessment (CIA) and semester end examination (SEE). Performance will be decided after combining performance in CIA and SEE. In Case of failure in SEE in particular course (s), exam will be conducted in immediate subsequent semester. However, if a student fails in CIA (considering independent CIA score), he / she may appear for the same CIA, at his / her own responsibility in the next academic year, when the same course is offered during regular academic session.

Continuous Internal Assessment (CIA):

A. For 4 credit courses-

There will be 20 marks for Continuous Internal Assessment. Two internal tests (of 20 marks each) will be conducted, after completion of 40% and 80% of the curriculum respectively.

Average performance of the two tests will be considered for final marks-memo preparation. The setting of question papers and the assessment will be done by concerned teacher.

B. For 2 credit courses-

There will 10 marks for Continuous Internal Assessment. Two internal tests (of 10 marks each) will be conducted, after completion of 40% and 80% of the curriculum respectively. Average performance of the two tests will be considered for final marks-memo preparation. The setting of question papers and the assessment will be done by concerned teacher.

Semester End Examination (SEE):

The semester end theory examination for each theory course of 4 credits will be of 80 marks. Whereas, for 2 credit theory course, the same will be 40 marks. Therefore, the total marks shall be 100 for 4 credits theory course (80 marks semester end exam + 20 marks CIA) and 50 for 2 credit theory course (40 marks semester and exam +10 marks CIA)

Pattern of semester end question paper will be as below

(A) For 4 credits courses-

- The semester end examination of theory courses will have two parts
- (20+60=80Marks)
- Part A will be consisting of 10 question having 2 marks each (multiple choice question /fill in the blanks/ answer in one sentence) as compulsory question and it should cover entire course syllabus (20marks)
- Part B will contain 05 question of 12 marks each with equal weightage on every module. Each of these questions will have two option, from which students will have to attempt any one.
- 20 to 30% weightage can be given to problems/numerical (wherever applicable) wherein use of non-programmable scientific calculator may be allowed.
- Number of sub question (with allotment of marks) in a question may be decided by the examiner

(B) For 2 credit courses-

- The semester end examination of theory course will have two parts (10+30Marks)
- Part A will be consisting of 05 question having 2 marks each (multiple choice question /fill in the blanks/ answer in one sentence) as compulsory question and it should cover entire course syllabus (10marks)
- Part B will contain 05 question having of 06 marks each with equal weightage on every module Each of these question will have two options, from which student will have to attempt any one.
- 20 to 30% weightage can be given to problems/ numerical (wherever applicable) wherein use of non-programmable scientific calculator may be allowed.
- Number of sub question 9 with allotment of marks) in a question may be decided by examiner.

Regarding practical examination, the assessment will be based on 50: 50 ratio of continuous internal assessment (CIA) and semester end examination (SEE). During each semester, student must perform at least six experiments from every laboratory course. Internal and external (semester end) practical examination will be conducted at the end of each semester.

Earning credits

At the end of every semester, a letter grade will be awarded in each course for which a student had registered. A student's performance will be measured by the number of credits that he/she earned by the weighted Grade point Average (GPA).The SGPA (semester grade point Average) will be awarded after completion of respective semester and the CGPA (Cumulative Grade point Average) will be awarded at the respective exit point.

Grading System:

The grading reflects a student's own proficiency in the course. A ten point rating scale shall be used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Master programme. Grade points are based on the total number of marks obtained by him / her in all heads of the examination of the course, the grade points and their equivalents range of the marks are shown in Table-I

Table-I: Ten Point grade and grade description

Marks Obtained (%)	Grade Point	Letter Grade	Description
90-100	9.00-10	O	Outstanding
80-89	8.00-8.99	A ⁺⁺	Exceptional
70-79	7.00-7.99	A	Excellent
60-69	6.00-6.99	A	Very Good
55-59	5.50-5.99	B	Good
50-54	5.00-5.49	B	Fair
45-49	4.50-4.99	C ⁺⁺	Average (Above)
41-44	4.1-4.49	C	Average
40	4.0	P	Pass
<40	0.0	F	Fail (Unsatisfactory)
	0.0	AB	Absent

- Non-appearance in any examination / assessment shall be treated as the students have secured zero mark in that subject examination / assessment.
- Minimum P grade (4.00 grade points) shall be the limit to clear / pass the course / subject. A student with F grade will be considered as-failed in the concerned course and he / she has clear the course by appearing in the next successive semester examination. There will be no revaluation or recounting under this system.
- Every student shall be awarded grade points out of maximum 10 points in each subject (based on 10 points scale). Based on the grade points obtained in each subject / semester.
- Grade point Average (SGPA) and then cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and CGPA will be given at respective exit point

Computation o SGPA (Semester Grade Point Average)and CGPA (Cumulative Grade Point Average)

Grade in each subject / course will be calculated based on the summation of marks obtained in all five modules.

The computation of SGPA and CGPA will be as below

- Semester Grade Point Average (SGPA) is the weighted average points obtained by the students in a semester and will be computed as follows:

$$\text{SGPA} = \frac{\text{Sum (Course Credits) X Number of grade points in concerned Course Gained by the students}}{\text{Sum (Course Credits)}}$$

- The SGPA will be mentioned on the grade card at the end of every semester
- The Cumulative Grade Point Average (CGPA) will be used to describe the overall performance of a student in all semester of the course and will be computed as under,

$$\text{CGPA} = \frac{\text{Sum (All six Semester SGPA)}}{\text{Total Number of Semester}}$$

- The SGPA and CGPA shall be rounded off to the second place of decimal.

