

# RULES, REGULATION AND SYLLABUS

Faculty of Paramedical Sciences



## Master of Science in Medical Laboratory Technology (Microbiology)

Uttar Pradesh University of Medical Sciences, Saifal

Dean  
Faculty of Paramedical Sciences,  
UPUMS Saifal



Sr No.	Questions	Probable answer
1	What is the name of course? (Nomenclature)	Master of Science in Medical Laboratory Technology (Microbiology)
2	What is the broad area of profession? (Medical, Allied, Healthcare , others).	Allied Healthcare Profession
3	What is the scope of this course?	<p>Job opportunities after M. Sc Medical Lab Technology in India are numerous in both the private and government sectors. Graduates can work in research clinics, laboratories, companies, the industrial sector, etc. The graduates can choose one of the jobs after M.Sc Medical Lab Technology in a variety of fields such as Healthcare Administrator, Research Scientist, Biomedical Analyst, Lab Technician, etc.</p> <p>The following are the most common M.Sc Medical Lab Technology job opportunities:</p> <ul style="list-style-type: none"> <li>• Biomedical Analyst</li> <li>• Lab Technician</li> <li>• Research Scientist</li> <li>• Phlebotomist</li> <li>• Biochemist</li> <li>• Operations Manager</li> </ul> <p>The M. Sc Medical Lab Technology provides a postgraduate degree education that can assist in boosting an individual's career. The course is mostly an advanced course for individuals who are interested in pursuing higher education and degrees in this field. As a result, the M.Sc Medical Lab Technology scope and salary in India are always at an increasing rate.</p> <ul style="list-style-type: none"> <li>• Government and Private Companies</li> <li>• Food and Drug Toxicology Research Centre</li> <li>• DRDO</li> <li>• Industrial Sector</li> <li>• Government Hospitals</li> <li>• Indian Council of Medical Research</li> </ul>
4	What are the learning goals and objective of the profession?	<p><b>Learning Objectives:</b> At the completion of this course, the student should be -</p> <p>(i) Advanced and up-to-date knowledge and excel in the academic field of study as a whole and its applications, and links to related disciplinary areas/subjects of study; including a critical understanding of the established theories, principles and concepts, and of a number of</p>




  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal.



		<p>advanced and emerging issues in the field of Medical Laboratory Sciences.</p> <p>(ii) Procedural knowledge that creates different types of professionals related to the Medical Laboratory Sciences, including research and development, teaching in government and public service;</p> <p>(iii) Professional and communication skills in the domain of Medical Laboratory Sciences, including a critical understanding of the latest developments, and an ability to use established techniques in the domain of Medical Laboratory Sciences.</p> <p>(iv) Possess comprehensive knowledge about Medical Laboratory Sciences, including current research, scholarly, and/or professional literature, relating to essential and advanced learning areas pertaining to the field of study, and techniques and skills required for identifying problems and issues.</p> <p>Proficient skills in</p> <p>i) identifying the issues in health care needs;</p> <p>ii) collection of quantitative and/or qualitative data relevant to client's needs and professional practice;</p> <p>iii) analysis and interpretation of data using methodologies as appropriate for formulating evidence based hypotheses and solutions.</p> <p>(iv) Apply knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to Physiotherapy in various specialties.</p> <p>(v) Communicate efficiently with all stakeholders, and provide relevant information to the members of the healthcare team.</p> <p>(vi) Optimize one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials based on new frontiers of knowledge.</p> <p>(vii) Execute one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyse problems and issues and seek solutions to real-life problems</p>
5	What is the job responsibility of the Profession?	<p><b>Lab Technician:</b> The role of a Lab Technician includes collecting, accurately marking and analyzing samples of blood, tissues, urine, faeces etc. and framing a proper report card of patients. Lab Technicians are the backbone of any scientific research lab.</p> <p><b>Senior Biomedical Analyst:</b> Biomedical scientists or analysts are responsible for diagnosing illnesses such as HIV, cancer, diabetes, hepatitis,</p>


  
 Dean  
 Faculty of Paramedical Sciences,  
 UPUMS Saifai

		<p>meningitis etc. The work is majorly lab based. Other tasks involved are analyzing the cultures and samples and interpreting the results.</p> <p><b>Healthcare Administrator:</b> A healthcare administrator outlooks for everyday administrative operations of hospitals &amp; other healthcare facilities. They are also responsible for supervising all the medical services such as monitoring budgets &amp; updating health records.</p> <p><b>Health and Safety Officer:</b> The job role typically involves designing health and safety strategies to ensure compliance with mandatory regulations. Apart from that, they also carry out regular audits, outlooks any risky or unsafe behavior. Conduct analytical reports of safety data. Inspect equipment productions to make sure they are safe.</p> <p><b>Academician:</b> Teaching students enrolled in undergraduate or postgraduate programmes or both. He or she prepares study materials, conducts research, invigilates examinations as well as attends staff meetings, conferences and seminars.</p>									
6	Is any foundation Course required during this course?	NO									
7	What is the duration of this course? (Including Teaching hours, Clinical Posting, Internship etc)	4 Semesters (2 years) Total hours =2,150									
8	What is the medium of Teaching?	English									
9	What is intake capacity per year?	06									
10	Is hospital training required during this course?	Yes									
11	What are required facilities (No. of Bed) in the Hospital to conduct the course?	The institution must provide in-house facility for clinical training of students. In the absence of this a Memorandum of Understanding with access to hands on clinical training should be made with specialty hospitals and institutions in each of the areas of Diagnostic Microbiology. The student to patient ratio in the hospital/institution should be 1:3.									
12	What is the required teaching faculty to student ratio?	<p>Faculty and student ratio of 1:3</p> <p>Total number of minimum faculty for all the two years will be as follows -:</p> <p><b><u>For M Sc MLT (Microbiology)</u></b></p> <table> <tr> <td>Professor</td> <td>-</td> <td>01</td> </tr> <tr> <td>Associate Professor</td> <td>-</td> <td>01</td> </tr> <tr> <td>Assistant Professor</td> <td>-</td> <td>02</td> </tr> </table>	Professor	-	01	Associate Professor	-	01	Assistant Professor	-	02
Professor	-	01									
Associate Professor	-	01									
Assistant Professor	-	02									

  
**Dean**  
 Faculty of Paramedical Sciences,  
 IPUMS Saifal



13	What are required non-teaching staffs?	Clerk-01, Computer operator-01, Lab Technician for each lab-02, Lab assistant for each lab-02, Driver-01, Peon-01
14	What are role & responsibilities of Teaching Faculty and non Teaching staff?	Whoever adopts teaching as a profession assumes the obligation to conduct himself / herself in accordance with the ideal of the profession. A teacher is constantly under the scrutiny of his students and the society at large. Therefore, every teacher should see that there is no incompatibility between his precepts and practice. The national ideals of education which have already been set forth and which he/she should seek to inculcate among students must be his/her own ideals. The profession further requires that the teacher should be calm, patient and communicative by temperament and amiable in disposition.
15	What are the minimum required infrastructure and facilities to conduct the course?	Annexure-A attached at the bottom of this questionnaire
16	What is the selection process for the Course?	Admission to M Sc MLT (Microbiology) course shall be made on the basis of merit obtained by the students in the entrance examination conducted by the UPUMS or by State regulatory body. Selected candidate has to be medically fit to join the course.
17	What are the eligibility criteria for the course?	Professional Qualification- A candidate seeking admission to degree in M Sc MLT (Microbiology) must have completed the degree of B Sc Medical Laboratory Technology with 6 months compulsory internship or Equivalent from any recognized Institute or University in India or a degree of a foreign university recognized as equivalent with at least 50% marks in aggregate.
18	Is lateral entry available in this course?	No
19	What is the eligibility criterion for lateral entry to this course?	N/A
20	Are additional subjects included under eligibility or not?	N/A
21	What is the minimum and maximum age for admission to this course?	The candidate seeking admission into the M Sc MLT (Microbiology) program should have a minimum age of 20 years as on 31 <sup>st</sup> December of that academic year and there is no maximum age limit.
22	What are the Reservation Policy for admission including PH,FF, EWS, Ex Army etc.?(Explain Horizontal and Vertical)?	As per the govt. of Uttar Pradesh
23	Criteria for validation of reservation certificates?	As per the govt. of Uttar Pradesh

  
 Dean  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal

24	Criteria for admission from other states students? (Moolnivas / General Domicile)	Open to all Indian Nationals.
25	What are the documents required to be submitted for admission into the course?	<p>The following documents has to be submitted in original and 2 sets of self attested Xerox copies</p> <ol style="list-style-type: none"> <li>1. High school certificate ( For DOB proof)</li> <li>2. Intermediate /10+2/other equivalent certificate and marks sheet</li> <li>3. Original or Provisional (valid for 6 months) B Sc MLT or equivalent degree.</li> <li>4. Marks sheets of all years/Semesters</li> <li>5. Internship completion certificate.</li> <li>6. Migration/Transfer certificate</li> <li>7. Domicile certificate</li> <li>8. Caste certificate(if applicable)</li> <li>9. Character certificate</li> <li>10. Affidavit for gap in the education period.</li> <li>11. Affidavit by student and parent/ Guardian for anti ragging declaration</li> <li>12. Aadhar card (Xerox copy)</li> <li>13. 4 latest color passport size photographs</li> </ol>
26	What is the process of the enrollment of students?	<p>The students admitted through CPPNET in this course will be enrolled by UPUMS Saifai. The process of enrollment should be completed within one month after the closing of admission to that session. The required documents for enrollment are as follows:</p> <ol style="list-style-type: none"> <li>1. Enrollment form (Provided by University)</li> <li>2. High school certificate</li> <li>3. Intermediate /10+2/other equivalent certificate and marks sheet</li> <li>4. Original or Provisional (valid for 6 months) B Sc M LT or equivalent degree.</li> <li>5. Marks sheets of all years/Semesters</li> <li>6. Internship completion certificate</li> <li>7. Migration/Transfer certificate</li> <li>8. One Photographs</li> </ol>

  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifai



		9. Enrollment fee
27	What are the required hours (working days) for students per semester?	Each semester shall consist of a minimum of 90 working days ( 90 x 6 hours per day = 540 hours excluding examination days and vacation.
28	What are the attendance criteria to appear in university semester end Examination? (Theory and Practical Separately)	A candidate has to secure minimum of 75% attendance in theory and 80% in skills training to appear in the university semester end examination.
29	What are the Examination Criteria (for appear in examination)?	Candidate must obtain at least 35% marks in theory and practical's separately in internal assessment to be eligible for the university semester end examination.
30	What are the learning outcome / knowledge comprehension / application of this study? (per year)	Annexure-B attached at the bottom of this questionnaire
31	What are the learning outcome / Program objective and graduate attributes for this course?	<p>Graduates will apply knowledge of entry-level skills to accurately perform testing in all areas of the medical laboratory.</p> <p>Graduates will evaluate clinical laboratory data and relate that data to various disease processes.</p> <p>Graduates will comply with laboratory safety regulations and standards.</p> <p>Graduates will demonstrate the elements of professionalism to operate as respected members of the health care team.</p> <p>Graduates will employ interpersonal communication skills in relaying laboratory test information and when interacting with patients, lab personnel and other health care professionals.</p>
32	Model of Paper (For Theory & Practical both)	Annexure-C attached at the bottom of this questionnaire
33	What are Eligibility Criteria For Examiners? (External & Internal)	Minimum five years post PG Teaching Experience as Lecturer/ Asst. Professor and above.
34	What are the criteria for commencement of examination (Annual/Supple) twice annually?	University examinations are conducted Semester wise.



