SEMESTER II
LSM3226 MEDICAL MYCOLOGY AND DRUG DISCOVERY

Prerequisite: **LSM2233 or LSM2252 or LSM2291**
Workload: **22 lecture hours + 6 tutorial hours + 18 practical hours incorporating self-directed study**

Course description:
With the growing aging population and number of immunocompromised patients, fungal infections are increasingly becoming relevant. This module will re-examine Koch's postulates in relation to the roles opportunistic and primary fungal pathogens play in mycoses. Issues surrounding the molecular, physiological and biochemical aspects of fungal cells that make them successful microbial pathogens will be discussed. Key mechanisms of anti-fungal resistance in relation to challenges facing the discovery of new therapeutics will be examined. These concepts will underpin a case that students have to solve. As part of solving the case, students will have the opportunity to design and conduct a typical drug-susceptibility screen and drug discovery process. They will write up their findings from the case and present their work.

S/N	Topics	Lecture hours
1.	Overview of the fungi kingdom	2 h A/P Yeong Foong May
2.	Primary and opportunistic fungal pathogens in relation to Koch's postulate and its limitations	2 h A/P Yeong Foong May
3.	Fungal pathogenic and virulence factors	4 h A/P Yeong Foong May
4.	Host-cell interactions, innate and acquired immunity	4 h A/P Gan Yunn Hwen
5.	Diagnostics and their limitations	2 h A/P Yeong Foong May
6.	Drug resistance and emerging issues	2 h Dr Chaminda Jayampath Seneviratne
7.	Drug discovery – current approaches	2 h Dr Chaminda Jayampath Seneviratne
8.	Drug discovery – present and future challenges	2 h A/P Yeong Foong May
9.	Public health concerns	2 h A/P Yeong Foong May
	Total Lectures : 22h **Tutorials: 6h** **Practicals: 3 x 6 = 18h**	
	Total hours: 48h	

TEXT BOOK:
Core Textbook
Fundamental Medical Mycology. Errol Reiss, H. Jean Shadomy, G. Marshall Lyon ISBN: 978-0-470-17791-4, 656 pages, October 2011, Wiley-Blackwell

Reviews (example – current reviews will be included year- to-year)
1. Denning DW, Bromley MJ. Infectious Disease. How to bolster the antifungal pipeline. Science. 2015 Mar 27;347(6229):1414-6. doi: 10.1126/science.aaa6097.

Primary literature (examples – current articles will be included year-to-year)
1. Vogan AA, Khankhet J, Samarasinghe H, Xu J.Identification of QTLs Associated with Virulence
2. Related Traits and Drug Resistance in *Cryptococcus neoformans*. G3 (Bethesda). 2016 Sep8; 6(9):2745-59.
3. Johnson CJ, Cabezas-Olcoz J, Kernien JF, Wang SX, Beebe DJ, Huttenlocher A, Ansari H, Nett JE. The Extracellular Matrix of *Candida albicans* Biofilms Impairs Formation of Neutrophil Extracellular Traps. PLoS Pathog. 2016 Sep 13;12(9):e1005884.
4. Mor V, et al. Identification of a New Class of Antifungals Targeting the Synthesis of Fungal Sphingolipids. MBio.2015 Jun 23;6(3):e00647.

MODE OF ASSESSMENT: CA 60%; Final exam (Open Book) 40%

MODULE CO-ORDINATOR:
A/P Yeong Foong May (Tel: 6516-8866, E-mail: bchyfm@nus.edu.sg)

LECTURERS:

A/P Yeong Foong May (Biochemistry)
A/P Gan Yunn Hwen (Biochemistry)
Dr Chaminda Jayampath Seneviratne (Faculty of Dentistry)