

SEMESTER I & II
LSM1102 – MOLECULAR GENETICS

Prerequisite: 'A' level biology or equivalent, or LSM1301

Workload: 26 lecture hours + 24 practical and tutorial hours

The course will cover topics on (i) the patterns of inheritance, (ii) the molecular structure and replication of genetic material, (iii) the molecular properties of genes, and (iv) genetic analysis of individuals and populations. This will include an in-depth understanding of Mendelian patterns of inheritance and variations that could occur due to multiple alleles, lethal genes, chromosomal variations, linkage, gene interaction and other genetic phenomena. Emphasis is placed on the understanding of the underlying molecular and biochemical basis of inheritance. Quantitative and population genetics will also be discussed with the emphasis of understanding the processes and forces in nature that promote genetic change.

S/N	Topics	Lecture hours
1.	(1) Overview of Genetics and Cellular Organization (2) Reproduction and Chromosome Transmission (Cellular Division: Mitosis and Meiosis) (3) Genetic transfer and mapping analysis in microorganisms (4) Chromosome organization, molecular structure and recombination Continual Assessment 1 (on Lectures 1-4) (10% of module scores)	8 Wu Jinlu (Sem 1 & 2)
2.	(5) Molecular structure of DNA and RNA (6) DNA replication (7) Gene transcription and RNA processing (8) Translation of mRNA Continual Assessment 2 (on Lectures 5-8) (10% of module scores)	8 He Yuehui (Sem 1) Liou Yih-Cherng (Sem 2)
3.	(9) Mendelian genetics + Sex Chromosomes and Sex Linkage (10) Modes of Inheritance and Pedigree Analysis (11) Variations to Mendelian Genetics, Penetrance, Expressivity, Pleiotrophy and Linkage (12) Population Genetics – Hardy-Weinberg Equilibrium, Mutation and Selection, Fitness, Factors Maintaining Polymorphism e.g., Over-dominance (13) Quantitative Genetics and Genetic Epidemiology Continual Assessment 3 (on Lecture 9 onwards) (10% of module scores)	10 Chew Fook Tim (Sem 1 & 2)
Total Lectures: 26h		
Tutorials & Practicals: (8x3)= 24h		
Total hours:		50h

TEXT BOOK (RECOMMENDED):

Genetics. Analysis & Principles by R J Brooker. Addison Wesley / McGraw-Hill
Principles of Genetics, 3rd Edition by Snustad & Simmons. John Wiley

MODE OF ASSESSMENTS:

30% Continual Assessments/Class Tests/Assignments/Quizzes
10% Lab Sessions/Reports/Attendance
60% Semester Exam

MODULE CO-ORDINATORS:

Dr Chew Fook Tim (Tel: 6516-1685, E-mail: dbscft@nus.edu.sg)

LECTURERS:

Semester I

Dr He Yuehui (Tel: 6516-2716, E-mail: dbshy@nus.edu.sg)
Dr Chew Fook Tim (Tel: 6516-1685, E-mail: dbscft@nus.edu.sg)
Dr Wu Jinlu (Tel: 6516-8476, E-mail: dbswjl@nus.edu.sg)

Semester II

Dr Liou Yih-Cherng (Tel: 6516-7711, E-mail: bchlyc@nus.edu.sg)
Dr Wu Jin Lu (Tel: 6516-8476, E-mail: dbswjl@nus.edu.sg)
Dr Chew Fook Tim (Tel: 6516-1685, E-mail: dbscft@nus.edu.sg)