Dean  
Faculty of Paramedical Sciences,  
UPUMS Salfal

35	What are the Criteria for Internal Assessment? (Notes/practical file/Chart/Attendance/Discipline/Dress)	<p>INTERNAL ASSESSMENT: Two internal examinations shall be conducted in a semester.</p> <p>It will be for theory and practical both.</p> <p>It will be done throughout the semester.</p> <p>Candidate must obtain at least 35% marks in theory and practical separately in internal assessment to be eligible for the university semester end examination.</p> <p>Internal assessment (Theory) will be done as follows :</p> <p>a) Mid-semester examinations = 15 marks  b) Assignments/Projects/Class test/Clinical Presentations = 05 marks  c) Attendance = 05 marks  Total = 25 marks</p> <p>Internal assessment (Practical) will be done as follows :</p> <p>a) Laboratory manual = 15 marks  b) Day to day performance = 05 marks  c) Attendance = 05 marks  Total = 25 marks</p>		
36	How many semesters are present in an academic year?	Semester	Starting Month	
		ODD Semester 1 <sup>st</sup> , 3 <sup>rd</sup>	August to January	
		EVEN Semester 2 <sup>nd</sup> , 4 <sup>th</sup>	February to July	
37	What is the Examination Paper Pattern for internal and external examination? (Objective or Subjective)	<p>Subjective</p> <p>Annexure C</p>		
38	What are the Passing Criteria?	<p>The passing marks for every course in the semester should be 50% marks. (Semester end examination combined with Internal examination marks) in theory and practical considered separately</p>		
39	What are the Criteria for Semester back students?	<ol style="list-style-type: none"> <li>1. If any student enrolled the end semester examination unable to appear in all the courses of that examination then he/she has to repeat the semester with the regular batch.</li> <li>2. If the student is not fulfilling the eligibility criteria for semester end examination for what so ever reason, then he/she has to repeat the semester with the regular batch.</li> </ol>		
40	What are the schedules for conduction of Odd and Even semester end examination?	<p>Odd semester end examination will be conducted in the month of December/January and Even semester end examination will be conducted in the month of June/July.</p>		
41	What are the Criteria for the Promotion to next semester?	<ol style="list-style-type: none"> <li>1. The student will be promoted to next semester after Semester end University examination:</li> <li>2. The student is allowed to carry forward the failed courses to the next semester only if he/she passes 50 % of the courses in that semester.</li> </ol>		

  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal



		The student can carry forward such courses till 4 <sup>th</sup> semester.
42	What are the eligibility criteria to appear in the final semester examination?	<ol style="list-style-type: none"> <li>1. Attendance and Internal assessment marks as per the norms mentioned above.</li> <li>2. Carry forward courses as per the norms mentioned above</li> </ol>
43	What are the criteria for carry forward examinations?	<p>The student failing in even semester shall reappear in the fail subject/s with next even semester.</p> <p>The student failing in odd semester shall appear in the fail subject/s in next odd semester.</p>
43	What are the Criteria for Grace Marks?	The student has failed in only one subject and has passed in all the other subjects of a particular semester and Grace marks of up to 5 marks to theory marks can be added for one subject only, provided that by such an addition the student passes the semester examination.
44	What are the Criteria for Reviewing of answer paper of failed candidates (Scrutiny/Re-totaling, Re-checking)?	The student has failed in only one course and has passed in all the other courses of a particular semester then grace marks of up to 5 marks to theory marks can be added for one course only, provided that by such an addition the student passes the course and end- semester examination.
45	What are the Criteria for Challenge Evaluation?	<ol style="list-style-type: none"> <li>1. The candidate seeking Scrutiny/Re-totaling of his / her answer script must apply within 10 days from the date of publications of the results.</li> <li>2. No application will be entertained after the stipulated period mentioned above.</li> <li>3. Scrutiny/Re-totaling in a maximum of only 2 (two) papers will be allowed.</li> <li>4. Scrutiny/Re-totaling Fee - Rs.300.00 (rupees three hundred) per paper.</li> <li>5. The application for Scrutiny/Re-totaling must be submitted directly to the examination department along required document(s).</li> <li>6. Marks awarded after Scrutiny/Re-totaling shall be retained as the final marks even if such marks may be lower than the marks originally awarded and a fresh mark - sheet shall be issued.</li> <li>7. No claim whatsoever for retaining the original marks shall be entertained. Application found without original mark sheet shall not be processed.</li> <li>8. Re-checking is not allowed.</li> </ol>
46	What is the Maximum duration of the program?	Candidates should complete the M Sc MLT (Microbiology) course within a period of 4 (four) years from the date of joining in the course.
47	What is the classification of successful candidate?	<p>A successful candidate</p> <p>The candidate obtaining 75% or above marks in any subject, he will be declared pass with distinction in that particular subject, and a letter (D) shall</p>



**Dean**  
Faculty of Paramedical Sciences,  
UPUMS Saifal



		<p>be suffixed in the marks sheet against the subject.</p> <p>A candidate securing 50% or above in a subject is declared to pass in that particular subject.</p>
48	What are the criteria for Re-admission of students after break of studies?	Readmission in to the course is allowed only in the condition, that the total duration of the course is not exceeding 4 years.
49	What is the Rule for providing Provisional Passing Certificate?	<p>After successful completion of Final semester (iv) and submission of Dissertation, the student shall have to apply for Provisional Passing Certificate in prescribed application format along with supporting documents to examination department of the university by paying the prescribed fee of Rs. 300/- only.</p> <p>The examination department of the university after scrutiny of application shall provide provisional certificate.</p>
50	What is the Rule for providing original degree?	<p>Original degree will be provided after 6(six) months of successful completion of course/Convocation of the University or whichever is earlier.</p> <p>The candidate shall have to apply for original degree to The, Registrar, Uttar Pradesh University of Medical Sciences, Saifai along with prescribed fee of Rs. 300/- only.</p>
51	What are the Rules for Synopsis & Dissertation?	<p>The student shall submit a detailed synopsis (5 copies) signed by the guide and by the candidate:</p> <ol style="list-style-type: none"> <li>1. The evidence of his/her qualification</li> <li>2. The topic of same specialty for M Sc</li> <li>3. The subject of the proposed research and dissertation</li> <li>4. The outline of the proposed research work.</li> <li>5. The place/Institution where he/she proposes to carry on his/her research work.</li> <li>6. The name of the guide under whom he/she proposes to carry on his/her research work.</li> </ol> <p>He/she shall settle the subject of his/her dissertation work and prepare a brief outline under the guidance of the guide under whom he/she proposes to work and carry out his/her research works within three months of his admission to the program.</p> <p><b>Note:</b> A person shall not be appointed Guide to supervise his/her relatives (son, daughter, husband, wife, sister, brother and relative in law)</p>

  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifai



To consider the synopsis submitted for M Sc MLT programme of the University for approval the University shall look into the following matters:

- i) That the candidate possesses the requisite qualifications.
- ii) Affidavit from the Management of the College that adequate and appropriate faculty and facilities exist at the place of research for the proposed work.

**Documents to be submitted at the time of submission of the Dissertation**

- a. The dissertation shall be submitted three months prior to the final examination and approval of dissertation after plagiarism check will be the pre-requisite condition for the final examination eligibility.
- b. The candidate shall submit three copies of his/her dissertation in a format prescribed by the University with 1 research publication in indexed journal as annexure.
- c. Certificate from the guide to the effect that:-(i) The dissertation embodies the work of the candidate himself/ herself.
- e. A Certificate from the Principal of the College to the effect that -The candidate has worked for the period prescribed under the ordinance and has put in the required attendance during that period at the place/s of research and no dues are pending against the candidate.

**Evaluation of Dissertation**

The examiners shall examine the dissertation and submit their detail report and send final recommendation which shall be in the following form:

- a. The dissertation and any other contribution to the study of the subject of the candidate shall be evaluated by the examiners appointed by the University. The candidate shall be required to present him/herself at specified time and place to be tested orally or by means of written or practical or both.
- b. A dissertation shall be treated as having been accepted on the recommendation of the examiners stating that the dissertation and research work carried out by the candidate is to their satisfaction.
- c. If the examiner recommends revision, the candidate shall be permitted to submit the dissertation in a revised form within the time specified by the University.

**Note:** The copy of the dissertation in the library of the university and the library of the concerned college shall be kept.

		<p align="center"><b><u>Certificate of Supervisor/ Guide</u></b></p> <p>This is to certify that work embodied in this dissertation entitled..... has been carried out by..... under my/our supervision and guidance.</p> <p>No part of this dissertation has been submitted for any other degree. The work included in this dissertation is original and is own work of the candidate.</p>																					
52	What are the criteria for eligibility of Guide/ supervisor?	<p>The guide/Supervisor to be assigned for PG students should posses Master degree in concerned specialty with 5 years Post-P.G teaching experience in the rank of Lecturer/ Assistant Professor and above.</p> <p>The Guide: Student ratio is 1:3.</p>																					
53	Whether M Sc MLT student during his/her course period will get stipend or not?	As per the University Norms.																					
54	What are the Criteria for Vacation in an academic year for students? (Academic calendar)	The Head of the Institution may declare 30 days of vacation in an academic year to the students without a semester break. The period(s) of vacation can be decided by the Head of the Institution																					
57	What are the criteria for award of Degree?	A candidate passing in all semesters/ subjects and satisfactory completion of Dissertation is eligible for award of MPT degree.																					
58	Details for syllabus & curriculum?	Syllabus attached at the end of this table as Annexure D																					
59	Is curriculum credit hour based?	Yes. It is mentioned in Annexure D																					
60	Is CGPA followed for evaluation and assessment?	<p>The UGC has recommended system of awarding grades and CGPA for all the UG/PG courses. UPUMS would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals. The UGC recommended 10-point grading system with the following letter grades will be followed:</p> <p align="center"><b>Table 1: CGPA Grading System - Marks Equivalence Table</b></p> <table border="1"> <thead> <tr> <th><i>Letter Grade</i></th> <th><i>Grade Point</i></th> <th><i>% of Marks</i></th> </tr> </thead> <tbody> <tr> <td><i>O (Outstanding)</i></td> <td align="center">10</td> <td align="center">86-100</td> </tr> <tr> <td><i>A+ (Excellent)</i></td> <td align="center">9</td> <td align="center">70-85</td> </tr> <tr> <td><i>A (Very Good)</i></td> <td align="center">8</td> <td align="center">60 -69</td> </tr> <tr> <td><i>B (Good)</i></td> <td align="center">7</td> <td align="center">55 -59</td> </tr> <tr> <td><i>C (Above Average) –</i></td> <td align="center">6</td> <td align="center">50- 54</td> </tr> <tr> <td><i>F (Fail) )/ RA (Reappear)</i></td> <td align="center">0</td> <td align="center">Less than</td> </tr> </tbody> </table>	<i>Letter Grade</i>	<i>Grade Point</i>	<i>% of Marks</i>	<i>O (Outstanding)</i>	10	86-100	<i>A+ (Excellent)</i>	9	70-85	<i>A (Very Good)</i>	8	60 -69	<i>B (Good)</i>	7	55 -59	<i>C (Above Average) –</i>	6	50- 54	<i>F (Fail) )/ RA (Reappear)</i>	0	Less than
<i>Letter Grade</i>	<i>Grade Point</i>	<i>% of Marks</i>																					
<i>O (Outstanding)</i>	10	86-100																					
<i>A+ (Excellent)</i>	9	70-85																					
<i>A (Very Good)</i>	8	60 -69																					
<i>B (Good)</i>	7	55 -59																					
<i>C (Above Average) –</i>	6	50- 54																					
<i>F (Fail) )/ RA (Reappear)</i>	0	Less than																					

<i>Ab (Absent)</i>	0	-
<i>NC- not completed</i>	0	-
<i>RC- Repeat the Course</i>	0	0

A student obtaining Grade F/RA will be considered failed and will require reappearing in the examination.

Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 50% attendance or less than 50% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

**Table 2: Cumulative Grades and Grade Points**

<i>Letter Grade</i>	<i>Grade Point</i>	<i>CGPA</i>
<i>O (Outstanding)</i>	10	9.01 - 10.00
<i>A+ (Excellent)</i>	9	8.01 - 9.00
<i>A (Very Good)</i>	8	7.01 - 8.00
<i>B (Good)</i>	7	6.00 - 7.00
<i>C (Above Average)</i>	6	5.01 - 6.00

**Assessment of a Course:**

Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CGPA to conduct internal assessments, followed by one end-semester university examination (ES) for each course. Courses in programs where in Theory and Practical/Clinical are assessed jointly, the minimum passing head has to be 50% Grade each for theory and practical's separately. RA (Re appear) grade in either of the components will amount to reappearing in respective components only. i.e. the student failing in theory/practical shall appear in theory/practical respectively.

**Computation of SGPA and CGPA**

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone & earned by a student, i.e.,

$$SGPA (S_i) = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

where  $C_i$  is the number of credits of the  $i$ th course and  $G_i$  is the grade point scored by the student in the  $i$ th course.

  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal



		<p>The CGPA is also calculated in the same manner taking into account all the courses undergone &amp; earned by a student over all the semesters of a programme, i.e.</p> $CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i}$ <p>where <math>S_i</math> is the SGPA of the <math>i</math>th semester and <math>C_i</math> is the total number of credits in that semester.</p> <p>The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.</p>
61	Is Sponsored candidate allowed to get admission in this course?	No
62	How many days of leave is allowed for the Students during a semester?	No leave is permitted.
63	How to Leave the course in between?	The student can be allowed to leave the course on submission of No dues certificate and no caution deposit will be refunded.
64	Academic calendar	ANNEXURE : E
65	Format for Various certificates issued by Faculty of paramedical sciences	<p>ANNEXURE : F</p> <ul style="list-style-type: none"> <li>Character certificate</li> <li>College leaving certificate</li> <li>Course completion certificate</li> <li>Internship completion certificate</li> <li>No objection certificate</li> <li>No dues form for Hostel</li> <li>No dues form for college.</li> <li>Admission form</li> <li>Hostel admission form</li> <li>0. Caution money refund form</li> <li>1. Temporary Documents withdrawal form</li> </ul>
66	Fee structure	ANNEXURE G
67	Is there any Internship in the M Sc MLT program?	No Internship in M Sc MLT program.
68	What are the rules and regulations for forming institutional research committee?	<p><i>Composition and SOP's of Departmental Research Committee (DRC)/Institutional research committee (IRC)- Annexure H</i></p> <p>If the proposed research work entails experimental work on humans or work in the animal laboratory, the application shall be accompanied by a certificate of</p>

  
 Dean  
 Faculty of Paramedical Sciences,  
 UPUMS Saltal

		<p>clearance has to be obtained from concerned Govt. approved Institutional Ethics Committee (IEC).</p> <p>If the experimental study involves clinical trial (RCT), then the study should be registered with CTRI (Clinical trials registry of India)(As per the IEC SOP).</p> <p>External guide from outside Institution/place of clinical posting will be allowed to guide and supervise the research work of the candidate provided the external guide satisfies qualification as per norms.</p> <p>The candidate shall meet and discuss with the guide the plans and progress of his/her research work when the guide ask him/her to do so.</p> <p>The candidate shall submit the plans and progress of his/her research in a prescribed format once in 6 months. The progress reports will be reviewed by the Research Committee.</p> <p>The candidate should publish at least one article in any indexed journal and it should be annexed in the dissertation.</p> <p>When the dissertation is ready for submission to the university, the student shall also certify that the work presented in the dissertation is the candidate's own work and shall submit the draft thesis for plagiarism check in the University. The University will perform plagiarism checks of research work through an University approved software and only when it is satisfied that the research work is free of plagiarism shall the thesis work be accepted for submission for award of marks.</p>
69	How work dairy is maintained by the PG student?	<p>Every candidate shall maintain a work diary and record his/her participation in the training programmers conducted by the department such as journal reviews, seminars etc.</p> <p>Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution and presented in the university examination.</p>
70	What are the rules for periodic evaluation of PG students ?	<p>The College may conduct periodic tests. The test may include written theory papers, practical and clinical tests in the pattern of university examination. Records and marks obtained in such tests will be maintained by the Head of Department and sent to the University, when called for.</p> <p>The assessment will be comprised of Formative and Summative assessments comprising of -</p> <ol style="list-style-type: none"> <li>1. Theory, inter-departmental meeting</li> <li>2. Practical, clinical rounds and bed side evaluation &amp; application.</li> </ol>

  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal

3. Journal club

4. Dissertation

5. Open discussion, debate, Viva.

6. Seminars, recent advances, case presentation, discussion and clinical conference.

Graded responsibility in the care of patients and operative work (Structured Training Schedule of clinical & elective subjects only)

Category	I year MPT	II y
O	20 Cases	20
A	20 Cases	30
PA	100 Cases	60
PI	20 Cases	50

**Key:** O – Observes, A – Assisted a more senior Physiotherapist, PA – Performed procedure under the direct supervision of a senior specialist. PI – Performed Independently

**Learning Activities :** Self Learning, Use of computers & library.

Participation in departmental activities;

o Journal Review meetings

o Seminars

o Clinical presentation

o Special clinics

o Inter departmental meetings

o Community work, camps / field visits

o Clinical rounds

o Dissertation work

o Participation in conferences/ presentation of paper -Minimum 2 in two years


o Any other – Specify (eg : CME)

o Rotation and posting in department

Dean  
Faculty of Paramedical Sciences,  
UPUMS Saifal



		<p>The paper setters/ moderator are required to submit their intention of acceptance/ decline of the offer.</p> <p>The Internal paper setters/ moderator shall normally not decline the assignment of examination work except in extraordinary situations since examination duty is treated as an <b>essential service by the University</b>. The external paper setters/ moderator shall intimate their acceptance or otherwise as soon as they receive the communication from the University or in the prescribed time limit (one week). The acceptance of the offer may also be informed by email to the COE. If no communication is received within the prescribed time limit, it will be presumed that the assignment is not accepted by the paper setter/ scrutinizer.</p> <p>If by chance, a wrong subject has been assigned to the paper-setter, he shall indicate the same and decline the offer. He shall NOT accept an offer that is NOT related to his subject/ expertise/ knowledge domain.</p> <p>The paper setters/ scrutinizers/ examiners shall follow all the regulations of the University from time to time in respect of setting of question papers, scheme of evaluation etc.</p>
5	Who will be the moderator of question paper and what are their role in moderation of Question paper?	<p>1. Question paper moderator are appointed from the current Examiners panel as a validation process for the purpose of carefully examining the question papers for any aberrations, errors, spelling mistakes, pattern, scope, distribution of marks etc. or any other lapse and providing necessary corrections.</p> <p>2 The Question paper moderator shall be present in the office of the COE of the University on the assigned date and time to fulfil the given responsibility.</p>
6	What will be required number of sets of Question Paper?	The Paper setter shall set the number of sets of question papers as requested, as per the prescribed pattern containing questions covering a wide range of contents of the courses for which they are set and send them all in sealed packets to the COE or in password protected file through e-mail.
7	What is the amount payable for Paper setting question paper, evaluation of answer scripts, etc ?	As per University norms
8	What are the criteria for Question Paper Printing, Content of paper and sealing process of question paper?	<p>All arrangements shall be made to get the required sets of question papers for each paper of examination sufficiently in advance to the commencement of the examination period.</p> <p>The question paper (s) shall meet the specifications/ pattern as per the academic regulations of each programme of study in the University.</p>


  
 Dean  
 Faculty of Paramedical Sciences,  
 IPUMS Solihull



		Question papers for each subject shall be available in multiple sets to meet any eventuality
9	What is the process for sealing question paper?	<p>The question paper-setters shall be communicated regarding their appointment together with the necessary instructions, syllabus, model question papers, question paper pattern, forms of acceptance, inner cover and outer cloth cover, remuneration forms and other related stationery etc or same with e-mail.</p> <p>The Paper setter shall ensure that the question papers set carry the correct name of the subject, Title and code of the paper, applicable Regulation (s). He/ she shall also indicate the duration of the paper, the maximum marks allotted to each question of the paper, choice, and maximum marks of the full paper. If the question paper is common to one or more schemes/courses, it shall be clearly indicated.</p> <p>The Paper setter must carefully paste the inner cover provided by the University and affix his/ her signature on the joints of the cover and fix a cellophane tape on the signatures. The Paper setter shall fill in all the details required on the inner cover. This inner cover shall then be enclosed in a cloth-lined outer envelope marked "CONFIDENTIAL" and sent through Speed Post/ Registered post to the Controller of Examinations, or delivered to the COE in person.</p>
10	What is the process of transporting question Paper to the examination hall?	It should be verified that sufficient quantum of Question Papers of each paper have been received in sealed envelopes. The sealed envelopes are arranged date-wise, hall-wise and paper-wise and kept inside a sealed almirah/safe/ locker. A copy of the time table is kept in the almirah/ safe with the envelopes of Question Papers. This should be available for ready reference every day. It should be seen every day before taking out the envelopes before the scheduled time of the examination
11	What are the criteria for UFM?	<p>The following shall be the procedure for dealing with the cases of candidates found using or suspected of using unfair-means or involved in malpractice or misconduct in connection with the examinations:</p> <p>Where a candidate is suspected of using unfair means as defined above, the HS or the centre superintendent or any other member of the supervisory staff or observer shall search the candidate and/ or his belongings. Where any written or printed material is found in his possession as a consequence of the search, the matter is taken to the notice of the Centre Superintendent of Examination centre. The candidate's answer booklet shall be confiscated</p>

Dean  
 Faculty of Paramedical Sciences,  
 UPUMS Salfat

along with the material recovered.

The Centre Superintendent shall hold a preliminary enquiry, record the report of the Hall Superintendent, the statement of the candidate in the presence of a teacher other than the HS concerned. On sufficient grounds, the Centre Superintendent shall forthwith suspend the candidate from writing the examination and withdraw the admission ticket.

The Centre Superintendent shall thereafter obtain a statement/ undertaking of the student. The HS shall provide his/ her report. CS shall countersign both the report and the statement. The candidate shall be made to affix his/ her signature on the incriminating materials used in the malpractice. Answer scripts of all such cases are packed separately.

If the candidate refuses to give a statement, he/she should be asked to record in writing his/her refusal to give a statement. If he/she refuses to give a statement, the facts shall be noted duly witnessed by two members of the supervisory staff.

If the candidate refuses to hand over the incriminating material or destroys or runs away with the material (causes to disappear) the facts shall be noted duly witnessed by two members of the supervisory staff and the matter reported to the Centre Superintendent immediately.

In case of Misconduct/ insolent behaviour (i.e. verbal or nonverbal e.g. gestures), the Supervisor or concerned authorized person shall record the facts in writing and shall report the same to the Controller of Examinations.

The answer scripts, relevant question paper(s), statement of the errant-examinee and the incriminating materials confiscated shall be packed in a cover and labelled. This packet in turn shall be placed in an outer cover along with the HS Report(s) of all such cases along with the consolidated report of the CS on cases of malpractices for the session. It is reiterated that these Answer scripts should NOT be packed with the other Answer scripts. They should be placed in a separate packet and sealed. It is the responsibility of the Centre's Chief Superintendent to ensure that the malpractice related bundle is securely despatched to the COE with appropriate labelling.

A record of such malpractice shall be maintained at the examination centre in order to prevent such candidates from appearing in subsequent examinations by pretending to have lost the Admit Card.

