

SRI BALAJI VIDYAPEETH (DEEMED UNIVERSITY)
MAHATMA GANDHI MEDICAL COLLEGE AND RESEARCH INSTITUTE,
PONDICHERRY

M.SC MEDICAL MICROBIOLOGY (FACULTY OF MEDICINE)

CONTENTS

Sl.No	Subjects	Page No.
1	Short title and commencement	
2	Regulations	
3	Course of instruction	
4	Scheme of examination	
5	Anatomy	
6	Physiology	
7	English	
8	General Biochemistry	
9	Pharmacology	
10	General Microbiology and Immunology	
11	Parasitology and Entomology	
12	Systemic Bacteriology , Virology and Mycology	
13	Hematology & Blood Banking	
14	Community Medicine	
15	Computer Applications	
16	Clinical Biochemistry	
17	Histopathology & Cytology	

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**SRI BALAJI VIDYAPEETH
(DEEMED UNIVERSITY), PUDUCHERRY**

REGULATIONS OF THE UNIVERSITY

I. SHORT TITLE AND COMMENCEMENT

These regulations shall be called “THE REGULATIONS FOR THE **MASTER OF SCIENCE IN MEDICAL MICROBIOLOGY (FACULTY OF MEDICINE)** OF SRI BALAJI VIDYAPEETH (DEEMED UNIVERSITY), Puducherry”.

They shall come into force from the academic year 2009-2010 session.

The regulation and syllabi are subject to modifications by the standing Post Graduate Board of Studies for paramedical courses from time to time.

II.

REGULATIONS

1. *ELIGIBILITY FOR ADMISSION:*

A degree in Bachelor of Science (B.Sc) from any University in India with Biology/ Botany/ Zoology/ Microbiology/ Medical Lab Technology/ Biotechnology, with a minimum of 50% marks.

2. *MODE OF SELECTION:*

Based on the merit list of candidates drawn from the common entrance test conducted by Sri Balaji Vidyapeeth University.

3. *DURATION OF THE COURSE AND COURSE OF STUDY:*

M. Sc Medical Microbiology (Faculty of medicine) is a 3 years full time course. This syllabus is framed after perusal of the syllabi of same course offered by various Central and State Medical Universities.

First year subjects (M. Sc Preliminary)

Human Anatomy, Human Physiology and Medical Biochemistry. These are common to both the presently proposed M. Sc Medical Microbiology and M. Sc Medical Biochemistry (as well as future courses like M. Sc Pharmacology and Therapeutics, M. Sc Human anatomy and M. Sc Human Physiology).

Second and third year subjects (M. Sc Final)

Medical Microbiology

4. *MINIMUM WORKING DAYS IN AN ACADEMIC YEAR:*

Each academic year shall consist of not less than 180 working days (Minimum 90 working days per semester).

5. *ATTENDANCE REQUIRED FOR APPEARING EXAMINATION:*

- a) Examination will be conducted in both theory and practical as prescribed. Candidates will be permitted to appear for the University Examinations in the subject, only if they secure not less than 80% of attendance in each subject of the respective year.
- b) A student who does not meet the minimum attendance requirement in a year must repeat the course along with the next batch of students.

6. *CONDONATION FOR LACK OF ATTENDANCE:*

Condonation of shortage of attendance in aggregate up to 10% (between 70% and 80%) in each semester may be granted by the College Academic Committee and as per the regulations of University.

7. *INTERNAL ASSESSMENT:*

Internal assessment will be done in each subject of study and the marks will be awarded to the candidates as detailed in the scheme of examinations. The marks awarded will be on the basis of the candidate's

performance in the assignments, class tests, laboratory work, preparation and presentation of seminars as assessed by the teachers.

8. EXAMINATIONS:

- a) The exams in the above three first year subjects (M.Sc. Preliminary) will be at the end of first year July/ August. Supplementary examination for failed candidates shall be conducted not more than 6 months after the regular exams. Any student failing in theory and/ or practicals of any subject shall repeat both the theory and practicals of the respective subject. There is provision for carry over of failed subjects. The students can continue their studies in the second and third year, but should clear the arrears in M. Sc Preliminary subjects before appearing for the M.Sc Final examination, which is conducted at the end of third year June/ July.
- b) The University Practical Examinations shall be jointly conducted by two internal and two external examiners duly appointed by the University.

9. MAXIMUM DURATION FOR THE AWARD OF THE DEGREE:

- a) The maximum period to complete the course successfully should not exceed a period of six years from the date of joining first year.

