1. Introduction

Bangabandhu Sheikh Mujib Medical University (BSMMU) was established by an Act of the Parliament as an autonomous institution of national importance in 1998 which also defined its objectives and functions. By virtue of this Act, the University has been granted the authority to confer post-graduate medical degrees and other academic distinctions. The Faculty of Basic Medical and Paraclinical sciences is one of the faculties of the University. The Degrees granted by this Faculty are recognized medical qualifications in accordance to the Bangladesh Medical and Dental council Act and not withstanding anything contained in the Bangladesh Medical and Dental Council Act. The degree holders of this University will be entitled to the same privileges as those awarded by an equivalent awards from any other recognized University of Bangladesh. The medium of instruction of the University is English.

2. Aims and Objectives

In the field of postgraduate medical education the functions of this Faculty are to:

1. Provide teaching and training to the students at the postgraduate level in an atmosphere of research and enrich and equip them for teaching in Medical colleges and Institutions.

2. Expose the post graduate students to the newer methods of teaching and to provide opportunities to actively participate in teaching exercises.

3. Provide strong infrastructure in course of time to all branches of basic medical sciences, so that both educational facilities and quality of education could be upgraded to a standard equivalent to the upgrade modern sciences.

4. Enable the students to conduct basic medical research.
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5. The educational principles and practices being adopted should be those which are best suited to the needs of the nation.

3. Admission Requirements

3.1 Pre-requisites for admission in Phase-A
a. MBBS/equivalent degree as recognized by BMDC
b. One year of internship/in-service training
c. Completion of one year after internship/in-service training
d. BMDC registration

3.2. The applicants should not be above 45 years of age on enrolment.

Candidates for residency in the clinical faculties have to sit for a written MCQ based admission test on Basic Medical and Paraclinical Sciences (Anatomy, Pharmacology, Physiology, Biochemistry, Pathology, Microbiology etc.) and Clinical subjects. In case of the Basic Medical Sciences residency programs, the questions are selected from the subjects taught in the undergraduate medical courses.

Exam time: 180 minutes. Total marks: 200.

3.3. Admission eligibility for foreign candidates:
i) Foreign candidates have to collect an NOC (No Objection Certificate) from their respective missions/embassies in Bangladesh and other relevant organizations and from WHO.

ii) Their MBBS/equivalent certificate/degree requires recognition of equivalence from Bangladesh Medical & Dental Council (BMDC).

iii) They should have an IELTS score of minimum 6.5 (relaxable)

iv) They must submit their one-year Internship certificate.
v) One year has to be passed after their internship.

vi) Their training certificates (if any) obtained from foreign institutions shall have to be acceptable to the University.

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vii) The candidate's age should not be over 45 years at the time of enrolment.
viii) Eligible candidates have to satisfy an interview board approved by the University.

4. Stipend

A stipend, as determined by the University from time to time, is available to those residents who are not employed by the government or by any non-governmental organization.

5. Time of commencement: Once a year (1st March)

6. Microbiology Resident Education Committee

For conducting the residency program the department will have a Microbiology Resident Education Committee with at least two faculty members from outside the University, in the field of Microbiology.

6.1 Functions of the committee

- To advise the Course Coordinator on matters of policy and procedures
- To assist the Course Coordinator in the planning, organizing and supervision of the program
- To ensure that residents are provided with opportunities to attain all of the competencies outlined in the Objectives of Training, successfully pass their examinations and obtain all of the skills needed to be successful in their microbiology careers.
- To review or recommend materials to be used in the education or evaluation of residents, including all program objectives.
8. Residency Program in Medical Microbiology

Residency program in Medical Microbiology is designed to help residents acquire a sufficient level of skill in all aspects of the epidemiology, prevention, diagnosis, and management of infections and communicable diseases and to have a solid foundation in the basics of infection control. The program offers a broad-based experience characterized by a wealth of case material and expert teaching staff in a diversity of settings.

The 3-year training program includes rotations that are typically scheduled as 3-month blocks. First year is a rotation in different section of diagnostic laboratory keeping with the philosophy that a good foundation in diagnostic laboratory is the best foundation for a good Medical Microbiologist. Two years are spent in the diagnostic laboratory as well as infectious disease wards. This is a very exciting time for Medical Microbiology and Infection Control. The world is becoming a smaller place with international work and travel, immigration, and the global transport of foodstuffs, all of which bring new and exotic diseases to our doorstep. Every year we are identifying new infectious agents of disease through techniques such as molecular biology. Over the past year Medical Microbiologists have been at the forefront in the fight against Tuberculosis, Malaria, Filariasis, Kalaazar, SARS and Avian Influenza. This trend will continue.

8.1 Duties and Responsibilities

Duties and responsibilities of students shall be fixed. They will be required to perform such work as may be needed according to the interest of Department. The will have a log book and will run the rotation (Block) according to log book and will fill the log by appropriate signatory.

8.2 Date of Joining

Selected candidates must join the course within the date mentioned in the letter of selection, otherwise, the candidate’s admission shall be automatically cancelled/withdrawn.
8.3 Duration
Three years and consists of two phases.

9. PHASE-A
9.1 Year 1 (Three papers & Four block in 1st year)
Paper-I: General Bacteriology and Basic Immunology
Paper-II: Systemic Bacteriology
Paper-III: Parasitology and Mycology

Whole course of part-I will be carried out in following four block
Each block comprising three months duration.
Block A: General Bacteriology and Basic Immunology (three months)
Block B: Systemic Bacteriology (three months)
Block C: Parasitology and Mycology (three months)
Block D: Clinical Pathology (one and half months)
(2 weeks for preparatory leave, and 4 weeks for Year 1 final examination)
Block E: Medical education (2 classes each week, Each class one hour. Maximum 20 classes)
and Clinical Pathology will be evaluated as a block. These subjects will be an end block and will not be evaluated as paper in year ending examination. But residents have to satisfactorily complete this block.