The Office of the COE shall open only the outer cover containing the reports of HS/ CS and the inner cover/ packet containing the malpractice

  
  
Dean  
Faculty of Paramedical Sciences  
UPUMS Saifal





		<p>related answer scripts, statement of the errant-examinee and the incriminating materials confiscated shall not be opened. Based on the reports of HS/ CS, the COE shall place such cases before the Examination Malpractices Enquiry Committee (EMEC) along with all the materials and records received by him/ her.</p> <p>Post-Examination, if the examiner at the time of assessment of answer-booklet(s) suspects that there is a prime facie evidence that the examinee(s) whose answer script(s) the examiner is assessing appears to have resorted to malpractice, he/ she shall forthwith stop further evaluation and return the answer script with a report prepared by him under his/ her name and signature to the Chairman of the Board in separate confidential sealed envelope marked as "Suspected Malpractice case". The Chairman shall forward the same to the COE along with his/ her remarks and signature. If the suspicion arises or malpractice is suspected after script is already valued, marks shall not be entered in the OMR Sheet or marks list along with other students but enter them in a separate list and hand over to the custodian who in turn shall forward the same to the COE in a sealed cover.</p>
12	<p>Procedure of evaluation of Answer sheet</p> <p>Procedure of reevaluation of Answer sheet</p> <p>Procedure of Scrutiny of Answer sheet</p> <p>Procedure of challenge evaluation of Answer sheet</p>	<p>Dummy Number Printing of Answer-scripts is undertaken after due random shuffling of the Answer - scripts. The part revealing the identity of the candidate is then cut off from the cover page of the Answer-script in a secure manner and stored safely in the custody of the COE as quickly as possible.</p> <p>The Identity masked and dummy number printed Answer-scripts are then packed in packets.</p> <p>On the day of commencement of Central Valuation, the Identity masked Answer-script packets shall be transferred to Valuation Centre and Custody Transfer to Chairman of the respective BoE. In the case of the valuation done by the course teacher himself/herself, he/she has to collect the answer scripts from the examination section after verifying the number of papers.</p> <p>A period of Central valuation of answer scripts is finalized by the COE in consultation with the respective Chairman of the Board of Examiners.</p> <p>The shortlisted examiners are issued appointment order to evaluate the answer-scripts of the University examination along with a form in which they shall express their acceptance/ decline of the offer within the stipulated period.</p> <p>All theory answer scripts shall be sent to the central valuation center (CVC) securely after the due process of assigning Dummy numbers and removal of the flap containing the examinee's Register number.</p>

  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Saifal

Only examiners duly appointed by COE/ the Chairman, Board of Examiners, approved by the University should be assigned valuation work and none else.

The Chairman of the Board shall ensure that the Registers pertaining to issuing of Answer-scripts to the Examiners, receiving of assessed answer-scripts from the Examiner are maintained properly

Only one packet of answer-scripts shall be given for valuation, one after another i.e., after completing the Valuation of answer scripts of the previous packets. Only 40-60 answer-scripts should be issued for evaluation to each examiner in a day.

The Chairman of the Board shall remind the examiners to ensure that the papers are valued strictly in accordance with the scheme of valuation, if any, and that the papers are not valued in a hurry.

Daily account to be maintained regarding the number of answer packets valued and number of OMR sheets sent to the COE from time to time with acknowledgement.

Re-evaluation:

Re-evaluation is applicable only for theory papers and shall not be entertained for other components such as practical/ Thesis/ Dissertation etc.

Every application for revaluation should be submitted by the candidate in the prescribed form along with the prescribed fee so as to be received by the Controller of Examinations within TWO WEEKS of obtaining the photocopy of the answer-script.

Re-evaluation of answer-scripts can be sought only with at least one affirmation by a teacher relevant to the subject as mentioned below and that any of the criteria below are satisfied:

Finds that any answer(s) to question(s) that has/ have not been evaluated

Finds that the answer-script valuation in full or part is not justified and there is reasonable ground for re-evaluation.

The application for revaluation shall be submitted to the Controller of Examinations through the HOD of the concerned Department of study.

The COE shall arrange for re-evaluation of such answer-scripts by an examiner from the approved panel of examiners. If there is a difference of more than 15% of maximum marks between the first valuation and Re-evaluation, the average of the original and reevaluated marks shall be awarded to the candidate. Otherwise the candidate is entitled to the marks advantageous to him/ her.

  
Dean  
Faculty of Paramedical Sciences  
JIPMMS Saital

		<p>The marks awarded by the original examiner if marked on the answer scripts shall be concealed from the answer script and sent for reevaluation.</p> <p>In cases of Re-evaluation(s), the University may provide two Answer-scripts of candidates who have secured high marks in the concerned paper/ subject to serve as bench-mark for re-evaluation.</p> <p>In all cases of Re-evaluation, Fees once paid will not be refunded.</p> <p>Applications which are late and not in the prescribed form and which are found defective in any respect will not be entertained and will be summarily rejected without notice. In the case of applications</p> <p>Which are found in order, the University shall take steps to get the answer-scripts re-evaluated.</p> <p>The result of the reevaluation shall ordinarily be made known to the student through the Head of the Department within 2 months of the last date of receipt of applications by the Office of the Controller of Examinations. No interim enquiries of any kind will be entertained in this regard. It may be noted that the University can never set in any case a time limit for the issue of the results of reevaluation. The University will also therefore, not be liable for loss of any kind sustained by candidates concerned on account of the delay, if any, in issuing the results of reevaluation.</p> <p>Issue of Duplicate Admit Card/ Mark Statement/ Transcripts/ Consolidated Marks Statements/ Degree Certificate may be done after due application process with the necessary fees/ fine.</p>
13	<p>Process of result Preparation</p> <p>Publication of Result</p> <p>Printing of Mark sheet, Migration Certificate, Provisional Certificate</p> <p>Provisional degree, Original Degree, Internship completion certificate, Cause completion certificate</p>	<p>There shall be restricted/ classified zones within the office of COE with adequate security measures to ensure that no unauthorized person has access to sensitive materials or information that would affect the outcome of examination process. Only authorized persons shall have access to these areas.</p> <p>All the data processing relevant to the marks shall be done in these restricted/ classified zones.</p> <p>Marks Tabulation and Validation</p> <p>The results of each of the examinations shall be tabulated in the Examination Database maintained on well secured Computer server with restricted access. The persons responsible for such activity may be referred to as Marks-Tabulators.</p> <p>Marks-Tabulator(s) shall be appointed by COE with the approval of Vice-Chancellor. Marks-Tabulator(s) shall be staff members of the University working in the office of COE. They shall possess sufficient computer</p>

  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Saifai



		<p>programming and database (SQL &amp; RDBMS) skill and experience.</p> <p>The marks tabulated by the Marks-Tabulator shall be scrutinized and validated by a Validator who shall be appointed by the COE. Validator(s) shall be drawn from the teaching faculty of the University.</p> <p>The Validator shall:</p> <p>Check the posting made by the Marks-tabulators from the original statement submitted by the examiner</p> <p>Check totals/aggregates posted by Marks-tabulator;</p> <p>Check the implementation of the resolutions of the Passing BoE;</p> <p>Check the result prepared by the Marks-Tabulator for failures, honors such as Distinction, Pass, Fail, and Absentees etc.</p> <p>Validate the Grades, GPA and CGPA etc. computed on the basis of the marks obtained by the candidates in examination.</p> <p>Any other discrepancy/ errata/ manipulation/ inconsistency etc. that might have crept into the marks database.</p>
--	--	---

ANNEXURE -A

**EQUIPMENTS**

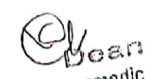
The institution should have all the following equipments for M Sc MLT course

A. MICROBIOLOGY:-

a. Laboratory equipments

1. Auto clave
2. Hot air oven
3. Incubator
4. Centrifuge
5. Water distillation/Purification unit
6. pH meter
7. Physical Balance
8. Digital Balance
9. -Refrigerator
10. Microscope –
  - Monocular 10
  - Binocular - 5
  - Dark field Microscope - 1
  - Fluroscnt microscope - 1
12. ELISA reader
13. Anaerobic Jar
14. Micropipettes



  
 Faculty of Paramedical Sciences  
 UPUMS Saifal

15. Pressure cooker
16. Laminar air flow
17. Water bath
18. VDRL shaker
19. Deep freezer – 1

Apart from the above mentioned equipments necessary glassware, kits, chemicals as per the syllabus requirements should be made available in adequate quantity.

**b. Minimum work load criteria for conducting M. Sc MLT course in Microbiology 100 different types of samples per day including serological tests**

**B. BIOCHEMISTRY:-**

**a. Laboratory equipments**

1. Chemical Balance/single Pan Balance
2. Colorimeter
3. Electrolyte analyser
4. pH meter
5. HPLC machine
7. Semi auto analyser
8. Auto analyser
10. Blood gas analyser
11. Refrigerator
12. Titration Apparatus
13. Electrophoresis equipments

Apart from the above mentioned equipments, necessary glass ware, kits, chemicals, as per the syllabus requirements should be made available in adequate quantity.


**b. Minimum work load criteria for conducting M.Sc MLT in Clinical Biochemistry.**

100 different bio-chemical tests per day [Routine and special tests]

**C. PATHOLOGY:-**

- a) Laboratory Equipments
  1. Refrigerator
  2. Micro oven
  3. Microtome
  4. Hot Air Oven
  5. Water Bath
  6. Coil Stone
  7. Cooker – 5 lit.
  8. Digital flame
  9. Binocular Microscope
  10. Monocular Microscope
  11. Centrifuge



  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Saital

12. Autoclave
13. Automatic Tissue Processor
14. Ryle's tube
15. Urinometer
16. PH meter
17. Albuminometer
18. Specific gravity meter
19. FNAC Aspiration

b. Minimum work load criteria for conducting M. Sc MLT in Pathology.

100 different pathological tests per day [Routine and special tests]

#### D. HAEMATOLOGY & BLOOD TRANSFUSION

a. List of Equipments [Haematology] Name of the Equipment

1. Blood cell counter - 1
2. Coagulometer -1
3. Spectrophotometer- 1
4. Refrigerator - 165 lit 2
5. Hot air oven -1
6. Electronic Balance (Libror) 1
7. Water bath -1
8. Distilled water unit -1
8. Centrifuges -1
9. Hb Electrophoresis Machine 1(Tank, Scanner, monitor, Printer, CPU)
10. ELISA reader 1
11. pH meter 1
12. Autoclave 1
13. Microscope - Binocular 10
14. Haemocytometer One per student
15. Westergren pipette one per student
16. D C counters one per student
17. Calorimeter 1
18. Urinometer 1
19. Albuminometer 1
20. Blood Bank Refrigerator 2
21. Domestic Refrigerator 1
22. Centrifuge - 16 tube capacity 1
23. tube capacity 1
24. Water bath 1




  
Dean  
Faculty of Paramedical Education  
UPMS Saital





25. Thawing bath 1
26. Microscope 1
27. Photoelectric Colorimeter 1
28. view box 1
29. Weighing Machine 1
30. Hot air Oven 1
31. Elisa Reader with washer 1
32. VDRL Rotator 1
33. Donor cots with mattress and pillows 2 (ICU cots)
34. Blood collection Monitor 1
35. Spring Balance 2
36. Deep Freezer - 300C Horizontal 1
37. Deep Freezer - 700C Horizontal / Vertical 1
38. Platelet Agitator with Incubator 1
39. Refrigerated Centrifuge 1
40. Laminar Flow 1
41. Tube sealer 2
42. Cobe Spectra Cell Separator 1
43. Couch 1 Optional
44. Automatic component extractor 1
45. Component weighing scale 1
46. Rough Balance 1
47. Oxygen cylinder

  
Dean  
Faculty of Pharmaceutical Sciences

#### ANNEXURE-B

##### PROGRAM OUTCOMES (POs):

After successful completion of Master of Science in Medical Laboratory Technology (Microbiology) program, students will be able to:

1. Upon successful completion of the degree in Medical Laboratory Technician, the student should be able to: Perform routine clinical laboratory procedures within acceptable quality control parameters in Microbiology under the general supervision of a Clinical Laboratory Scientist or Microbiologist.
2. Demonstrate technical skills, social behavior, and professional awareness incumbent upon a laboratory technician.
3. The student will be able to explain the basic nature of disease processes from the standpoint of causation, epidemiology, natural history, and the structural and functional abnormalities that result.
4. Apply systematized problem solving techniques to identify and correct procedural errors, identify instrument malfunctions and seek proper supervisory assistance, and verify the accuracy of laboratory results obtained.
5. Operate and maintain laboratory equipment, utilizing appropriate quality control and safety procedures.
6. Effect a transition of information and experiences learned in the MLT program to employment situations and performance on the written examinations.
7. Recognize and participate in activities which will provide current knowledge and upgrading of skills in laboratory medicine.


