SYLLABUS

MAHARISHI CHARAK
SCHOOL OF PARAMEDICAL SCIENCE

BACHLOR OF MEDICAL LABORATORY TECHNOLOGY

(Effective from Academic Year 2022-23)

2022-23

&

2024-25

AN ISO 9001:2015 CERTIFIED FOR QMS
DR. C.V. RAMAN UNIVERSITY
Madhya Pradesh, Khandwa AN AISECT GROUP UNIVERSITY
Approved by : MP. Govt., AICTE, NCTE, MP PARAMEDICAL COUNCIL, PCI Recognized by : UGC Member of : AIU

CVRU
विद्या परं देवता
DR. C.V.RAMAN UNIVERSITY

Preamble

The objective of any program at paramedical institute is to prepare professionals well equipped with attitude-skills and knowledge demanded by the growing society. The CVRUK envisio0ns all its programs in the best interest of its student and in this endeavor, it offers a new vision to all its under graduate courses. It imbibes learning outcome-based curriculum frame work (LOCF) For all its under graduate programs. The LOCF approach is envisioned to provide focused, outcome-based syllabus the teaching-learning experiences in a more student-centric manner.

The LOCF approach has been adopted to strengthen students experience as they engage themselves in the program of their choice. The under graduate programs will prepare the students both for academic pursuit as well as enhance his/her employability.

Each program widely elaborates its nature and promises the outcomes that are to be accompanied by studying the courses. The program also states the attributes that its offer to in calculate at the graduation level. The graduates' attributes encompass values related to wellbeing, emotional stability, critical thinking, social justice also skills for employability. In short, each program prepares students for sustainability and lifelong learning.

The new curriculum of paramedical offers the student gains the requisite knowledge, skills and aptitude for the field of paramedical. The efforts are made to measure cognitive as well as applied learning. Student are not only trained on the core components but also in areas which are need based, innovative, and relevant keeping in pace with the fast-growing food industry. The course is internationally competitive.

The CVRUK hopes the LOCF approach of the program paramedical will help students in making an informed decision regarding the goals that they wish to pursue in further education and life.

In the pursuit of excellence in healthcare education, our paramedical school stands as a beacon o0f knowledge and compassion. committed to shaping skilled professional, we provide a transformative learning environment where dedication meets innovation. welcome to a journey of discovery, where each student is nurtured to become a proficient and empathetic healthcare practitioner contributing to the wellbeing of society.

1. Introduction to Paramedical

Paramedical services form the backbone of modern healthcare, encompassing a diverse range of crucial roles beyond conventional medical practice. From physiotherapist, emergency medical technicians and radiographers to laboratory technologist, paramedical professionals play a vital role in diagnosis, treatment, and overall patient care. This dynamic field combines technical expertise with a deep sense of compassion, ensuring, a holistic approach to health and wellbeing.

The program is comprised of Three broad interrelated curriculum areas: -

1. Perspective in education.
2. Curriculum and pedagogic studies.
3. Engagement with the field.

The extensive program provides enough flexibility in respect of lecture courses, practical training, and internship. Dr. C.V. Raman university is offering paramedical courses as per the guideline of M.P. Paramedical council. The paramedical courses are of 3 years duration which compromises of annual examination scheme. This course has been designed keeping in view the unique requirement of paramedical students.

Objectives Of Paramedical Courses

"The objectives of a paramedical course are multifaceted, aimed, to equip students with the essential skills and knowledge to excel in healthcare. These courses focus on fostering a deep understanding of medical procedures, honing technical proficiency, cultivating empathy, and instilling a commitment to ethical practices. Ultimately, the goal is to produce. competent and compassionate paramedical professionals who contribute significantly to the healthcare ecosystem, meeting the evolving needs of society."

Bachelor Of Medical Laboratory Technology.

"The objectives of bachelor of Medical Laboratory Technology program include developing a comprehensive understanding of human anatomy, physiology, acquiring specialized skills in Histology, Biochemistry, Microbiology techniques, and fostering the ability to assess and design effective rehabilitation Diagnosis programs. Additionally, these programs aim to install critical thinking, research capabilities, and patient centric approach, ensuring graduates contribute proficiently to enhancing individuals' physical wellbeing and quality of life."

1. To systematize experience and strengthen the professional competencies.
2. to develop skills required in selecting and organizing learning experiences.
3. to understand the nature of learning process.
4. to develop skills involved in dealing with the academic and personal problems of learning.
5. to acquire knowledge and develop an understanding of various procedures and techniques of evaluation and their classroom applications.

The course content has been designed to provide aspiring teaching with the necessary knowledge, skills, and attitudes. The curriculum aims to preparer individuals to understand the principles of paramedical course.

2. Learning Outcome-Based Curriculum Framework.

2.1 Nature and Extent of The Program In

Maharishi Charak School of Paramedical Science.

"The nature and extent of paramedical program encompass a comprehensive exploration of healthcare disciplines, combining theoretical knowledge with practical skills.

3. Graduate attributes in maharishi charak school of paramedical science.

Disciplinary knowledge: -graduate attributes in a paramedical course typically include skills like critical thinking, effective communication, clinical competence, ethical practice, teamwork, and adaptability to various healthcare settings. These attributes ensure graduates are well prepared for the dynamic and demanding field of paramedicine.