During the first year in the program, the resident will spend designated lengths of time in each of the subspecialty sections. The expectation is that the fellow will become knowledgeable as to the technical and theoretical aspects of the tests used in each section, the clinical as well as microbiological importance of the organisms, and the type of problems encountered in the section. After a brief one month orientation in the laboratory, the resident will start doing the laboratory works independently under the guidance of Program coordinator.

A. Knowledge
- To acquire knowledge in General bacteriology
- To acquire knowledge Systemic bacteriology
- To acquire knowledge of specific bacteria, fungi.
- To acquire a practical knowledge of disinfection and sterilization and the appropriate handling and disposal of infectious materials.
- To acquire a working knowledge of newer molecular diagnostic methodologies (including molecular fingerprinting, resistance, determination, and the detection of pathogens).
- To acquire knowledge of normal microbiologic flora and pathogens common at various infection sites.
- To acquire knowledge in General mycology
- To acquire knowledge in Systemic mycology

B. Skill
- To learn common bench level methods, including manual, semi-manual and automated systems.
- To acquire the ability to prepare and interpret Gram, acid fast and other special stains for fungi and parasites.
- To develop the ability to perform and interpret Fluorescent microscopy.
- To develop the ability to recognize common bacterial species using conventional biochemical tests and commonly used kits.
- To acquire the ability to recognize common bacteria and parasites in human tissue.
- To develop the ability to utilize serologic and culture investigations for the diagnosis of common infections.
- To develop the ability to perform and interpret susceptibility testing and to interpret the results.
C. Communications
- To develop effective communications with other members of medical staff, house staff, and other members of the healthcare delivery team.
- To develop awareness of appropriate timeliness, clarity, and accuracy of verbal and written microbiology related communications.

D. Collaborator
- To learn to work effectively with other members of the laboratory team.

E. Health Advocate
- To understand the role of the Microbiology laboratory in the public health system.
- To understand role of the Microbiology laboratory in population screening.

F. Scholar
- To gain experience in the critical review of the Medical Microbiology literature.
- To acquire experience presenting new knowledge to other learners.

9.2 Year 2 (Three papers & Four Block in 2nd year)
Paper-IV: Virology
Paper-V: Systemic and Applied Immunology
Paper-VI: Infectious disease & Clinical Microbiology

Whole course of Year 2 will be carried out in following four block.
Each block comprising three months
Block A: Systemic and Applied Immunology (three months)
Block B: Virology (three months)
Block C: Infectious disease & Clinical Microbiology (four and half month)

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(One and half months, 2 weeks for preparatory leave, and 4 weeks for Year 2 examination)
Block D: Biostatistics and Research methodology, 2 classes each week. Each class one hour. Maximum 30 classes
Clinical Pathology, Biostatistics and Research Methodology will be evaluated as a block. It will be an end block and will not be evaluated as paper in year ending examination. But residents have to satisfactorily complete this block.
During the latter part of the first year and into the second year, the resident returns to each of the subspecialty sections for a longer period of time. During this second rotation, the fellow is given the responsibility of overseeing the section, and becomes more deeply involved with the method development for the section, trouble shooting and problem solving, serving as the technical and clinical consultant for the technologists and the supervisor of the section, and managing personnel-related issues.

A. Knowledge
- To acquire a practical knowledge of infectious disease pathogenesis.
- To acquire knowledge of common infectious diseases as they relate to body sites.
- To learn the principles associated with immunofluorescence.
- To learn the principles of serologic testing including, hemagglutination inhibition testing, enzyme immunoassay, plaque reduction neutralization testing, immunofluorescence, complement fixation testing.
- To learn the uses for antigen detection assays and the diagnosis of viral infection.
- To learn to perform electron microscopy and to recognize commonly occurring viruses from their EM morphology.
- To learn about commercial systems currently available for serologic and nucleic acid amplification testing.
- Basic concept of Immunology
Residency Program

Clinical application of Immunology
Laboratory application of Immunology
To learn the immunologic response to viral infection.
To learn about the pathogenesis of viral infections including, concepts of latency and persistence.
To learn the appropriate clinical specimens to diagnosing important virologic infections, including, specimen collection and transport.
To learn the various specimen transportation systems available to a Virology laboratory.
To learn the usual cell culture lines used in Clinical Virology labs, the typical changes seen in cell culture, the maintenance and quality control of tissue culture lines.
To learn the typical immunologic responses to viral infection including, HIV, hepatitis A, B, and C, EBV, etc.
To recognize the common patterns of cytopathogenic effect in tissue culture.
Basic concept of Parasitology
Clinical and laboratory application of Parasitology

B. Skill
Review the principals and applications of PCR, restriction enzymes, PFGE, NASBA.
Learn to trouble shoot the above methodologies
To learn chemiluminescence machines
To learn nephelometry machines
Capability of running ELISA
To learn to manipulate cell cultures, to examine them microscopically and recognize common cell lines.
Learn to prepare and inoculate tissue culture specimens.
Ability to identify an outbreak
Use of surveillance to identify incidents/outbreaks.
Recognition of abnormal patterns of infection.
Ability to initiate investigation and control measures.

Microbiology

Recognition of the role of others in outbreak management:
Public health
Reference laboratories
Infection prevention and control nurses
Surveillance scientists
Ability to communicate (both in writing and verbally) with colleagues, the media and the public.

10. Course composition
1. Theoretical lectures
2. Small group classes (tutorials, discussion session & demonstrations)
3. Practical classes
4. Seminars, journal club meetings, assignments
5. Research & thesis writing
6. Clinical/Laboratory/teaching attachment
7. Self-learning exercises

11. Resident’s Responsibilities
Orientation to the Microbiology laboratory should normally be the responsibility of the senior microbiology resident. This should be scheduled to coincide with the learner’s first week on residency.
- Begins work when work begins on the specific bench.
- Will attend the morning session
- Attends weekly Microbiology Journal and Seminar
- Attends all other learning activities of the department
- Routinely informs technologist when away from the laboratory.
- When in the second to third block of Microbiology training should covers all sections of laboratory.
- On entering into second six month of residency, Residents will have to perform the laboratory procedure in Bacteriology, Parasitology and Microscopy section. They will perform the
preliminary report and will be present when senior resident or any faculty evaluate the test or microscopic examination.

