

## **LIFS2040: Introduction to Cell Biology (Spring 2019)**

### **Course Instructors:**

Prof. David BANFIELD (*Course Director*), Room 5441, Ext. 23588633, e-mail: bodkb@ust.hk

Prof. Yusong GUO, Room 5535, Phone: 34692492, e-mail: guoyusong@ust.hk

**Entry level:** A level Biology or with permission of the Course Director

**Course schedule:** Monday 10:20 – 11:50 in LTA  
Wednesday 10:20 – 11:50 in LTA

**Course objectives:** This course aims to introduce students to some of the fundamental features of eukaryotic cells by emphasizing experimental approaches to studying cell biology.

**Learning Outcomes:** Upon completion of this course students will be able to:

Describe and comprehend important features and functions of the cell nucleus as they relate to gene organization, DNA replication, protein synthesis and regulation of cell division.

Describe how the amino acid sequences of proteins facilitate protein folding and protein targeting within the cell.

Describe the features and functions of the endomembrane transport machinery that comprise the endocytic and exocytic membrane trafficking pathways.

Describe features of biological membrane structures and their transport mechanisms.

Describe important features of the cytoskeleton as well as basic mechanisms of cell communication and cell division.

Understand the experimental basis / techniques employed in modern cell biological research.

**Course Assessment: Two examinations:**

Midterm Exam (Exam I) 35% (1 hour 20 minutes) (Banfield)

Final Exam (Exam II) 65% (2 hours 30 minutes) (Guo)

**Recommended Text Book:** *Essential Cell Biology*, 4<sup>th</sup> edition, by Alberts *et al.* (2014, Garland Publishing Co.).

**Reference Books:** *The Cell: A Molecular Approach*, by Cooper and Hausman. (2006, ASM Press).  
*The World of the Cell*, 7<sup>th</sup> edition by Becker *et al.* (2008, Pearson Press).  
*Molecular Cell Biology*, 6<sup>th</sup> edition by Lodish *et al.* (2008, Freeman Press).

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### Course Calendar:

<b>Date</b>	<b>Topic</b>	<b>Instructor</b>
30 January	Course Overview / Cells: their properties and behaviours	Banfield
4 February	The composition of cells	Banfield
11 February	How do we study cells?	Banfield
13 February	The organization of cellular genomes I	Banfield
18 February	The organization of cellular genomes II	Banfield
20 February	The structure of eukaryotic chromosomes	Banfield
25 February	Biological membranes	Banfield
27 February	How molecules cross biological membranes: Pumps, transporters and channels	Banfield
4 March	How cells target proteins to membranes and organelles	Banfield
6 March	Midterm 35%	Banfield
11 March	How cells generate energy	Guo
13 March	The nucleus I	Guo
18 March	The nucleus II	Guo
20 March	Vesicular traffic, secretion and endocytosis I	Guo
25 March	Vesicular traffic, secretion and endocytosis II	Guo
27 March	Mechanisms of cellular homeostasis	Guo
1 April	The cytoskeleton and cell movement I	Guo
3 April	The cytoskeleton and cell movement II	Guo
8 April	Mechanisms of cellular communication I	Guo
10 April	Mechanisms of cellular communication II	Guo
15 April	The cell-division cycle	Guo
17 April	Sexual reproduction and the power of genetics	Guo
24 April	The extracellular matrix	Guo
29 April	Cell communities and the formation of tissues and organs	Guo
6 May	Stem cell biology and cancer	Guo
8 May	Review section	Guo