Communication Skills: - Aspiring teachers need strong communication skills to effectively interact with students, colleagues, parents, and the wider community. Communication is not just about speaking; it also involves active listening. Teachers need to pay attention to students' questions, concerns, and feedback to create an inclusive and supportive learning environment. Besides that, the teachers give various assignments that enable student to develop skills in public speaking writing and effective's interpersonal skills. Presentations in each paper enhances their confidence, ability to express themselves; presentation skills.

Research-related skills: - Research related skills in paramedical fields involve the ability to critically evaluate scientific literature, design and conduct research studies, collect and analysis data, and communicate findings effectively. Proficiency in statistical analysis, ethical research practices, and staying updated on the latest advancements are also crucial for paramedical professionals engaged in research activities.

Cooperation/Team work: - Cooperation and teamwork are essential skills that paramedical students need to develop throughout their program. As future educators, they will work closely with colleagues, administrators, parents, and, most importantly, their students. Cooperation and teamwork play a significant role as they foster a collaborative and supportive learning environment, prepare future educators for the dynamics of the classroom, and equip them with essential skills to succeed in their teaching careers.

Self-directed learning: - Incorporating self-directed learning in the paramedical program empowers aspiring educators to become lifelong learners, critical thinkers, and proactive professionals who can continuously improve their paramedical practice and make a positive impact on their students learning experiences. By fostering self-directed learning, educators aim to produce graduates who are adaptable, reflective, and committed to continuous professional development. These qualities are essential for educators to meet the diverse needs of their students and contribute positively to the ever-changing landscape of education.

Multicultural competence: - Multicultural competence in paramedical practice involves understanding and respecting diverse cultural backgrounds among patients. Paramedical professionals should be sensitive to cultural differences, communicate effectively with individuals from various backgrounds, and adapt their approach to provide culturally

competent care. This includes recognizing cultural beliefs about health and illness, addressing language barriers, and promoting inclusivity to ensure the wellbeing of all patients.

Moral and ethical awareness/reasoning: - Student has awareness of ethical conduct in different situations (academic and personal). They have skills in understanding and avoiding unethical behavior such as misrepresentation, plagiarism and environmental misuse and violence. They are formally taught ethics of research and human interventions.

Leadership readiness/qualities: - Leadership readiness in paramedical professionals involves qualities like effective communication, decision making skills, adaptability, and the ability to inspire and motivate a team. Strong problem solving, empathy, and commitment to continuous learning are also vital. Paramedical leaders must be able to handle high pressure situations, foster collaboration within their team, and exhibit a strong ethical foundation in their decision-making processes.

Lifelong learning: - Students acquire ability to gain knowledge and skills which are necessary in life for the holistic development for meeting their professional and personal needs in varying environment and changing contexts.

4. Qualification descriptors for maharishi charak school of paramedical science.

The following descriptors indicate the expectations from Paramedical students

- Demonstrating a strong understanding of the subjects and staying updated with current developments in their field.
- Acquiring effective strategies and techniques to engage and support diverse learners.
- Developing skills to maintain an orderly and conducive learning environment.
- Designing well-structured lesson plans aligned with learning objectives and student needs.
- Designing and implementing fair and effective assessment methods to measure student progress.
- Adapting teaching approaches to meet the diverse learning needs of students.
- Integrating educational technology to enhance teaching and learning experiences.
- Engaging in self-reflection to improve practices and student outcomes.

5. Program learning outcome in maharishi charak school of paramedical science.

The learning outcomes of the course are: -

1. Proficiency in essential clinical procedures.
2. Effective communication skills with patients and colleagues.
3. Critical thinking and problem-solving ability.
4. Adherence to high ethical standards in paramedical practice.
5. Cultural competence for diverse patient interactions.
6. Ability to work collaboratively in term-based healthcare settings.
7. Commitment to ongoing professional development and learning.
8. Demonstration of leadership qualities in paramedical roles.
9. Application of evidenced based practices in health.
10. Adaptability to diverse and dynamic healthcare environment.

6. Structure of paramedical course in maharishi charak school of paramedical science.

The structure of paramedical includes: -

1. Foundation course: -Introduction to basic sciences and foundational knowledge relevant to paramedical.
2. Core paramedical course: -in depth study of topics such as anatomy, physiology, hematology, pharmacology, emergency, medical procedures etc. subjects.
3. Clinical training: -hands on experience in clinical settings, including internship and practical training to apply theoretical knowledge.
4. Ethics and legal aspects: -understanding ethical standards and legal considerations in paramedical practice.
5. Communication skills: -Training in effective communication, both with patients and healthcare professionals.

B.M.L.T. First Year SCHEME OF EXAMINATION 2022-23

Course Details			External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Name	Total Marks	Majaor		Minor		Sessional					Subject Wise Distribution
			Maxmarks	Min.Marks	Max.Marks	Min.Marks	Max.Marks	Min.Marks	L	T	P	
Theory Group												
PBMLT101	Basic Histology (Anatomy & Physiology)	200	100	50	50	25	50	25	5		-	5
PBMLT102	Microbiology - I	200	100	50	50	25	50	25	5		-	5
PBMLT103	Biochemistry -I	200	100	50	50	25	50	25	5			5
BBMLT104	Hematology -I	200	100	50	50	25	50	25	5			5
Practical & Viva			**Term and Practical Exam**		**Lab Performance**		**Sessional**					
PBMLT101	Basic Histology (Anatomy & Physiology)	100	60	30			40	20			1	1
PBMLT102	Microbiology - I	100	60	30			40	20			1	1
PBMLT103	Biochemistry -I	100	60	30			40	20			1	1
BBMLT104	Hematology -I	100	60	30			40	20			1	1
Grand Total		1200							20		4	24