- They will carry out all the advised test for the diagnosis of the bacteria in the culture section and follow up
- They will be responsible for collecting Slit skin smear, Bone marrow, Skin scraping, Nail shaving, Hair and other laboratory specimen.
- Preliminary microscopy of the urine and stool advised for culture, Gram stained of all the other specimen sent for microscopy.
- They will perform Gram stain, Zeihl Nelseen stain, Leishman staining, Giemsa stain, Fluorescent staining, all fungal staining etc independently.
- Will attend all departmental journal club, seminar, other departmental presentation.
- Each resident will have to present two journal and hold two in this period.
- They will be given task to collect different specimen from the admitted patients, to collect information about admitted patients and follow up those cases.
- Is scheduled for Infectious Disease call while on service (after second six month introductory block)
- Will regularly visit ICU, Infectious disease ward, Hepatology, Gastroenterology, Dermatology and Venereology and all Surgical departments (Will be placed to those department under the disposal of the chairman. They will work in addition to departmental responsibilities).
- Will report independently in Bacteriology, Parasitology and Mycology laboratories under the guidance of Program Director.
- Will present two cases of infectious disease admitted in hospital in a month.
- Will rotate among the serological and immunological laboratories like Nephelometry, Chemiluminescence, ELISA, and CFT.
- Will perform these tests independently and will interpret the tests.

12. PHASE-B (One year)

Involvement in research projects is required after completion of the initial rotations through the sections. Appropriate types of research include development of new diagnostic tests, review and analysis of laboratory data to help determine laboratory policies, and collaboration on clinical studies that have a microbiologic component. Fellows present their research at national meetings whenever possible, in addition to submitting their material for publication.

Will develop a research protocol for thesis under a guide and will present this protocol to full faculty for approval within first month of phase B.

A. Knowledge
- To increase knowledge of clinically important bacteria, viruses, fungi and parasites.
- To increase knowledge of infectious disease pathogenesis.
- To increase knowledge of hospital infection control and prevention activities.
- To increase knowledge of disinfection and sterilization and the appropriate handling and disposal of infectious materials.
- To acquire knowledge of rules and regulations relating to notifiable communicable diseases.
- To increase knowledge of common infectious diseases as they relate to body sites.
- To increase knowledge of molecular diagnostic methodologies (including molecular fingerprinting, resistance determination, and the detection of pathogens).

B. Skill
- To apply common bench level methods, including manual, semi-manual, and automated systems.
- To interpret Gram, acid fast and other special stains for fungi and parasites.
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- To perform and interpret fluorescent microscopy.
- To recognize common bacterial species using conventional biochemical tests and commonly used kits.
- To recognize common bacteria and parasites in human tissue.
- To utilize serologic and culture investigations for the diagnosis of common infections.
- To perform and interpret susceptibility testing and to interpret the results.
- To develop the ability to develop and subsequently interpret a quality management program within the Medical Microbiology laboratory.

C. Management
- To develop awareness of resource utilization in the Microbiology laboratory.
- To understand the principles underlying utilization management.
- To understand how to use information technology to more efficiently manage the laboratory.
- To become familiar with human resource management and budgeting.
- To understand how a Microbiology laboratory funding is structured.
- To understand how Microbiology workload is measured.
- To understand principles around quality control, quality assurance, and continued quality improvement as they relate to Microbiology.
- To gain experience in directing the activities of laboratory technologists.
- To gain experience in evaluating clinical specimens.
- To acquire knowledge of employee health and safety issues.
- To understand the process of budget development.

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D. Health Advocate
- To understand the role of the Microbiology laboratory in the public health system.
- To understand role of the Microbiology laboratory in population screening.
- To learn to match available resources with laboratory priorities and the demands for patient testing.
- To understand when to use laboratory resources for the benefit of individual patients vs the benefit of the population.
- To understand the role of advocacy for a strong public health and diagnostic laboratory system.

13. In Phase-B residents should be able to correlate
- Theory and application of infection prevention and control precautions;
- Recognition and investigation of outbreaks;
- Reporting requirements of outbreaks to local public health authorities;
- Management of nosocomial infections, including the principles and methods of surveillance;
- Economic implications of nosocomial infection, and infection prevention and control;
- Principles of prevention and implementation of infectious prevention and control interventions, including educational strategies;
- Occupational infections;
- Surgical chemoprophylaxis;
- Water and food borne illnesses in facilities;
- Application of molecular epidemiology techniques.
A knowledge of the principles of communicable diseases, epidemiology and public health and their application in the prevention and control of infection in the community to include;
Residents should identify at least one research project in the final year of their residency and are normally expected to complete one project during the 3rd year of training. Each resident will publish at least one article in University recognized journal. They will present their progress of research project given to them as part of their curriculum once in a month after knowledge of the essential steps involved in answering research questions by clinical and basic research. Participation in a clinical or basic research project in order to develop the potential for a research career.

Before appearing the final examination his thesis should be approved at the faculty meeting in the department and a article bases on his or her research project should be submitted in a University recognized journal.

14. Examination format
- Thesis
- Thesis defense
- Comprehensive Viva

15. Activities under taken
- Academic
- Research
- Laboratory service for patient care

16. Work time
Full time rotational with emergency duty roster

17. Charter of Responsibility of Supervisors, Course Co-ordinators and Course directors

A. Supervisor:
Eligibility: Assistant Professor and above.

Responsibility:
- maintain attendance and discipline of the residents,
- provide orientation, guidance and feedback to resident's learning,
- day to day signing of performance record (log book),
- authorized to sign casual leave of the resident and forward it to the chairman,
- be responsible for completing the following block program-
  a. Clinical performance
  b. Academic performance
  c. Global competence
  d. Organizing end of block assessment
  e. Leave report
- Assess residents competence outcomes.
- Send end of Block Report to the Course Coordinator.

