# 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 emphasis the application of molecular microbiology in laboratories that handle the diagnosis and surveillance of infectious diseases.

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<tr>
<th>S/N</th>
<th>Topics</th>
<th>Lecture hours</th>
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| 1   | Introduction  
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   | Viruses  
1. Molecular Virology  
2. Viral evolution and pathogenesis  
3. Vaccine development  
4. Antivirals and antiviral resistance | 4h |
| 3   | Bacteria and Fungi  
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   | Parasites  
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 |

**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; (b) Modern approaches for detecting drug resistance in malaria: PCR and fluorescent drugs (4h)  
5. Bacterial infection and host responses (4h)

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<tr>
<th>Total Lectures</th>
<th>22h</th>
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<tbody>
<tr>
<td>Practicals/tutorials</td>
<td>20h</td>
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<tr>
<td><strong>Total hours</strong></td>
<td><strong>42</strong></td>
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TEXTBOOK.
Strilkauskas, 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:
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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)