		DR.C.V.RAMAN UNIVERSITY KHANDWA									
		B.M.L.T. SECOND YEAR SCHEME OF EXAMINATION 22-23									
Course Details			External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Name	Total Marks	Majaor		Minor		Sessional					Subject Wise Distribution
			Maxmarks	Min.Marks	Max.Marks	Min.Marks	Max.Marks	Min.Marks	L	T	P	
Theory Group												
PBMLT201	Histology	200	100	50	50	25	50	25	5		-	5
PBMLT202	Microbiology - II	200	100	50	50	25	50	25	5		-	5
PBMLT203	Biochemistry -II	200	100	50	50	25	50	25	5			5
BBMLT204	Hematology -II	200	100	50	50	25	50	25	5			5
Practical & Viva			Term and Practical Exam		Lab Performance		Sessional					
PBMLT201	Histology	100	60	30			40	20			1	1
PBMLT202	Microbiology - II	100	60	30			40	20			1	1
PBMLT203	Biochemistry -II	100	60	30			40	20			1	1
BBMLT204	Hematology -II	100	60	30			40	20			1	1
Grand Total		1200							20		4	24

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B.M.L.T. Third Year SCHEME OF EXAMINATION 2022-23

Course Details			External Assessment		Internal Assessment				Credit Distribution			Allotted Credits
Course Code	Course Name	Total Marks	Majaor		Minor		Sessional		L	T	P	Subject Wise Distribution
			Maxmarks	Min.Marks	Max.Marks	Min.Marks	Max.Marks	Min.Marks				
Theory Group												
PBMLT301	Applied Histopathology	200	100	50	50	25	50	25	5		-	5
PBMLT302	Microbiology - III	200	100	50	50	25	50	25	5		-	5
PBMLT302	Biochemistry - III	200	100	50	50	25	50	25	5			5
PBMLT304	Hematology -III	200	100	50	50	25	50	25	5			5
PBMLT305	Instrumentation	50	-		50	25	-	-			1	1
Practical & Viva			Term and Practical Exam		Lab Performance		Sessional					
PBMLT101	Basic Histology (Anatomy & Physiology)	100	60	30			40	20			1	1
PBMLT102	Microbiology - I	100	60	30			40	20			1	1
PBMLT103	Biochemistry -I	100	60	30			40	20			1	1
BBMLT104	Hematology -I	100	60	30			40	20			1	1
Grand Total		1250							20		5	25

Bachelor In Medical Lab Technology (BMLT)

Scheme Of Examination: BMLT-1st Year

S.No.	Subject	Theory	Internal Assessment	Practical	Total
1	Basic Histology (Anatomy & Physiology)	100	100	100	300
2	Microbiology-I	100	100	100	300
3	Biochemistry-I	100	100	100	300
4	Hematology-I	100	100	100	300
Total Max. Marks					**1200**

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

Scheme Of Examination: BMLT-2nd Year

S.No.	Subject	Theory	Internal Assessment	Practical	Total
1	Histology	100	100	100	300
2	Microbiology-II	100	100	100	300
3	Biochemistry-II	100	100	100	300
4	Hematology-II	100	100	100	300
Total Max. Marks					**1200**

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

Scheme Of Examination: BMLT-3rd Year

S.No.	Subject	Theory	Internal Assessment	Practical	Total
1	Applied Histopathology	100	100	100	300
2	Microbiology-III	100	100	100	300
3	Biochemistry-III	100	100	100	300
4	Hematology-III	100	100	100	300
Total					1200
5	Instrumentation #	--	50	--	50
Total Max. Marks					**1250**

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

All theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	**Marks for each Question**	**Total Marks**
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Bachelor in medical lab technology (BMLT)
Scheme of examination: BMLT-1st Year

S.No.	Subject	Theory	Internal Assessment	Practical	Total
1	Basic Histology (Anatomy & Physiology)	100	100	100	300
2	Microbiology-I	100	100	100	300
3	Biochemistry-I	100	100	100	300
4	Hematology-I	100	100	100	300
Total Max. Marks					**1200**

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

-All theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	**02**	**20**
5 short answer Questions Answer to be given in 250-300 words	**10**	**50**
2 essay type Questions Answer to be given in 450-500 words	**15**	**30**
Total Marks		**100**

Scheme Of Examination and Syllabus: BMLT-1st Year

Paper-I: Basic Histology (Anatomy & Physiology): PBMLT101

Subject	Theory	Internal Assessment	Practical	Total
Basic Histology (Anatomy & Physiology)	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Anatomy/Physiology after M.S.-Anatomy/MD-Physiology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

BACHLOR OF MEDICAL LABORATORY TECHNOLOGY

I YEAR

(Effective from Academic Year 2022-23)

Scheme Of Examination and Syllabus: BMLT- I Year

Paper-I: Basic Histology (Anatomy and Physiology): PBMLT101

ANATOMY PHYSIOLOGY

Syllabus Contents

1. The anatomic and physiological organization of human body and integrated physiology.
2. Cell organization and function.
3. Skeletal system, bones, joints, and muscles.
4. Body fluids and their significance.
5. Blood morphology, chemistry and function.
6. Respiratory system
7. Cardiovascular system viii) Alimentary system, mechanism and physiology of digestion and absorption
8. Liver structure
9. Urinary system.
10. Male genital system
11. Female genital system.
12. Nervous system.
13. Spleen, lymph node and R.E. system.
14. Endocrine glands and their functions.