B. Course Coordinator:
Eligibility: Associate Professor and above.

Responsibility:
- be responsible for planning, organizing and providing management support to training and academic activities of the residents in the Department.
- supervise, guide and lead the team of Supervisors.
- circulate the Training Rotation Schedule to the Supervisors for implementation.
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- assist the Course Director in planning, organizing and managing the entire course.
- maintain inter-departmental communications regarding training, end of block report and circulation of the reports.
- compile end of block report (EOBR) and prepare the Phase Completion Report (PCR).
- will compile & maintain leave records and take necessary actions as per university rules in consultation with the chairman.
- report to the Course Director.

C. Course Director:
Eligibility: Any Professor of the respective faculty.
Responsibility:
- supervise, guide and lead team of Course Coordinators.
- appoint Course Coordinators as per recommendations of the respective Chairman of the Departments.
- prepare the Training Rotation Schedule (rota) and circulate it to the Course Coordinators/Chairman.
- collect and endorse Phase Completion Report.
- certify qualifications eligibility for appearing in the phase final examinations.
- will prepare training rotation schedule for residents with incomplete or defectors, in consultation with respective Chairman.
- manage disputes and conflicts in consultation with the Dean and refer appropriate cases to the appropriate authority through the Dean.
- submit Phase Completion Report to the Dean for onward presentation in the Academic Council.
- report to the Dean.

18. Submission of Research protocol
Before commencing the research work, all research protocol must be approved by the academic committee of the departmental academic committee and IRB of BSMMU. All teachers of the concerned department and two teachers from the related disciplines will be the members of the academic committee. The protocol should be submitted and approved by the academic committee before appearing in the Year 2 exam.

19. Guide of the Research work
The guide must be of the rank of Professor or Associate professor.

20. Thesis

A. Aim
To Orient the students to various methodologies of research, induce them to get acquainted with them and facilitate fruitful research, which will add to existing body of knowledge in the fields of Microbiology.

B. Objectives
- Identify a relevant research question
- conduct critical review of literature
- formulate a hypothesis
- determine most suitable study design
- state the objectives of the study
- prepare a study protocol
- get approval from the Ethics Committee
- conduct the study, compile the data
- analyze & interpret the data
- draw a conclusions, declare results
- write a research paper
- Guidelines
Residency Program

- Student: Teacher Ratio should be limited to 1:1 should be strictly maintained.
- Scope of the study should be such that it is possible to conduct within the resources & time available.
- More emphasis should be given on methodology rather then results.
- Ethical issues and consideration must be given priority & all the concerned inclusive of entire department must be committed.
- Within first months of phase-B student should design a Protocol consisting of
  (a) Title of study
  (b) Aims/Objectives
  (c) Material & methods
  (d) Adequate numbers of references (8-10) must be submitted.
- It is to be signed by student, guide, Chairman of the Department
- Candidate presenting for the M.D. Microbiology final examinations shall be required to submit 2 months before commencement of the examination

21. Assessment formats
Assessment is the process of forming a judgment about the quality and extent of student achievement or performance, and therefore, by inference, a judgment about the learning itself. Assessment inevitably shapes the learning that occurs; that is, what students learn and how they learn should reflect closely the purposes and aims of the course.
Residency assessment examination will be two types: Formative and Summative.

21.1 Formative evaluation
Formative assessments include Assessment at work place situations, Assessment at rotational placements, End-of-Block or

End-of-Module Exams and within-Block or within-Module assessments (Seminar/journal club presentations, Other presentations, Written, Practical or Clinical assignments etc. End of Block Exams will be Formative.

21.2 End of Block Exams

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Total Marks</th>
<th>Pass Marks</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Written Exams</td>
<td>50</td>
<td>30</td>
<td>90 minutes</td>
</tr>
<tr>
<td>Objective questions</td>
<td>15</td>
<td></td>
<td></td>
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<tr>
<td>SAQ</td>
<td>35</td>
<td></td>
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<tr>
<td>B. Oral Exams</td>
<td>50</td>
<td>30</td>
<td></td>
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<tr>
<td>C. Practical/Clinical Exams</td>
<td>50</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>D. Grades and Marks from</td>
<td>50</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Within-Block or Within-Module</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Assessments (Log-Book results)</td>
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</tbody>
</table>

21.3 Examiners of formative examinations
There shall be two examiners (preferably one external) for oral and practical exams. Written script will be examined by either of the examiners.
Departmental examination committee will propose the name of the examiners. The examiners and moderators of the examinations will be of the rank of Professor/Associate Professor. In absence of eligible examiners only, assistant Professor of the respective department of BSMMU, Dhaka, may be appointed as examiners provided he/she has worked as regular assistant professor for at least three years.
Eligibility of examinations: Before sitting for EOB exams all modules of the block must be cleared. If one fails in the End of Block of Exam she will have to repeat the exam. Throughout the course, structured assessment will be done for the assessment of students’ performance. Log book for every students will be maintained.

21.4 Summative Examinations
These include Year 1, Year 2 Phase B final examinations

21.5 Eligibility
There are three summative examinations: i) Phase- A, Year- 1 Exams; ii) Phase- A, Year- 2 Exams; iii) Phase- B Exams.

i). Phase- A, Year- 1 Examinations are open to any candidate who:
• has undertaken the course of study prescribed for Year- 1, and has attended at least 75% of the classes.
• has completed all the assignments prescribed in the curriculum for Year- 1.

ii). Phase- A, Year- 2 Examinations are open to any candidate who:
• has previously passed the Year- 1 Examination in at least two of the three Papers
• has undertaken the course of study prescribed for Year- 2, and has attended at least 75% of the classes.
• has completed all the assignments prescribed in the curriculum for Year- 2.

