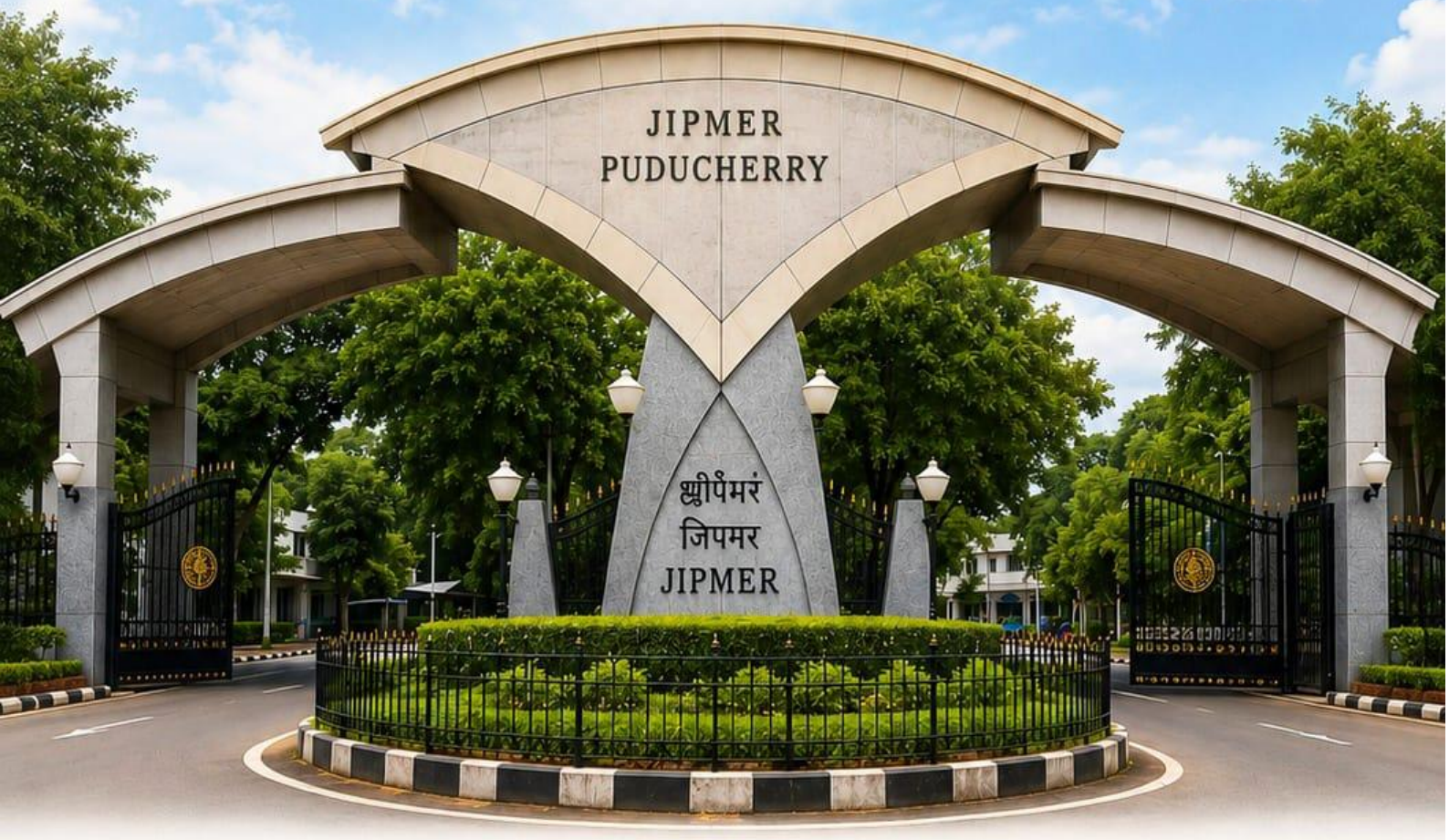
CURRICULUM

POSTGRADUATE

— MD Microbiology —

From July 2026 session



JAWAHARLAL INSTITUTE OF POSTGRADUATE MEDICAL EDUCATION AND RESEARCH (JIPMER),
PUDUCHERRY – 605 006.

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This curriculum was approved at the 19th meeting of the Standing Academic Committee held on 28th January 2026 and ratified at the 22nd meeting of the Governing Body and will be applicable for students joining MD Microbiology from the July 2026 session.

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CONTENT OF DOCUMENT

S. No.	Text	Pages
	Section 1	
1	Goal of the course	4
2	Terminology	5
3	Course content	6
4	Learning resources	7
5	Educational strategy	12
6	Workplace observation	13
7	Assessment	14
	Section 2	
1	Annexure 1(Part A) – Key-Capabilities in the Microbiology	23
2	Annexure 1(Part B) – Core ideas in the practice of Key-capabilities	30
3	Annexure 2- Consolidated list of procedures	39
4	Annexure 3 – Workplace assessment	46

GOAL OF THE COURSE

To train students of Medicine in the field of clinical Microbiology (theoretical and practical training is imparted to the candidates in subspecialties viz., Bacteriology, Virology, Parasitology, Immunology, Mycology, Hospital infection control and Molecular Biology) so that they can participate in good patient care and prevention of infectious diseases in the community. Students are introduced to basic research methodology so that they can plan and conduct fundamental and applied research. They are also imparted training in teaching methods in the subject which may enable them to take up teaching assignments in medical colleges/institutes.

TERMINOLOGY

Key-capabilities

They refer to the practices carried out by the specialists as part of their professional services. They represent the services required from them, by patients, students, other medical/paramedical staff or the society in general.
Thus, they refer to the specific tasks that the postgraduate will be expected to do after he completes the course.
For the purpose of training, the tasks are broken down into units that have distinct cognitive concepts, unless they are predominantly procedural, or attitude based.

Core ideas in practice of Key-capabilities

They refer to the ideas that underly the practice of the specialists. They include ideas and concepts about classification of diseases, equipment, diagnostic assays etc.