Grade Card:

Result will be declared by the Center and grade card (containing the grades obtained by the student along with SGPA) will be used by the university after completion of every semester. The grade card will be consisting of following details.

- Title of courses along with code opted by the student. Credits associated with the course.
- Grades and grade points secured by the student.
- Total credits earned by the student in a particular semester. Total credits earned by the students till that semester.
- SGPA of the student.
- CGPA of the student (at respective exit point)

Cumulative Grade Card:

The grade card showing details secured by the student in each subject in all semesters along with overall CGPA will be issued by the University at respective exit point.

Uniform Curriculum Structure of B. Voc. Medical Laboratory Technology
Syllabus with effective from 2020-2021

Semester I

Semester I							
Sr. No.	Subject Code	Title of the Subject	Contact Hours Per Week		Evaluation Scheme (Marks)		Credit
			L	P	CIA	SEE	
	General Education						
1	BMLT101	English language and communicative skills	4	0	20	80	4
2	BMLT 102	Computer fundamentals & IT	4	0	20	80	4
3	BMLT 103	Fundamentals of Microbiology -I	4	0	20	80	4
	Skill Courses						
4	BMLT 104	Fundamentals of anatomy and physiology	4	0	20	80	4
5	BMLT105	Laboratory science & human body	4	0	20	80	4
6	BMLT106	Hematology	4	0	20	80	4
	Practical Skill Courses						
7	BMLT 107	LAB1: Fundamentals of anatomy and physiology	0	4	25	25	2
8	BMLT108	LAB 2:Laboratory science & human body	0	4	25	25	2
9	BMLT109	LAB3: Hematology	0	4	25	25	2
	Total				195	555	30

Semester II

Semester II							
Sr. No.	Subject Code	Title of the Subject	Contact Hours Per Week		Evaluation Scheme (Marks)		Credit
			L	P	CIA	SEE	
	General Education						
1	BMLT 201	Soft skill & personality Development	4	0	20	80	4
2	BMLT 202	Environmental Studies	4	0	20	80	4
3	BMLT 203	Fundamentals of Microbiology - II	4	0	20	80	4



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Skill Courses							
4	BMLT 204	Advanced Laboratory Science Techniques & Testing Process	4	0	20	80	4
5	BMLT 205	Biochemistry	4	0	20	80	4
6	BMLT 206	Bioinstrumentation, Haematological Techniques	4	0	20	80	4
Practical Skill Courses							
7	BMLT 207	LAB4: Advanced Laboratory Science Techniques & Testing Process	0	4	25	25	2
8	BMLT 208	LAB5: Biochemistry	0	4	25	25	2
9	BMLT 209	LAB6: Bioinstrumentation, Haematological Techniques	0	4	25	25	2
Total					195	555	30

Total Credit (Three Years): 180 Credits

Total Marks: 3000

- # Students have to undertake 120 contact hours internship in respective industry during summer vacation at the end of each academic year. This is off campus activity.
- # Students should submit report of the training within seven(07) days after completion

Signature

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SEMESTER-I

Credit : 04

Marks : 100

Paper Title: BMLT – 101:

ENGLISH LANGUAGE AND COMMUNICATIVE SKILLS

Objective: The objective of this paper is to familiarize the students with the importance of Communication and its associated components in the hard core corporate sector.

Outcome :

1. Students will be able to understand the computer organization and architecture with data representation techniques in computers.
2. Students will be able to understand the working, functions and handling of operating system.
3. Students will be able to understand and design algorithms and flowchart for solving problems.

(15 Hours)

UNIT I- The Sentence and Its Structure - How to Write Effective Sentence -- Phrases - What Are They? - The Noun Clauses - The Adverb Clause - The Relative Clause - How the Clauses Are Conjoined - Word - Classes and Related Topics - Understanding the Verb - Understanding the Auxiliary Verb - Understanding the Adverbs - Understanding the Pronoun - Prepositions.

(15 Hours)

UNIT II- Spelling and Pronunciation - Pronunciation, The Tense and Related topics- Presentness and Present Tenses - The Presentences of a Past Action - Interrogatives and Negatives - Negatives - How to Frame Questions - What's What? - Polite Expressions – Some Time Expressions - In Conversation – Letter Writing - Academic Assignments.

(15 Hours)

UNIT III - Self - Assessment; Identifying Strength & Limitations; Habits, Will-Power and Drives, Developing Self - Esteem and Building Self - Confidence, Significance of Self - Discipline, Understanding Perceptions, Attitudes, and Personality Types, Mind - Set: Growth and Fixed, Values and Beliefs, Motivation and Achieving Excellence; Goal Setting, Life and Career Planning , Constructive Thinking, Communicating Clearly; Understanding and Overcoming barriers.

(15 Hours)

UNIT IV - Active Listening, Persuasive Speaking and Presentation skills conducting Meetings, Writing Minutes, Sending Memos and Notices; etiquette: Effective E - mail Communication; Telephone Etiquette, Body Language in Group Discussion and Interview.

Books Recommended:

1. Dorch, Patricia. What Are Soft Skills? New York: Execu Dress Publisher, 2013.
2. Kulbhushan Kumar, Effective Business Communications, Khanna Publishing House (AICTE Recommended-2018)
3. Kamin, Maxine. Soft Skills Revolution: A Guide for Connecting with Compassion for Trainers, Teams, and Leaders Washington, DC: Pfeiffer & Company, 2013.
4. Klaus, Peggy, Jane Rohman & Molly Hamaker. The Hard Truth about Soft Skills. London: HarperCollins E - books, 2007.
5. Petes S. J. , Francis. Soft Skills and Professional Communication. New Delhi: Tata McGraw - Hill Education, 2011.
6. Stein, Steven J. & Howard E. Book. The EQ Edge: Emotional Intelligence and Your Success. Canada: Wiley & Sons, 2006.