Has undergone a course of study for at least 1 year in the respective subject, and has attended at least 75% of each component of the course composition as prescribed in the syllabus for the course. Before sitting for Year 1 final examinations examinees have to clear the EOB exams.

Year 2 examination shall be open to any candidate who has attended at least 75% of each component of the course composition as prescribed in the syllabus for the course. Before sitting for Year 2 final examinations examinees have to clear the EOB exams and has previously passed the Part I examination in at least two paper.

• There shall be two examiners (one external and one internal) for each paper, who will
• examine the answer scripts along with practical and oral examination.

The examination will consist of three parts: viz- Part I, Part II & Final Part.
1. Part I examination shall be open to any candidate who:
• Has undergone a course of study for at least 1 year in the respective subject, and has attended at least 75% of each component of the course composition as prescribed in the syllabus for the course.
### 21.6 Marks distribution

**Year Ending Final Result: Part-I**

Pass marks 60% in each compartment (Written, Oral and Practical)

<table>
<thead>
<tr>
<th>Paper and Subject</th>
<th>30% marks of formative examination</th>
<th>70% marks of summative examination</th>
<th>Total marks obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-I (General Bacteriology and Basic Immunology)</td>
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<tr>
<td>Paper-II (Systemic Bacteriology)</td>
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<tr>
<td>Paper-III (Mycology and Parasitology)</td>
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<tr>
<td>Practical</td>
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<tr>
<td>Paper-I (General Bacteriology and Basic Immunology)</td>
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<td>Paper-II (Systemic Bacteriology)</td>
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<td>Paper-III (Mycology and Parasitology)</td>
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<tr>
<td>Oral</td>
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<td></td>
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<tr>
<td>Paper-I (General Bacteriology and Basic Immunology)</td>
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<tr>
<td>Paper-II (Systemic Bacteriology)</td>
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<tr>
<td>Paper-III (Mycology and Parasitology)</td>
<td></td>
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</tr>
<tr>
<td>Medical Education</td>
<td>Satisfactory</td>
<td>Unsatisfactory</td>
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<tr>
<td>Clinical Pathology</td>
<td>Satisfactory</td>
<td>Unsatisfactory</td>
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</tr>
</tbody>
</table>

### 21.7 Year Ending Final Result: Part-II

Pass marks 60% in each compartment (Written, Oral and Practical)

<table>
<thead>
<tr>
<th>Paper and Subject</th>
<th>30% marks of formative examination</th>
<th>70% marks of summative examination</th>
<th>Total marks obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper-IV (Virology)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Paper-V (Systemic and Applied Immunology)</td>
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<tr>
<td>Paper-VI (Infectious disease &amp; Clinical Microbiology)</td>
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<tr>
<td>Practical</td>
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<tr>
<td>Paper-IV (Systemic Immunology and Virology)</td>
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<td></td>
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<tr>
<td>Paper-V (Systemic and Applied Immunology)</td>
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<tr>
<td>Paper-VI (Infectious disease &amp; Clinical Microbiology)</td>
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<tr>
<td>Oral</td>
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<tr>
<td>Paper-IV (Virology)</td>
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<tr>
<td>Paper-V (Systemic and Applied Immunology)</td>
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<tr>
<td>Paper-VI (Infectious disease &amp; Clinical Microbiology)</td>
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<tr>
<td>Biostatistics and Research Methodology</td>
<td>Satisfactory</td>
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<td>Un satisfactory</td>
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27
21.8 Examiners of Year ending examinations

Departmental examination committee will propose the name of the examiners to the Faculty of Basic Medical Sciences for recommendation. The Academic Council of BSMMU, Dhaka, will then appoint the examiners based on the recommendation of the departmental examination committee and Faculty of Basic Medical Sciences. The examiners and moderators of the examinations will be of the rank of Professor/Associate Professor. In absence of eligible examiners only, assistant Professor of the respective department of BSMMU, Dhaka, may be appointed as examiners provided he/she has worked as regular assistant professor for at least three years. There shall be two examiners (one external and one internal) for each paper, who will examine the answer scripts along with practical and oral examination. Each group (A and B) of written exam paper will be examined by one examiner of the oral and practical examination.

22. Phase B Final examination

22.1 Eligibility

Phase-B examinations are open to any candidate who:
- Has previously passed the Year-1 and Year-2 Examinations.
- Has conducted an approved research work for at least one year at BSMMU, Dhaka, or any other institute approved by the University, and has submitted a thesis embodying the results of that research.
- Has completed all the assignments prescribed in the curriculum for Phase-B.
- Has submitted five unbound copies of the thesis to the University within the stipulated time.
- Has produced a certificate of completion of his/her work from the Supervisor(s) of the thesis countersigned by the Chairman of the Department.

A resident passing in any Paper in any summative examination is not required to appear in the same Paper in any subsequent examination.

23. Phase b

23.1 Result

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<thead>
<tr>
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<th>Total mark</th>
<th>Pass mark</th>
<th>Mark received</th>
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<tbody>
<tr>
<td>Thesis</td>
<td>100</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Thesis defense</td>
<td>100</td>
<td>60</td>
<td></td>
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<tr>
<td>Comprehensive viva</td>
<td>100</td>
<td>60</td>
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</tbody>
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1. The results of the thesis presentation and defense will be consolidated as follows
   i) Accepted
   ii) Accepted with corrections
   iii) Not accepted

2. In case a candidate is unable to satisfy the Viva-voice Board even though the thesis is adjudged adequate, the Board may recommend to the Academic Council that the candidate may
be permitted to appear at another oral examination after a lapse of 6 months from the first oral examination. Provided that no candidate shall be allowed to appear at the oral examination of the same thesis for more than two times.

3. If a thesis is judged inadequate for the award of the MD degree, the examiners may permit the candidate to do more research work in order to improve the standard of the thesis, and may recommend to the Academic council that the candidate may be allowed to appear at a new examination after necessary improvement of his/her thesis.