COURSE CONTENT:

1. Key-capabilities (outline below, details in Annexure 1 (Part A))
2. Core ideas in the practice of key-capabilities (outline below, details in Annexure 1(Part B))

OUTLINE

KEY CAPABILITIES	
1	Demonstrate competence as a good Clinical Microbiologist in the different subspecialties like Bacteriology, Virology, Parasitology, Immunology and Mycology.
2	Establish good "laboratory practice" in hospital and community in the field of Microbiology
3	Understand the principles and actively play a part in hospital infection control and offer advice on antimicrobial therapy in different conditions.
4	Interact effectively with clinical departments to provide basic and advanced laboratory services in the field of infectious diseases.
5	Plan and execute teaching assignments of Microbiology for undergraduate students.
6	Plan, execute and analyse applied and fundamental research in various branches of Microbiology involving other related disciplines for health care.
7	To participate in various workshops/seminars/ training programs carried out by the parent as well as allied departments
8	Gain knowledge about control programs for various infectious diseases at the national and international level to be able to contribute to public health programs on communicable diseases
9	To understand the principles and concepts of biosafety

CORE IDEAS IN THE PRACTICE OF KEY-CAPABILITIES	
1	General Microbiology and Immunology
2	Systematic Bacteriology and Mycology
3	Virology and Parasitology
4	Applied Microbiology and recent advances

LEARNING RESOURCES

(Suggested Books/ Online Resources)

Please refer to latest edition when available

S.No	Name of Book	Author	Edition	Publisher
1.	Bailey & Scott's Diagnostic Microbiology,	Patricia M.Tille	15 th edition	Elsevier
2.	Gillespie's Medical Microbiology and Infection at a Glance	Stephen H. Gillespie & Kathleen B. Bamford	5 th edition	Wiley Blackwell
3.	Harrison's Principles of Internal Medicine, 20th Edition.	Joseph Loscalzo, Anthony Fauci, Dennis Kasper	21 st Edition.	McGraw Hill
4.	Jawetz Melnick and Adelbergs' Medical Microbiology	Stefan Riedel, Stephen Morse, Timothy Mietzner, & Steve Miller	28th Edition.	McGraw Hill
5.	Kuby's Immunology	Jenni Punt, Sharon Stranford , Jones and Owen	8th Edition.	W. H. Freeman
6.	Mackie and McCartney's Practical Medical Microbiology	J Colle, J.P. Duguid, Fraser, Marmion	14th Edition.	Elsevier
7.	Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases	John E. Bennett, Raphael Dolin ,Martin J. Blaser	9th Edition.	Elsevier
8.	Patrick R Murray's Medical Microbiology	Patrick R. Murray, Ken Rosenthal, Michael A. Pfaller	9 th edition	Elsevier
9.	Plotkin's Vaccines	Walter A. Orenstein, Paul A. Offit MD , Kathryn M. Edwards	7th Edition.	Elsevier

10.	Robbins & Cotran Pathologic Basis of Disease	Vinay Kumar, Abul K. Abbas, Aster	9th Edition.	Elsevier
11.	Stites' Medical Immunology	Daniel P. Stites Terr, Abba I. Tristram G. Parslow	10th Edition.	Appleton & Lange
12.	Topley and Wilson's Microbiology and Microbial Infections	W. W. C. Topley, Graham S. Wilson	10th Edition.	Wiley-Blackwell
13.	Garcia's Diagnostic Medical Parasitology, 6th edition.	Lynne Shore Garcia	6th edition.	ASM press
14.	Harrison's Infectious Diseases, Third Edition	Dennis Kasper and Anthony Fauci	Third Edition	McGraw Hill
15.	Clinical Microbiology Procedures Handbook	Amy L. Leber	Third Edition	ASM press
16.	Essentials of Hospital infection control, Sastry AS, Deepashree R	Sastry AS, Deepashree R		Jaypee Brothers Medical Publishers
17.	Fisher's Fundamentals of Diagnostic Mycology	Fran Fisher, Norma B. Cook	-	Saunders
18.	Zuckerman's Principles and Practice of Clinical Virology, Sixth Edition	Arie J. Zuckerman, Jangu E. Banatvala, Paul Griffiths, Barry Schoub, Philip Mortimer	Sixth Edition	Wiley
19.	Fields Virology - Seventh Edition	Peter M. Howley, David M. Knipe, Sean Whelan	Seventh Edition	Wolters Kluwer Health
20.	Larone's Medically Important Fungi	Lars F. Westblade, Eileen M. Burd, Shawn R.	Seventh Edition	ASM Press

		Lockhart, Gary W. Procop		
21.	Errol Reiss, H. Jean Shadomy, G. Marshall Lyon. Fundamental Medical Mycology	Errol Reiss, H. Jean Shadomy, G. Marshall Lyon.	First edition	Wiley-Blackwell
22.	Colin K. Campbell, Elizabeth M. Johnson, David W. Warnock. Identification of Pathogenic Fungi	Colin K. Campbell, Elizabeth M. Johnson, David W. Warnock.	Second edition	Wiley-Blackwell
23.	William N. Rom and Stuart M. Garay. Tuberculosis	William N. Rom and Stuart M. Garay.	2nd edition	Lippincott Williams and Wilkins
24.	Koneman's Color Atlas and Textbook of Diagnostic Microbiology	Gary W. Procop, Deirdre L. Church, Geraldine S. Hall, William M. Janda	7th Edition.	Jones and Bartlett Publishers,
25.	Manson's Tropical Diseases	Jeremy Farrar, Peter J Hotez	23rd Edition.	Saunders
26.	Patrick R Murray's Medical Microbiology, 9th Edition.	Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller	9th Edition.	Elsevier
27.	Abbas' Cellular and Molecular Immunology	Abul K. Abbas, Andrew H. H. Lichtman, Shiv Pillai	8th Edition.	Saunders
28.	D.D. Richman, Clinical Virology, 4th Edition	Douglas D. Richman, Richard J. Whitley, Frederick G. Hayden	4th Edition	ASM Press

Suggested Journals

S. No	Journal Title Journal Home Page	Abbreviation Browse Journal in Medline	ISSN	
1	Indian Journal of Medical Microbiology	Indian J Med Microbiol	0255-0857	Elsevier
2	Journal of Clinical Microbiology	J Clin Microbiol	0095-1137	ASM Journals
3	Journal of Medical Microbiology	J Med Microbiol	0022-2615	Microbiology Society
4	Indian Journal of Medical Research	Indian J Med Res	0971-5916	Medknow
5	The Lancet Infectious Diseases	Lancet Infect Dis	1473-3099	Elsevier Science
6	American Journal of Infection Control	Am J Infect Control	0196-6553	St. Louis, Mosby
7	Journal of hospital infection control	J Hosp Infect	0195-6701	Saunders
8	Clinical Microbiology and Infection	Clin Microbiol Infect	1198-743X	Elsevier
9	Microbiology - PLOS ONE	PLoS One	1932-6203	Public Library of Science
10	Clinical Microbiology reviews	Clin Microbiol Rev	1098-6618	ASM Press
11	BMC infectious diseases	BMC Infect Dis	1471-2334	BioMed Central
12	Diagnostic Microbiology and Infectious Diseases	Diagn Microbiol Infect Dis	0732-8893	Elsevier
13	Medical Mycology	Med Mycol	1369-3786	Blackwell Science
14	Mycopathologia	Mycopathologia	0301-486X	Kluwer Academic

15	Medical Mycology Case Reports	Med Mycol Case Rep	2211-7539	Elsevier
16	Mycoses	Mycoses	0027-5557	-
17	Indian Journal of Tuberculosis	Indian J Tuberc	0019-5707	Elsevier
18	Tuberculosis	Tuberculosis (Edinb)	1472-9792	Churchill Livingstone
19	Tropical Parasitology	Trop Parasitol	2229-7758	Medknow
20	Parasitology International	Parasitol Int	1873-0329	Elsevier
21	Journal of Vector Borne Diseases	J Vector Borne Dis	0972-9062	Wolters Kluwer - Medknow
22	Pediatric Infectious Disease Journal	Pediatr Infect Dis J	0891-3668	Williams & Wilkins