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Credit : 04

Marks : 100

Objectives: The objective of this course is to familiarize students with Fundamentals of Computer and IT applications. It enablesthe student to get practical exposure towards MS - Office tools.

Outcome :

1. Students will be able to understand the computer organization and architecture with data representation techniques in computers.
2. Students will be able to understand the working, functions and handling of operating system.
3. Students will be able to understand and design algorithms and flowchart for solving problems.

(15 Hours)

UNIT I - KNOWING COMPUTER: Introduction, Objectives, Basic Applications of Computer, Components of Computer System: Central Processing Unit, Keyboard, mouse and VDU, Other Input devices, Other Output devices, Computer Memory. Concept of Hardware and Software: Hardware, Software: Application Software, Systems software. Concept of computing, data and information. Bringing computer to life: Connecting keyboard, mouse, monitor and printer to CPU, Checking power supply.

(15 Hours)

UNIT II - OPERATING COMPUTER USING GUI BASED OPERATING SYSTEM: Introduction,

Objectives, Basics of Operating System: Operating system, Basics of popular operating system (LINUX, WINDOWS). The User Interface: Task Bar, Icons, Menu, Running an Application. Operating System Simple Setting: Changing System Date And Time, Changing Display Properties, To Add Or Remove A Windows Component, Changing Mouse Properties, Adding and removing Printers. File and Directory Management: Creating and renaming of files and directories, Common utilities.

(15 Hours)

UNIT III - INTRODUCTION TO INTERNET, WWW AND WEB BROWSERS: Introduction,

Objectives. Basic of Computer Networks: Local Area Network (LAN), Wide Area Network (WAN). Internet: Concept of Internet, Applications of Internet, Connecting to the Internet, Troubleshooting, World Wide Web (WWW), Web Browsing Software, Popular Web Browsing Software. Search Engines: Popular Search Engines / Search for content, Accessing Web Browser, Using Favorites Folder, Downloading Web Pages, Printing Web Pages. Understanding URL, Surfing the web: Using e - governance website.

(15 Hours)

UNIT IV - COMMUNICATIONS AND COLLABORATION: Introduction, objectives, Basics of E - mail: What is an Electronic Mail, Email Addressing, Using E - mails: Opening Email account, Mailbox: Inbox and Outbox, Creating and Sending a new E - mail, Replying to an E - mail message, Forwarding an E - mail message, Sorting and Searching emails. Introduction to MS - Office: MS - Word, MS - Excel, MS - Power Point.

Books Recommended:

1. Computer Fundamentals, R.S. Salaria, Khanna Publishing House (AICTE Recommended Textbook – 2018)
2. Handbook of Computer Fundamentals, N.S. Gill, Khanna Publishing House (AICTE Recommended Textbook – 2018)
3. Fundamentals of Computers, V. Rajaraman, PHI Publication

4. Computer Fundamentals, P. K. Sinha, BPB Publication
5. Introduction to Computers with MS - Office 2007, Leon, TMH Publication

Paper Title: BMLT – 103:

FUNDAMENTALS OF MICROBIOLOGY-I

Credit : 04

Marks : 100

Objectives: The structure of the course comprises the instrumental use, study of microscopes, micro organisms, sterilization and the other related concepts.

Outcome :

Students will be able to understand general concepts of Microbial world.

Students will be able to use basic techniques of Identification, Isolation, Staining,

(15 Hours)

UNIT I – Classification, morphology and physiology of bacteria, anatomy of bacterial cell, growth requirement of bacteria-growth curve, nutrients required. Gram positive & Gram negative Bacteria. Normal flora of human body.

(15 Hours)

UNIT II – Use of microscope in examination of unstained bacteria, fungi, algae, parasites and stained cell preparations including simple staining, Gram's staining, acid fast staining, capsule staining, spore staining using prokaryotic and eukaryotic cells, hanging drop preparation,

Preparation of culture media, spread plates, pour plates, selective media, differential media.

(15 Hours)

UNIT III - Separation of pure cultures and study the effect of selective nutrients on prokaryotes. Isolation of Soil Bacteria, Soil Fungi, Soil Actinomycetes

(15 Hours)

UNIT IV - Selective media for Soil microflora and use of growth factors, Study of Rhizosphere interactions, Quantitative measurements of Soil nutrients and Rhizosphere microflora and preparation of starter cultures of Rhizobia, Azotobacter.

Suggested Readings:

1. Textbook of Pathology - Harsh Mohan; Jaypee
2. Basic Pathology - V.Kumar, S.Robbins; Harcourt
3. Text Book of Microbiology - Pelczar, Chan, Kreig
4. Bacteriology - A.J. Salle
5. Text Book of Microbiology - Vol I and Vol II - Powar and Dagainawala 6 Text Book of Microbiology - Stanier
7. Human Anatomy, Physiology & Health Education by Harie R. Berasari, Gandhi & Goel
8. Textbook of Medical Physiology by Guyton and Hall

Credit : 04

Objectives: The course offers a classic blend of anatomy and physiology, enabling the students to understand the fundamentals as well as the advanced level of the course.