4. If a thesis is judged inadequate for the award of the MD degree, the examiners may recommend for a Diploma in Bacteriology (D. Bact) degree.

23.2 Total in course activities in Phase B
1. Participation in lectures, participation in small group discussion.
2. Laboratory exercise.
3. Participation in assignment & discussion.
4. Seminar presentation.
5. Journal club presentation.
7. Self learning exercises (computer assisted learning including use of Microsoft word, Excel, SPSS, PowerPoint, Scanning picture)

24. The responsibilities of the departmental examination committees are the following:
- Assuring the quality of the assessment methods by:
- Reviewing all examinations
- Ensuring content validity of exams by blueprinting
- Designing and selecting the assessment methods that will reflect the objectives of the course/module
- Setting standards of expected performance
- Informing students of assessment requirements at the beginning of the block/module/rotation
- Scrutinizing and monitoring of assessment quality by:
- Ensuring University
- Reviewing reports from Block and Module
- Periodically reviewing item performance
- Periodically reviewing the distribution of grades
- Recommending improvements and change
- Ratification of changes in the assessment process
- Approval of timetables and invigilation guidelines of final examinations
- Notification of appropriate bodies through the Chairman of the department to recommend remedial action regarding problem and failed students whose academic progress is at risk.
- Preparation of all examination time tables in liaison with Course Coordinators and Course manager, Course supervisor and student representatives.
- Copying, storage, and ensuring security of all examination question papers Coordination of invigilation and assign
- Registration for preparation of the MD transcript
- Custody of student log books of results
- Methods of Assessments should be both formative and summative.
- Continuous evaluation of the assessment process
- Conducting research in the area of assessments
- Conducting regular faculty development

25. Role of External Examiners
The External Examiner will act as a form of quality assurance for the standards of assessments. In the course modules in the departmental assessments and a comparison with internationally
accepted standards. In addition, the External Examiner is expected to interact with faculty and students so as to provide contemporaneous constructive feedback to Program director, Course Coordinator.

26. Absenteeism from Examinations
Sick leave accompanied by detailed medical reports only from University approved may be accepted as an excuse for absence from course examinations subject to confirmation by an expert panel from the Department. Note: A student exempted due to hospital admission, or in extreme ill health will be offered the option of sitting for the examination. Misconduct in examinations should be reported to the controller of examinations officer by the invigilator through the Chairman of the department. Examinations Committee in a meeting will discuss the matter and will refer the matter to the central examination committee. Examination papers should be prepared in number of students taking the exam. Soft copies of the examination should not be stored on the hard drive of office computers. Examination questions shall be examination papers will be wrapped, sealed, and the seals signed over by the Course Coordinator or their representatives and put away in a safe.

27. General Conduct of Candidates
- Candidates must not indulge in any behavior or conduct that may disturb other candidates or disrupt the smooth progress of an examination.
- Candidates are not permitted to smoke in any part of the examination room.
- Candidates must obey the instructions of any Invigilator and their attention is drawn to the regulations for the invigilation of examinations governing admission to and departure from the examination room.

- A resident must not use external assistance on any “in-class”, “take-home” or in hall examination, unless the involved faculty member specifically has authorized external assistance. This prohibition includes, tutors, books, notes, calculators, computers, and wireless communication devices.
- A resident must not use materials from a commercial term paper company; files of papers prepared by other persons, or submit documents found on the Internet.
- A resident must not, without authorization, alter a grade or score in any way, nor alter answers on a returned exam or assignment for credit.
- A resident must not falsify or invent any information or data in an academic exercise including, records or reports, laboratory results and citation to the sources of information.
- Any ideas or materials taken from another source for either written or oral use must be fully acknowledgement.
- A resident must not adopt or reproduce ideas, opinions, theories, formulas, graphics, or pictures of another person without acknowledgement.
- Whenever:
  - directly quoting another person’s actual words, whether oral or written;
  - using another person’s ideas, opinions, or theories;
  - paraphrasing the words, ideas, opinions, or theories of others, whether oral or written;
  - borrowing facts, statistics, or illustrative material; or offering materials assembled or collected by others in the form of projects or collections without acknowledgement.
- A resident must not steal, change, destroy, or impede another student’s work, nor should the student unjustly attempt, through a bribe, a promise of favors or threats, to affect any resident grade or the evaluation of academic performance.
- A resident must not violate course rules established by a department, the course syllabus, verbal or written instructions,
or the course materials that are rationally related to the
content of the course.
- A resident must not intentionally or knowingly help or attempt
to help another student to commit an act of academic
misconduct, nor allow another student to use his or her work
or resources to commit an act of misconduct.

28. Course Content
Year 1
Paper-I General Bacteriology and Basic Immunology

General Bacteriology
Knowledge
History of Bacteriology, Introduction to world of living cells,
Prokaryotes/ Eukaryotes, Bacterial Structure, Nomenclature,
Growth and Nutrition and Metabolism, Classification, Media and
Staining, Sterilization & Disinfection, Host parasite Relationship,
Genetics, Molecular Biology & Biotechnology, Normal floras &
opportunistic Bacteria, Bacterial Pathogenesis, Antimicrobial
agents and Drug resistance, Milk, Food & Water Bacteriology,
Laboratory design and Management and Laboratory safety,
Automation of laboratory and information management system,
Safe disposal of laboratory waste. Introduction to animal house
or laboratory animals required in Microbiology.

Skill
Laboratory safety, Different levels of biosafety levels with their
applications. Quality assurance, Safe disposal of laboratory
waste, Specimen collection and transportation, Laboratory
procedures, Record keeping, Preparation of Standard operating
procedures (SOP) for different tests, Testing water/Milk,
Preparation of Media, Preparation of Staining material, Staining,

Different types of Microscopy (Light, Dark ground, Phase
contrast, Fluorescence etc) of stained, and unstained smear and
other sample. Preparation of Antimicrobial disc, Practice of
sterilization and disinfection.