Dean  
Faculty of Paramedical Education  
UPUMS Salsal

### COURSE OUTCOMES

Course Name	Course Outcomes
General pathology	Demonstrate an understanding of essential basic pathological processes including cell death and injury, inflammation, thrombosis and neoplasia.
General Microbiology	At the end of the course students should know the prokaryotic cell structure, develop basic skill in aseptic techniques, sterilization technique. Perform various staining techniques, Cultivate bacteria with different cultivation technique.
General Biochemistry	At the end of the course the student should know the structures and functions of biomolecules, their relations that form the basis of what we understand to be living organisms and know the experiment, research related to them.
Anatomy & Physiology	At the end of the course student should know in depth Anatomy and physiology of the nervous, musculoskeletal, respiratory, and cardiovascular, excretory, endocrine and reproductive systems from a regional perspective.

✓

  
**Dean**  
 Faculty of Paramedical Sciences  
 UPUMS Salfat





<b>Computational skills &amp; Biostatistics</b>	At the end of the course student should demonstrate computational skills and understanding of the central concepts of modern statistical theory and their probabilistic foundation.
<b>Immunology</b>	At the end of the course student should know the concepts of immune system and they determine what immunomodulatory strategies can be used to enhance immune responses or to suppress unwanted immune responses such as might be required in hypersensitivity reactions, transplantations or autoimmune diseases.
<b>Medical Genetics</b>	The student will be able to develop understanding of the patterns of inheritance and clinical manifestations of genetic diseases; chromosomes, chromosomal abnormalities, and the clinical features of common chromosomal disorders; population genetics; inborn errors of metabolism; and inherited cancer syndromes, genetic testing and screening, and plans for management and treatment.
<b>Molecular biology &amp; Recombinant DNA Technology</b>	At the end of the course students should explain genome organization in higher organisms, kinetic classes of DNA and Gene families, steps involved in recombinant DNA technology. Demonstrate practical skills used in molecular biotechnology such as PCR and molecular cloning and obtain and evaluate information on a current topic in molecular biology and communicate this analysis in writing.
<b>Management and Biomedical Techniques</b>	At the end of the course students are able to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including, chemistry, microbiology, urine analysis, body fluids, molecular diagnostics, and immunology.

  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Sarai

ANNEXURE-C  
MODEL QUESTION PAPER  
M. Sc MLT MAIN EXAMINATIONS-20—

PAPER CODE:  
MAX.MARKS:70

SEMESTER-  
TIME: 3 HRS

1. LONG ANSWER TYPE QUESTIONS (ANSWER ANY TWO OUT OF FOUR) EACH 15 MARKS.

- 1.
- 2.
- 3.
- 4.

2. SHORT ANSWER TYPE QUESTIONS (ANSWER ANY FOUR OUT OF SIX) EACH 10 MARKS.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.



  
Dean  
Faculty of Paramedical Sciences,  
UPUMS Saifal



**Uttar Pradesh University of Medical  
Sciences, Saifai, Etawah**



**Ordinance & Syllabus**

**For**

**M.Sc. - MLT Microbiology**

**Duration:**

**2 years (4 Semesters)**

  
  
**Dean**  
**Faculty of Paramedical Sciences,**  
**UPUMS Saifai**

Adopted from CS & MO Kampani





## **Master of Science in Medical Laboratory Technology (M.Sc.-MLT)**

### **1. Duration of Course:**

- a) M.Sc.-MLT course will be a full-time course.
- b) Duration will be two years (Four Semesters).

This course shall be divided into four semester examinations namely MSc in Medical Laboratory Technology I & II Semester (First Academic Year), & III & IV Semester (Second Academic Year) .

### **2. Specialization/Discipline**

There shall be following specialization/discipline:

<b>Specialization/ Discipline</b>	<b>No. of Seats</b>
M.Sc.-MLT in Medical Microbiology & Immunology	06

### **3. MEDIUM OF INSTRUCTION**

English shall be the medium of instruction for all the subjects of study and for examination of the course.

### **4. SEATS:**

Total no. of seats will be 30.

### **5. EXAMINATION:**



As per the University norms.

### **6. DURATION OF EXAMINATION:**

As per the University norms.

### **7. ELIGIBILITY:**

The students who have passed B.Sc.-MLT (B.Sc.-Medical Laboratory Technology) Course from any recognized Institutions/University with minimum of 55% marks (50% for SC/ST)

  
  
**Dean**  
Faculty of Paramedical Sciences

1 <sup>ST</sup> YEAR / 1 <sup>ST</sup> SEM						
Course Code	Type	Course Title	Credits	CIA	ESE	Max. Marks
M010701T	Core	Medical Biochemistry	4	25	75	100
M010702T	Core	Clinical Pathology & Immunopathology	4	25	75	100
M010703T	Core	General Microbiology	4	25	75	100
M010704T	Core	Research Methodology	4	25	75	100
M010705P	Practical	Medical Biochemistry	4	25	75	100
M010706P	Practical	Clinical Pathology & Immunopathology	4	25	75	100
M010707P	Practical	General Microbiology	4	25	75	100
	Dissertation	Dissertation	0			
	<b>TOTAL</b>		<b>28</b>			<b>700</b>
1 <sup>ST</sup> YEAR / II <sup>ND</sup> SEM						
M010801T	Core	Medical Laboratory Management	4	25	75	100
M010802T	Core	Blood Grouping & Immunology	4	25	75	100
M010803T	Core	Biomedical Techniques	4	25	75	100
M010804T	Core	Biostatistics	4	25	75	100
M010805P	Practical	Medical Laboratory Management	4	25	75	100
M010806P	Practical	Blood Grouping & Immunology	4	25	75	100
M010807P	Practical	Biomedical Techniques	4	25	75	100
M010808R	Dissertation	Dissertation	8	25	75	100
	<b>TOTAL</b>		<b>36</b>			<b>800</b>

8

Dean  
Faculty of Paramedical Sciences  
UPUMS Sarai



II <sup>nd</sup> YEAR / III <sup>rd</sup> SEM						
Course Code	Type	Course Title	Credits	CIA	ESE	Max. Marks
M01M0901T	Core	Systemic Bacteriology	4	25	75	100
M01M0902T	Core	Virology	4	25	75	100
M01M0903T	Core	Mycology	4	25	75	100
M01M0904P	Practical	Systemic Bacteriology	4	25	75	100
M01M0905P	Practical	Virology	4	25	75	100
M01M0906P	Practical	Mycology	4	25	75	100
	Dissertation	Dissertation	0			
		Teaching Skills/Seminars/Symposia/ Journal Club Etc.	2			
		Clinical Training/ Camps	2			
	<b>TOTAL</b>		<b>28</b>			<b>600</b>
II <sup>nd</sup> YEAR / IV <sup>th</sup> SEM						
M01M1001T	Core	Applied Microbiology & Immunology	4	25	75	100
M01M1002T	Core	Parasitology	4	25	75	100
M01M1003P	Practical	Applied Microbiology & Immunology	4	25	75	100
M01M1004P	Practical	Parasitology	4	25	75	100
M01M1005R	Dissertation	Dissertation	8	25	75	100
		Teaching Skills/Seminars/Symposia / Journal Club Etc.	2			
		Clinical Lab Practices Or Clinical Training	2			
	<b>TOTAL</b>		<b>28</b>			<b>500</b>
	<b>Grand Total</b>		<b>120</b>			<b>2600</b>

*[Handwritten signature]*

*[Handwritten signature]*

Dean  
Faculty of Paramedical Sciences  
UPUMS





## Internal Assessment

1. It will be for theory and practical both.
2. It will be done through the whole semester
3. Candidate must obtain at least 40% marks in theory and practicals separately in internal assessment to be eligible for the semester university examination.
4. Internal assessment (Theory) will be done as follows:
  - a) Seminars/Symposia/Journal club/Assignment/  
Clinical presentation = 10 marks
  - b) Mid-term examination = 10 marks
  - c) Attendance/Teaching Skills = 05 marks

**Total = 25 marks**
5. Internal assessment (Practical) will be done as follows:
  - a) Lab work Presentation /Clinical Lab Practices/Clinical Training = 10 marks
  - b) Practical Training Skills/ Continuous evaluation = 10 marks
  - c) Laboratory Manual/Attendance = 05 marks

**Total = 25 marks**
6. Internal assessment of subjects without practical will be done as:
  - a) Assignments/ Projects/ class test/ Presentations = 10 marks
  - b) Mid Term examination = 10 marks
  - c) Attendance/Teaching Skills = 05 marks

**Total = 25 marks**

## 7. Criteria for Passing

As per University norms.

## 8. Maximum duration for completion for course

A candidate shall complete the course within four years from date of admission failing which the candidate will be discharged.

## 9. Division:

As per the University norms.

## 10. Degree:

The degree of M.Sc.-MLT course of the University shall be conferred according to specialization/discipline on the candidates who have pursued the prescribed course of study for not less than two academic years and have passed examinations as prescribed under the relevant scheme.



Dean  
Faculty of Paramedical Sciences  
UPUMS Saha

A recognized guide shall supervise dissertation work of not more than 5 students per academic year.

#### **IV. Change of Guide**

In the event of registered guide leaving the department/institute or in the event of death of guide, guide may be change with prior permission from the university.



**Dean**  
Faculty of Paramedical Science  
UPUMS Salfai

A recognized guide shall supervise dissertation work of not more than 5 students per academic year.

**IV. Change of Guide**

In the event of registered guide leaving the department/institute or in the event of death of guide, guide may be change with prior permission from the university.



**Dean**  
Faculty of Paramedical Science  
UPUMS Salfat

## COURSE OF STUDY

### First Semester University Examination

Course Code	Type	Course Title	Teaching Hours
M010701T	Core	Medical Biochemistry	80
M010702T	Core	Clinical Pathology & Immunopathology	80
M010703T	Core	General Microbiology	80
M010704T	Core	Research Methodology	80
M010705P	Practical	Medical Biochemistry	80
M010706P	Practical	Clinical Pathology & Immunopathology	80
M010707P	Practical	General Microbiology	40
	Dissertation	Dissertation	
<b>TOTAL</b>			<b>600</b>

### Second Semester University Examination

Course Code	Type	Course Title	Teaching Hours
M010801T	Core	Medical Laboratory Management	80
M010802T	Core	Blood Grouping & Immunology	80
M010803T	Core	Biomedical Techniques	80
M010804T	Core	Biostatistics	80
M010805P	Practical	Medical Laboratory Management	80
M010806P	Practical	Blood Grouping & Immunology	80
M010807P	Practical	Biomedical Techniques	80
M010808R	Dissertation	Dissertation	120

(2)

Dean  
Faculty of Paramedical Sciences  
UPJMS Sahil



	<b>TOTAL</b>	<b>680</b>
--	--------------	------------

**Third Semester University Examination**

Course Code	Type	Course Title	Teaching Hours
M01M0901T	Core	Systemic Bacteriology	80
M01M0902T	Core	Virology	80
M01M0903T	Core	Mycology	80
M01M0904P	Practical	Systemic Bacteriology	80
M01M0905P	Practical	Virology	80
M01M0906P	Practical	Mycology	80
	Dissertation	Dissertation	40
		Teaching Skills/Seminars/Symposia/ Journal Club Etc.	40
		Clinical Training/ Camps	160
		<b>TOTAL</b>	<b>720</b>

**Fourth Semester University Examination**

Course Code	Type	Course Title	Teaching Hours
M01M1001T	Core	Applied Microbiology & Immunology	80
M01M1002T	Core	Parasitology	80
M01M1003P	Practical	Applied Microbiology & Immunology	80
M01M1004P	Practical	Parasitology	80

MO1M1005R	Dissertation	Dissertation	120
		Teaching Skills/Seminars/Symposia/ Journal Club Etc.	40
		Clinical Lab Practices Or Clinical Training	160
		<b>Total</b>	<b>640</b>

## Syllabus

**M.Sc.-MLT -Semester-I for all Specialization**

**MEDICAL BIOCHEMISTRY**

**Course Code: MO10701T Theory- Min. Hrs -: 80 Hrs.**

**Objective:**

1. To provide brief knowledge of biochemical metabolites.
2. To impart knowledge about methods of qualitative and quantitative analysis of biomolecules.

