Division of Life Science
The Hong Kong University of Science & Technology

LIFS4140
Cancer Biology

1. Instructor

Instructor	Office	Extension	E-mail address
Randy Y.C. POON (Course Coordinator)	Room 5526	x8703	rycpoon@ust.hk

2. Teaching Assistant

NA

3. Meeting Time and Venue

Date/Time:	Monday	15:00–16:20	Lecture
	Friday	10:30–11:50	Lecture
Venue:	G009A		

4. Course Description

Cancer is one of the most important causes of death in our society and has been the driving force behind major research discoveries. A better understanding of the basic biology of cancer has led to more effective treatments, enhanced detection methods, and the development of prevention strategies. This advance undergraduate course will provide a comprehensive overview of the biology of cancer. Through interactive lectures, fundamental concepts in the mechanisms of carcinogenesis, epidemiology, etiology, detection, and treatment of cancer will be introduced. Emphasis will be placed on the current understanding of common cellular and molecular mechanisms that contribute to the development of cancer. In-depth discussion and analysis of original literature of selected topics will also give students an appreciation of the complexity and state-of-the-art of current research.

Prerequisites: LIFS3020 or LIFS3030 or LIFS3140
4th year UG students

5. Intended Learning Outcomes

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

1. Describe in detail the key concepts and principles of current cancer biology.
2. Apply key concepts and principles to the analysis of cancer-related issues, including cancer epidemiology, etiology, detection, and treatment.
3. Appraise original biomedical literature to analyse experimental design and critically evaluate the interpretations.

4. Organise biomedical information and communicate it effectively both orally and in writing.
5. Work and coordinate effectively in a team to develop collaborative projects.

6. Assessment Scheme

Open-book examination (75%, for assessing ILOs 1 & 2):
Group literature review (25%, for assessing ILOs 1, 2, 3 & 4)
Oral presentation (17.5%, instructor & peer-assessed)
Written report (7.5%)

7. Student Learning Resources

Lecture notes
Primary literature and review articles

8. Learning Activities

1 Attending and participating in lectures (for attaining ILO 1).
2 Reading and discussing assigned research articles (for attaining ILOs 1 and 2).
3 Participating in a group literature review, which includes an oral presentation and a written report, on a cancer-related topic (for attaining ILOs 1, 2, 3, and 4).

9. Course Schedule

Cancer Defined
1. Characteristics of cancer
Multi-step tumorigenesis and the evolution of cancer

Studying Cancer
2. Models for cancer research

Causes and Risk Factors of Cancer
3. Cancer epidemiology
Heredity and cancer
4. Chemicals and cancer
Radiation and cancer
5. Infectious agents and cancer

Cellular and Molecular Hallmarks of Cancer
6. Oncogenes and tumor suppressor genes
7. Genetic and epigenetic alterations in cancer
8. Growth factors and receptors in cancer
9. Growth factors and receptors in cancer
10. Cell cycle control and cancer
11. Apoptosis and cancer
12. DNA repair defects and cancer
13. Senescence, cell immortalization and cancer
14. Angiogenesis and cancer
15. Angiogenesis and cancer
16. Metastasis
17. Cancer stem cells
Cancer immunology

Cancer Detection & Treatment
18. Conventional surgery, chemotherapy, and radiotherapy

19. Targeted therapy
20. Targeted therapy
21. Immunotherapy
    Hyperthermia
    Stem cell therapy
22. Current advances in cancer detection

Special Topics

23. Special current topics e.g. Socioeconomics of cancer;

Presentation

24. Group presentation and discussion
25. Group presentation and discussion

NB: Since the topics are highly integrated, all the estimated time and order are approximations.