Outcome :

Students will be able to understand general Physiology of Human being

Students will be able to use Functional mechanism of Physiology.

Students will be able to understand and implement the concepts Of various systems in Human Physiology (15 Hours)

Unit-I

A) Body as a whole and its constituents

The cells, tissues and organization of the body Tissues- epithelial, connective, muscle, nervous

Cell regeneration, membranes, glands, Organization of the body
Bones of the skeleton, Axial skeleton, Appendicular skeleton, Cavities of the body, Cranial, thoracic, abdominal, pelvic.

B) Blood Composition of blood

Erythrocytes-Structure and functions Leucocytes-Types, Structure and functions Platelets-Structure and functions, Hemostasis

Haemoglobin, Blood groups, Coagulation Factors, Anaemia & Immunoglobulins

C) Cardiovascular System

Heart-Functional anatomy; Properties of heart muscle; Heart as a pump; Cardiac output and venous return; Vascular system; Systemic arterial blood pressure (15 Hours)

Unit-II

A) Respiratory System

Basic features and functional anatomy, Ventilation, Functions, Lungs Volumes and capacities

B) Digestive System

Elementary functional anatomy; Salivary glands; Stomach and its secretion; Liver, pancreas and their role in digestion, Bile, Small and large intestine; Movement of alimentary tract; Gastrointestinal hormones and their functions

C) Excretory system

Functional anatomy of kidney; Mechanism of formation of urine; Water, electrolyte and acid-base balance; Skin and its functions (15 Hours)

Unit-III

A) Nervous System

Elementary neuroanatomy; Properties of neurons; Nerve impulse, Types of nerves; Synapse and chemical transmitters; Central nervous system-Neuroglia, membranes of; brain and spinal cord, Ventricles of brain and cerebrospinal fluid.
Brain- cerebrum, cerebellum Spinal cord- structure

Peripheral nervous system-Spinal nerves and cranial nerves Autonomic nervous system- Sympathetic NS, Parasympathetic NS. Functions of ANS
Central visceral regulations

B) Special senses and Endocrinology Eye and Ear (in brief)-

a) List of Endocrine Glands; Hormones : Their secretion and functions (in brief) (15 Hours)

Unit-IV: A) Reproductive System

Female reproductive system; Anatomy- External and internal parts; Puberty, menstrual cycle, Fertilization.

Male reproductive system- Elementary anatomy; Functions of male reproductive system

B) Muscular System Muscles characteristics Properties of skeletal muscles Properties of smooth muscles

Suggested Readings:

1. Anatomy and physiology in health and illness - Wilson Katheen, Anne Waugh ; Churchill livingstone
2. Concise medical physiology - Sujit Chaudhari; Central
3. Textbook of medical physiology - Arthur Guyton and Hall; W.B. Saunders
4. Understanding medical physiology R. L. Bijlani, Jaypee

Paper Title: BMLT – 105:

LABORATORY SCIENCE & HUMAN BODY

Credit : 04

Marks : 100

Objectives: The aim of the course is to familiarize the students not only with the human anatomy but also the practical edge to understand the various organs and functions as well.

Outcome :

1. Students will be able to understand general anatomy of Human being
2. Students will be able to use Functional mechanism of Anatomy.
3. Students will be able to understand and implement the concepts Of various systems in Human Body.

(15 Hours)

UNIT I- Basic Understanding of Healthcare Service Providers (Primary, secondary & tertiary), Basic Understanding of Hospital Functions, Basic Understanding of Diagnostic Centers and medical laboratory facilities, Understanding of Laboratory at different level (National / State / District).

(15 Hours)

UNIT II - To develop broad understanding of the Role of MLT, To understand laboratory maintenance needs to be taken care by MLT, To develop Understanding of Patient Comforts and Safety, To develop understanding of Laboratory Test Results, To exhibit Ethical behavior

(15 Hours)

UNIT III - Basic understanding of organization of body cells, tissue Organs, organ systems, membranes and glands in human body, Understanding basic unit of body - Cell, Understanding different types of tissues, Understanding different types of organ systems, Understanding different types of body fluids, secretions and excretions, Understanding different parts of body, Understanding Endocrine system in human body Understanding cardiovascular system and blood, vessels in human body.

(15 Hours)

UNIT IV- Understanding musculo - skeletal system in human body, Describe digestive System in human body, Describe Respiratory system in human body, Describe Urinary System in human body, Describe Nervous System in human body, Describe Sense organs in human body, Describe Reproductive System in human body, Describe Integumentary system and Lymphatic system

Books Recommended:

1. Solomon. 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

Paper Title: BMLT – 106:	HEMATOLOGY
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Credit : 04**Marks : 100**

Objectives: The course is designed to encapsulate the fundamentals of chemistry, the laboratory application and the current scenario of the subject.

Outcome : Students can broad understand the different types of samples, techniques performing in laboratory.

They will understand laboratory planning & reporting the laboratory operations.