**THEORY**

1. Carbohydrates

  
  
**Dean**  
 Faculty of Paramedical Sciences  
 UPJMS Sakhal

the presentations by the candidate as well as details of clinical practice, if any conducted by the student.

**(f) Mid Term Examination/Class Test/Assignments**

There will be mid-term examination/class tests/ assignments in every semester. Various class test may be taken by the department and assignments may be given to students on various topics. Marks of these will be included in every semester.

**(g) Records**

Records, log books and marks obtained in mid-term examination/class tests/ assignments will be maintained by the Head of the Department/Teacher of the concerned subject.

Every candidate pursuing M.Sc.-MLT degree course is required to carry out research work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of dissertation. Topic for dissertation shall be assigned by the guide.

If the subject of Thesis entails collaboration with other departments or specialties, the collaborative portion of the work will be supervised by Co-Guide, designated by the School of Health Sciences in consultation with the Guide. Where a Co-Guide is involved, the Thesis will be certified jointly by the Guide & Co-guide.

Every candidate shall submit synopsis to the University in the prescribed Performa containing particulars of proposed dissertation work, within 6 months from the date of commencement of the course on or before the dates notified by the university. The synopsis shall be sent through the proper channel. Such synopsis will be reviewed and the university will register the dissertation topic.

No change in the dissertation topic or guide shall be made without prior approval of the university. Guide will be only a facilitator, advisor of the concept and hold responsible in correctly directing the candidate in the methodology and not responsible for the outcome and results.

The dissertation should be written under the following headings.

1. Introduction
2. Aims or objectives of study
3. Review of literature
4. Material and methods
5. Results



  
Dean  
Faculty of Paramedical Sciences  
UPUMG Salfat

# Syllabus

M.Sc.-MLT -Semester-I for all Specialization

## MEDICAL BIOCHEMISTRY

Course Code: M010701T Theory- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<p>1. To provide brief knowledge of biochemical metabolites.</p> <p>2. To impart knowledge about methods of qualitative and quantitative analysis of biomolecules.</p>	<p>1. <b>Carbohydrate</b></p> <ul style="list-style-type: none"> <li>• Definition, Function, Classification, Isomerism &amp; Properties of Monosaccharides, Disaccharides Polysaccharides</li> <li>• Metabolism-Utilization of Glucose, Glycogenesis (in brief), Glycogenolysis (in brief), Glycolysis, Citric Acid Cycle, Gluconeogenesis(in brief), HMP Shunt(in brief), Regulation of Blood Glucose level</li> </ul> <p>2. <b>Amino Acids</b></p> <ul style="list-style-type: none"> <li>• Definition, Classification &amp; functions</li> <li>• Properties</li> </ul> <p>3. <b>Proteins-</b></p> <ul style="list-style-type: none"> <li>• Definition, classification, functions</li> <li>• Structural Organization-Primary,</li> </ul>	80	Lecture Tutorial Demonstrations Power point presentations	<p>1. Very Short answer questions</p> <p>2. Short answer questions</p> <p>3. Long Answer Questions</p> <p>4. Assignments</p>

Dean  
Faculty of Paramedical Sciences,  
UPUMS Saifal





diabetes mellitus, glucose tolerance test, Glycosylated hemoglobin, glycosurias,

- Glucose Tolerance test, Insulin Tolerance Test Hypoglycemia & its causes

**7. Bilirubin General types and Jaundice**

- Liver Function Test
- Bilirubin estimation
- Alkaline phosphates and acid phosphates estimation
- SGOT, SGPT Estimation

**8. Xylose absorption test**

**9. Analysis of calculi**

**10. Cerebrospinal fluid analysis**

- Composition and function of CSF
- Clinical significance of CSF analysis
- Estimation of sugar and proteins in CSF

**11. Urine chemistry**

- Physical and Chemical examination of Urine samples. Qualitative tests for inorganic urinary ingredients
- Common qualitative and quantitative tests of urine
- Automation in Urine chemistry

**12. Renal Function tests-**

<p>pathology.</p> <p>3. To provide brief knowledge of immunohematological diseases.</p>	<p>method.</p> <ul style="list-style-type: none"> <li>• Microscopic examination</li> <li>• Chemical examination</li> <li>• Strip method</li> <li>• Test for Occult blood – Benzidine Test</li> </ul> <p>6.</p> <ul style="list-style-type: none"> <li>• Sputum examination –</li> <li>• Collection of specimen</li> <li>• Physical examination</li> <li>• Microscopic – Gram's stain, Ziehl Neelsen stain for AFB</li> <li>• Chemical examination</li> </ul> <p>7.</p> <ul style="list-style-type: none"> <li>• Gastric analysis: Indications, contra indications. Method of collection. Fasting gastric juice – Macroscopic and microscopic examination.</li> <li>• Fractional test meal</li> <li>• Augmented Histamine test</li> <li>• Hollander's test</li> </ul> <p>8.</p> <ul style="list-style-type: none"> <li>• Cerebrospinal fluid analysis</li> <li>• Method of obtaining CSF, indications, contra indications. Examination of CSF:</li> <li>• Physical examination</li> <li>• Biochemical examination</li> <li>• Microscopic examination</li> </ul>			
---	--	--	--	--

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<p>1. To provide supportive clinical care and uses of relative investigations.</p> <p>2. To identify the indicators of basic procedures and perform them in appropriate manner.</p>	<p>(A) <b>General Microbiology</b></p> <ul style="list-style-type: none"> <li>• Classification of microorganism - Prokaryotes and Eukaryotes</li> <li>• Microscope - Light/Dark field microscope / phase contrast / fluorescence / Electron</li> <li>• Staining Methods: Sample, Stain, Negative staining, Gram's Stain, principle, Modification of Gram's Staining. Acid fast stain, Modifications, Interpretation, About Stain.</li> <li>• Morphology of Bacteria - Shape, Cell wall, Gram positive cell wall, Gram negative cell wall, Cell membrane. Cytoplasm, Cell wall, Appendages - Capsule, Flagella, Fimbriae/pilli. Bacterial spore</li> <li>• Bacterial growth and nutrition- Growth requirement, sources, environmental factors affecting growth. Bacterial count</li> <li>• Bacterial growth curve, Lag phase, log phase, stationary factors, affecting growth of bacteria - oxygen</li> </ul>	80	Lecture Tutorial Demonstrations Power point presentations	<p>1. Very Short answer questions</p> <p>2. Short answer questions</p> <p>3. Long Answer Questions</p> <p>4. Assignments</p>

  
 Dean  
 Paripatnam Medical College  
 Paripatnam, Salem

		<p>culture. Anaerobic culture methods : Anoxomat, McIntosh &amp; fild's Anaerobic Jar, Gaspak system</p> <p>D) <b>General Principles in Microbiology</b></p> <p>Collection and handling of various samples. Antimicrobial sensitivity and assay. Lab animals handling and care and Laboratory Safety</p>			
--	--	--	--	--	--

**RESEARCH METHODOLOGY**

**Course Code: MO10704T Theory- Min. Hrs :- 80 Hrs.**

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	Understand the basic principles of research and methods applied to draw inferences from theresearch findings.  To be made aware of the need of biostatistics and understanding of data and sampling methods in pathology lab.	<p><b>Research Methodology</b></p> <p><b>1. Research in Medical Laboratory Technology</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Research for Laboratory Technician: Why? How? And When?</li> <li>• Research – Definition, concept, purpose, approaches</li> <li>• Internet sites for Physiotherapist</li> </ul>	80	Lecture Tutorial Demonstrations Power point presentations	<p>1. Very Short answer questions</p> <p>2. Short answer questions</p> <p>3. Long Answer Questions</p> <p>4. Assignments</p>

✓

Dean  
Faculty of Paramedical Sciences  
IIPHMS Salfat



		<ul style="list-style-type: none"> <li>• Design, instrumentation &amp; analysis for qualitative research</li> <li>• Design, instrumentation &amp; analysis for quantitative research</li> <li>• Design, instrumentation &amp; analysis for quasi-experimental research</li> <li>• Design models utilized in Physiotherapy</li> </ul> <p><b>5. Research Ethics</b></p> <ul style="list-style-type: none"> <li>• Importance of Ethics in Research</li> <li>• Main ethical issues in human subjects' research</li> <li>• Main ethical principles that govern research with human subjects</li> <li>• Components of an ethically valid informed consent for research</li> </ul>			
--	--	---	--	--	--

**MEDICAL BIOCHEMISTRY**

**Course Code: MO10705P Practical- Min. Hrs :- 80 Hrs.**

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
--------	--------------------	---------	--------------	------------------------------	--------------------

**Dean**  
Faculty of Paramedical Sciences  
UJUM Sarfaraj

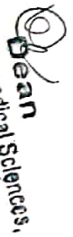
	17- Estimation of serum Globulin 18- Estimation of serum – Albumin 19- Estimation of Serum Amylase 20- Estimation of common parameters in urine through use of strips.			
--	---	--	--	--

**CLINICAL PATHOLOGY & IMMUNOPATHOLOGY**

**Course Code: M010706P Practical- Min. Hrs :- 80 Hrs.**

S. No.	Learning Objective	Content	No. of Hours	Teaching- Learning Activities	Assessment Methods
1	To provide complete knowledge of collection, transportation and processing of various clinical pathology specimens. To provide complete knowledge of investigative diagnostic procedure involved in clinical pathology. To provide brief knowledge of immunohematological	<b>A. Clinical Pathology</b> 1. Urine examination - microscopic. Urine Test for haemosiderin pigment. 2. Stool examination – i. Macroscopic examination ii. Concentration method, Flotation method. iii. Microscopic examination iv. Benzidine Test- for occult blood 3. Sputum examination - Macroscopic, Microscopic and AFB Staining 4. Examination of Cerebrospinal fluid (CSF) and body fluids.	80	1. Lecture 2. Discussion 3. Tutorial 4. Practical	1. Short essay questions. 2. Practical examination 3. Viva-voce 4. Spotter

*Handwritten mark*



**Ogan**  
Paramedical Sciences,  
HPUIMS Saital

	tissue.			
	4- Antibiotic sensitivity testing			
	5- Identification of various bacteria on various culture medias.			

**DISSERTATION**

**Min. Hrs :- 40 Hrs.**

1. Every candidate pursuing M.Sc.-MLT degree course is required to carry out research work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of dissertation. Topic for dissertation shall be assigned by the guide.
2. If the subject of thesis requires collaboration with other departments or specialties, the collaborative portion of the work will be supervised by Co-Guide, designated by the School of Health Sciences in consultation with the Guide. Where a Co-Guide is involved, the thesis will be certified jointly by the Guide & Co-guide.
3. The students will select various topics concerned with day to day recent trends in medicine and pathological investigations & their various outcomes. Before selection of the topic the student must go through various medicinal journals and study them elaborately to understand the recent trends and scientific research.
4. A minimum of atleast 5 topics must be scrolled by each students and out of this the most appropriate topic may be selected for his further synopsis preparation with the consent of guide.
5. After selection of topic the student has to discuss the various aspects of the selected topic with his guide and strategically plan how he will proceed in his research work.
6. Importance should be given to legitimate data collection and handling, sample size and the recent trends in the field of Medical Lab Technology.