WEBSITES:

1. World Health Organization (WHO)
2. Centres for Disease Control and Prevention, Atlanta, USA.
3. Indian Council of Medical Research, New Delhi, India
4. National AIDS Control Organisation (NACO), India.
5. National Centre for Disease Control (NCDC) Guidelines, India.
6. National Vector Borne Disease Control Program (NVBDCP), India.
7. National Tuberculosis Elimination Program (NTEP), India.
   Ministry of health and family welfare, Government of India

EDUCATIONAL STRATEGY

Rotation Posting

The residents are posted by rotation to all the different sections of the department ensuring that they get a minimum of 3 months posting in each section by the end of 3 years. He/she will achieve the objectives of the posting in all these workplaces. (Annexure 1 Part A & B)
Participation in reporting of the clinical samples- everyday in the morning for 1.5hours (9-10.30 am)
Seminars – everyday in the morning for 1 hr (11.30 am to 12.30 pm)
Formative assessment is done for each seminar and feedback is given.

Sections in the department

1. **Bacteriology (Exudate, Respiratory, Blood, Sterile body fluids, Anaerobic bacteriology, Urine and Stool)**
2. **Mycobacteriology**
3. **Immunology and serology**
4. **Mycology and STI**
5. **Virology**
6. **Parasitology**
7. **Hospital infection control and prevention**

Dissertation

- A research project should be undertaken and dissertation must be submitted as per Postgraduate Research Monitoring Committee (PGRMC) guidelines of JIPMER.
- Two hard copies of the dissertation, prepared from the research project, should be submitted to the Dean (Academics) JIPMER, at two and half years of the course to become eligible to appear for the final examination at the end of the course, as per the guidelines of JIPMER.
- Six monthly interim presentations of the dissertations will be done to monitor the progress of the research work and take corrective measures when faced with difficulties.
- **Please refer to Postgraduate Dissertation Regulations and Postgraduate Examination Regulations document for further details**

WORKPLACE OBSERVATION

Logbook

1. A consolidated record of the number of postings in each of the sections posted and diagnostic work done in each section done independently and with assistance is entered as per the format. Each entry is made with date and certified by the faculty.
2. Record of the academic activities in the department to be entered in the log book are as follows
    i. Journal clubs presented
    ii. Culture seminars presented
    iii. Technique/slide seminars presented
    iv. Topic seminars presented
    v. Undergraduate classes
        1. MBBS practical and demonstration classes
        2. BSc MLT practical and demonstration classes
        3. MRT/MRO theory classes handled
    vi. Conferences attended- national/international
    vii. Papers published with title, name and issue of the journal certified by the faculty
    viii. Sterilization and disinfection practices
    ix. Quality control practices
    x. Hospital infection surveillance
    xi. Hospital waste management
    xii. Overall assessment of the student

Workplace observation scheme (submitted along with internal assessment marks)
The day-to-day activities in practice and learning of the student will be observed and recorded in the ``workplace observation form`` at the end of every posting or monthly.
Assessment of logbook is to be done at the same time instances, and entry made in the ``workplace observation form ``by the faculty. Feedback, as part of the formative assessment is given to students by the faculty, during these time instances.

Formative assessment should be continual and should assess medical knowledge, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.
Assessment during the MD programme should be based on:

1. Journal based / recent advances learning- Journal clubs and topic/technique/culture/slide seminars
2. Laboratory or Skill based learning- assessment may be done at the end of posting in each section
3. Notified written tests and practical examination
4. Log book entry and regularity of submission
5. Attendance and participation in CMEs, conferences, workshops
6. Manuscript submission and paper presentation in regional/national conference

ASSESSMENT

Marks

Exam	Marks	Description
Theory exit examination	400 marks	This is the written exam at the end of the course. Four theory examination papers as given in the curriculum document of the course.
Practical exit exam	400 marks	This is the practical examination at the end of the course. The detailed scheme is given in the curriculum document of the course.
Internal Assessment	Internal assessment Theory: 50 marks	Two exams should be conducted - one at the end of first year and the other at the end of second year. Portions for the examination and pattern of the examination must be notified to the students at least one month in advance. The pattern of the internal assessment test will be similar to one paper of the theory exit examination. Two faculty members will evaluate the paper of each candidate in a blinded manner and the average of the 2 scores will be taken as the final score for the internal assessment. If a resident misses one of the tests due to medical reasons (medical certificate from a faculty member of the treating department and duly forwarded by the HoD to the Dean (Academic)), he/she can be permitted to appear in the test that is held for the next batch 6 months later. This can be permitted only once in the course period. If a resident does not attend an internal assessment test, or if he/she fails to attend the rescheduled test due to medical reasons, the score will be considered as 0 for the test. No retests or re-evaluation will be permitted under any circumstances. The internal assessment marks should be communicated to the students within two months of conducting the exams. Internal assessment test marks will be added to the final aggregate to the tune of 100 marks (theory and practical). There is no cut off of internal assessment test scores for determining eligibility to appear in the exit examination or to decide pass/fail solely based on the internal assessment test scores.

Exam	Marks	Description
		However, when a student secures less than 50% marks in the internal assessment or when any concern is formally raised by the student with the Dean office, a review board with at least 3 faculty members should be constituted to review the student's performance with the student, recommend appropriate remedial measures, document the remedial plan, and submit a signed copy of the document to the Dean's Office. Additional periodic assessments can be held as part of formative assessment. Scores of these tests will not be considered for internal assessment and will not be considered for replacing scores of any of the internal assessment tests. Information to be provided to the Dean Office, before the final examination. 1. Dates of internal assessment examinations conducted 2. Names of faculty members involved in assessment against each date 3. Marks obtained by students in theory, practical and workplace-based observation in each exam session 4. Internal assessment marks for each student for Theory, Practical and Workplace based assessment. An average of the two theory and practical tests will be used to calculate scores for 50 and 25 marks respectively. Cumulative workplace-based assessment scores will be determined for 25 marks. 5. Copy of review documentations for periods of low performance of a student, if any, with remedial measures suggested by the departmental committee.
Internal Assessment (Practical and Workplace-based assessment)	Internal assessment Practical: 25 marks	For practical examinations, all members of the faculty of the department, from Assistant Professor to the senior-most faculty, shall participate in internal assessment on a rotating basis. The assessment shall be planned such that multiple faculty members are engaged for each student and different faculty members are engaged for the two assessments, wherever feasible. The pattern prescribed in the curriculum document shall be followed for practical assessments and the score shall be adjusted for 25 marks.