10. MARKS QUALIFYING FOR A PASS:

50% of marks in aggregate in University Theory, Internal assessment (Theory), Viva-voce examination taken together. The students must also obtain a minimum of 40% in each theory paper.

50% of marks in aggregate in the University Practical examination, Internal assessment (Practical) and Record marks taken together.

11. DECLARATION OF CLASS:

- A successful candidate obtaining 75% and more marks in the grand total aggregate in the first attempt shall be declared to have passed with **Distinction**.

- A successful candidate obtaining 60% and more but less than 75% of marks in the grand total aggregate shall be declared to have passed with **First Class**.

- A successful candidate obtaining 50% and more but less than 60% of marks in the grand total aggregate shall be declared to have passed with **Second Class**.

- Ranks shall be declared on the basis of the aggregate marks obtained by a candidate in the M.Sc Microbiology (Final year) University Examination. Only those candidates who have passed in the first attempt shall be eligible for the award of **Rank**.

M. Sc MEDICAL MICROBIOLOGY (FACULTY OF MEDICINE)

SYLLABUS

M. Sc Medical Microbiology (Faculty of medicine) is a 3 years full time course. This syllabus is framed after perusal of the syllabi of same course offered by various Central and State Medical Universities.

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Second and third year subjects (M. Sc Final)

Medical Microbiology

Scope of Microbiology:

To train students in the field of Medical Microbiology. Theoretical, as well as practical training is imparted to the candidates in the sub-specialities, namely, Bacteriology, Virology, Parasitology, Immunology, Mycology and introduction to basic research methodology, so that students can conduct fundamental and applied research.

Objectives:

1. Establish a good knowledge of Bacteriology, Virology, Parasitology, Mycology and Immunology and be trained in diagnostic work.
2. Carry out fundamental or applied research in various branches of Microbiology

Microbiology Training:

Spread over 2 years on General Bacteriology, Immunology, Systematic Bacteriology, Mycology, Virology, Parasitology and Clinical Microbiology/ Applied Microbiology.

Training programme includes

Discussion

Seminars – Topic seminar, Culture seminar (Bacterial & Fungal)

Journal club

Participation in laboratory diagnostic and experimental works

Involvement in research studies including short term research projects, attending continued medical education programmes and workshops and conferences (encouraged to present papers)

1st Six Months: General Bacteriology and Immunology

General Bacteriology:

Theory

History of Microbiology;
Principles, mechanisms of different types of microscopes and their uses;
Morphology of bacteria,
Bacterial metabolism,
Bacterial taxonomy and classification;
Sterilisation and disinfection;
Growth and nutrition of bacteria and methods of cultivation;
Collection ,Transport & Processing of clinical specimen
Isolation and identification of bacteria;
Bacterial genetics and variation;
Drug resistance – mechanisms & detection Methods
Normal bacterial flora, zoonoses,
epidemiology and transmission;
Bacteriological examination of water, food, air and milk;
Care, management, method of inoculation and uses of experimental laboratory animals;
Antimicrobial chemotherapy.
Sterility testing, pyrogen testing, Mutagen testing

Practicals ----

1. Microscopy – Handling and general maintenance
2. Staining procedures – Preparation of stains and staining methodology
3. Growth and survival of microorganisms and estimation of microbial colonies by various procedures
4. Cultivation – Media preparation – details of ingredients, pH measurement, preparation of reagents, buffers, preparation of glass wares, etc and quality control
5. Antimicrobial agents – Preparation, susceptibility testing, quality control, MIC, MBC
6. Sterilisation and disinfection – Handling of main types of filters, autoclaving preparation procedures, hot air oven, testing of disinfectants
7. Care and maintenance of common laboratory instruments

8. Handling, maintenance and inoculation techniques of small laboratory animals.

Immunology:

Theory -----Anatomy, development and functions of immune system;

Host and parasite relationship;

Biology of immune response;

Microbial pathogenicity and host immune response; I

nfection and immunity;

antigen and antibodies;

Toxins, antitoxin; Complement;

antigen antibody reactions;

Hypersensitivity;

Vaccine and immunisation;

Immunodeficiency diseases;

Autoimmunity,

Immunotolerance;

Immunology of transplantation and malignancy;

Immunohaematology,

Laboratory immunological procedures.