**Dean**  
Faculty of Paramedical Sciences,  
UPJMS Satalai

	<p><b>5. Training of technical staff</b></p> <p>Familiarity is needed with the syllabi of various training programs; knowledge of the teaching requirements and level of knowledge technical staff; understanding of qualifications of technologists trained in other countries.</p>			
	<p><b>6. Maintenance of records</b></p> <p>Procedure manuals, ward manuals, quality control programs, patient data retrieval.</p>			
	<p><b>7. Personnel management</b></p> <p>Personnel policy manual; job descriptions; labor, supervision relations; conducting job interviews; motivation, recognizing job distress syndrome; delegation to a laboratory manager.</p>			
	<p><b>8. Hospital organization</b></p> <p>Interactions between the laboratory service and the rest of the hospital.</p>			
	<p><b>9. Professional ethics.</b></p>			
	<p><b>10. Quality assurance;</b></p> <p>Total quality management; development and monitoring of performance indicators.</p>			
	<p><b>11. Public relations:</b></p>			
	<p><b>12. Hospital and community.</b></p>			



## BLOOD GROUPING & IMMUNOLOGY

Course Code: M010802T Theory- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<ul style="list-style-type: none"> <li>• This syllabus provide knowledge about Blood grouping and cross matching.</li> <li>• Students will be able to perform blood group testing and cross matching.</li> <li>• To make aware of basic aspects of immunity, antigens, antibodies.</li> <li>• To make use of immunological diagnosis in patient disease finding.</li> </ul>	<p><b>BLOOD GROUPING</b></p> <p>Introduction, Human Blood Group system, ABO Subgroups, Red Cell Antigen, Natural Antibodies, Rh System, Rh Antigens &amp; Rh Antibodies, Hemolytic Disease of Newborn &amp; Prevention, Principal of Blood grouping, antigen-antibody reaction, Agglutination, Haemagglutination, Condition required for antigen antibody reaction, Blood grouping techniques, Cell grouping, Serum grouping, Methods for ABO grouping. Slide &amp; Tube Method, Cell grouping, Serum grouping, Rh grouping by slide &amp; tube method, Difficulties in ABO grouping, Rouleaux formation, how it interferes with Blood grouping, Auto agglutinins, Antiserum used in ABO test procedures, Anti -A, Anti-B Anti- AB Antiserum, Inheritance of the Blood groups, Control, A&amp;B Cells preparation, Auto control, Medical applications of Blood groups.</p>	80	Lecture Tutorial Demonstrations Power point presentations	1. Very Short answer questions 2. Short answer questions 3. Long Answer Questions 4. Assignments

  
 **Dean**  
 Faculty of Paramedical Sciences  
 UPUMS Saitai



		<b>Compliment system pathway</b> <b>Immunological mechanism in health system - Lymphoid system, MHC Complex</b>			
--	--	--	--	--	--

### BIOMEDICAL TECHNIQUES

Course Code: M010803T Theory- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	To make aware of different biomedical techniques and their uses.	<p>1. Methods of qualitative analysis of biomolecules:</p> <p>Principles, experimental procedures and application of chromatography – paper, thin-layer, ion exchange, affinity, gel filtration, gas-liquid and HPLC. Principles, procedures and application of Electrophoresis – paper, polyacrylamide gel, agarose gel, capillary and cellulose acetate.</p> <p>2. Quantitative methods:</p> <p>Principles and applications of Photometry, Spectrophotometry, fluometry, ion selective procedures, flame photometry, atomic absorption spectrometry. Ion selective electrodes and their applications</p>	80	Lecture Tutorial Demonstrations Power point presentations	<p>1. Very Short answer questions</p> <p>2. Short answer questions</p> <p>3. Long Answer Questions</p> <p>4. Assignments</p>

  
 Dean  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal



## BIOSTATISTICS

Course Code: M010804T Theory- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<p>To know the basic knowledge of Biostatistics and their use in data analysis.</p> <p>To evaluate patient data</p>	<p><b>1. Biostatistics</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Definition</li> <li>• Types</li> <li>• Application in Physiotherapy</li> </ul> <p><b>2. Data</b></p> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Types</li> <li>• Presentation</li> <li>• Collection methods</li> </ul> <p><b>3. Measures of central value</b></p> <ul style="list-style-type: none"> <li>• Arithmetic mean, median, mode. Relationship between them</li> <li>• Partitioned values- Quartiles, Deciles, Percentiles</li> <li>• Graphical determination</li> </ul>	80	<p>Lecture</p> <p>Tutorial</p> <p>Demonstrations</p> <p>Power point presentations</p>	<p>1. Very Short answer questions</p> <p>2. Short answer questions</p> <p>3. Long Answer Questions</p> <p>4. Assignments</p>

8



Dean  
Faculty of Paramedical Sciences,  
Saifal



	<ul style="list-style-type: none"><li>• Standard error</li><li>• Types I &amp; II error</li></ul> <p><b>9. Probability (in Brief)</b></p> <p><b>10. Hypothesis Testing</b></p> <ul style="list-style-type: none"><li>• Null Hypothesis</li><li>• Alternative hypothesis</li><li>• Acceptance &amp; rejection of null Hypothesis</li><li>• Level of significance</li></ul> <p><b>11. Parametric &amp; non parametric tests</b></p> <ul style="list-style-type: none"><li>• Chi square test</li><li>• Mann-Whitney U test</li><li>• Wilcoxon Signed test</li><li>• Kruskal-Wallis test</li><li>• Friednam test</li><li>• T-test/student T test</li><li>• Analysis of variance</li></ul>			
--	---	--	--	--

✓

  
**Dean**  
Faculty of Paramedical Sciences  
UPUMS Saifai





## BLOOD GROUPING & IMMUNOLOGY

Course Code: MO10806P Practical- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching- learning Activities	Assessment Methods
1	<p>a. This syllabus provide knowledge about Blood grouping and cross matching.</p> <p>b. Students will be able to perform blood group testing and cross matching.</p> <p>c. To make aware of basic aspects of immunity, antigens, antibodies.</p> <p>d. To make use of immunological diagnosis in patient disease finding.</p>	<ol style="list-style-type: none"> <li>1. Blood grouping</li> <li>2. Rh grouping &amp; Rh typing (slide &amp; tube method)               <ol style="list-style-type: none"> <li>a. Du Testing</li> <li>b. Rh - antibody titration</li> </ol> </li> <li>3. Compatibility Testing               <ol style="list-style-type: none"> <li>a. Selection of blood</li> <li>b. Crossmatching Technique - Major, Minor, Saline, Albumin, Coomb's, Emergency and Special conditions.</li> </ol> </li> <li>4. Rapid plasma Reagin Tests</li> <li>5. Rheumatoid arthritis factors</li> <li>6. C reactive protein test</li> <li>7. ELISA</li> <li>8. Antistreptolysin-O</li> </ol>	80	<ol style="list-style-type: none"> <li>1. Lecture</li> <li>2. Discussion</li> <li>3. Tutorial</li> <li>4. Practical</li> </ol>	<ol style="list-style-type: none"> <li>1. Short essay questions.</li> <li>2. Practical examination</li> <li>3. Viva-voce</li> <li>4. Spotter</li> </ol>

  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Sakhal

	14. Estimation of Hemoglobin			
	15. Other tests			

**DISSERTATION**

**Course Code: M010803RMIn. Hrs :- 120 Hrs.**

- Every candidate shall submit synopsis to the University in the prescribed Performa containing particulars of proposed dissertation work, within 6 months from the date of commencement of the course on or before the dates notified by the university.
- The synopsis shall be sent through the proper channel. Such synopsis will be reviewed and the university will register the dissertation topic.

Students will prepare their synopsis for dissertation in consultation with their guides.

**Performa for synopsis:**

1. Introduction
2. Aims and Objectives
3. Review of Literature
4. Methodology or Material and Methods
5. References

**Note:**

1. The copies of synopsis must be in bound properly.
2. The candidate have to submit 4 copies of synopsis.
3. Colour scheme for synopsis will be white.
4. Text writing

Paper to be used – A4 size (Bond Paper) Printing – One side  
 Font - Title – 18 Pt. Bold Heading – 16 Pt. Bold Sub Heading – 14 Pt. Bold

  
**Dean**  
 Faculty of Paramedical Sciences,  
 UPUMS Saifal

<p>To understand different types of bacterial culture procedure.</p> <p>To understand the staining procedure and various test to identify the bacteria.</p> <p>To understand the morphology, cultural characteristics and lab diagnosis of various bacteria.</p>	<p>Gram-positive cocci :- Staphylococcus, Streptococcus, Pneumococcus, Gram-negative cocci:- Neisseria Gonorrhoea and Neisseria Meningitidis</p> <p>Gram-positive bacilli:- Corynebacterium diphtheria, Clostridium Tetanae Clostridium Botulinum, Mycobacterium tuberculosis, Mycobacterium Leprae, Bacillus</p> <p>Gram-negative bacilli:- Enterobacteriaceae- E.coli, Klebsiella, Proteus, Salmonella, Helicobacter. Pylori, Shigella</p> <p>Miscellaneous Bacteria:- Spirochaetes, Mycoplasma, Chlamydia</p>	80	<p>Lecture</p> <p>Tutorial</p> <p>Demonstrations</p> <p>Power point presentations</p>	<p>1. Very Short answer questions</p> <p>2. Short answer questions</p> <p>3. Long Answer Questions</p> <p>4. Assignments</p>
--	--	----	---	--

**VIROLOGY**

Course Code: MO1M0902T Theory- Min. Hrs :- 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Method
--------	--------------------	---------	--------------	------------------------------	-------------------

*[Handwritten Signature]*

*[Handwritten Initials]*

Dean  
Faculty of Paramedical Sciences  
Up/MS Saifal



<p>To understand different types of bacterial culture procedure.</p> <p>To understand the staining procedure and various test to identify the bacteria.</p> <p>To understand the morphology, cultural characteristics and lab diagnosis of various bacteria.</p>	<p>Gram-positive cocci :- Staphylococcus, Streptococcus, Pneumococcus, Gram-negative cocci:- Neisseria Gonorrhoea and Neisseria Meningitidis</p> <p>Gram-positive bacilli:- Corynebacterium diphtheria, Clostridium Tetanae Clostridium Botulinum, Mycobacterium tuberculosis, Mycobacterium Leprae, Bacillus</p> <p>Gram-negative bacilli:- Enterobacteriaceae- E.coli, Klebsiella, Proteus, Salmonella, Helicobacter. Pylori, Shigella</p> <p>Miscellaneous Bacteria:- Spirochaetes, Mycoplasma, Chlamydia</p>	80	<p>Lecture Tutorial Demonstrations Power point presentations</p>	<p>1. Very Short answer questions 2. Short answer questions 3. Long Answer Questions 4. Assignments</p>
--	--	----	--	---

### VIROLOGY

Course Code: MO1M0902 Theory- Min. Hrs :- 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
--------	--------------------	---------	--------------	------------------------------	--------------------

*(Handwritten signature)*

*(Handwritten initials)*

Dean  
Faculty of Paramedical Sciences  
Updms Sawai




	<p>Morphology, Antigenic variation, Antigenic shift and antigenic drift, pathogenesis, Transmission-target cell entry, spread, local damage, clinical manifestations, incubation period, flu syndrome- complications, lab diagnosis, specimens, collection, isolation of viruses, detection of virus, direct immunofluorescence test, molecular method, antibody detection.</p> <p><input type="checkbox"/> <b>Mumps viruses</b>-Pathogenesis, clinical manifestations, incubation period in apparent infection, bilateral parotitis, aseptic meningitis, oophoritis, lab diagnosis, specimens, direct viral antigen, detection, viral isolation, serum antibody detection</p> <p><input type="checkbox"/> <b>Measles viruses</b> – Pathogenesis, clinical manifestations, incubation period, prodromal stage, eruptive, post measles, complications, secondary bacterial infections, central nervous system complications, lab diagnosis, specimens, antigen detection, virus isolation, antibody detection, reverse transcriptase, PCR.</p> <p><input type="checkbox"/> <b>Picornaviruses</b>- Classification, Morphology, enteroviruses, Polio virus, antigenic types, pathogenesis, transmission, clinical</p>		
--	--	--	--

