

**City University of Hong Kong
Course Syllabus**

**offered by Department of Biomedical Sciences
with effect from Semester A 2024/25**

Part I Course Overview

Course Title: Ageing and the Science of Human Longevity

Course Code: BMS5009

Course Duration: One semester

Credit Units: 3

Level: 5

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) NIL

Precursors:
(Course Code and Title) NIL

Equivalent Courses:
(Course Code and Title) NIL

Exclusive Courses:
(Course Code and Title) NIL

Part II Course Details

1. Abstract

This is an introductory course on aging and the science of human longevity, a field of biomedicine that has emerged as a mainstream subject in recent years. It is an exciting and fast-moving area in which discoveries are still being made that are deepening our understanding of the causes of aging and how to develop interventions that can slow it down, or even reverse it.

The course starts with the ecological role of aging. It then delves into the current evolutionary and mechanistic theories and associated pathways, accompanied by a review of the animal models used by scientists. It is followed by a review of the current science behind the causes of aging and the leading causes of death in humans. Next, the course looks at how human longevity is affected by medicine, genetics and lifestyle factors, such as sleep, diet, microbiota, supplements, and exercise. Finally, the course highlights some of the leading scientists and companies involved in human longevity.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Students can critically discuss and compare the theories of aging, their strong and weak sides, and their usability to instruct research. They can describe the development of the science of longevity, how it has evolved over the years, and what the current ways of thinking are on this subject, along with its associated known pathways and causes.	50	✓	✓	
2.	Students can describe the factors that have been shown to rejuvenate or slow down ageing based on related biomarkers. These include lifestyle factors such as sleep, diet, microbiota, exercise, supplements and medicines.	25	✓	✓	✓
3.	Students can describe who the current leading scientists are in the field of longevity. They can explain the strategies of companies and institutions that have been established with longevity focus, and where the industry is heading over the next 5-10 years.	25		✓	✓
		100%			

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Learning and Teaching Activities (LTAs)

(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Lectures	Students are engaged in weekly lectures to gain knowledge about aging and longevity science	✓	✓	✓	
Tutorial	Students are engaged in oral presentation, debates, and participation in journal discussions to gain skills and confidence for using the knowledge they acquired during the lecture	✓	✓	✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting	Remarks
	1	2	3		
Continuous Assessment: 65%					
Oral Presentation	✓	✓	✓	30%	
Mid-term Examination	✓	✓	✓	35%	Mid-term exam covering weeks 1 to 6 of the course
Final Examination: 35% (2 hours)				35%	Final exam covering weeks 7 to 13 of the course
				100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Oral Presentation, Engagement in learning activities	Critically discuss, analyse, and evaluate the theoretical views on aging as well as achievements of the science of human longevity. Describe and classify the fundamental principles of aging and the science of human longevity. Describe and evaluate the directions pursued by different researchers and companies in the field of longevity science. Compare their strategies and evaluate their potential outcomes. Critically analyse the course material.	Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Substantial performance on all CILOS. Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Satisfactory performance on the majority of CILOS possibly with a few weaknesses. Being able to profit from the course experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Barely satisfactory performance on a number of CILOS. Sufficient familiarity with the subject matter to enable the student to progress without repeating the course.	Unsatisfactory performance on a number of CILOS. Failure to meet specified assessment requirements, little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.
Mid-term Examination	Describe and systematize theoretical and experimental achievements in the field of aging and longevity science.					
Final Examination	Describe and evaluate the directions pursued by different researchers and companies in					

	the field of longevity science. Compare their strategies and evaluate their potential outcomes.					
--	---	--	--	--	--	--

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Oral Presentation, Engagement in learning activities	Critically discuss, analyse, and evaluate the theoretical views on aging as well as achievements of the science of human longevity. Describe and classify the fundamental principles of aging and the science of human longevity. Describe and evaluate the directions pursued by different researchers and companies in the field of longevity science. Compare their strategies and evaluate their potential outcomes. Critically analyse the course material.	Outstanding performance on all CILOs. Strong evidence of original thinking; good organization, capacity to analyse and synthesize; superior grasp of subject matter; evidence of extensive knowledge base.	Substantial performance on all CILOS. Evidence of grasp of subject, some evidence of critical capacity and analytic ability; reasonable understanding of issues; evidence of familiarity with literature.	Satisfactory performance on the majority of CILOS possibly with a few weaknesses. Being able to profit from the course experience; understanding of the subject; ability to develop solutions to simple problems in the material.	Unsatisfactory performance on a number of CILOS. Failure to meet specified assessment requirements, little evidence of familiarity with the subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.
Mid-term Examination	Describe and systematize theoretical and experimental achievements in the field of aging and longevity science.				

Final Examination	Describe and evaluate the directions pursued by different researchers and companies in the field of longevity science. Compare their strategies and evaluate their potential outcomes.				
-------------------	--	--	--	--	--

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

- Anti-ageing
- Lifespan
- Healthspan
- Longevity
- Biological age
- Ageing biomarkers
- Hallmarks of aging
- Ageing pathways
- Inflammaging
- Immunosenescence
- Cellular senescence
- Supercentenarian
- Medicine 3.0
- Lifestyle factors

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	
2.	
3.	
...	

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Lifespan: Why We Age – and Why We Don't Have To by David Sinclair
2.	Juvenescence: Investing in the Age of Longevity by Al Chalabi & Jim Mellon
3.	The Telomere Effect by Elizabeth Blackburn
4.	The Blue Zones Secrets for Living Longer: Lessons From the Healthiest Places on Earth by Dan Buettner