

SEMESTER II
LSM3225 MOLECULAR MICROBIOLOGY IN HUMAN DISEASES

Prerequisite: LSM2211 or LSM2232 or LSM2233

Workload: 22 lecture hours + 20 laboratory hours

Course description:

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> 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> 1. Molecular Virology 2. Viral evolution and pathogenesis 3. Vaccine development 4. Antivirals and antiviral resistance	4h
3	<u>Bacteria and Fungi</u> 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> 1. Introduction to medical parasitology 2. Diagnostic parasitology 3. Host-Parasite Interactions 4. Anti-parasite Strategies 5. Emerging parasitic pathogens	4h
5	Communicable disease outbreak investigation and public health surveillance	2h
6	Molecular Microbiology for Public Health	2h
7	Clinical Applications of Molecular Diagnostics - Infectious Diseases	2h
	<u>Practical Sessions</u> 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; (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.

RECOMMENDED COURSE SUPPORT MATERIAL

Not applicable

MODE OF ASSESSMENT:

40% - Laboratory Reports & Continuous Assessment

60% - Final Examinations

MODULE COORDINATOR:

Tan Yee Joo

(Tel: 6516-3692, E-mail: mictyj@nus.edu.sg)

LECTURERS:

Tan Yee Joo (TYJ)

Justin Chu Jang Hann (JC)

Raymond Lin (RL)

Chris Lok To Sham (CS)

Chng Jun Hong (JH)

GUEST LECTURERS:

Ng Lee Ching (NLC)

LEE Hong Kai (LHK)