Histotechnology Fundamentals of Applied Histology

Introduction

1. Introduction to histopathology and laboratory organization.
2. Laboratory equipment, uses and maintenance.
3. Laboratory hazards and safety precautions.
4. Compound microscope - optical system, magnification and maintenance.

Fundamentals Of Applied Histology

1. Reception, recording and labeling of histology specimens.
2. Fixation and various fixatives.
3. Processing of histological tissues for paraffin bedding.
4. Embedding and embedding media.
5. Decalcification various types, there.
6. Micro tomes various types, there working principle and maintenance.
7. Microtome knives and knife sharpening.
8. Practical section cutting, cutting faults and remedies.
9. Routine staining procedures, mounting and mounting media. Dye chemistry, theory and practice of staining.
10. Solvents, mordents, accelerators and accentuators.
11. Uses of controls in various staining procedures.

Cytology Lectures

1. Introduction to exfoliative cytology with special emphasis on female genital tract.
2. Collection processing and staining of the Cytologic specimen

Scheme Of Examination and Syllabus: BMLT- I Year
Paper-II: Microbiology-I: PBMLT102

Subject	Theory	Internal Assessment	Practical	Total
Microbiology-I	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Microbiology after M.D.-Microbiology/Pathology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

Paper-II: Microbiology-I: PBMLT102

Syllabus Contents

MEDICAL MICROBIOLOGY

1. Introduction and brief history of microbiology.
2. Safety measures in microbiology.
3. General characteristics and classification of bacteria and fungi.
4. Growth and nutrition of microbes.
5. Care and maintenance of laboratory equipment's.
6. Care and handling of various microscopes – binocular, DGI, phase contrast, fluorescence and electron microscopes.
7. Principles and methods of sterilization.
8. Uses and mode of action of antiseptics and disinfectants.
9. Handling and cleaning of glassware apparatus. Decontamination and disposal of contaminated material.
10. Preparation, uses and standardization of culture media.
11. Principles of staining methods and preparation of reagents.
12. Aerobic and anaerobic culture methods.
13. General characters and nature of antigens and antibodies.
14. Principles of Antigen Antibody reactions.
15. Collection, transportation and processing of clinical samples for microbiology investigations.
16. Principles and mode of action of antibiotics and chemotherapeutic agents for bacteria and fungi.
17. Care and handling of laboratory animals.
18. Laboratory organization, management, recording of results and quality control in microbiology.

Virology

1. Introduction to Medical Virology.
2. Nomenclature and classification of viruses.
3. General characteristics of viruses: physical, chemical and biological properties.
4. Collection, transport, processing and storage of sample for viral diagnosis.

Practical

1. Introduction to use of different laboratory instruments and their safety precautions.
2. Collection, handling and storage of samples for viral diagnosis.
3. Washing, cleaning and sterilization of media and glassware in virology.
4. Principles of bio safety hoods, use of pipettes, syringes and other virus contaminated instruments in the laboratory.
5. Demonstration of preservation of viruses, viral antigens, infected biological materials and viruses.

Parasitology

1. Introduction to medical and safety.
2. General characters and classification of protozoa.
3. Laboratory procedure collections, preservation and processing of samples for parasites stool/blood/fluids/tissue/biopsy.
4. Morphology and life cycles of intestinal protocol, Amoeba- Giardia.
5. Laboratory diagnosis of intestinal protozoa infection: - Amoeba-Giardia.
6. Morphology and diagnosis of oral of – trichomonas vaginal flagellates – E. Gingivalia.
7. Morphology and life cycle of Haemopro- malaria protozoa- parasite.
8. Laboratory diagnosis of malarial infection.

9. General characters and classification of medical helminthology.
10. Morphology and life cycles of Nematodes (Intestinal), - Ascaris, Enterovirus, - ancylostoma, - Strongyloides.
11. Laboratory diagnosis of intestinal Nematode infection.

Practical

1. Introduction to operation of laboratory instruments and safety precautions.
2. Macroscopic examination of adult worms, cysts, tissues, and processing of stood sample for routine examination.
3. Saline and I2 preparation for protozoa cysts and trophozoites.
4. Concentration procedures for protozoa cysts and trophoziotes.
5. Concentration procedures for helminthic ova and cyst.
6. Examination and identification of ova and cyst of parasites of medical importance.

Scheme Of Examination & Syllabus: BMLT- I Year

Paper-III: Biochemistry-I: PBMLT103

Subject	Theory	Internal Assessment	Practical	Total
Biochemistry-I	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Biochemistry after M.D./M.Sc. -Biochemistry with five years of teaching experience shall be on the panel of examiner.

-Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

Scheme Of Examination & Syllabus: BMLT-I Year

Paper-III: Biochemistry-I: PBMLT103

Syllabus Contents

BASIC PRINCIPLES OF BIOCHEMISTRY

1. Introduction to medical technology role of medical laboratory Technologists, ethics, responsibility, safety, measures First aid (accidents).
2. Cleaning and care of general laboratory glassware and equipment, preparation and storage of distilled water analytical balance, preparation of reagents and standard solutions, storage of chemicals.
3. Units of measurement, S.I. Units, measurement of volumetric apparatus, (pipettes, flasks, cylinders) Calibration of volumetric apparatus.
4. Radioisotopes and their use in Biochemistry, mole, molar and normal solutions, pH, buffer solutions, pH and pH measurement, Osmosis, dialysis, surface tension.
5. Urine analysis (qualitative) for sugar, proteins bile pigments, ketone bodies, porpholinogen, faecal of blood.
6. Collection and recording of biological specimens' separation of serum plasma, preservation and disposal of biological samples material. Basic statistics (mean, SD, CV, normal distribution, probability).
7. Normal or Reference range. Definition, influencing factors, determination.
8. Volumetric analysis- Preparation of standard acid and base solutions, chloride estimation.