Exam	Marks	Description
	Internal assessment Workplace-based assessment: 25 marks	Workplace-based assessment marks are given based on practice of the profession and affective domain attributes in the workplace and in the learning environment. Workplace observation proforma should be provided to students at the time of joining the department. The method of workplace observation should be explained to the students at the beginning of the course.
Dissertation	100 marks	Dissertation marks will be calculated by the average of the scores provided by 2 external examiners. Approval of the dissertation with more than 50% scores awarded by the external examiners will be one of the eligibility criteria for appearing for the exit examination of the discipline.
Total	1000 marks	**Criteria for PASS:** 1. (a) A candidate will need to pass the final Theory Exit Exam and Practical Exit Exam independently. (b) A minimum of 50% marks in 'Theory Exit exam' (a minimum of 40% in each of the four papers) and 50% in 'Practical Exit exam' separately shall be mandatory 2. A candidate should also score 50% or above in the final aggregate marks (500 out of 1000) to pass in the degree course. If a student secures a pass score in theory and practical examination but fails in the aggregate score, he/she can re-appear in the exit examination of the subsequent session. There is no provision to improve internal assessment or dissertation scores.
Please refer to Postgraduate Examination Regulations document for further details		

<u>Theory Exit Exam</u> (400 Marks)

Written exam is conducted in the following four papers,

A. **Paper I: General Microbiology and Immunology 100 Marks** (Total 10 questions, each question carries total 10 marks)

B. **Paper II: Systematic Bacteriology and Mycology 100 Marks** (Total 10 questions, each question carries total 10 marks)

C. **Paper III: Virology and Parasitology 100 Marks** (Total 10 questions, each question carries total 10 marks)

D. **Paper IV: Applied Microbiology, Hospital Infection Control and Recent advances** (Total 10 questions, each question carries total 10 marks)

Practical Exit Exam (400 marks)

Practical should be spread over two days and include the following components:

A. Bacteriology: 70 Marks
Isolation and identification of bacteria from clinical samples
Performance and interpretation of antimicrobial susceptibility test of the pathogen Preparation of clinical microbiology report

B. Bacterial Serology: 40 Marks
Common serological tests like VDRL test, WIDAL test, standard agglutination test etc.

C. Virology: 50 Marks
1. Serological tests for diagnosis of viral infections

2. Molecular tests for viral infections**Mycology: 50 Marks**
3. Identification of fungal cultures – yeasts and moulds
4. Slide culture technique

D. Parasitology: 50 Marks
1. Stool specimen- concentration techniques and identification of ova and cysts in stool samples
2. Blood specimen for malarial parasites- smear, ICT, QBC etc

E. Charts and slides: 10 spots **- 30 Marks**

F. Pedagogy: This must include a component of teaching session of not more than 5 minutes duration **10 Marks**

G. GRAND VIVA: 100 Marks

MODEL THEORY QUESTION PAPERS

M.D. DEGREE EXAMINATIONS

Department of Microbiology, JIPMER

Paper-I

General microbiology and Immunology

Time: 3 hours Maximum marks: 100**(10x10marks)**

Answer all the questions

1. Discuss about the surface structures that contribute to bacterial virulence
2. Discuss the different methods of disinfectant testing.
3. Discuss the various mechanisms of drug resistance in bacteria
4. Discuss the quality control in antimicrobial susceptibility testing according to Clinical and Laboratory Standard guidelines M02
5. Describe in detail the structure and function of transposons
6. Discuss in detail antibody dependent cell mediated cytotoxicity
7. Discuss the immune response of host to viral infections
8. Discuss the important cytokines and their actions
9. Describe the mechanisms of antigen processing and presentation via MHC class I and class II molecules to T lymphocytes.
10. Discuss the ligands and molecular signalling pathways relevant to Toll like receptors (TLR)

M.D. DEGREE EXAMINATIONS Department of

Microbiology, JIPMER

Paper-II

Systematic bacteriology and Mycology

Time: 3 hours Maximum marks: 100

Answer all the questions

1. Describe the pathogenesis and laboratory diagnosis of pertussis.
2. Discuss the laboratory diagnosis of gonorrhoea. Add a note on the current status of drug resistance in *Neisseria gonorrhoeae*
3. Discuss the laboratory diagnosis of enteric fever.
4. Discuss the current status of leptospirosis in India and its laboratory diagnosis
5. Describe the etiological agents of bacterial pneumonia and its laboratory diagnosis
6. Describe the pathogenesis and laboratory diagnosis of *Pneumocystis jirovecii* pneumonia
7. Discuss the clinical infections caused by *Aspergillus* species
8. Laboratory diagnosis of Histoplasmosis
9. Discuss invasive *Malassezia* infections
10. Discuss the mechanism of drug resistance in *Candida auris*

M.D. DEGREE EXAMINATIONS

Department of Microbiology, JIPMER

Paper-III

Virology and Parasitology

Time: 3 hours Maximum marks: 100

Answer all the questions

1. Discuss the WHO classification of Dengue fever. Add a note on pathogenesis of Dengue haemorrhagic fever.
2. Discuss the WHO strategy for eradication of Measles
3. Discuss the management of dog bite. Add a note on the post exposure prophylaxis as per the GOI guidelines.
4. Discuss the role of Next Generation Sequencing in virology
5. Discuss the epidemiology and laboratory diagnosis of Monkey pox infection
6. Discuss briefly the pathogenesis of falciparum malaria. Add a few points on the current picture of its drug resistance (6+4)
7. Write briefly on life cycle of Hookworms. Discuss the laboratory diagnosis of soil transmitted helminths (4+6)
8. Enumerate the various species of pathogenic free-living amoebae. Write briefly on the pathogenesis of Primary amoebic meningoencephalitis (PAM) (4+6)
9. Discuss the salient points of the National Vector Borne Disease Control Programme of India with respect to parasitic infections.
10. Give a detailed account of use of Aptamers in diagnostic parasitology

M.D. DEGREE EXAMINATIONS

Department of Microbiology, JIPMER

Paper-IV

Applied Microbiology and recent advances

Time: 3 hours Maximum marks: 100

Answer all the questions

1. Discuss the automated methods employed in diagnosis of Tuberculosis
2. Enumerate the techniques of testing the quality of water
3. Compare and contrast Pulsed-field Gel electrophoresis and multilocus sequence typing as epidemiological tools
4. Discuss old and new pneumococcal vaccines and their status in India.
5. Define quality assurance. Discuss in detail the principles and practice of quality assurance in microbiology laboratory
6. Discuss the various types of antimicrobial stewardship interventions
7. Discuss the various preventive measures for surgical site infections according to WHO guidelines.
8. Discuss the role of microbiologist in One Health Program
9. Discuss the diagnostic and therapeutic algorithm for Hepatitis C under National Viral Hepatitis Control Program
10. Discuss various isothermal amplification techniques.