1. Hematological Disorders **(15 Hours)**
 - a. Classification of Anemia : Morphological & etiological.
 - b. Iron Deficiency Anemia : Distribution of body Iron, Iron Absorption, causes of iron deficiency, lab findings.
 - c. Megaloblastic Anemia : Causes, Lab findings.
 - d. Hemolytic Anemia : Definition, causes, classification & lab findings.
 - e. Bone Marrow : Cell composition of normal adult Bone marrow, Aspiration, Indication, Preparation & Staining, Special Stain for Bone Marrow - Periodic Acid Schiff, Sudan Black, Myeloperoxidase.
 - f. Leukemia : Classification, Blood Picture, Differentiation of Blast Cells.
2. Basic Hematological Techniques **(15 Hours)**
 - a. Characteristics of good technician
 - b. Preparation of specimen collection material.
 - c. Lab. request form.
 - d. Basic steps for drawing a blood specimen by veinipuncture. Complications of veinipuncture.
 - e. Patient after care
 - f. Specimen rejection criteria for blood specimen
 - g. Hemolysis of blood
 - h. Blood collection by skin puncture (Capillary Blood)
 - i. Arterial puncture.
 - j. Deciding specimen types and selection of -
 - o Anticoagulant- EDTA, Citrate, Oxalate, Heparin, sodium fluoride.
 - k. Separation of serum
 - l. Separation of plasma
 - m. Changes in blood on keeping
 - n. Maintenance of specimen identification
 - o. Transport of the specimen.
 - p. Effect of storage on Blood Cell Morphology
 - q. Universal precautions

Suggested Readings:

1. Text book of medical laboratory technology by Praful Godkar; Bhalani
2. Text book of biochemistry for medical students by D M Vasudevan; Jaypee
3. Fundamentals of biochemistry by J L Jain; S Chand
4. Biochemistry by D Voet, J Voet; Wiley
5. TB of biochemistry and human biology by G P Talwar; Prentice Hall
6. MOLBIO by Avinash and Kakoli Upadhyay; Himalaya Publishing house
7. Clinical Biochemistry by G.Guru
8. Principal of Biochemistry by Lehninger

BMLT 107	LAB1: Fundamentals of anatomy and physiology
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Credit : 02**Marks : 50**

List of Experiments: (Based on BMLT – 104)

(30 Hours)

1. Measurement of pulse, blood pressure.
2. Elicitation of Reflexes and jerks.
3. Identification of blood cells by study of peripheral blood smear.
4. Preparation of sterile swabs / sterile tubes and bottles
5. Preparation of smear
6. Staining: Germ & Ziehl – Neelson staining
7. Identification of culture media
8. Identification of instruments commonly used in Microbiology laboratory
9. Identification of common microbes
10. Microscopy:
 - a) Components and setting of the compound Microscope
 - b) Focusing of object
 - c) Use of low & high power objectives of Microscope
 - d) Use of oil immersion lens
 - e) Care and maintenance of the Microscope
11. Different types of Microscopy:
 - a) Dark field Microscopy
 - b) Fluorescence Microscopy

BMLT 108	LAB1: LABORATORY SCIENCE & HUMAN BODY
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Credit : 02**Marks : 50**

Practical session: (Based on BMLT – 105)

(30 Hours)

1. PPT on role and importance of a medical lab technologist in the society
2. PPT/Audio visual demonstration of a qualified medical technologist working in sophisticated medical lab
3. Video demonstration on the mechanism of blood coagulation
4. Video demonstration on the mechanism of urine formation
5. Video demonstration on the mechanism of respiration
6. An audio visual presentation on the "Ethical behavior" of a medical lab technician
7. An audio visual presentation on the complication of the medical lab work
8. PPT presentation on the life and career of a professionally sound lab technologist
9. PPT presentation on the statutory regulations of a good medical lab technologist
10. Video demonstration of identification of different equipments of a medical lab
11. PPT on the history of a medical lab technologist in India

12. Video demonstration on "How to deal with patient" and professional medical history compilation

BMLT 109	LAB 3: HEMATOLOGY
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Credit : 02

Practical session: (Based on BMLT – 106)

(30 Hours)

PRACTICAL

1. Basic requirements for hematology laboratory.
2. Glasswares for Hematology.
3. Equipments for Hematology.
4. Anticoagulant vial preparation.
5. Complete Blood Counts.
6. Determination of Hemoglobin.
7. TRBC Count by Hemocytometers.
8. TLC by Hemocytometer.
9. Differential Leukocyte count.
10. Determination of Platelet Count.
11. Determination of ESR by wintrobe's.
12. Determination of ESR by Westergren's method.
13. Determination of PCV by Wintrobe's.
14. Erythrocyte Indices- MCV, MCH, MCHC.
15. Reticulocyte Count.
16. Absolute Eosinophil Count.
17. Morphology of Red Blood Cells.

SEMESTER-II

Paper Title: BMLT – 201:

SOFT SKILL & PERSONALITY DEVELOPMENT

Credit : 04

Marks : 100

Objective: On completion of the course, the students will be able to listen to lectures, public announcements, news on TV, radio and engage in telephonic conversation to communicate effectively and accurately in English used as spoken language for various purposes.

Outcome :

- Listen to lectures, public announcements and news on TV and radio
- Engage in telephonic conversation
- Communicate effectively and accurately in English.
- Use spoken language for various purposes.

(15 Hours)

UNIT I - Listening Skills: Barriers to listening; effective listening skills, feedback skills. Attending telephone calls; note taking. Activities: Listening exercises - Listening to conversation, News and TV reports. Taking notes on a speech / lecture.

(15 Hours)

UNIT II - Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics. The study of sounds of English, stress and intonation. Situation based Conversation in English.

(15 Hours)

UNIT III - Essentials of Spoken English: Activities, Making conversation and taking turns, Oral description or explanation of a common object, situation or concept, Giving interviews.

(15 Hours)

UNIT IV - Oral Presentation with / without audio visual aids. Group Discussion . Listening to any recorded or live material and asking oral questions for listening comprehension.

