

**SEMESTER I and II**  
**LSM1301 GENERAL BIOLOGY**

**Preclusion:** *GCE A-Level or H2 Biology, or equivalents or LSM1301X or LSM1301FC*

**Course description:**

This is an introductory module that explores what a living thing is, the basics of life and the science behind it. The course will introduce the chemistry of life and the unit of life. The question of how traits are inherited will be discussed and the field of biotechnology, including its applications and the ethical issues involved will be introduced. The diversity of life on earth will be explored, with discussions how life on earth possibly came about and how biologists try to classify and make sense of the diversity. The course will also introduce the concept of life functions from cells to tissues and from organs to systems. The concept of how organisms maintain their internal constancy and the organisation of major organ systems will be discussed. The focus will be to introduce the unifying concepts in biology and how they play a role in everyday life.

S/N	Topics	Hours	
		Semester 1	Semester 2
1	<b>Science of Biology</b> Attributes of a living thing. Classification of living things. Scientific method and the limits of science. Biology and the scientific method.	4 hrs (flipped classroom) Seow Teck Keong	2 hrs (Blended Learning) Wu Jinlu
2	<b>Chemistry of Life</b> Functional groups. Condensation and hydrolysis. Structure and function of biological molecules - carbohydrates, lipids, amino acids and nucleic acids.	4 hrs (flipped classroom) Seow Teck Keong	4 hrs (Blended Learning) Wu Jinlu
3	<b>Cell Structure and Function</b> Size of a cell. Biological membranes. Structures and functions of prokaryotic and eukaryotic cells. Mitosis and meiosis (Semester II).	4 hrs (flipped classroom) Seow Teck Keong	6 hrs (Blended Learning) Wu Jinlu
4	<b>Energy and Life</b> Energy release in cells. Aerobic cellular respiration - glycolysis, acetyl-CoA formation, citric acid cycle and oxidative phosphorylation. Fermentation. Breakdown of carbohydrates, lipids and proteins.	4 hrs (flipped classroom) Seow Teck Keong	4 hrs (Blended Learning) Wu Jinlu
5	<b>DNA and Heredity</b> Genetic material. DNA structure and replication. DNA sequencing. Mitosis and meiosis (Semester I).	4 hrs (flipped classroom) Seow Teck Keong	4 hrs (Blended Learning) Wu Jinlu
6	<b>Gene Expression</b> Central dogma of molecular biology. RNA molecules and genetic code. Transcription - prokaryotic and eukaryotic cells. Translation and mutations. Regulation of gene expression - prokaryotic and eukaryotic cells.	4 hrs (flipped classroom) Seow Teck Keong	4 hrs (Blended Learning) Wu Jinlu
7	<b>Biotechnology</b> Genetically modified organisms - bacteria, plants and animals. DNA profiling. Genetic screening and gene therapy. Environmental, safety and ethical issues.	4 hrs (flipped classroom) Seow Teck Keong	4 hrs (Learning in the lab) Wu Jinlu
8	<b>Evolution</b> History of evolutionary thought. Theory of natural selection. How populations evolve. Evidence for evolution.	4 hrs Mary Rose Cervantes Posa	4 hrs Loh Chiang Shiong
9	<b>Biodiversity</b> Species concepts. Identification, naming and classifying of organisms. Constructing and interpreting cladograms.	4 hrs Mary Rose Cervantes Posa	4 hrs Loh Chiang Shiong
10	<b>Plant Form and Function</b> Major plant groups. Plant tissue types. Photosynthesis. Plant growth and reproduction.	4 hrs Mary Rose Cervantes Posa	4 hrs Loh Chiang Shiong

S/N	Topics	Hours	
		Semester 1	Semester 2
11	<b>Animal Form and Function</b> Major animal groups. Animal tissues and selected organ systems. Homeostasis.	4 hrs Mary Rose Cervantes Posa	4 hrs Loh Chiang Shiong
12	<b>Ecology</b> Population growth. Community interactions. Ecosystem dynamics. Human impacts on the environment.	4 hrs Mary Rose Cervantes Posa	4 hrs Loh Chiang Shiong

**Recommended Texts:**

1. *Biology* by Sylvia S. Mader and Michael Windelspecht, 11th Edition, 2013, McGraw-Hill Higher Education.
2. *Biology: Concepts and Investigations* by Marielle Hoefnagels, 3rd Edition, 2015, McGraw-Hill Higher Education.
3. *Biology: Life on Earth with Physiology* by Teresa Audesirk, Gerald Audesirk, and Bruce E. Byers, 11th Edition, 2017, Pearson
4. *Biology: The Unity and Diversity of Life* by Cecie Starr, Ralph Taggart, Christine Evers, and Lisa Starr, 14th Edition, 2016, Thomson Brooks/Cole.

**Mode of assessment:**

**Semester I**

60% Continual Assessments + 40% Final Examination

**Semester II**

40% Continual Assessments + 60% Final Examination

**Module coordinators:**

**Semester I**

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**Semester II**

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**Lecturers:**

**Semester I**

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Dr Mary Rose Cervantes Posa (E-mail: mrcposa@nus.edu.sg)

**Semester II**

A/P Loh Chiang Shiong (E-mail: dbslohcs@nus.edu.sg)  
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