Annexure 1(Part A)

S. No	Key capabilities	1 yr	2 yrs	3 yrs
A.	Laboratory and Diagnostic			
1	General Microbiology and Bacteriology ● Media and reagent preparation ● Operation of autoclave, hot air oven ● Washing and sterilization of glass wares ● Laboratory waste management ● Aseptic practices in laboratory and safety precautions ● Care and maintenance of common laboratory equipment ● Preparation and performance of common bacterial stains ● Collection of specimens for microbiological investigations ● Care and operation of microscopes ● Preparation, examination and interpretation of direct smears from clinical specimens ● Motility testing of bacteria ● Plating of clinical specimens on media· Latex and Staphylococcal Co-agglutination tests ● Quality control of media and reagents ● Quantitative and semi-quantitative analysis of urine ● Estimation of MIC, MBC, and tests for b-lactamases ● Identification of bacteria of medical importance up to species level	**1**	**2/3**	**4/5**
2	Immunology ● Separation of serum and preservation of serum for short and long periods ● Preparation of antigens from bacteria or tissues like Widal, VDRL, etc and their standardization ● Performance of serological tests viz. Widal, Brucella tube agglutination, Cold agglutination, VDRL, Paul-Bunnel, IF ● Enzyme linked immunosorbent assay	**1**	**2/3**	**4/5**
3	Mycology ● Collection of specimens ● Direct examination of specimens by KOH, Gram's, Kinyoun's, Giemsa, Lactophenol cotton blue stains ● Isolation and identification of common laboratory contaminants, dermatophytes and others of medical importance (yeast, hyaline or dematiaceous fungi) ● Maintenance of stock cultures ● Phenotypic and automated identification methods of various medically important fungi ● Perform and interpret the results of antifungal susceptibility tests	**1**	**2/3**	**4/5**
4	Parasitology ● Collection of specimens ● Examination of faeces for parasitic ova and cysts etc. by	**1**	**2/3**	**4/5**

S. No	Key capabilities	1 yr	2 yrs	3 yrs
	direct and concentration methods (salt floatation and formal-ether methods) ● Examination of blood for protozoa and helminths by wet mount and thin and thick stained smears ● Performance of stains- Leishman, Giemsa ● Preservation of parasites- mounting, fixing, staining, etc. ● Egg counting techniques for helminths ● Examination of other specimens e.g. urine, CSF, bone marrow etc. for parasites ● In-vitro culture of parasites like Entamoeba, etc. ● Molecular assays			
5	Virology ● Understand the principles of various diagnostic assays and attain proficiency in performing and interpreting diagnostic assays like Lateral flow assays, flow through assays, ELISA, ELFA, Chemiluminescence assay etc ● Understand the principles, perform and interpret molecular assays like conventional PCR, real time PCR.	**1**	**2/3**	**4/5**
B.	Teaching skill			
C.	Research methodology			
D.	Communication and Attitude			

Learning objectives for key-capabilities

The post graduate training should include the following components**.**

a. Laboratory, Diagnostic and Interpretative skills in Clinical Microbiology

b. Teaching Skills

c. Research Methodology

d. Communication and attitude skills

A) Laboratory and Diagnostic

An MD postgraduate in Medical Microbiology by the end of their training should be capable of the following skills

Pre-analytical

1. Understanding and advising the diagnostic tests required for different clinical syndromes.
2. Understand and advise appropriate sample requirement to perform diagnostic tests as required for the given clinical syndrome

3. Understand and advise appropriate storage and transport conditions for the samples
4. Understand and practice the sample acceptance and rejection criterion for different clinical samples
5. Understand and practice appropriate storage of clinical specimen/ biological material for subsequent testing or short/long term archival including maintenance of archival records
6. Understand and demonstrate appropriate packing and transport conditions for biological/ clinical samples as per the national and international guidelines.
7. Understand the workflow of the laboratory and advise batching of tests for optimal utilization of reagents and manpower keeping in line the timeliness of sample reporting as per the disease syndrome
8. Understand the principle and operate various equipment used for sterilization including quality control such as autoclave, etc.
9. Understand the applications and use of different disinfectants in the laboratory & Hospital
10. Understand and practise, information technology components relevant to laboratory functioning like hospital/ laboratory information systems, inventory management systems etc

Analytical

1. Understand the principles of diagnostic tests; sample requirement, methods, interpretation, limitations, diagnostic accuracy etc.
2. Understand, perform and interpret various immunological tests done like lateral flow assay, flow through assay, immunofluorescence, ELISA, Kinetic ELISA, ELFA, Chemiluminescence etc
3. Understand, perform and interpret various molecular methods used as diagnostic tests like PCR, real time PCR, LAMP and other nucleic acid amplification tests.
4. Understand and practice methods of culturing pathogens in laboratory
    a. Bacteria – various artificial culture media like enriched, selective, differential and transport media including methods of isolating anaerobic organisms.
    b. Fungi – different media for fungal culture – general and selective

c. Viruses – principles of virus culture – cell culture, identification and interpretation of cytopathic effects and other methods of identifying viral growth
d. Parasites – cultivation of parasites

5. Understand and practise methods of identification of bacteria and fungi using conventional, automated systems and molecular techniques
6. Understand and practise conventional and automated methods of antimicrobial susceptibility testing of bacteria and fungi and should understand the fundamentals of synergy testing
7. Understand and perform the quality control processes for diagnostic tests in laboratory like antimicrobial susceptibility testing, LJ charting, participation in EQA, Inter- laboratory Quality Control, etc in addition to quality checks of media, equipment and other laboratory items for performance standards
8. Understand and practise the risk assessment procedures for processing of clinical specimen as per the clinical syndrome and epidemiological relevance to ensure the safety of laboratory personnel
9. Understand the principles of genomic sequencing in day-to-day practice of clinical Microbiology and be capable of deriving actionable evidence from it.

Post analytical

1. Understand the diagnostic assays performed on the clinical specimen, interpret them with a knowledge of their sensitivity, specificity, diagnostic accuracy and report the findings with relevant comments/ advises on management/ therapeutics, infection control in hospital and field setting and epidemiologic relevance
2. Understand the principles of biomedical waste management and apply them in appropriate disposal of clinical specimen and test material from laboratory
3. Understand and practice the national guidelines for notifiable diseases and report to concerned authorities
4. Should be aware of the importance of patient autonomy and practise maintaining confidentiality of patient data and laboratory documents

Instrumentation

Understand the principle, functioning, trouble shooting, calibration and maintenance of commonly used laboratory instruments and equipment

Accreditation

Should understand the procedures and documentation required for obtaining accreditation from national and internationally recognized professional organizations

Public health and infection control advice beyond the laboratory reports

1. Should have thorough understanding of the disease syndrome and be capable of giving appropriate advice with respect to infection control practices, public health initiatives to be taken such as surveillance activities
2. Should have thorough knowledge of the national programs with respect to specific diseases/ syndromes and act accordingly as per the laboratory component required for the program.

B) Teaching Skills

a. Should undergo training by The Medical Education Department/Unit of the institution in basic concepts of medical education like domains of learning, teaching skills, teaching - learning methods, learning resource material, evaluation techniques etc.
b. The postgraduate students should attend all undergraduate lectures in the subject of Microbiology and participate actively in the undergraduate teaching programme including tutorials, demonstrations and practical.