Basic Immunology
Knowledge
History of Immunology, Structure & organization of immune
system, innate immunity, specific acquired immunity, Cells of
immune system, antigen, immunogen, hapten, Complements,
Cytokines, MHC, Antibody, Primary and Secondary immune
response, Immunity.

Systemic Bacteriology
Knowledge
Cocci (Staphylococcus, Streptococcus, Enterococcus,
Neisseria), Haemophilus, Corynebacteria, Mycobacteria,
Enterobacteriaceae, Vibrionaceae, Pseudomonaceae,
Burkholderia, Plesiomonas, Aeromonas, Listeria, Erysipelothrix,
Actinomyces, Acinetobacter, Nocardia, Yersinia, Pasteurella,
Bordetella, Francisella, Brucella, Anaerobic (Non sporing)
bacteria, S. Pneumoniae, Clostridium, Bacillus, Helicobacter,
Campylobacter, Spirochete, Rickettsia, Chlamydia,
Mycoplasma, Legionella, Gardnerella, Actinobacillus.

Skill
1. Introduction to procedures for identification of bacteria,
different types of biochemical tests
2. Introduction to automated procedures for identification of
bacteria
3. Isolation and identification of known and unknown Bacteria
4. Serological procedures in Bacteriology
Residency Program

5. Biochemical procedures in Bacteriology
6. Different methods for in-vitro Antimicrobial sensitivity (Disk diffusion, Drug/ Broth dilution, E test, Determination of MBC, MIC)
7. Procedures for In vivo antimicrobial sensitivity test
8. Molecular methods for diagnosis of bacterial disease (PCR, etc)

Paper-III: Mycology and Parasitology

Mycology

Knowledge
- Structure, Classification, Anti fungal drugs
- Malassezia furfur, Dermatophytes, Sporothrix schenckii, Candida.
- Deep/Systemic fungus (Histoplasma, Blastomyces, Coccidioidomycosis, Paracoccidioidomycosis.
- Opportunistic fungus (Candida, Cryptococcus, Aspergillus, Mucormycosis), Mycetoma, Pneumocystis jiroveci

Skill
- Specimen collection, processing and staining procedure
- Microscopy (Wet film and Stained microscopy)
- Culture and Serology
- Reporting
- Recognise clinical features of superficial and systemic fungal infection
- Understand how to examine skin, hair, nails and other relevant samples for presence of fungal elements.
- Understand how to identify yeast, dermatophyte fungi and other common moulds from clinical material.
- Recommend appropriate treatment.
- Identification of patients at risk of systemic infection.
- Request appropriate specimens for diagnosis including appropriate serological and molecular test as available.
- Recognise when susceptibility testing is required

Residency Program

Parasitology

Knowledge
History and Introduction, Classification of Parasite
Protozoology: Amoebae, Giardia, Trichomonas, Enteromonas hominis, Leishmania, Trypanosoma spp, Plasmodium, Isospora, Toxoplasma, Cyclospora, Cryptosporidium, Balantidium, Non pathogenic protozoal parasite (Entamoeba dispar, Entamoeba coli, Entamoeba nana, Entamoeba hartmanni, Iodoamoeba, Dientamoeba, Trichomonas hominis), Free living amoeba, Chilomastix mesnili
Helminthology
Cestode: Diphyllolothrium, Tinea, Multiceps, Echinococcus, Hymenolops
Trematode: Schistosoma, Paragonimus, Fasciola, Fasciolopsis, Opisthorchis, Heterophyes, Metagonimus, Echinostoma, Chlonorchis sinensis, Watsonius watsoni, Gastrodiscoides hominis, Opisthorchis spp

Skill
Examination of Stool including concentration technique and count of ova, culture of stool for protozoa and helminthes.
Microscopic Examination of Blood for different type of parasites.
Preparation of Buffy coat for LD bodies.
Examination of Bone marrow
Exam of Aspirate: Liver, Spleen, Lymph node
Examination of adult parasite
Examination of urine
Residency Program  

Culture of Leishmania, Entamoeba, Hookworm etc  
Identify major parasitic species.  
Plan an appropriate investigation scheme for individuals at risk of tropical parasitic infection.

Medical Education
It will be evaluated as a block. It will be an end block and will not be evaluated as paper in year ending examination. But residents have to satisfactorily complete this block.

1. Introduction to Medical Education  
2. Basic information including terminology, Trends in Medical Education, Current trends in Medical Education.  
3. Curriculum, what it is and what its utilities are. Designing a course curriculum, Evaluation of a curriculum/course.  
5. Lesson plan: What a lesson plan is? Advantages of planning a lesson, Different stages and components of lesson planning.  
6. Large group teaching/learning: Different large group teaching methods, Importance, advantages and disadvantages of large group teaching/learning.  

8. Principles: Attributes of a good teaching/learning material. Common teaching/learning tools: their advantages and disadvantages and proper use (with demonstration as far as feasible): Chalkboard, Flip chart, Printed material (handout), Overhead projector (OHP), Slide projector, Video & film, Multimedia Models, Others.


10. Assessment of theoretical knowledge: essay questions, Advantages and disadvantages, Question of structurization, Attributes of a good written question paper- including weighting, Marking system.

11. Assessment of theoretical knowledge: MCQ/MEQ/SAQ, What it is? Why it is used? Advantages and limitations, Different types of MCQ and their utilities How to construct MCQ/MEQ/SAQ, Marking system of MCQ/SAQ/SEQ, How to validate questions (item analysis).


13. Practical examinations: What to assess in a practical examination- including attitude. How useful are the traditional practical examinations. How to improve practical examination.

14. OSPE- What it is? Why it is required? Advantages and limitations, How to prepare an OSPE station (including the
Residency Program | Microbiology
---|---

checklist) Computer-Assisted Testing (CAT): basic ideas and utilities
NB: Teaching assignments shall be given to the students and shall be evaluated by the teachers.

