

**Division of Life Science**  
**The Hong Kong University of Science and Technology**

**LIFS 2010      Modern approaches to Biochemical and Cell Biological Research**  
Fall semester, 2018-2019

**Instructors:**      Prof. David Banfield (E-mail: bodkb@ust.hk) (course coordinator)  
                         Dr. Ho Yi MAK (E-mail: hym@ust.hk)

**Time and Venue:**      Wednesday & Friday      15:00 - 16:20      Room 2464

**Course Description**

Credits:              3  
Pre-requisite:      LIFS 1902

**Course description**

This is the signature course for the Program in Biochemistry and Cell Biology (BCB). Our current understanding of biochemical reactions and internal organization of a cell was progressively enriched by technological and conceptual breakthroughs in the 20<sup>th</sup> century. This course will use personal and scientific stories of six prominent scientists to highlight research areas that are still being actively pursued today. Topics to include are DNA and protein biochemistry, physical and chemical methods for biological research, and the use of genetically tractable model organisms.

**Intended Learning Outcomes**

On successful completion of this course, students are expected to be able to:

1. Understand how inter-disciplinary approaches contribute to the advancement of biological research.
2. Understand the historical and personal context in which landmark discoveries were made by prominent scientists.
3. Explain and differentiate the technologies used for modern biological research.
4. Apply the knowledge on biochemical and cellular processes to evaluate the scientific validity of articles from the mass media.
5. Create short biographies of prominent scientists by gathering and analyzing information on their discoveries.

**Teaching approach**

The primary delivery mode of the course will be interactive lectures and tutorials. Students are required to use iPRS for class participation. Short videos and written articles will be provided as supplementary background information for out-of-class review. The scientific validity of articles from the mass media will be evaluated by students during tutorials through instructor-led class discussions.

## Assessment scheme

Assessment Task	Percentage	Intended Learning Outcomes assessed
Final written exam <sup>A</sup>	35%	1, 2, 3
Mid-term exam <sup>B</sup>	35%	1, 2, 3
Written assignment <sup>C</sup>	20%	1, 2, 3, 5
Tutorial participation <sup>D</sup>	10%	1, 3, 4

A. 1 hour 20 minutes.

B. 1 hour 20 minutes.

C. This individual written assignment is due on **02-Dec-2018**. Students will choose one from a list of scientists and write his/her biography focusing on one significant scientific discovery. The report should be 1 page of text (12 pt font size, Times New Roman, single space, 1-inch page margins, excluding references).

D. 'Clicker' type questions will be asked during tutorials. Students are required to respond to these questions in all tutorials to gain full credit.

The Academic Honor Code (<http://tl.ust.hk/integrity/student-1.html>) applies to all assessments.

## Assessment rubrics

### Written assignment: biography of a scientist

	Needs improvement	Good	Excellent
<b>Summarizes the scientific training received by the scientist.</b>	Inaccurate information on the doctoral and postdoctoral research of the scientist.	Correct information on the doctoral and postdoctoral research of the scientist.	Correct information on the doctoral and postdoctoral research of the scientist. Identification of potential links between his/her training and subsequent independent research.
<b>Describes and explains the methods used in the seminal discovery of the scientist.</b>	Lack of understanding of the methods and their potential shortcomings.	Understands the methods and their potential shortcomings.	Understands the methods and identifies alternative approaches that can be used to extend principles established by the discovery.
<b>Assesses the influence of the seminal discovery to scientific research by others.</b>	Incorrect interpretation on the scientific impact of the seminal discovery.	Correct interpretation on the scientific impact of the seminal discovery.	Correct interpretation on the scientific impact of the seminal discovery. Identification of potential societal impact of the discovery.

### Student learning resources

Course material will be drawn from scientific and general news articles that are publicly available. Essential material will be deposited into the CANVAS system.

### Course schedule

Week	Date	Topic		Instructor
1	05-09-2018	Module 1: Seymour Benzer	Lecture	Mak
	07-09-2018	Biological clocks	Lecture	Mak
2	12-09-2018		Lecture	Mak
	14-09-2018		Tutorial	Mak
3	19-09-2018	Module 2: John Sulston	Lecture	Mak
	21-09-2018	Animal development	Lecture	Mak
4	26-09-2018		Lecture	Mak
	28-09-2018		Tutorial	Mak
5	03-10-2018	Module 3: Eugene Kennedy	Lecture	Mak
	05-10-2018	Fat synthesis	Lecture	Mak
6	10-10-2018		Lecture	Mak
	12-10-2018		Tutorial	Mak
7	17-10-2018	Public holiday		
	19-10-2018	Mid-term exam		
8	24-10-2018	Module 4: George Palade	Lecture	Banfield
	26-10-2018	Secretion and membrane trafficking	Lecture	Banfield
9	31-10-2018		Lecture	Banfield
	02-11-2018		Tutorial	Banfield
10	07-11-2018	Module 5: Gunter Blobel	Lecture	Banfield
	09-11-2018	Mechanisms of protein targeting	Lecture	Banfield
11	14-11-2018		Lecture	Banfield
	16-11-2018		Tutorial	Banfield
12	21-11-2018	Module 6: Paul Nurse	Lecture	Banfield
	23-11-2018	The mechanics of the cell cycle	Lecture	Banfield
13	28-11-2018		Lecture	Banfield
	30-11-2018		Tutorial	Banfield