C) Research Methodology

Training in research methodology should be imparted by planning of a research project by the student under the guidance of a recognized guide to be executed and submitted in the form of a thesis. The thesis is aimed at training the post graduate student in research methods and techniques. It should include identification of a research question, formulation of a hypothesis, search and review of relevant literature, getting acquainted with recent advances, designing of research study, collection of data, critical analysis of the results and drawing conclusions. They can collaborate with other departments, analyse data and become familiar with basic biostatistics. They should also be able to write a research paper. The thesis should be completed and submitted by the student six months before appearing for the final university examination.
The PG should attend workshops on research methodology and Scientific paper writing.

D) Communication and attitude skills

Post-graduate student is expected to imbibe ethical practice of professional attributes of honesty, integrity, accountability, honour, humanism and excellence and demonstrate the same in the day to-day conduct and dealings with the teacher, peers, the nursing and paramedical staff and most-importantly patients. They should work as an effective team member and leader. They should also demonstrate right kind of attitude while handling clinical material and reports. To ensure that student is able to acquire these attributes, their personal conduct should be keenly observed by the teachers. The student should be counselled as and when required. Personal attributes of the student should be regularly assessed by peers, senior, and junior students and Head of the Unit/ In charge.

Interaction with other departments

The residents should interact with their colleagues from other clinical and paraclinical departments for comprehensive training. This may include discussions with faculty from Pathology department to learn the tissue reactions to pathogens and their identification, visit to ICUs as part of audit activities and wards during AMSP rounds.

Emergency duty

The resident should be posted for managing emergency laboratory services in Microbiology which includes processing samples and communicating critical alerts to the clinician.

Annexure 1(Part B)

CORE IDEAS IN THE PRACTICE OF KEY-CAPABILITIES

GENERAL MICROBIOLOGY

1. History and pioneers in Microbiology
2. Microscopy
3. Bio-safety including universal precautions and bio safety cabinets
4. Morphology of bacteria
5. Nomenclature and classification of bacteria
6. Growth, nutrition and metabolism of bacteria
7. Culture media and methods
8. Identification of bacteria – Conventional and automated
9. Sterilization and disinfection
10. Bacterial toxins and virulence factors including quorum sensing mechanism
11. Bacterial antagonism: Bacteriocins
12. Bacterial genetics and bacteriophages
13. Molecular genetics relevant for Medical Microbiology including gene cloning
14. Antibacterial substances used in the treatment of infections- mechanism of action, drug resistance in bacteria and concept of PK,PD
15. Antimicrobial susceptibility tests and their interpretation
16. Bacterial ecology - Normal flora of the human body and human microbiome in health and disease
17. Host parasite relationship
18. Epidemiology of infectious diseases and One Health Concept
19. Quality assurance, quality control and accreditation standards in Diagnostic Microbiology
20. Preservation of microbial agent

IMMUNOLOGY

1. The immune system- structure and function
2. Innate and acquired immunity
3. Cells involved in immune response
4. Antigens
5. Immunoglobulins, antibodies including monoclonal antibodies
6. Complement
7. Humoral and Cell mediated Immune response
8. Antigen and antibody reactions including the methods of demonstration and applications in diagnostic microbiology
9. Hypersensitivity
10. Autoimmunity and Immune tolerance
11. Immunodeficiency diseases
12. Basics of Transplantation immunity and Tumour immunity
13. Immunoprophylaxis and immunotherapy
14. Immunopotentiation and immune modulation

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria
2. Gram positive cocci of medical importance including *Staphylococcus, Streptococcus, Enterococcus*, etc
3. Gram negative cocci of medical importance including *Neisseria, Moraxella*, etc.
4. Aerobic Gram positive bacilli of medical importance including Coryneform organisms, Bacillus, aerobic Actinomycetes, *Erysipelothrix, Listeria,* etc
5. The Enterobacterales
6. *Vibrio* and *Aeromonas*
7. Fastidious organisms such as *Haemophilus, Bordetella, Brucella, Helicobacter, Campylobacter* etc
8. Non-fermentative Gram negative bacilli including *Pseudomonas, Acinetobacter, Stenotrophomonas, Burkholderia* etc
9. Anaerobic bacteria – *Clostridium* and non sporing anaerobes
10. Mycobacteria including *M. tuberculosis*, nontuberculous mycobacteria and *M. leprae*
11. Spirochaetes
12. *Chlamydia*
13. *Rickettsia, Coxiella, Bartonella*
14. Mycoplasmatales: *Mycoplasma, Ureaplasma, Acholeplasma*, etc
15. Miscellaneous bacteria- *Legionella, Francisella, Gardnerella* etc

VIROLOGY

1. The nature of viruses
2. Classification of viruses
3. Morphology: virus structure
4. Virus replication
5. The genetics of viruses
6. The pathogenicity of viruses
7. Epidemiology of viral infections
8. Laboratory diagnosis of viral infections
9. Viral Vaccines and anti-viral drugs, methods of testing and drug resistance
10. RNA viruses of medical importance including, Enteroviruses, Togaviridae, Flaviviruses, Orthomyxoviruses, Paramyxoviruses, Reoviridae, Rhabdoviridae, Arenaviridae, Bunyaviridae, Retroviridae, Filoviruses, Human immunodeficiency virus, Arboviruses, Coronaviridae, Calciviruses, etc.
11. DNA viruses of medical importance including Poxviridae, Herpesviridae, Adenoviridae, Hepadnavirus, Papovavirus, Parvovirus etc.
12. Slow viruses and Prions
13. Viral oncogenesis
14. Newer and emerging viruses

PARASITOLOGY

1. General characteristics and classification of parasites
2. Pathogenesis and pathology of parasitic infections.
3. Immune responses in parasitic infections
4. Laboratory diagnosis of parasitic infections
5. Invitro cultivation of parasites
6. Antiparasitic agents and drug resistance
7. Prevention of parasitic infections including vaccines
8. Protozoan parasites of medical importance including *Entamoeba,* free living amoebae, *Giardia, Balantidium coli, Trichomonas,* intestinal coccidian parasites, *Toxoplasma, Sarcocystis*, blood parasites including *Plasmodium, Leishmania, Trypanosoma*, etc
9. Cestodes of medical importance including *Diphyllobothrium latum, Spirometra, Taenia, Echinococcus, Hymenolepis, Dipylidium caninum*, etc
10. Trematodes of medical importance including *Schistosoma, Fasciola, Fasciolopsis buski, Paragonimus, Clonorchis*, other trematodes.
11. Nematodes of medical importance including *Trichuris, Strongyloides, Ancylostoma, Necator, Enterobius, Ascaris, Toxocara*, agents causing larva migrans, tissue nematodes including, Filarial worms, *Dracunculus medinensis, Trichinella, etc*
12. Ectoparasites: Common arthropods and other vectors viz. Mosquito, Sandfly, Ticks, Mite, Cyclops.

