Program and Course Structure

School of Medical Science and Research

MSc (Medical Microbiology)
Session:2020-22

Code- SMS0402

1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community

Vision of the School

To serve the society by being a premier institute that promotes a comprehensive approach to human health through excellence inacademics, research and clinical care

Mission of the School

- Provide a transformative educational experience in Medical Science
- Develop skills and competencies to create global leaders in clinical care
- Promote innovative and collaborative research through intellectual and technological advancement
- Establish a center for excellence in preventive, promotive and curative health care

Core Values

- Integrity
- Leadership
- Ethics
- Community Health

1.3 Programme Educational Objectives (PEO)

1.3.1 Writing Programme Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

A post graduate student having qualified the MSc Microbiology examination should be able to:

PEO1. Who shall recognize the health needs of the community and carry out professional obligations ethically in keeping with the objectives of the national health policy

PEO2. Who shall have mastered most of the competencies, pertaining to medical diagnostic Microbiology that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;

PEO 3. Who shall be aware of the contemporary advances and developments in the field of medical and diagnostic Microbiology.

PEO 4. Who shall have acquired the spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology.

PEO 5. Who shall have acquired the basic skills of teaching of the medical and paramedical professionals.

1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4
PEO1:	3	3	2	3
PEO2:	3	3	3	3
PEO3:	2	2	1	3
PEO4:	2	3	2	2
PEO5	3	3	2	3
PEO6	3	2	2	3

1.3.3 Program Outcomes (PO's)

At the end of the course the students shall be able to:

1. State and explain the etiology, pathogenesis and methods of laboratory diagnosis of infectious diseases and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.

2. State and explain the principles of immunity and immunological phenomenon which help to understand the pathogenesis, laboratory diagnosis of infectious and non-infectious diseases.

3. Establish and practice "laboratory medicine" for diagnosis of infectious diseases in hospitals and community in the field of bacteriology, parasitology, virology, mycology, serology and immunology in the light of clinical findings.

4. Organize the prevention and control of communicable diseases in the community. 5. Understand and practice the principle of prevention and control of health care associated infections and rational antibiotic policy.

6. State the recent advances in the field of Medical Microbiology and apply this knowledge in understanding aetiopathogenesis and diagnosis of diseases caused by micro-organisms.

7. Carry out fundamental or applied research involving microbiological work.

8. Undertake teaching assignments in the subject of medical Microbiology.

(B) Skills At the end of the course the student shall be able to

9. Plan the laboratory investigations for the diagnosis of infectious diseases

10. Perform laboratory procedures to arrive at the etiological diagnosis of infectious diseases caused by bacteria, fungi, viruses and parasites including the drug sensitivity profile.

11. Perform and interpret immunological and serological tests.

12. Operate routine and sophisticated instruments in the laboratory.

13. Develop microteaching skills and Pedagogy

14. Successfully implement the chosen research methodology

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
PO1	3	3	2	2	1	2
PO2	2	2	2	1	3	1
PO3	2	2	1	3	1	1

PO4	1	2	3	3	3	3
PO5	3	3	1	3	2	3
PO6	2	2	1	2	3	3
PO7	1	2	2	2	1	1
PO8	3	3	3	3	1	1
PO9	3	3	2	3	1	2
PO10	3	2	3	2	2	2
PO11	3	3	3	3	3	2
PO12	3	3	3	3	3	3
PO13	3	3	3	3	1	1
PO14	3	2	2	3	1	2

School: SMSR		**Batch:**
Program: MSc Microbiology		**Current Academic Year: 2020-22**
1	Programme Code	SMS0402

Syllabus

Course contents:

TRAINING PROGRAMME: The candidates joining the course must work as full time resident during the whole period of their postgraduate training. They will be required to attend a minimum of 80% of training period. Candidate shall be given full time responsibility and assignments and their participation in all facets of the educational process assured. Postgraduate students must maintain a record book of the work carried out by them and the training undergone by them during the period of training. These record books shall be checked and assessed by the faculty.

TEACHING /LEARNING METHODS: Learning in M. Sc. (Medical microbiology) will essentially be self-learning. Following teaching-learning methods shall be followed- Group teaching sessions:

- Journal review
- Subject seminar presentation
- Group discussion
- Presentation of the findings of an exercise on any of the sub-specialities
- Participation in CME programs and conferences Hands on experience (practical training)

Practical training shall be imparted by posting the students in various subspecialities (sections) as detailed in the intrinsic and extrinsic rotation. Student shall be actively involved in day to day working of all the sections. He/she will be trained under the guidance of teachers in all the aspects of Clinical Microbiology and applied aspects of laboratory medicine including collection and transport of specimens, receiving of samples, preparation of requisite reagents, chemicals, media and glassware, processing of specimens, performing required antimicrobial susceptibility testing and reporting on the specimens, interpretation of results, sterilization procedures, bio-safety precautions, infection control practices, maintenance of equipments, record keeping and quality control in Microbiology.

