SEMESTER I
LSM3234 BIOLOGICAL IMAGING OF GROWTH AND FORM

Prerequisite: LSM2103 Cell Biology
Workload: 26 lecture hours + 6 tutorial hours + 10 Practical hours

Growth and form are fundamental to all living organisms, crucial to health and diseases. Development in imaging methods and tools has transformed biological and biomedical sciences. This module will introduce basic concepts in imaging and their applications. The major topics will include: basic optics, light and electron microscopy, fluorescence and related methods. Introduction of each imaging technology will be linked with a set of biological problems of fundamental interests and biomedical implications.

S/N	Topics	Lecture hours
1.	**Lecture 1**-- Basic Optics: how does a microscope work? Magnification and resolution	2 hr CH
2.	**Lecture 2-** The chemistry of cells (Introduction to contrast formation)	2hr CH
3.	**Practical 1**- Basic microscopy	2 hr CH, MW
4.	**Lecture 3-** Cell compartments (Introduction to electron microscopy)	2hr MW
5.	**Lecture 4-** Cytoskeleton (Introduction to confocal microscopy)	2hr CH
6.	**Lecture 5-** Gradient in a cell (FRET and FLIM)	2hr CH
7.	**Practical 2 –** Cell fixation	2hr CH
8.	**Practical 3** -- Immunostaining	2hr CH
9.	**Practical 4** – Fluorescence microscopy	2hr CH
10.	**Tutorial 1** -- Lab report writing	2hr CH, MW
11.	**Lecture 6**—Cell polarity	2 hr Invited
12.	**Lecture 7**—Cell shape	2hr CH
13.	**Lecture 8**—Organ size-cell size	2hr MW
14.	**Lecture 9**—Organ size-cell growth cycle	2 hr MW
15.	**Lecture 10**—Organ size- cell proliferation	2hr MW
16.	**Lecture 11**—Tissue pattern 1	2hr MW
17.	**Field trip**	2 hr
18.	**Lecture 12**—Tissue pattern 2	2hr MW
19.	**Lecture 13**—Tissue pattern 3	2hr MW
20.	**Field trip presentation**	2 hr CH, MW
21.	**Tutorial 2** – Final report writing	2 hr CH, MW
		Total Lectures: 26hr Tutorial/Presentation: 6 hr Practical: 10 hr
	Total hours:	**42 hr**

REFERENCES BOOKS:

MODE OF ASSESSMENT: participation (10%), group presentation (20%), group lab report (20%), field trip presentation (20%), final report (30%)

MODULE CO-ORDINATOR: A/P Cynthia He (Tel: 6516-7377) E-mail: dbshyc@nus.edu.sg)
LECTURERS: A/P Cynthia He (Tel: 6516-7377, E-mail: dbshyc@nus.edu.sg)
Dr Min Wu (Tel: 6601-2310, E-mail: dbswum@nus.edu.sg)