Scheme Of Examination & Syllabus: BMLT- I Year

Paper-IV: Hematology-I: PBMLT104

Subject	Theory	Internal Assessment	Practical	Total
Hematology-I	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Pathology after M.D. Pathology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction for the paper setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

scheme of examination & Syllabus: BMLT- I Year

Paper-IV: Hematology-I: PBMLT104

Syllabus Contents

HEMATOLOGY

1. Introduction to hematology and Laboratory Organization.
2. Lab. Safety and instrumentation.
3. Formation of blood.
4. Composition and functions of blood.
5. Various anticoagulants, their uses, mode of action and their merits and demerits.
6. Collection & preservation of blood for various hematological investigations.
7. Physiological variations in Hb, PCV, TLC and platelet.
8. Normal and absolute values in hematology. 8. Quality assurance in hematology.
9. Haemoglobinometry, various methods of estimation of Hb, errors involved and standardization of instrument for adaptation for Hb estimation.
10. Hemocytometry, procedures for cell counts visual as well as electronic, red cell, leucocytes and platelet counts. An error involved and means to minimize such errors.
11. Romanowsky dyes, preparation and staining procedure of the blood smears.
12. Morphology of normal blood cells and their identification.
13. Erythrocyte sedimentation rate, factors influencing and various procedures for its estimation with their significance.
14. Haemocrit value by macro and micro methods their merit and demerits.
15. Routine examination of urine.
16. Examination of biological fluids such as CSF, etc.
17. Examination of semen.

MAHARISHI CHARAK
SCHOOL OF PARAMEDICAL SCIENCE

BACHLOR OF MEDICAL LABORATORY TECHNOLOGY

II YEAR

(Effective from Academic Year 2022-23)

Bachelor in medical lab technology (BMLT)

Scheme of examination: BMLT- II Year

S.No.	Subject	Theory	Internal Assessment	Practical	Total
1	Histology	100	100	100	300
2	Microbiology-II	100	100	100	300
3	Biochemistry-II	100	100	100	300
4	Hematology-II	100	100	100	300
Total Max. Marks					**1200**

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

-All theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Scheme Of Examination & Syllabus: BMLT- II Year

Paper-I: Histology: PBMLT201

Subject	Theory	Internal Assessment	Practical	Total
Histology	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Pathology after M.D. Pathology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under.

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Scheme of examination & syllabus: BMLT- II Year

Paper-I: Histology: PBMLT201

Syllabus contents

Histotechnology: basic cellular pathology and allied technology

Human Histology

I. Study of various body tissues.

1. Epithelial tissue.
2. Connective tissue including bone and cartilage.
3. Muscular tissue.
4. Nervous tissue.
5. Glands, epithetical and endocrine glands.

II. Histological study of various system

1. The circulatory system
2. The alimentary system.
3. The digestive system including liver, pancreas and gall bladder.
4. The respiratory system.
5. The urinary system.
6. The endocrinal gland system
7. The reproductive system
8. Nerve ending and organ of special senses.

Fundamentals Of Applied Histology

1. Microscopy, working principle, maintenance and application of various types of microscopes: -

a. Dark ground microscope
b. Polarizing microscope
c. Phase contrast microscope
d. Interference microscope
e. UV microscope
f. Micrometry

2. Metachromasia and metachromatic dyes
3. Haematoxylum its importance in histology.
4. Carbohydrates and amyloid –special stains procedures.
5. Connective tissue, trichome staining and other special stains for the muscular fibers, elastic. reticulin and collagen fibers.
6. Principle of metal impregnation techniques.
7. Demonstration and identification of mineral pigments.

Cytology Lectures

1. Stain cytologic preparation with special emphasis of MGG, PAPANICOLAOU stains.
2. Special stains like PAS, mucicarmine, alcian blue, schmorl and acid phosphates.
3. Cytolologic screening and quality control in cytology laboratory.

Histology and Cytology Practicals

Includes practical demonstration of all contents includes in

theory syllabus contents.

Scheme of Examination and Syllabus: BMLT- II Year

Paper-II: Microbiology-II: PBMLT202

Subject	Theory	Internal Assessment	Practical	Total
Microbiology-II	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Microbiology after M.D. Microbiology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under.

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Scheme of Examination and Syllabus: BMLT- II Year

Paper-II: Microbiology-II: PBMLT202

Syllabus Contents

MICROBIOLOGY

I. Identification Of Bacteria

1. Micrococci
2. Staphylococci
3. Streptococci
4. Pneumococci
5. Corynebacteria
6. Escherrichia
7. Kiebsiella
8. Enterobacter
9. Proteus-providencia
10. salmo-nella
11. Shigella
12. Arrizona
13. Citrobacter
14. Yersinia
15. Pseudomonas
16. Vibrio
17. Haemophilus
18. Hydobacteris
19. Brucella
20. Bordetella
21. Bacillus
22. Clostridia
23. Anaerobic cocci
24. Neisseria
25. Treponema
26. Borrelia
27. Laptospira
28. Mycoplasma
29. Ricketessia
30. Chlomydia
31. Tric agent

Pathogenic And Nonpathogenic Fungi

1. Candida
2. Cryptococci
3. Dermatophytes
4. Sprotrichoums
5. Histoplasma
6. Blastomyces
7. Coccidioides
8. Para Coccidioides
9. Dematiaceous fungi
10. Mycetoma
11. Actinomyces
12. Nocardia

13. Common laboratory contamins
14. Biochemical test used for the identification of bacteria and fungi
15. Antimicrobial sensitivity testing
16. Assay methods for body fluids
17. Antimicrobial susceptibility testing for mycobacterium
18. Preparation and standardization of antigen and antisera

Virology

1. Different staining technique used virology.
2. Used of embryonated eggs in clinical virology
3. Principles of animal cell culture and their use in virology.
4. Use of common laboratory animals in viral culture.