MYCOLOGY

1. The morphology and reproduction of fungi
2. Classification of fungi
3. Epidemiology of fungal infections
4. Pathogenesis and pathology of fungal infections.
5. Immune responses in fungal infections
6. Laboratory diagnosis of fungal infections
7. Antifungal agents, drug resistance and in-vitro antifungal susceptibility testing
8. Yeasts and yeast like fungi of medical importance including *Candida, Cryptococcus, Malassezia, Trichosporon, Geotrichum* etc.
9. Hyalohyphomycetes of medical importance including *Aspergillus, Penicillium, Fusarium, Mucor* and other hyalohyphomycetes
10. Fungi causing phaeohyphomycosis including *Bipolaris, Exophiala, Curvularia, Chaetomium, Phoma, Exserohilum* etc.
11. Fungi causing superficial mycoses including dermatophytes, *Malassezia* and piedra
12. Fungi causing subcutaneous mycoses including mycetoma and rhinosporidiosis.
13. Dimorphic fungi including *Histoplasma, Blastomyces, Coccidioides, Paracoccidioides, Sporothrix, Talaromyces,* etc.
14. *Pneumocystis jiroveci*
15. Prototheca and other hydrophilic fungi
16. Mycetismus & mycotoxicosis
17. Antifungal stewardship and fungal infection control

HOSPITAL INFECTION CONTROL, RECENT ADVANCES AND MISCELLANEOUS TOPICS

HOSPITAL INFECTION CONTROL

1. Hospital acquired infections and surveillance
2. Management of needle stick injuries
3. Diagnostic and Antimicrobial stewardship
4. Biomedical waste management
5. Environmental surveillance
6. Standard and transmission-based precautions
7. Policies of sterilization and disinfection in hospital

RECENT ADVANCES AND MISCELLANEOUS TOPICS

1. Molecular diagnostics including sequencing
2. Vaccinology: principle, methods of preparation, administration of vaccines
3. Infectious Disease Surveillance & Investigation of outbreak of infectious diseases
4. Role of Microbiologist in One Health Concept
5. Infectious syndromes including infections of various organs and systems of human body viz. sexually transmitted diseases, respiratory tract infections, urinary tract infections, central nervous system infections, congenital infections, reproductive tract infections, gastrointestinal infections, hepatitis, skin and soft tissue infections, bone and joint infections, pyrexia of unknown origin, infections of eye, ear & nose, bacteraemia, septicaemia, endocarditis, haemorrhagic fever, etc.
6. Zoonotic infections
7. Infections in transplant recipients
8. Opportunistic infections
9. Agents of bioterrorism
10. Emerging and re-emerging infections

11. Automation in Microbiology

12. Statistical analysis of microbiological data and research methodology

13. Biomarkers of infectious diseases

14. Biosafety and biosecurity in laboratory

15. Internal and External quality assurance measures in the Microbiology Laboratory

Annexure 2

Consolidated list of procedural skills

1. Bacteriology (Exudate, Respiratory, Blood, Sterile body fluids, Anaerobic bacteriology, Urine and Stool)

Must know and do	Desirable to perform
1. Should know the appropriate specimens for different clinical conditions	
2. Process all types of specimens received in the laboratory - should know the media to be used, type of loops to be used and method of inoculation, ideal incubation time and environment	
3. Should understand the acceptance and rejection criteria for various specimens	
4. Should understand the importance of adhering to optimum turnaround time for each test and take the necessary steps to maintain the turnaround time within the recommended limit	
5. Should be thorough with procedure of Gram stain starting from smear preparation (both from specimens and culture) and fixation. Should understand the principle and modifications of Gram stain. Should learn interpretation of Gram stain of various specimens and scoring system wherever applicable	
6. Should know different types of biosafety cabinets, use and maintenance	
7. Should learn composition and uses of the different media used for various specimens and growth characters of common pathogens on each type of medium used in the section.	
8. Should be able to read, interpret cultures and identify different colony morphologies	
9. Understand the principle and operate automated culture systems for different specimens	
10. Should know and demonstrate how to create anaerobiosis using available systems and Automated Anaerobic culture system and understand the workflow for recovery of anaerobic pathogens	
11. Should perform and understand the principle of various tests used for bacterial identification	
12. Should understand principle and perform tests by MALDI- TOF and other automated identification and antimicrobial susceptibility testing (AST) systems	
13. Should understand principle of AST, be able to perform different methods of AST including MIC and MBC. Should be able to read AST plates, interpret the results and recognize contamination/ mixed growth in AST plates. Should understand the concept of intrinsic resistance to antibiotics and principle of selective /cascade reporting	

14. Should interact with patients and clinicians in special situations, and should be able to guide their clinical colleagues in the types of samples to be collected and antibiotics to be used in particular situations	
15. Should be able to understand the concept of critical alert and identify the critical reports for immediate communication to the clinician	
16. Should learn and demonstrate methods of maintenance of bacterial/fungal stock cultures ➢ Perform phenotypic/ molecular tests for diagnosis and/ or demonstration of virulence characters where relevant ➢ Perform and interpret quantitative culture of various specimens	

2. Mycobacteriology section

Must know and do	**Desirable to perform**
1. Should know the list of appropriate specimens for identification of Mycobacteria	
2. Should know the acceptance the rejection criteria for various specimens	
3. Should know the principle, perform, and interpret Ziehl Nielsen staining and Auramine Phenol staining in accordance with National Tuberculosis Elimination Programme	
4. Should know the methods of culture including media preparation and automated systems	
5. Should know the principle and perform molecular tests for diagnosis and AST including the cartridge based nucleic acid amplification tests and line probe assay	

3. Immunology/Serology section

Must know and do	**Desirable to perform**
1. Should know the procedure of collecting a blood sample, separation of serum, correct method of storage of serum sample	Should know the principle and applications of flowcytometry
2. Should know the acceptance the rejection criteria for various specimens	
3. Should be able to perform and interpret serological tests for various infectious diseases such as enteric fever, leptospirosis, syphilis, etc	
4. Should be able to perform and interpret serological tests for biomarkers for infectious disease	
5. Should be able to operate various automated systems for performing serological tests	

4. Mycology

Must know and do	Desirable to perform
1. Should know appropriate specimens and their processing for microscopy and culture of fungi	Calcofluor staining and Examination under fluorescence microscope.
2. Should perform and interpret Potassium hydroxide (KOH) mountand other stains for direct demonstration of fungi from clinical specimens	Examination of histopathology slides for fungal infections
3. Should learn preparation of Sabouraud dextrose agar (SDA) and other special media for fungal culture and susceptibility testing	Special techniques like Wood's lamp examination, hair perforation technique and paraffin baiting technique
4. Should perform phenotypic and automated identification methodsof various medically important fungi	Molecular techniques for fungal identification
5. Should perform and interpret the results of antifungal susceptibility tests	Procedure and interpretation of microbroth dilution method for yeast and moulds
6. Should understand principle and interpretation of tests for fungal antigens and various metabolites	Should understand the principle of therapeutic drug monitoring
7. Should interact with patients and clinicians in special situations, and should be able to guide their clinical colleagues in the types of samples to be collected and antifungal to be used in particular situations	
8. Should understand the concept of intrinsic resistance in fungus to antifungal agents and principle of selective /cascade reporting (Antifungal stewardship)	
9. Should learn maintenance of fungal stock cultures	