Practicals:

1. Blood collection and preservation for serological testing
2. Precipitation tests (including immunodiffusion tests)
3. Agglutination tests
4. ELISA
5. Immunofluorescence
6. Antigen preparation
7. Serum Electrophoresis

2nd Six months: Systematic Bacteriology

Theory: Properties, epidemiology, transmission, methods of isolation, identification, pathogenesis, toxins and enzymes production, antigen structures,

clinical importance and laboratory diagnosis of the infection with the following bacteria:

cocci - Staphylococcus, Streptococcus, Pneumococcus, Neisseria,

Gram positive bacilli -Corynebacterium, Bacillus, Clostridium,

Gram negative bacilli -Enterobacteriaceae, Vibrio, Pseudomonas, Aeromonas, Plesiomonas, Acinetobacter, Yersinia, Pasteurella, Francisella, Haemophilus, Bordetella, Brucella, Helicobacter,

Non-sporing anaerobes,

Mycobacterium,

Spirochaetes,

Mycoplasma,

Actinomycetes,

Campylobacter and other miscellaneous bacteria,

Rickettsia and Chlamydia.

Immunology of bacterial infections.

Emerging & re- emerging bacterial infections

Practicals:

1. Processing of clinical specimens: Complete characterisation of bacteria of medical importance including morphology, cultural, biochemical, serological, antimicrobial susceptibility pattern and any other biological properties as well as molecular methods (if any)

3rd Six months: Virology, Mycology and Parasitology

Virology:

Theory --- General properties, cultivation, interferon and interference of virus.

Clinical importance and laboratory diagnosis of infections with the following viruses:

DNA Viruses- Pox, Herpes, Adeno,

RNA Viruses - Picorna, Myxo, Arbo, Rhabdo, Hepatitis,

Miscellaneous viruses.

Bacteriophage,

Oncogenic viruses,

Slow viruses,

Prion diseases and HIV.

Emerging viral infections

Immunology of viral infections,

Diagnosis of viral infections (Cell culture, immunoserology and molecular methods of diagnosis).

Practicals ---

1. Serodiagnosis of viral infections – Rapid diagnostic tests for viral infections
2. Polymerase chain reaction for viral nucleic acid detection
3. ELISA

Mycology:

Theory ---

Taxonomy & Classification

Morphology, cultivation, epidemiology, transmission, clinical importance and lab diagnosis of yeasts, yeast-like, moulds and dimorphic fungus,

superficial, subcutaneous and deep fungal infections, opportunistic fungal infection,

laboratory contaminating fungus and mycotoxins.

Immunology of mycotic infections.

Antifungal agents & antifungal susceptibility testing

Practicals:

1. KOH and LPCB preparations
2. Staining techniques
3. Culture of fungi
4. Slide culture
5. Basic identification techniques
6. antifungal susceptibility testing

Parasitology:

Theory ---- Taxonomy and classification, transmission, clinical features and prophylaxis of medically important protozoa, Cestodes, Trematodes and Nematodes.

Immunology of parasitic diseases

laboratory diagnosis of parasitic infections.

Opportunistic parasitic infections in immunosuppressed individual

Medical Entomology

Practicals:

1. Examination of stool for parasites, including concentration techniques
2. Examination of blood for parasites and microfilaria
3. Examination of sputum/ aspirate/ tissue for parasites – trophozoites, larvae etc

4th Six months: Clinical Microbiology,

Theory: Hospital infection;

Biomedical Waste Management

Quality control in microbiology;

Laboratory control of antimicrobial therapy;

Collection of specimens for bacteriological investigations;

Methods of culture, techniques and organisms encountered in: CSF, blood culture, sputum, pus, urine, stool,

UTI, endocarditis;

Bone and joint infections;

Bacteriological investigations in PUO,

Tuberculosis,

Leprosy;

Meningitis and eye infections;

Causative agents and investigations in cases of diarrhoea, gastroenteritis, respiratory tract infections and sexually transmitted diseases;

Food poisoning,

dental infections;

Transfusion associated infections;

Immunoprophylaxis against diseases;

Bioterrorism

Handling of Pandemic scenario

CSSD

Molecular biology and Recent advances in Microbiology

Rapid diagnostic methods in microbiology;

Basic knowledge of the following:

Bacteriophage typing, recombinant DNA technology,

Southern, Northern and Western blotting.

DNA amplification techniques, diagnostic PCR, different methods of PCR product detection;

Genotyping of microbes and viruses;

Emerging & Re emerging infections.

Diseases of public health importance

Practicals:

1. Surveillance sampling
2. O.T. Sterility testing
3. Bacteriological examination of water, milk, food and air
4. Processing of clinical samples for pathogens

Project – Compulsory

During the 2nd Six months & 3rd Six months

External posting- Compulsory (for Two months) in Regional / National Institutions

Revision tests

Model examination – Theory & Practical

University Examination

EVALUATION METHODS

EXAMINATIONS:

During the 2nd and 3rd year in the Microbiology department the postgraduate is evaluated by conducting three internal examinations involving theory and practicals.