Emergency duty: Student shall be posted for managing emergency laboratory services in Microbiology. He/she will deal with all the emergency investigations in Microbiology. Teaching experience: Student shall be actively involved in the teaching of undergraduate students. He/she will be trained in teaching methods and use of audiovisual aids.

BROAD AREAS OF STUDY General Microbiology; Systematic Bacteriology, Mycology, Virology, Parasitology; Serology,Immunology, molecular diagnostics and Applied Clinical Microbiology including recent advances in Microbiology.

GENERAL MICROBIOLOGY

1. History and pioneers in Microbiology
2. Microscopy
3. Morphology of bacteria and other micro-organisms.
4. Nomenclature and classification of microbes.
5. Growth and nutrition of bacteria.
6. Bacterial metabolism.
7. Sterilization and disinfection.
8. Biomedical waste disposal
9. Bacterial toxins.
10. Bacterial antagonism: Bacteriocins.
11. Bacterial genetics, gene cloning.
12. Antibacterial substances used in treatment of infections and drug resistance in bacteria.
13. Bacterial ecology-normal flora of human body, hospital environment, air, water and milk
14. Host parasite relationship.
15. Quality control and Quality Assurance in Microbiology.
16. Laboratory Biosafety
17. Health care associated infections- prevention and control.

IMMUNOLOGY AND APPLIED ASPECTS

1. The normal immune system.
2. Innate immunity.

3. Antigens.
4. Immunoglobulins.
5. Complement.
6. Antigen and antibody reactions.
7. Hypersensitivity.
8. Cell medidated immunity.
9. Immunodeficiency.
10. Autoimmunity.
11. Immune tolerance.
12. Transplantation immunity.
13. Tumour immunity.
14. Prophylaxis and immunotherapy
15. Measurement of immunity.
16. Immunity and immunopathogenesis of specific infectious diseases
17. Molecular Biology Techniques. For e.g. PCR, DNA probes.

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria. The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by them
2. Staphylococcus and Micrococcus; Anaerobic Gram positive cocci.
3. Streptococcus and Lactobacillus.
4. Neisseria, Branhamnella and Moraxella.
5. Corynebacterium and other coryneform organisms.
6. Bacillus: the aerobic spore-bearing bacilli.
7. Clostridium: the spore-bearing anaerobic bacilli.
8. Non-sporing anaerobes
9. The Enterobacteriaceae.
10. Vibrios, Aeromonas, Plasiomonas, Campylobacter and Spirillum,H.pylori
11. Erysipelothrix and Listeria
12. Pseudomonas.
13. Chromobacterium, Flavobacterium, Acinetobacter and Alkaligens.

14. Pasteurella, Francisella.
15. Haemophilus and Bordetella.
16. Brucella.
17. Mycobacteria.
18. The spirochaetes.
19. Actinomyces, Nocardia and Actinobacillus.
20. Mycoplasmatales: Mycoplasma, Ureaplasma and Acholeplasma.
21. Rickettsiae.
22. Chlamydiae.
23. Emerging bacterial pathogens.

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. Vaccines and antiviral drugs
9. Bacteriophages
10. Pox viruses
11. Herpes viruses
12. Togaviridae
13. Bunyaviridae
14. Arenaviridae
15. Marburg and Ebola viruses
16. Rubella virus
17. Orbi viruses
18. Influenza virus
19. Respiratory disease: Rhinoviruses, adenoviruses, corona viruses

20. Paramyxoviridae
21. Enteroviruses : Polio, Echo, Coxsackie viruses
22. Hepatitis viruses
23. Rabies virus
24. Slow viruses
25. Human immunodeficiency viruses
26. Oncogenic viruses
27. Viruses of gastroenteritis 28. Prion diseases 29. Emerging viral infections – SARS, Avian influenza, H1N1.

PARASITOLOGY

1. Protozoan parasites of medical importance : Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocyst Cryptosporidium, Balantidium,Isospora,Cyclospora,Microsporidium

2. Helminthology : All those medically important helminths belonging to Cestoda, Trematoda and Nematoda. Cestodes : Diphyllobothrium, Taenia, Echinococcus, Hymenolepis, Dypyllidium, Multiceps etc. Trematodes : Schistosomes, Fasciola, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc. Nematodes : Trichuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.

3. Ectoparasites : Common arthropods and other vectors viz.,Mosquito, Sandfly, Ticks, Mite, Cyclops.

MYCOLOGY

1. The morphology and reproduction of fungi and antimycotic agents
2. Classification of fungi
3. Contaminant and opportunistic fungi
4. Fungi causing superficial mycoses and. subcutaneous mycoses
5. Fungi causing systemic infections