Books Recommended:

1. Soft skills Training - A workbook to develop skills for employment by Fredrick H. Wentz
2. Personality Development and Soft skills , Oxford University Press by Barun K. Mitra

Paper Title: BMLT – 202:

ENVIRONMENTAL STUDIES

Credit : 04

Marks : 100

Objective: Keeping in view the modern status of environment, the course primarily aims at providing various awareness programs required for the welfare of the environment apart from the emphasis on the general and conventional issues surrounding the environment.

Outcome :

1. Students will be able to understand & analyse the concept of Business
2. Students will be able to understand the working, functions and handling of business with environment, sales & marketing.

(15 Hours)

UNIT I- Multidisciplinary nature of environmental studies - Definition, scope and importance, need for public Awareness, Natural Resources: Renewable and non - renewable resources, Natural resources and associated problems, Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles, Ecosystems: Concept, Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.

(15 Hours)

UNIT II- Biodiversity and its conservation, Bio - geographically classification of India, Value of biodiversity, Biodiversity at global, National and local levels. India as a mega diversity Nation, Hot - spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man - wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In - situ and Ex - situ conservation of biodiversity.

(15 Hours)

UNIT III- Environmental Pollution: Definition , Cause, effects and control measures of : Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides . Social Issues and the Environment: From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and Rehabilitation of people; its problems and concerns. Case Studies.

(15 Hours)

UNIT IV- Environmental ethics: Issues and possible solutions. Climate global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment. Population growth, variation among nations. Population explosion - Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and Human health. Case Studies.

Books Recommended:

1. M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House
2. Mike Hulme, Climates and Cultures.
3. Mark Garrett, Encyclopaedia of Transportation Social Science and Policy.
4. Steel, Science An A - to - Z Guide to Issues and Controversies.
5. John A Matthews, Encyclopaedia of Environmental Change.
6. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House

Objectives: The structure of the course comprises the instrumental use, study of microscopes, microorganisms, sterilization and the other related concepts.

Outcome :

- Students will be able to understand general Morphology of Microbes.
Students will be able to use basic techniques of Identification, Isolation, Staining,
Student can perform laboratory procedures like sterilization, Media preparation etc.

(15 Hours)

UNIT I - Basic principles and usage of Instruments, General Instruments and Distillation plant, Centrifuge machine, Analytical Balance, Hotplate, Magnetic Stirrer, Water Bath, Automatic dispenser and diluters, Deionizer, Microbiological Instruments : pH - meter, Autoclave, Incubator, Hot air oven, Laminar Air flow, Colony counter, Muffle furnace, Refrigerator, Inoculator, McIntosh and Flides anaerobic jar.

(15 Hours)

UNIT II - Microscopy : Study of compound microscope – magnification numerical aperture, resolution and components of microscope, Dark ground illumination, care of microscope and common difficulties. Study of phase contrast, interference, fluorescent, polarizing and electron microscope. Calibration of ocular micrometer and measurement of microorganisms.

(15 Hours)

UNIT III - Microbiology & Medicine :Introduction to Medical Microbiology, Discovery of microorganisms. Contribution of Robert Koch, Antonie Van Leeuwenhoek, Louis Pasteur, Bordet, Paul Ehrlich, Alexander Flemming, Elie Metchnikoff, Needham, Tyndall Janssen, Joseph Lister, Karl Landsteiner etc. Scope & relevance and safety measures of Medical Microbiology. Role of medical microbiology in identification and management of various infectious diseases.

(15 Hours)

UNIT IV - Sterilization and Disinfection : Definition, mode of action and use of various physical methods of sterilization - heat, UV radiation, ionizing radiation, character affecting sterilization, autoclave control and sterilization indicators. Chemical disinfectants - phenol and its compounds, alcohol, halogen, heavy metals and quaternary ammonium compounds, aldehyde, gaseous compounds. Use and abuse of disinfectants. Disinfectants, antiseptics, chemotherapeutic agents, chemotherapeutic index, development of chemotherapy, antibiotics and effect of antibiotics on protein and nucleic acid synthesis and cytoplasmic membrane. Future development of chemo - therapy.

Books Recommended:

1. Clinical Microbiology; J. Stokes and G. L. Ridgeway; William & Wilkins
2. Manual of Practical Medical Microbiology and Parasitology; T. R. Oberhofer Churchill and Livingston
3. Introduction in Medical Microbiology; Anant - Narainyan Indian
4. Practical Medical - Microbiology; Mackie and MC Cathey
5. Laboratory Manual and work book for Microbiology in Health and Disease; Robert Fuerst W. B. Sunderu

Paper Title: BMLT – 204:	ADVANCED LABORATORY SCIENCE TECHNIQUES & TESTING PROCESS
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Credit : 04

Marks : 100

Objectives: The course is designed to enable the students on the use and application of the advanced laboratory techniques and the process of testing as well.

Outcome :

Students can broad understand the different types of samples, techniques performing in laboratory.

They will understand laboratory planning & reporting the laboratory operations.

(15 Hours)

UNIT I -Broad understanding of different types of samples to be taken in medical laboratory, Sample Handling, Various equipments useful for blood sample collection, broad understanding of correct method of blood sample collection, broad understanding on collection method of samples other than blood samples, broad understanding of correct procedure of sample transportation.