1st internal at the end of 12 months (Theory)

2nd internal at the end of 18 months (Theory)

3rd internal at the end of 22 months (Send up Theory and Practical)

I. Microbiology University Theory examination at the end of III year involves:

Paper I: General Bacteriology and Immunology

Paper II: Systematic Bacteriology and Mycology

Paper III: Virology, Parasitology and Applied Clinical Microbiology

II. Practical Examination: For **two days**

1) Bacteriology exercise

Pure culture and mixture or clinical samples provided with clinical history for isolations, identifications and antibiogram

2) Mycology exercise – Identification of two fungi: one rapid grower for slide culture technique

3) Serology – Common serological test done in laboratory

4) Virology – ELISA and for diagnosis of viral infection

5) Parasitology – Stool examination for ova and cyst by concentration technique

6) Slides – For identification and report

III. Viva-voce – is compulsory

PATTERN OF M.SC MEDICAL MICROBIOLOGY FINAL EXAMINATION

MICROBIOLOGY THEORY AND PRACTICAL MARK DISTRIBUTION:

Theory exam: <u>for Pass</u>	<u>Max/ Minimum</u>
Paper I: General Bacteriology and Immunology	- 80/ 32
Paper II: Systematic Bacteriology and Mycology	- 80/ 32
Paper III: Virology, Parasitology and Applied Clinical Microbiology	- 80/ 32
Total Theory	- 240/ 120
Viva-voce	- 50
Internal assessment Theory	- 60/ 24
Total (Theory + Viva + I.A) 175	-350/
Practical exam:	
Practical	- 180/ 90
Record	- 20
Internal assessment Practical	- 50
Total (Practical + Record + I.A)	- 250/ 125
Grand total (Theory and Practical)	- 600/ 300

MICROBIOLOGY PRACTICAL MARK DISTRIBUTION:

Pure culture	- 30
Mixed culture	- 40
Mycology	- 20
Serology – Major & Minor	- 25
Parasitology	- 20
Virology – Serology	- 15
Slides (Focussing & identification)	- 20

Applied / Animal handling

- 10

Total

- 180/ 90

CRITERIA FOR EVALUATION OF M.Sc MEDICAL MICROBIOLOGY

(FACULTY OF MEDICINE)

S. No.	Description	<u>M.Sc. MICROBIOLOGY (FACULTY OF MEDICINE)</u>
1.(A)	<u>THEORY</u>	
	No. of Theory Papers	- 3
	Marks for each Theory Paper	- 80 (<u>40% i.e. 32 marks in each Theory paper needed for pass</u>)
	Total Theory marks & Minimum Pass marks - 240 (120)	
1.(B)	<u>VIVA -VOCE</u>	50
1.(C)	<u>INTERNAL ASSESSMENT (THEORY)</u>	60 (24)
	Total Theory marks (Theory + Viva- Voce + I.A.Theory) and Minimum Pass Marks	350 (175)
2. (A)	<u>PRACTICAL</u>	180 (90)
2. (B)	<u>INTERNAL ASSESSMENT(PRACTICALS)</u>	50
2. (C)	<u>RECORDS</u>	20
	Total Practical marks (Practicals + I.A.Practical + Records) and Minimum Pass Marks	250 (125)
1 + 2	Total Marks for Theory & Practical and Minimum Pass Marks	600 (300)
	<u>Passing Minimum:</u>	
	The candidate shall secure not less than 50% marks in each head of passing which shall include	
	(1) Theory – aggregate 50% (In addition, in each Theory paper a candidate has	

	<p>to secure minimum of 40%)</p> <p>(2) Practical aggregate 50%</p> <p>(3) If any candidate fails even under one head, he/she has to re-appear for both Theory and Practical / viva-voce examinations.</p>
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Blue print of question papers

Paper I (General Bacteriology & Immunology)

	Long essay (16 Mark each)	Short Answer (8 Marks each)	Total Mark (80)
General Bacteriology	1	3	40
Immunology	1	3	40

Paper II (Systemic Bacteriology & Mycology)

	Long essay (16 Mark each)	Short Answer (8 Marks each)	Total Mark (80)
Systemic Bacteriology	1	5	56
Mycology	1	1	24

Paper III (Virology ,Parasitology & Applied Microbiology)

	Long essay (16 Mark each)	Short Answer (8 Marks each)	Total Mark (80)
Virology	1	2	32
Parasitology	1	2	32
Applied Microbiology	0	2	16