**Year 2**

**Paper-IV: Virology**

**Knowledge**

**General Virology**
Nomenclature, Properties and Structure of virus, Viral Pathogenesis, Antiviral Agents, Viral vaccine

**Systemic virology:**
Herpes viruses, Hepatitis viruses, Virus Associated with diarrhea, Human papilloma viruses, Respiratory viruses (Influenza and Para influenza viruses, Respiratory Syncytial Virus, Adeno virus, Rhino virus), Measles, Rubella, Mumps, Enteroviruses (Poliovirus), Pox virus, Viral Hemorrhage Fever, Rabies virus, Dengue Virus, Retroviruses, HTLVs, HIVs, Oncogenic viruses, Viral Oncogenesis, Prion and slow viral disease.

**Skill**
- Specimen collection and transport
- Laboratory safety and handling of hazardous viruses
- Laboratory diagnosis of viral diseases
- Tissue culture and other laboratory Techniques
- Serological methods in virology
- Molecular methods for diagnosis of viral disease (PCR, PFGE etc)

**Paper-V: Systemic and Applied Immunology**

**Knowledge**
Immunological Tolerance, Hypersensitivity, Drug allergy, Immuno deficiency, Transplantation Rejection, Auto immunity &

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**Residency Program | Microbiology**

Immunity against Bacteria, Virus, Parasite, Fungus, Antigen-Antibody reactions in vivo and in vitro, Immunodiagnosis (Principle, application and limitations of different types of Immunological tests) Vaccines, Immunophrophylaxis and Immunotherapy, Medico legal applications of Immunology

**Skill**
Development of antibody in the animals and their purification, Preparation of monoclonal antibody, Preparation of reagent for Latex agglutination, Co-agglutination, Immunochemical test (ICT), Haemolysin preparation, Titration (Complement, Haemolysin), CFT, Agglutination, Precipitation, IFAT, ELISA, Electrophoresis, Chromatography, PCR, Chemiluminescence, Cell separation (Flow cytometry), HLA typing.

**Paper-VI: Infectious Disease and Clinical Microbiology**

(Infectious Disease)

**Knowledge**
Epidemiology of infectious diseases, Respiratory Tract Infections: Pharyngitis, sinusitis, Otitis, Bronchitis, Pneumonia, Pleural effusion, Empyema, Lung abscess, Urinary Tract Infection, Fever, Sepsis, Peritonitis and other intra abdominal infections, Cardiovascular infections: Endocarditis, myocarditis, pericarditis, Infection of Prosthetic devices, Central Nervous System Infections: Meningitis, Brain Abscess, Skin and Soft Tissue Infection: Cellulitis, subcutaneous infection, Gastrointestinal tract
Residency Program

Microbiology


Skill

Placement in General ICU, Cardiac ICU, Neonatal ICU, Respiratory medicine ward, Infectious disease Hospital, Transplantation units, Placement in Gynae and Surgery ward, Visit Emergency departments and operation theaters.

Process common samples received in the laboratory and carry out further tests necessary for full identification of pathogens. Provide clinical advice based on interpretation of susceptibility testing. Ability to perform and interpret results serological tests for infectious disease. Be able to select appropriate tests and interpret (advantages and limitations) molecular diagnostic techniques. Ability to recommend appropriate typing methods for clinical situations and interpret the results.

Clinical Microbiology

Knowledge

Common infections in the community, Health care associated infection and infection prevention and control, Infection in immunocompromised patients including HIV, transplantation and neutropenia, Infection in critical care, Outbreaks of infection in hospital and the community, Sexually transmitted infection, Paediatric infection, Infection in pregnancy.

Skill

Distinguish infection from colonization, select, perform and interpret appropriate tests, Coordinate laboratory testing within screening programmes if indicated, Recommend antimicrobial treatment or prophylaxis appropriate to the clinical situation, Describe the development and execution of infection and prescribing control policies and processes in the hospital setting, controls assurance assessments, Describe the principles and importance of ventilation, e.g. in surgical site infection, prevention of spread of TB, Describe the various processes of disinfection and sterilization in the hospital and primary care settings, their indications advantages and limitations, Recognize clinical and laboratory manifestations of immunodeficiency, Perform and interpret investigations relevant to the patient and achieve specific or differential diagnosis.

Clinical Pathology

Knowledge

It will be evaluated as a block. It will be an end block and will not be evaluated as paper in year ending examination. But residents have to satisfactorily complete this block.

Blood cells Formations Function:


Skill

Laboratory diagnosis of

I) Anaemia II) Leukaemia III) Studies on peripheral Blood Film, Introduction to bone marrow study IV) Routine examination of Urine & Stool V) Routine Examination of Body Fluids. VI) Introduction to Automation in Hematology.

Biostatistics and Research methodology

It will be evaluated as a block. It will be an end block and will not be evaluated as paper in year ending examination. But residents have to satisfactorily complete this block.
Biostatistics

Data
Types, Sources, Presentations of data

Sampling: Population, Random and Non-random sampling, Simple random sampling, Systematic random sampling, Multistage sampling, Multiphase sampling, Stratified sampling, Cluster sampling, Quota sampling

Measures of morbidity: Prevalence, Incidence

Distribution: Frequency, Types

Measures of Central tendency: Mean, Median, Mode

Measures of dispersion: Range, Mean deviation, Standard deviation, Standard error, Coefficient of variation, Multiple regression

Probability: Tests of significance, Null and alternate hypothesis, 't' test, 'Z' test, 'X^2' test, 'r' test, 'F' test

Validity

Introduction to computer program for biostatistics (EPI info, SPSS etc)

Research Methodology
Definition and types of research
Identification of research problem
Formulation of hypothesis
Ethical considerations of biomedical research
Research "strategies and designs"
Construction of research protocol
Thesis writing

Phase B
A. Thesis
B. Thesis defense
C. Comprehensive VIVA
Comprehensive VIVA will cover all areas of Bacteriology, Parasitology and Mycology, Immunology & Virology.