Practical's

1. Demonstration of staining procedure: -
   Preparation of following stains and demonstration of viral inclusion of bodies: -
   a. Seller's stain for negri body demonstration.
   b. Giemsa's stain for CMV & Herpes viral inclusion.
2. Preparation of reagent for serological tests
   Phosphate buffered saline, veronal buffered saline, alsever's solution, dextrose gelatin, veronal buffer and tris buffer.
3. Principle and performance of viral haemoagglutination and haemoagglutination in hibition test.
4. Demonstration of haemadsorption test'IHA & RPHA test
5. Collection, titration and reservation of gunes pig serum for complement
6. Demonstration of complement fixation test
7. Demonstration of immunofluorescence test and immunoperoxidase tests.
8. Demonstration of ELISA for HBsAg detection

Parasitology

1. Morphology and life cycle of hemoflagellates – leishmania and trypanosomes.
2. Morphology and life cycle of tissue and blood nematodes

i. filariae, trichmella, dracunculus.

3. Laboratory diagnosis of tissue and blood nematodes infection: - tanenia, echinococcus.
4. Morphology and life cycle of intestinal cestodes – H. nana, D. Latum
5. Laboratory diagnosis of cessode infection- hydatid, cysticerosis.
6. Culture technique for protozoa, amoeba giardia, leishmania.
7. Culture method for helminth's –hook worm, round worm.
8. Egg counting techniques
9. Putting up cason's test and its interpretation.
10. Examination and processing of cysticerosis cyst.
11. Laboratory processing, staining and examination of sample.

Scheme of Examination and Syllabus: BMLT- II Year

Paper-III: Biochemistry-II: PBMLT203

Subject	Theory	Internal Assessment	Practical	Total
Biochemistry-II	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Biochemistry after M.D. Biochemistry with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Scheme of Examination and Syllabus: BMLT- II Year

Paper-III: Biochemistry-II: PBMLT203

Syllabus Contents

BIOCHEMISTRY

Analytical Biochemistry and Metabolism

1. Colorimeter
2. Spectrophotometer
3. Flame photometry
4. Atomic absorption spectroscopy
5. Electrometric determination of Na + and K +
6. Chromatography and electrophoresis.
7. Introduction, properties and simple metabolism of carbohydrates, protein, fats, nucleic and acid and enzymes
8. Digestion and absorption
9. Nutrition (vitamin and calories)
10. Radioimmunoassay (RIA) and ELISA

Biochemistry Practical

1. Study Of Colorimeter
2. Study of spectrophotometer
3. Study of flame photometer
4. Study of gel electrophoresis
5. Study of ELISA
6. Study of paper chromatography
7. Study of thin layer chromatography
8. Study of pH meter
9. To prepare phosphate buffer (200 ml pH 7.45) and determine its p H by using meter.
10. Determine the pKa value of acetic acid.
11. Estimation of sugar by DNS method.
12. To extract invertase enzyme from solanum tuberosum (patato).
13. Estimation of protein by lawry's method.
14. Estimation of protein by DNS method for determining the invertase activity.
15. Different type of glassware's and their composition.
16. Preparation of benedict's qualitative reagent.
17. Estimation of serum glutamate pyruvate transaminase enzyme (SGPT and ALT).
18. Determination of SGOT
19. Plot a standard graph of SGPT.
20. Plot a standard graph of SGOT.
21. Determination of serum acid phosphatase.
22. To plot a standard graph of serum acid phosphatase.
23. Determination of serum amylase by colorimeteric method.

Scheme of Examination and Syllabus: BMLT- II Year

Paper-IV: Hematology-II: PBMLT204

Subject	Theory	Internal Assessment	Practical	Total
Hematology-II	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Pathology after M.D. Pathology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Scheme of Examination and Syllabus: BMLT- II Year

Paper-IV: Hematology-II: PBMLT204

Syllabus contents

Fundamentals of hematology

1. History and discovery of blood group.
2. ABO and Rhesus blood group system.
3. Compatibility test in blood transfusion, complication and hazards of blood transfusion.
4. Laboratory investigation of transfusion reaction and mismatched transfusion.
5. Preparation of packed cells and various fractions of blood for transfusion purpose.
6. Staining of bone marrow smear and preparation of histological section
7. Hemoglobin its synthesis function and degradation.
8. Hemoglobin pigments and their measurements.
9. Abnormal hemoglobin and their means of identification and estimation.
10. LE cells phenomenon and various method of its demonstration.
11. Hemostatic mechanism and theories of blood coagulation.
12. Screening coagulation procedure.
13. Quantitative assay of coagulation factors.

