

LIFS2040: Introduction to Cell Biology (Spring 2022)

Course Instructors:

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

(Revised) Course schedule: **Tues, Thurs: 9:00 - 10:20 am in LTJ (and via Zoom for students designed not in Hong Kong)**

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*, 4th 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, 7th edition by Becker *et al.* (2008, Pearson Press).
Molecular Cell Biology, 6th edition by Lodish *et al.* (2008, Freeman Press).

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Course Calendar:

Date	Topic	Instructor
Feb 8	Course Overview / Cells: their properties and behaviours	Banfield
Feb 10	The composition of cells	Banfield
Feb 15	How do we study cells?	Banfield
Feb 17	The organization of cellular genomes I	Banfield
Feb 22	The organization of cellular genomes II	Banfield
Feb 24	The structure of eukaryotic chromosomes	Banfield
Mar 1	Biological membranes / How molecules cross biological membranes: Pumps, transporters and channels	Banfield
Mar 3	How cells target proteins to membranes and organelles I	Banfield
Mar 8	How cells target proteins to membranes and organelles II	Banfield
Mar 10	Mid-term	Banfield
Mar 15	How cells generate energy	Guo
Mar 17	The nucleus I	Guo
Mar 22	The nucleus II	Guo
Mar 24	Vesicular traffic, secretion and endocytosis I	Guo
Mar 29	Vesicular traffic, secretion and endocytosis II	Guo
Mar 31	Mechanisms of cellular homeostasis	Guo
Apr 7	The cytoskeleton and cell movement I	Guo
Apr 12	The cytoskeleton and cell movement II	Guo
Apr 19	Mechanisms of cellular communication I	Guo
Apr 21	Mechanisms of cellular communication II	Guo
April 26	The cell-division cycle	Guo
April 28	Sexual reproduction and the power of genetics	Guo
May 3	The extracellular matrix	Guo
May 5	Cell communities and the formation of tissues and organs	Guo
May 10	Stem cell biology and cancer	Guo