

## **LIFS2040: Introduction to Cell Biology (Spring 2020)**

### **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

**(Revised) Course schedule: Mondays, Wednesdays: 12:00- 13:50 am via Zoom, switch back to face-to-face as soon as situation allows, currently Mar 2, 2020.**

**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>
Feb 19	Course Overview / Cells: their properties and behaviours	Banfield
Feb 24	The composition of cells	Banfield
Feb 26	How do we study cells?	Banfield
Mar 2	The organization of cellular genomes I	Banfield
Mar 4	The organization of cellular genomes II	Banfield
Mar 9	The structure of eukaryotic chromosomes	Banfield
Mar 11	Biological membranes / How molecules cross biological membranes: Pumps, transporters and channels	Banfield
Mar 16	How cells target proteins to membranes and organelles I	Banfield
Mar 18	How cells target proteins to membranes and organelles II	Banfield
Mar 23	Mid-term (details to be announced later)	Banfield
Mar 25	How cells generate energy	Guo
Mar 30	The nucleus I	Guo
Apr 1	The nucleus II	Guo
Apr 6	Vesicular traffic, secretion and endocytosis I	Guo
Apr 8	Vesicular traffic, secretion and endocytosis II	Guo
Apr 15	Mechanisms of cellular homeostasis	Guo
Apr 20	The cytoskeleton and cell movement I	Guo
Apr 22	The cytoskeleton and cell movement II	Guo
Apr 27	Mechanisms of cellular communication I	Guo
Apr 29	Mechanisms of cellular communication II	Guo
May 4	The cell-division cycle	Guo
May 6	Sexual reproduction and the power of genetics	Guo
May 11	The extracellular matrix	Guo
May 13	Cell communities and the formation of tissues and organs	Guo
May 18	Stem cell biology and cancer	Guo