BACHLOR OF MEDICAL LABORATORY TECHNOLOGY

III YEAR

(Effective from Academic Year 2022-23)

Scheme of Examination: BMLT-III Year

S.No.	Subject	Theory	Internal Assessment	Practical	Total
1	Applied Histopathology	100	100	100	300
2	Microbiology-III	100	100	100	300
3	Biochemistry-III	100	100	100	300
4	Hematology-III	100	100	100	300
Total					1200
5	Instrumentation #	--	50	--	50
Total Max. Marks					**1250**

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

-All theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Scheme of Examination and Syllabus: BMLT - III Year

Paper-I: Applied Histopathology: PBMLT301

Subject	Theory	Internal Assessment	Practical	Total
Applied Histopathology	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Pathology after M.D. Pathology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Paper-I: Applied Histopathology: PBMLT301

Syllabus contents

SPECIAL HISTOLOGY AND HISTOCHEMICAL METHODS

I. Applied Histology

1. Handling of fresh histological specimen, cryo/frozen section of fresh and fixed tissue, freeze drying.
2. Lipid identification and demonstration
3. Micro-organism in the tissue-various staining techniques for their demonstration and identification.
4. Nucleic acid, DNA and RNA special stains and procedures.
5. Cytoplasmic constituent and their demonstration.
6. Tissue requiring special treatment i. e eye ball, B.M. biopsy, under calcified bones.
7. Neuropathology techniques.
8. Enzyme histochemistry demonstration of phosphatase, dehydrogenase, oxidase and peroxidase etc.
9. Electron microscope, their working, component and allied techniques for electron microscopy.
10. Ultra microtomy
11. Museum technique.

II. Cytology

1. Cervical cytology –basis of detection of malignant and pre malignant lesions.
2. Hormonal assessment with cytological techniques and sex chromatin and pregnancy test.
3. Aspiration cytology principles, indications and utility of technician in FNAC clinics.

III. Immunopathology

1. cells and organs of immune systems
2. immunoglobulin's antibodies and humoral immune response.
3. Allergy
4. Rheumatological diseases and investigations.
5. Infection and the immune system.
6. Cancer immunology
7. Tissue typing for kidney transplant.

Scheme of Examination and Syllabus: BMLT - III Year

Paper-II: Microbiology-III: PBMLT302

Subject	Theory	Internal Assessment	Practical	Total
Microbiology-III	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Microbiology after M.D. /M.Sc. Microbiology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

Scheme of Examination and Syllabus: BMLT - III Year

Paper-II: Microbiology-III: PBMLT302

Syllabus Contents

MICROBIOLOGY

I Applied Microbiology

1. Preservation of microbes and lyophilisation methods.
2. Total and viable count of bacteria.
3. Testing of disinfectant Riedeal –walker, Chick Martin, In use test.
4. Preparation and standardisation of vaccines and immunization schedule.
5. Bacteriological examination of water milk, food and air.
6. Nosocomial infections and sterility testing of IV fluids and processing of various samples for hospital infections.
7. Toxin-Antitoxin Assay and pathogenicity tests.
8. Epidemiological markers of micro-organisms serotyping, bacteriophage and bacteriocin typing method.
9. laboratory diagnosis of common bacterial infections-pyogenic infections, respiratory tract infections, meningitis, diphtheria, whooping cough, gas gangrene, food poisoning, entric fever, acute diarrhoeal disease, cholera, urinary tract infections, tuberculosis, leprosy, plague, anthrax, typhoid fever, syphilis, gonorrhea and others STDs disease.
10. Serological test. Widal, ASO, LET, CRP, Rosewaller brucella agglutination, cold agglutination, VDRL, TPHA FTA – ABS.
11. laboratory diagnosis of fungal infections Superficial dermatophyte, fungal infections, candidiasis infection, cryptococcosis, pulmonary infections, Mycetoma, other deep mycotic infections, subcutaneous fungal infections - Sporotrichosis, chromoblasato mycosis, eye and ear fungal infections.
12. Serological test for fungal infection and skin tests.
13. Advance techniques in microbiology – ELISA, RIA, CCIE, Coagglutination, GLC, HPLC etc.
14. Rapid diagnostic method and automation in microbiology.

II. Basic Virology Methods

1. Principles of serology techniques used in virology – PART I: HA, HAI, HAB, SRB RPHA, JHA, CET, CIEP.
2. Principles of serology techniques used in virology – PART II Ht, ELISA, RIA, IF, Immuno-ferooxidase test.
3. Mode of transmission of viral agent.
4. Prevention of viral diseases.
5. Immunity of viral infections.

Practical's

1. Demonstration of anatomical structure in fertile hen's egg –technique of inoculation of fertile egg-
    a. Chorioallantoic
    b. Membrane
    c. Allantois cavity
    d. Yolk sac
2. Inoculation of virus infected material into the mice by the following route: -
    a. Intracerebral
    b. Intravenous
    c. Intraperitoneal
    d. Subcutaneous
3. Harvesting of infected of infected mouse brain for rabies virus.
4. Preparation of tissue culture media: -
    a. Hank's balance salt solution
    b. Barle's balanced salt solution
    c. Minimum essential medium

5. Collection of blood from: -
    a. Mice - retro orbital route
    b. One day old chick –cardiac bleeding
6. Preparation of guinea pig kidney powder for Paul Bunnel Test.
7. Demonstration of Arboviral Antigen preparation from mouse brain for HAI and CFT Test.
8. Demonstration of herpes viral antigen in tissue culture system.

