

## **LIFS2040: Introduction to Cell Biology (Spring 2023)**

### **Course Instructors:**

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

Prof. Yusong GUO, Room 5530, Phone: 34692492, e-mail: guoyusong@ust.hk

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

**(Revised) Course schedule:** Tues, Thurs :9:00- 10:20 in LTJ

**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>
February 7	Course Overview / Cells: their properties and behaviours	Banfield
February 9	The composition of cells	Banfield
February 14	How do we study cells?	Banfield
February 16	The organization of cellular genomes I	Banfield
February 21	The organization of cellular genomes II	Banfield
February 23	The structure of eukaryotic chromosomes	Banfield
February 28	Biological membranes / How molecules cross biological membranes: Pumps, transporters and channels	Banfield
March 2	How cells target proteins to membranes and organelles I	Banfield
March 7	How cells target proteins to membranes and organelles II	Banfield
March 9	Review session	Banfield
March 14	Midterm	Banfield
March 16	How cells generate energy	Guo
March 21	The nucleus	Guo
March 23	Vesicular traffic, secretion and endocytosis I	Guo
March 28	Vesicular traffic, secretion and endocytosis II	Guo
March 30	Mechanisms of cellular homeostasis	Guo
April 4	The cytoskeleton and cell movement I	Guo
April 13	The cytoskeleton and cell movement II	Guo
April 18	Mechanisms of cellular communication I	Guo
April 20	Mechanisms of cellular communication II	Guo
April 25	The cell-division cycle	Guo
April 27	Sexual reproduction and the power of genetics	Guo
May 2	The extracellular matrix	Guo
May 4	Cell communities and the formation of tissues and organs	Guo
May 9	Stem cell biology and cancer	Guo