  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Saital

MYCOLOGY

Course Code: MO1M0903TTheory- Min. Hrs -: 30 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	To understand the basics of various fungi. Various diseases caused by fungi To understand the introduction, general characteristics and lab diagnosis of various medically important fungi.	<p><input type="checkbox"/> <b>Study of Fungi</b> Classification, morphological classification, yeast, yeast like fungus, molds, dimorphic fungi, classification of fungal diseases, superficial mycosis, subcutaneous mycosis, systemic mycosis, opportunistic mycosis</p> <p><input type="checkbox"/> <b>Lab diagnosis of fungal diseases</b> Specimen collection, microscopy, KOH preparation, gram stain, India ink stain, calcofluor, white stain, histopathological stain- PAS, GMS, mucicarmine, lactophenol cotton blue, culture, culture media, sabouraud's dextrose agar, Corn meal agar and rice starch agar, brain heart infusion agar.</p> <p><input type="checkbox"/> <b>Superficial mycosis</b> Tinea versicolor, clinical manifestation, lab diagnosis, direct microscopy culture, tinea nigra, piedra- black piedra &amp; white piedra.</p>	80	Lecture Tutorial Demonstrations Power point presentations	1. Very Short answer questions 2. Short answer questions 3. Long Answer Questions 4. Assignments

  
 Dean  
 Faculty of Paramedical Sciences,  
 UPJMS Satala

	clinical manifestations, lab diagnosis.			
	<input type="checkbox"/> <b>Opportunistic mycosis</b> Candidiasis- Pathogenesis, predisposing factor, clinical manifestation, mucosal, cutaneous, invasive, allergic, lab diagnosis-direct microscopy, culture. Cryptococcosis- Pathogenesis, virulence factors, risk factors, clinical manifestations, pulmonary, meningitis, lab diagnosis - direct detection methods, negative staining & Gram staining, culture. Mucormycosis-Pathogenesis, predisposing factors, clinical manifestations, lab diagnosis, staining, culture, microscopic appearance.			

**SYSTEMIC BACTERIOLOGY**

**Course Code: MO1M0904P Practical- Min. Hrs :- 80 Hrs.**

S. No.	Learning Objective	Content	No. of Hours	Teaching-Learning Activities	Assessment Methods
--------	--------------------	---------	--------------	------------------------------	--------------------

  
**Dean**  
Faculty of Paramedical Sciences,  
UPUMS Saital

No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<p>To understand the basics of various viruses.</p> <p>Various diseases caused by viruses, general characteristics and lab diagnosis of various medically important viruses.</p> <p>To understand the introduction general characteristics and lab diagnosis of various medically important viruses.</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> ELISA tests</li> <li><input type="checkbox"/> Lab diagnosis of viral infections</li> <li><input type="checkbox"/> Cultivation of viruses</li> </ul>	80	<ol style="list-style-type: none"> <li>1. Lecture</li> <li>2. Discussion</li> <li>3. Tutorial</li> <li>4. Practical</li> </ol>	<ol style="list-style-type: none"> <li>1. Short essay questions.</li> <li>2. Practical examination</li> <li>3. Viva-voce</li> <li>4. Spotter</li> </ol>

  
 Dean  
 Faculty of Paramedical Sciences,  
 UPJMS Satala



**TEACHING SKILLS/SEMINARS / SYMPOSIA/ JOURNAL CLUB ETC.**

**Min. Hrs :- 40 Hrs.**

**(a) Teaching Skills**

Candidates should be encouraged to teach undergraduate students if any. This performance will be based on assessment by the faculty members of the department and from feedback from the undergraduate students.

**(b) Seminar**

Seminars / recent advance presentation will be held every week, however, its timings are subject to clinical schedule. Topics must be well researched and must include common knowledge, recent advances, analysis and references.

PG students should present minimum of two seminars (One in general and one in elective area) and Internal Assessment marks will depend on better topic selection and presentation.

**(c) Journal Review Meeting (Journal Club):**

The ability to do literature search, in depth study, presentation skills, and use of audio-visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting.

**(d) Work diary / Log Book**

Every student shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical practice, if any conducted by the candidate by the student.

**CLINICAL TRAINING/CAMPS**

**Min. Hrs :- 160 Hrs.**

The students will get their clinical training in a medical college OR 100 bedded hospital with well-

	<p>culture, antigen detection, molecular method, toxin detection.</p> <p><input type="checkbox"/> <b>Meningitis</b> -Definition, types of meningitis, causative agents, pathogenesis, roots of infections, hematogenous, direct defect in CNS, predisposing factors, vaccination age, presence of CSF shunts, clinical manifestations, lab diagnosis, specimen collection, CSF collection, CSF transport, biochemical analysis and cell count of CSF, Bacterial meningitis, tubercular meningitis, viral meningitis, CSF microscopy, gram's staining, ZN staining, India ink, antigen detection from CSF, bacteriological culture, antibody detection.</p> <p><input type="checkbox"/> <b>Fever of unknown origin</b> - Definition, causes, lab diagnosis, specimen collection, microscopy, culture, serological method, molecular tests.</p> <p><input type="checkbox"/> <b>Respiratory tract infection</b>- upper respiratory tract infection, lower respiratory tract infection, pneumonia, clinical symptoms- Lobar pneumonia, atypical pneumonia, bronchitis, bronchiolitis, lab diagnosis, specimen collection, culture, identification &amp; serology.</p> <p><input type="checkbox"/> <b>Hospital acquired infections</b> - Definition, factors, immune status,</p>			
--	---	--	--	--

Diseases.

### PARASITOLOGY

Course Code: M01M1002T Theory- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	To provide brief knowledge of parasites involved in human infections. To understand the life cycle and lab diagnosis of various medically important human parasites. To understand the general characteristics of medically important parasites.	Study of morphology, developmental stages, pathogenesis & diagnosis of <ul style="list-style-type: none"><li>• Entamoeba histolytica</li><li>• Entamoeba coli</li><li>• Giardia</li><li>• Trichomonas</li><li>• Balantidium coli</li><li>• Malarial parasites</li><li>• Plasmodium</li><li>• Taenia solium</li><li>• Taenia saginata</li><li>• Schistosoma Haematobium</li><li>• Fasciola hepatica</li><li>• Ascaris</li></ul>	80	Lecture Tutorial Demonstrations Power point presentations	1. Very Short answer questions 2. Short answer questions 3. Long Answer Questions 4. Assignments

Dean  
Faculty of Paramedical Sciences,  
IPUMS Saital

## PARASITOLOGY

Course Code: MO1M1004P Practical- Min. Hrs :- 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<ul style="list-style-type: none"> <li>• To understand the prevention of various diseases. To provide brief knowledge of parasites involved in human infections.</li> <li>• To understand the life cycle and lab diagnosis of various medically important human parasites.</li> <li>• To understand the general characteristics of medically important parasites.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Diagnostic tests for detection of parasitic infections- methods for demonstration of parasites in clinical specimens</li> <li><input type="checkbox"/> Identification of different Ova and Cysts in stool.</li> <li><input type="checkbox"/> Stool examination</li> </ul>	80	<ol style="list-style-type: none"> <li>1. Lecture</li> <li>2. Discussion</li> <li>3. Tutorial</li> <li>4. Practical</li> </ol>	<ol style="list-style-type: none"> <li>1. Short essay questions.</li> <li>2. Practical examination</li> <li>3. Viva-voce</li> <li>4. Spotter</li> </ol>

  
**Dean**  
 Faculty of Paramedical Sciences  
 UPUMS Saifal



## PARASITOLOGY

Course Code: M01M1004P Practical- Min. Hrs -: 80 Hrs.

S. No.	Learning Objective	Content	No. of Hours	Teaching-learning Activities	Assessment Methods
1	<ul style="list-style-type: none"> <li>• To understand the prevention of various diseases. To provide brief knowledge of parasites involved in human infections.</li> <li>• To understand the life cycle and lab diagnosis of various medically important human parasites.</li> <li>• To understand the general characteristics of medically important parasites.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Diagnostic tests for detection of parasitic infections- methods for demonstration of parasites in clinical specimens</li> <li><input type="checkbox"/> Identification of different Ova and Cysts in stool.</li> <li><input type="checkbox"/> Stool examination</li> </ul>	80	<ol style="list-style-type: none"> <li>1. Lecture</li> <li>2. Discussion</li> <li>3. Tutorial</li> <li>4. Practical</li> </ol>	<ol style="list-style-type: none"> <li>1. Short essay questions.</li> <li>2. Practical examination</li> <li>3. Viva-voce</li> <li>4. Spotter</li> </ol>



  
 Dean  
 Faculty of Paramedical Sciences  
 UPUMS Saifal

**M.Sc.-MLT, Semester-IV**  
**CLINICAL LAB PRACTICES OR CLINICAL TRAINING**

**Min. Hrs -: 160 Hrs.**

**Clinical Lab Practices** Post graduate students must do:

- Sample collection, storages & analysis of every sample given to them for various parameters.
- They should know proper laboratory management.
- They should work on every instrument according to their specialization.
- Maintenance and care of the instrument of the laboratory.
- They will do hospital/laboratory/blood bank postings for training & skill development.

**OR**

**Clinical Training**

The students will get their clinical training in a medical college OR 100 bedded hospital with well-equipped Pathology/ Clinical Biochemistry/ Medical Microbiology Laboratory for at least one month.

**REFERENCE BOOKS:**

1. Text book of Microbiology by Ananthnarayan, Orient Longman.
2. Diagnostic Microbiology by Bailey & Scott, Mosby.  
Medical Microbiology by Greenwood & Slack; Churchill Livingstone.
3. The Short Textbook of Medical Microbiology by Satish Gupte; Jaypee.
4. Text book of Medical Parasitology by Panikar; Jaypee.
5. Colour Atlas and Textbook of Diagnostic Microbiology by Koneman, Williams Wilkins.
6. District Laboratory in Tropical Countries , Monica Cheesbrough, Cambridge.
7. Mackie & Maccartney Practical Medical Microbiology; Churchill Livingstone.
8. Essential Immunology, Roitts & Delves 10<sup>th</sup> Edition; Blackwel Science.

  
  
Dean  
Faculty of Paramedical Sciences,  
JSSS Saifal



## DISSERTATION

**Course Code: M01M1005RMin. hours- 120 hrs.**

- No change in the dissertation topic or guide shall be made without prior approval of the institute.
- Guide will be only a facilitator, advisor of the concept and hold responsible in correctly directing the candidate in the methodology and not responsible for the outcome and results.
- The dissertation should be written under the following headings.
  1. Introduction
  2. Aims or objectives of study
  3. Review of literature
  4. Material and methods
  5. Results
  6. Discussion
  7. Conclusion
  8. References
  9. Master and Chart & Table (If Applicable)
  10. Annexure (If Applicable)

The written text of dissertation/ research project shall not be less than 50 pages and shall not exceed 120 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of bond paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. A declaration by the candidate for having done the work himself should also be included, and the guide, head of the department and Director/Coordinator of the institute shall certify the dissertation/ research project..

Every candidate is required to give power point presentation before final submission of dissertation. Four copies of Dissertation/research project shall be submitted to the university, through proper channel, along with a soft copy (CD), 2 months before the final examination. It shall be assessed by two examiners appointed by the university, one internal and one external. There will be a power point open presentation

✓

  
Dean

of Paramedical Sciences.