(15 Hours)

UNIT II -Understanding about Laboratory planning, develop understanding about laboratory operations, gain broad understanding of care of laboratory glassware, equipment and instruments, understanding about Specimen Handling, Techniques of Disinfection & Sterilization of rubber goods, laboratory equipment & other instruments

(15 Hours)

UNIT III -Importance and method of Observing and reporting while dealing with patients during sample and report collection, Method of Observing and reporting while assisting the pathologists and other members of the team, Understanding the importance of verbally informing the person in authority,

UNIT IV -Understanding of chemicals/reagents useful in sample analysis, understanding of maintaining record of inventory , test results, etc. , Able to inspect the availability of medical supplies or diagnostic kits To develop understanding about laboratory safety

Books Recommended:

1. Crocker J, Burnett D. The science of laboratory diagnosis, 2nd ed, Chichester: Wiley, 2006
2. Turgeon M. L, Linné and Ringsrud's Clinical laboratory science: the basic and routine techniques, 5th ed, St. Louis, Mo: Mosby Elsevier, 2007

Paper Title: BMLT – 205:	BIOCHEMISTRY
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Credit : 04

Marks : 100

Objectives: The course is designed to encapsulate the fundamentals of chemistry, the laboratory application and the current scenario of the subject.

Outcome :

- Students will be able to understand the elementary knowledge of inorganic chemistry.

Students will be able to use basic concepts i.e. measurements and can per handle various instruments.

Student understand properties & metabolism of Biomolecules.

(15 Hours)

UNIT I - Introduction to Medical Lab Technology, Role of Medical Laboratory technologists - ethics, responsibility, safety measures and hazards in clinical biochemistry, first aid (accidents), Units of measurements, S. I. Units, measurement of volume, various volumetric apparatus (cylinders, flasks, pipettes), calibration of volumetric apparatus, Cleaning and caring of general laboratory glassware and equipment, preparation and storage of distilled water, preparation of reagents and standard solutions, storage of chemicals and reagents, use of analytical balance, dry and moist heat radiation, filtration, autoclaving and chemical disinfection for sterilization.

(15 Hours)

UNIT II - Introduction, aim and scope of Biochemistry. Elementary knowledge of inorganic chemistry: atomic weight, molecular weight, equivalent weight, acid, bases. Elementary knowledge of organic chemistry : Organic compounds, Aliphatic and aromatic compounds, Alcohols, Aldehydes, Ketones, Amines, Esters, Phenol etc.

(15 Hours)

UNIT III - Viscosity - principles and applications; sedimentation – Principles and applications; Radio - isotopes and their use in Biochemistry, mole, molar, molal and normal solutions, pH measurement, buffer solutions, percent solutions, osmosis, dialysis, surface tension. ANALYTICAL BIOCHEMISTRY AND METABOLISM: Colorimetry / Spectrophotometry, Flame photometry, Atomic absorption spectroscopy, electrophoretic determination of Na⁺ and K⁺, chromatography

(15 Hours)

UNIT IV - Introduction, properties and simple metabolism of carbohydrates proteins and fat, Nucleic acids and Enzymes introduction, general properties. Digestion and absorption, Nutrition (Vitamins, Calories) Radioimmunoassay (RIA) and ELISA. (Hepatitis A, B)

Books Recommended:

1. Varley's Practical Clinical Biochemistry; A. HGowehlock; Heineman Medical Books Ltd. , London
2. Lab Manual in Biochemistry; E. A. Storey; V. G. Makarova; MIR Publishers; 2PerbyRizkyl - 110 GSP Moscow
3. Harper's Biochemistry; A. K. Murray Prentice Hall of India Ltd. , New Delhi
4. Introduction to Practical Biochemistry; Plummer D. T. Tata McGraw Publishing co, New Delhi

Paper Title: BMLT – 206:

BIOINSTRUMENTATION HAEMATOLOGICAL TECHNIQUES

Credit : 04

Marks : 100

Objectives: The course is designed to encapsulate the fundamentals of chemistry, the laboratory application and the current scenario of the subject.

Outcome : Students can broad understand the different types of samples, techniques performing in laboratory.

They will understand laboratory planning & reporting the laboratory operations.

Unit-I Bioinstrumentation

(15 Hours)

1. Photometry-Definition, laws of photometry, absorbance, transmittance, absorption maxima, instruments, parts of photometer, types of photometry-colorimetry,

spectrophotometry, flame photometry, fluorometry, choice of appropriate filter, measurements of solution, calculation of formula, applications.

2. Electrophoresis - Principle, Types & Applications.

3. Autoanalysers - Principle & Applications

Unit-II

(15 Hours)

A) Water and Mineral Metabolism-

Distribution of fluids in the body, ECF & ICF, water metabolism, dehydration, mineral metabolism, macronutrients (principal mineral elements) & trace elements.

B) Vitamins- Fat & water soluble vitamins, sources, requirement, deficiency disorders & biochemical functions.

C) Liver Functions & their Assessment- Based on:

Carbohydrate metabolism; Protein metabolism; Lipid metabolism. Measurements of serum enzyme levels Bile pigment metabolism, Jaundice, its types and their biochemical findings.

D) Renal Function Tests- Various Tests, GFR & Clearance

Unit-III

(15 Hours)

A) Cardiac Profile - In brief Hypertension, Angina, Myocardial Infarction, Pattern of Cardiac Enzymes in heart diseases

B) Different methods of Glucose Estimation - Principle advantage and disadvantage of different methods

C) Different methods of Cholesterol Estimation - Principle, advantage and disadvantage of different methods.