III Parasitology

i. Morphology and life cycle of: -Free Living Amoeba Balantidium Toxoplasma
ii. Diagnosis of morphology and life cycle of tramatiodes: - schistosomes Intestinal flukes Blood flukes Lung flukes
iii. Serological & immunological technique used for the diagnosis of: - gel- diffusion THFA, IFA. ELISA, indirect fluorescent antibody Iv. Introduction to the biological identification of adult: - mosquitoes
iv. iv. Flies Tics and fleas Animal care and handling and its uses in parasitological preparation of parasitic antigen and antisera. handling and operation of sophisticated equipments.

Practical's

1. Serological and immunological test use in parasitological
    a. Gel diffusion technique
    b. Electrophoretic technique
    c. Preparation of various parasitic antigen and standardization.
    d. Differentiation of various mosquito's flies, worms and ticks.
    e. Uses of laboratory animals bleeding and inoculation.

Scheme of Examination and Syllabus: BMLT - III Year

Paper-III: Biochemistry-III: PBMLT303

Subject	Theory	Internal Assessment	Practical	Total
Biochemistry-III	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Biochemistry after M.D. Biochemistry with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Scheme of Examination and Syllabus: BMLT - III Year

Paper-III: Biochemistry-III: PBMLT303

Syllabus Contents

CLINICAL BIOCHEMISTRY METHODS

1. Principle for assay procedure for biological material-
   i. Total protein
   ii. Total albumin
   iii. Glucose
   iv. Urea
   v. Uric acid
   vi. Creatinine
   vii. Cholesterol
   viii. Bilirubin
   ix. Sodium
   x. Potassium
   xi. Chloride
   xii. Calcium
   xiii. Inorganic phosphates
   xiv. PBD 17 ketosterious
   xv. Barbiturates
2. Glucose tolerance test
3. Insulin tolerance test gastric analysis
4. Xylose absorption test
5. Clearance test for renal function
6. Enzyme-acid and alkaline phosphatase
7. AST
8. ALT
9. Amylase lactate dehydrogenase
10. CPK
11. Analysis of calculi and CSF
12. Quality control of clinical investigations
13. Automation in clinical biochemistry laboratory
14. Laboratory organizations
15. Management and maintenance of records

Scheme of Examination and Syllabus: BMLT - III Year

Paper-IV: Hematology-III: PBMLT304

Subject	Theory	Internal Assessment	Practical	Total
Hematology-III	100	100	100	300

N.B.-Internal Assessment marks will be added in theory marks; candidate have to get min. 50% marks i.e.-100 marks in theory and internal assessment collectively for passing the examination and in practical he/she should get 50% marks i.e.-50 marks to get pass.

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations.

Recognized teachers in Pathology after M.D. Pathology with five years of teaching experience shall be on the panel of examiner.

Theory papers will of 100 max. marks and 3Hrs. time duration. Pattern of Examination (Theory) if Maximum Marks are 100 will be as under; -

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	02	20
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		**100**

Instruction For the Paper Setter

Section-A: This will consist of 10 very short answer type questions with answer to each question up to five lines (50-60 words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weightage of the section shall be 20 marks.

Section-B: This will consist of short answer questions with answer to each question up to 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five have to be answered by the candidate. Each question will carry 10 marks. Total weightage of the section shall be 50 marks.

Section-C: This will consist of essay type questions with answer to each question up to 5 pages (approx. 500 words) in length. Four questions will be set by the examiner and two have to be answered by the candidate. Each question will carry 15 marks. Total weightage of the section shall be 30 marks.

Instructions For the Candidates: Answer all questions only in required word.

Scheme of Examination and Syllabus: BMLT - III Year

Paper-IV: Hematology-III: PBMLT304

Syllabus Contents

HAEMATOLOGY APPLIED HAEMATOLOGY

1. Definition and classification of Anaemia's.
2. Laboratory investigations of megaloblastic anemia.
3. Laboratory investigations of iron deficiency anemia.
4. Laboratory investigations of hemolytic anemia including classification and causes.
5. Leukemia: -definition and classification
6. Cytochemical staining procedures in various haemopoietic disorder.
7. Laboratory test for assessing bleeding disorder.
8. Laboratory investigation for disseminated intravascular coagulation
9. Mechanism of fibrinolysis: Test for fibrinolysis
10. Platelet's function test and their interpretation.
11. Techniques available for cytogenetic studies.
12. Uses of radio-isotopes in hematology.
    Safety measures for handling radio-isotopes.

Scheme Of Examination & Syllabus: Bmlt-3rd Year

Instrumentation: PBMLT305

Subject	Theory		Internal Assessment	Practical	Total
Instrumentation #	--		50	--	50

N.B.-There will be institutional examination/practical demonstrations of following instruments and procedures of 50 max. marks, where min.25 marks are required to get pass and after duly compilation of examination the marks have to send to university prior to theory examination.

INSTRUMENTATION

1. SIMPLE MICROSCOPY
2. Compound microscopy
3. Dark ground microscopy
4. Phase contrast microscopy
5. Fluorescence microscopy
6. PTL metry
7. Photometry electro
8. Spectrophotometry
9. Haemoglobinometry
10. Hemocytometer
11. hematocrit
12. centrifuge
13. Sterilization instrument (Autoclave, Hot air oven, Laminar air flow)
14. Egg incubator and dental drill
15. Co incubator
16. Bacteriological incubator
17. Microtome and accessories
18. Tissue floatation bath
19. Tissue meton.
20. Serological water bath
21. Micropipettes and microliter plates
22. Cellephan tubes and bags.
23. Paper and gel electrophoresis
24. Flame photometer
25. Polarizing microscope
26. Micro-hematocrit centrifuge
27. Gas chromatography
28. Radio immune assay
29. Auto analyzers
30. ECG