SRI BALAJI VIDYAPEETH DEEMED UNIVERSITY
M.Sc. MEDICAL (FINAL) MICROBIOLOGY DEGREE EXAMINATION

PAPER I: GENERAL MICROBIOLOGY AND IMMUNOLOGY

TIME: 3 HOURS

Maximum Marks: 80

- **Answer ALL the questions.**
- **Illustrate your answers with neatly drawn and correctly labelled diagrams wherever appropriate.**

I. Long Answer questions:

1. Describe the mechanisms of gene transfer in a prokaryotic cell. Add a note on the drug resistance in bacteria.

(10+6=16 marks)

2. Classify Hypersensitivity reactions with examples. Describe Anaphylaxis in detail.

(6+10=16 marks)

II. Short Answer questions:

(8×6=48marks)

3. Anaerobiosis
4. Cell envelope
5. Moist heat methods of sterilisation
6. Theories of antibody synthesis
7. Immunofluorescence
8. Major histocompatibility complex

SRI BALAJI VIDYAPEETH DEEMED UNIVERSITY
M.Sc. MEDICAL (FINAL) MICROBIOLOGY DEGREE EXAMINATION,

PAPER II: SYSTEMATIC BACTERIOLOGY AND MYCOLOGY

Time: 3 hours

Maximum Marks: 80

- **Answer ALL the questions.**
- **Illustrate your answers with neatly drawn and correctly labelled diagrams wherever appropriate.**

I. Long Answer questions: (2X16=32 marks))

1. Describe the pathogenesis, laboratory diagnosis and prophylaxis of Diphtheria. (4+8+4 =16 marks)
2. Classify fungal infections with examples. Describe in detail Surface and cutaneous mycoses (4+4+8=16 marks)

II. Short Answer questions : (6 x 8 = 48 marks)

3. MRSA
4. Bacterial food poisoning
5. Lab diagnosis of Enteric fever
6. Halophilic Vibrios
7. Lab diagnosis of Syphilis
8. Mycetoma

SRI BALAJI VIDYAPEETH DEEMED UNIVERSITY
M.Sc. MEDICAL (FINAL) MICROBIOLOGY DEGREE EXAMINATION

PAPER III: VIROLOGY, PARASITOLOGY & APPLIED CLINICAL
MICROBIOLOGY

Time: 3Hrs

Maximum Marks: 80

- **Answer ALL the questions.**
- **Illustrate your answers with neatly drawn and correctly labelled diagrams wherever appropriate.**

I. Long Answer questions: (2X16=32 marks)

1. Describe in detail the Arboviral diseases common in India.
(4+4+4+4=16marks)
2. Classify Nematodes. Describe the lifecycle and laboratory diagnosis of *Strongyloides stercoralis* (4+8+4 = 16marks)

II. Short Answer questions : (6 x 8 = 48 marks)

3. Post Exposure Prophylaxis against blood borne viruses
4. Nosocomial infections
5. Pathogenesis and lab diagnosis of EBV.
- 6 . Swine Flu
7. Cryptosporidium parvum
8. Peripheral blood smear examination for parasitic infections.

Recommended reading:

1. Collee J G Mackie and Mc cartney Practical Medical Microbiology latest edition
2. Bailey and Scott's Diagnostic Microbiology. 9th ed. CV Mosby, St. Louis, latest edition.
3. Koneman EW, Allen SD, Schreckenber PC, Winn WC (Eds): Atlas and Textbook of Diagnostic Microbiology. 4th ed. JB Lippincott, Philadelphia, latest edition
4. Latest edition of Bergey's manual
5. Daniel P. Stites, Abba I. Terr, Tristram G. Parslow. Medical immunology. 10th edition, Mc Graw Hill.
6. Brooks, Geo F Jawetz Medical Microbiology latest edition McGraw Hill.
7. Coller, Leslie Topley and Wilson's Microbiology and microbial infections Vol 1, 2, 3, 4,6,7 latest edition
8. Ananthanarayan & Paniker's Textbook of Microbiology, latest edition. Orient Longsman, India; 2009.
9. Jagdish Chander, Text book of Medical Mycology, latest edition, Mehta Publishers, latest edition
10. Parasitology – K.D.Chatterjee, latest edition
11. Textbook of Medical Parasitology – P.Chakraborty, latest edition
12. Parija SC. Textbook of Medical Parasitology . latest edition. All India Publishers and Distributors, New Delhi. India
13. Roitt Ivan M, Immunology latest edition Blackwell Science
14. Park and Park's textbook of Preventive and Social medicine. latest edition.
15. Manson's, Tropical Disease
16. Zuckerman AJ, Clinical Virology