Unit-IV

(15 Hours)

A) Basic Hematological Techniques Preparation of blood collection –

Basic steps for drawing blood by vein, capillary and artery puncture; Complications during and after blood collection

Specimen rejection criteria for blood

Anticoagulants- types and concentration Transport of blood sample Effect of storage on blood cell morphology Universal precautions

Books Recommended:

1. Biophysical Chemistry by Upahyay, Upadhyay, Nath; Himalaya Publishing house
2. Text book of medical laboratory technology by Praful Godkar; Bhalani
3. Essential haematology by A.V.Hoffbrand; Black well
4. De Gruchy's Clinical Haematology in medical practice by Frank Firkin, C Chester man; Black well
5. Principles of haematology Peter Haen WCB 17
6. Haematology by Emamanuel Besa; Harwal
7. Text Book of Microbiology by Ananthnarayan and Paniker
8. Clinical diagnosis and management by laboratory methods by Bernard Henry; W B Saunders
9. Text book of biochemistry for medical students by D M Vasudevan; Jaypee
10. TB of biochemistry and human biology by G P Talwar; Prentice Hall
11. Biophysical Chemistry by Dr. Nath, Avinash Upadyay and Kakoli Upadyay; Himalaya Publishing house
12. Clinical Biochemistry by G.Guru

Paper Title: BMLT – 207:	LAB 1: ADVANCED LABORATORY SCIENCE TECHNIQUES& TESTING PROCESS
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Credit : 02

Marks : 50

(30 Hours)

List of Experiments: (Based on BMLT – 204)

1. Blood collection process
2. Use of different instruments used for collection of blood
3. Identification of different instruments used for collection of blood
4. Identification and use of a Tourniquet
5. Identification of body areas for Venepuncture
6. SOP on the use of Vacutainers
7. Sterilization of areas used for where from blood is collected
8. Identification and use of anticoagulants for prevention of clotting of sample blood
9. Restoration of a venepunctured wound
10. Demonstration of the use of a lab request form
11. Demonstration of the morphology of red blood cell
12. Demonstration of the minimum safety requirements to be maintained in a lab for purpose of preventing contamination of slides

Paper Title: BMLT – 208:	LAB 2: BIOCHEMISTRY - I
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Credit : 02

Marks : 50

(30 Hours)

List of Experiments: (Based on BMLT – 205)

1. Introduction – Aim, basis, interpretation, safety in clinical biochemistry laboratory
2. Laboratory organization: instruments, glassware, sample collection & specimen labeling
3. Routine test & the identification of equipment & supply
4. Identification of supplies of a biochemistry lab
5. Preparation of different solutions used in the biochemistry lab
6. Standardization of methods commonly used in biochemistry lab
7. Detection of carbohydrates in a given sample
8. Detection of proteins in a given sample
9. Interpretation of results obtained from the routine tests
10. Study the general properties of enzyme (urease)
11. Achromatic time of salivary amylase
12. Estimation of glucose in a given sample
13. Centrifugation : principle, type and application
14. Chromatography: description of paper chromatography and methodology of their application

Paper Title: BMLT – 209:	LAB 3: BIOINSTRUMENTATION HAEMATOLOGICAL TECHNIQUES
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Credit : 02

Marks : 50

(30 Hours)

List of Experiments: (Based on BMLT – 206)

1. Blood urea estimation
2. Serum creatinine estimation
3. Serum uric acid estimation

4. Serum total protein estimation
5. Serum albumin estimation
6. Serum globulin estimation
7. Serum glucose estimation
8. Total cholesterol estimation
9. HDL and LDL cholesterol (direct) estimation.
10. Triglyceride estimation
11. Serum Bilirubin total estimation
12. Serum Bilirubin direct estimation
13. Serum amylase estimation
14. Serum GOT (AST) estimation
15. Serum GPT (ALT) estimation
16. Alkaline phosphatase estimation
17. Acid phosphatase estimation
18. Serum sodium estimation
19. Serum potassium estimation
20. Serum chloride estimation
21. CK-NAC estimation

Glossary and Notes:

- CIA: Continuous Internal Assessment
- SEE: Semester End Examination
- L: Theory Lecture
- P: Practical/ Hands-on
- VOC: Vocational
- Interpretation of Courses Code:

All Courses will have nomenclature as 'VOCXYZ'

X represent Semester Number

Y = '0' General Academic Components

'1' Skill Components (Theory)

'2' Skill Components (Lab Curses)

'3' Skill Components (In plant training)

'4' Major Project

Z Represents Incremental Number

- Contents of the syllabus should be designed to provide employability / Entrepreneurship opportunities to the students and should be supported by available technical infrastructure in the institution.

Uniform Courses Syllabus Template of Bachelor of Vocation (B. Voc)

VOC XYZ: Course Name

Credit: 4

Marks: 100

Unit- 1. Title	(15Hrs)
Contents	
Unit- 2. Title	(15Hrs)
Contents	
Unit- 3. Title	(15Hrs)
Contents	
Unit- 4. Title	(15Hrs)
Contents	

Text Books:

1. 'Title'; 'Author'; 'Edition'; 'Publisher'; 'Country of Origin'; ISBN No.
2. 'Title'; 'Author'; 'Edition'; 'Publisher'; 'Country of Origin'; ISBN No.

Reference Book:

1. 'Title'; 'Author'; 'Edition'; 'Publisher'; 'Country of Origin'; ISBN No.
2. 'Title'; 'Author'; 'Edition'; 'Publisher'; 'Country of Origin'; ISBN No.

Web: *Link of the Website*



Principal
Janvikas Mahavidyalaya,
Bansarola, Tq. Kaij Dist. Beed