5. Parasitology section

Must know and do	Desirable to perform
1. Should know the appropriate specimens to be collected for parasitic diagnosis	Perform and interpret egg counting techniques such as modified Kato Katz, invitro culture of parasites such as Harada Mori method and double staining method of tissue section
2. Should know the acceptance and rejection criteria for various specimens	Perform and understand the basis of some tests done on blood samples such as calculating parasitic index of *Plasmodium* sp, digital cytometry technique, DEC provocation test, etc.
3. Should prepare and perform various staining techniques such as Romanowsky's stains, Lugol's Iodine, Trichrome and Iron Haematoxylin, etc	Should understand the method and principle of EITB for cysticercosis
4. Should process stool samples for direct microscopy and concentration techniques and their interpretation	
5. Should process blood samples including making of thick & thin blood smears, their staining and interpretation for parasites	
6. Should know the principle, perform Quantitative buffy coat and its interpretation for malarial parasites	
7. Should know and perform antigen detection methods in blood and stool samples for various parasites	
8. Should know and perform antibody detection methods for various parasites including *Toxoplasma, Echinococcus granulosus*, etc	
9. Should know and perform microscopy of miscellaneous samples including liver aspirates, CSF, corneal scrapings, etc, for detection of parasites	
10. Should know and perform molecular methods for parasitic diagnosis	

6. Virology section

Must know and do	Desirable to perform
1. Understand the principles of various diagnostic assays and attain proficiency in performing and interpreting diagnostic assays like Lateral flow assays, flow through assays, ELISA, ELFA, Chemiluminescence assay etc.	Understand the basics of viral culture and perform the same including preparation of viral culture media, sample inoculation, identification of virus growth by cytopathic effects, immunofluorescence etc.
2. Understand the principles, perform and interpret molecular assays like conventional PCR and real time PCR.	Understand the principles and perform various methods involving viral culture like neutralization, Plaque reduction neutralization assay, calculating tissue culture infective dose (TCID), haemagglutination inhibition assay, etc
3. Should learn functioning of Integrated Counselling and Testing Centre (ICTC), including client confidentiality, and referrals.	
4. Should be able to perform and interpret laboratory tests for HIV diagnosis using national guidelines for testing	
5. Should be able to operate various automated systems for performing serological tests	

7. Hospital infection control and prevention

Must know and do	Desirable to perform
1. Should know structure and function of hospital infection control committee	Should learn the method of and perform disinfectant testing
2. Should know about the components of standard precautions and transmission-based precautions	Should learn the method of performing endotoxin testing
3. Should know the steps and indications of hand hygiene including audit	Should learn about antimicrobial stewardship — definition, steps of implementation, and monitoring the compliance
4. Should know the method of surveillance criteria for all the major HAI types and conduct HAI surveillance as a part of the HIC team	
5. Should know the care bundle approach for prevention of major HAI types	
6. Should know the principles of prevention and management of needle stick injury including the post exposure prophylaxis of HIV, hepatitis B and hepatitis C	
7. Should know about environmental surveillance— methods and interpretation of tests	
8. Should know about various types of personal protective equipment, their indication of use, method of donning and doffing including audit	
9. Should learn about sterilisation and disinfection policy in the hospital including Central Sterile Supplies Department (CSSD)	
10. Should learn about the guidelines for preparation of hospital antibiogram	

Annexure 3

Workplace assessment form

Record of Intra-department rotational posting in different workplaces

Place of posting: **Reporting time: on time/late**
Number of leaves taken: authorized: **Unauthorized absenteeism, if any**
Duration of posting: From ……. To …….

	Scores	0	1	2	3
	Score 0- Not attempting to meet expectations **Score 1-** Attempting to, but yet to meet expectations **Score 2-** meets expectations **Score 3-** Proficient, independently exhibits responsibility and standards beyond minimum expectations				
1.	**BACTERIOLOGY (Exudate, Respiratory, Blood, Sterile body fluids, Anaerobic bacteriology, Urine and Stool** a. Process all types of specimens received in the laboratory - should know the media to be used, type of loops to be used and method of inoculation, ideal incubation time and environment b. Preparation, examination and interpretation of direct smears from clinical specimens. c. Read, interpret cultures and identify different colony morphologies d. Perform tests by MALDI- TOF and other automated identification and antimicrobial susceptibility testing (AST) systems				
2.	**Mycobacteriology section** a) Perform, and interpret Ziehl Neelsen staining and Auramine Phenol staining in accordance with National Tuberculosis Elimination Programme b) The different methods of culture including media preparation and automated systems c) The principle and perform molecular tests for diagnosis and AST including the cartridge based nucleic acid amplification tests and line probe assay				
3.	**Immunology/Serology section** a) Perform and interpret serological tests for various infectious diseases such as enteric fever,				

	leptospirosis, syphilis, etc b) Perform and interpret serological tests for biomarkers for infectious disease.				
4.	**Mycology** a) Perform and interpret Potassium hydroxide (KOH)mount and other stains for direct demonstration of fungi from clinical specimens. b) Perform phenotypic and automated identification methods of various medically important fungi. c) Perform and interpret the results of antifungal susceptibility tests Monitors compliance during treatment.				
5.	**Parasitology section** a) Prepare and perform various staining techniques such as Romanowsky's stains, Lugol's Iodine, Trichrome and Iron Haematoxylin, etc b) Process stool samples for direct microscopy and concentration techniques and their interpretation c) Process blood samples including making of thick & thin blood smears, their staining and interpretation for parasites d) Perform antigen detection methods in blood and stool samples for various parasites e) Know and perform molecular methods for parasitic diagnosis.				
6.	**Virology section** a. Perform and interpret diagnostic assays like Lateral flow assays, flow through assays, ELISA, ELFA, Chemiluminescence assay b. Perform and interpret molecular assays like conventional PCR and real time PCR. c. Perform and interpret laboratory tests for HIV diagnosis using national guidelines.				
7.	**Hospital infection control and prevention** a) Know the steps and indications of hand hygiene including audit. b) Know the method of surveillance criteria for all the major HAI types and				

	conduct HAI surveillance as a part of the HIC team. c) Know the principles of prevention and management of needle stick injury including the post exposure prophylaxis of HIV, hepatitis B and hepatitis C d) Know about various types of personal protective equipment, their indication of use, method of donning and doffing including audit.				
8.	**Team-based work and Leader ship** ➢ Coordinates with Seniors and Colleagues ➢ Shows interest in teaching juniors				
9.	**Accepts feedback, self reflects and demonstrates willingness to change**				
	Total marks **(Maximum possible marks-30)**				
	Log Book Scoring (20 marks)				
	Signature of Faculty				

At the end of each posting, residents are expected to know the list of learning objectives listed in Annexure 1 (Part A)