

SEMESTER II
LSM3225 MOLECULAR MICROBIOLOGY IN HUMAN DISEASES

Prerequisite: LSM2102 or LSM2191 or LSM2291

Workload: 22 lecture hours + 16 laboratory hours + 4 tutorial hours

With the application of advanced technologies in molecular biology to the study of microorganisms, there are many implications on how we can identify and detect microbes, as well as treat and prevent diseases caused by both existing and newly emerged pathogens. In this course, the students will be taught the molecular principles of the physiological processes involved in the life cycle of different types of microbes and how these affect human health and disease. There are also practicals and specialized talks by guest lecturers to emphasize the application of molecular microbiology in laboratories that handle the diagnosis and surveillance of infectious diseases.

| S/N | Topics | Lecture hours |
|-----|--|---------------|
| 1 | <u>Introduction</u> <ol style="list-style-type: none"> 1. Introduction to molecular microbiology 2. Evolution of microbes/Introduction to host-pathogen relationships 3. The infectious disease mechanism (requirement and transmission)/Control and treatment of microbial growth | 4h |
| 2 | <u>Viruses</u> <ol style="list-style-type: none"> 1. Analysis of viral genomes - Basic principles 2. Relating viral sequence to structure and function 3. Viral evolution and pathogenesis 4. Identification of targets for the development of antiviral 5. Identification of virulence factors 6. Antivirals and antiviral resistance | 4h |
| 3 | <u>Bacteria and Fungi</u> <ol style="list-style-type: none"> 1. Introduction to Bacteriology-Basic principles and diagnostic methods 2. Pathogenesis of bacterial diseases 3. Host immune responses to bacterial infection 4. Fungi and fungal infection | 4h |
| 4 | <u>Parasites</u> <ol style="list-style-type: none"> 1. Introduction to medical parasitology 2. Diagnostic parasitology 3. Host-Parasite Interactions 4. Anti-parasite Strategies 5. Emerging parasitic pathogens | 4h |
| 5 | <u>Diagnostic techniques and translational microbiology</u> <ol style="list-style-type: none"> 1. Molecular diagnostics of infectious diseases 2. Opportunities to use pathogens and their components for therapy | 2h |
| 6 | Communicable disease outbreak investigation and public health surveillance | 2h |
| 7 | Molecular Microbiology for Public Health | 2h |

| S/N | Topics | Lecture hours |
|--------------------|--|---------------|
| | Practical Sessions 1. One-step Real-Time PCR detection and quantification of Chikungunya virus infection (4h) 2. ELISA & immunofluorescence assay for the detection of influenza A virus infection (4h) 3. Analysis of results (4h) 4. (a) Diagnostic Parasitology: Demonstrations of medically-important parasites (amoebas, ciliates, flagellates and apicomplexa); (b) Modern approaches for detecting drug resistance in malaria: PCR and fluorescent drugs (4h) 5. Bacterial infection and host responses (4h) | |
| | Total Lectures | 22h |
| | Practicals/tutorials | 20h |
| Total hours | | 42 |

TEXTBOOK.

Strlkauskas, Strelkauskas and Moszyk-Strelkauskas, Microbiology, a clinical approach, Garland Science, Taylor & Francis Group, New York. 2010.

RECOMMENDED COURSE SUPPORT MATERIAL

Not applicable

MODE OF ASSESSMENT:

40% - Laboratory Reports & Continuous Assessment
 60% - Final Examinations

MODULE COORDINATOR:

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LECTURERS:

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GUEST LECTURERS:

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