

**City University of Hong Kong
Course Syllabus**

**offered by
Department of Mechanical Engineering
with effect from Semester B 2019 / 2020**

Part I Course Overview

Course Title:	Science and Technology: From Past to Future						
Course Code:	GE2301						
Course Duration:	1 semester						
Credit Units:	3 credits						
Level:	A2, B2						
Proposed Area: <i>(for GE courses only)</i>	<table border="1"><tr><td><input type="checkbox"/></td><td>Arts and Humanities</td></tr><tr><td><input type="checkbox"/></td><td>Study of Societies, Social and Business Organisations</td></tr><tr><td><input checked="" type="checkbox"/></td><td>Science and Technology</td></tr></table>	<input type="checkbox"/>	Arts and Humanities	<input type="checkbox"/>	Study of Societies, Social and Business Organisations	<input checked="" type="checkbox"/>	Science and Technology
<input type="checkbox"/>	Arts and Humanities						
<input type="checkbox"/>	Study of Societies, Social and Business Organisations						
<input checked="" type="checkbox"/>	Science and Technology						
Medium of Instruction:	English						
Medium of Assessment:	English						
Prerequisites: <i>(Course Code and Title)</i>	Nil						
Precursors: <i>(Course Code and Title)</i>	Nil						
Equivalent Courses: <i>(Course Code and Title)</i>	Nil						
Exclusive Courses: <i>(Course Code and Title)</i>	Nil						

Part II Course Details

1. Abstract

(A 150-word description about the course)

Science and technology is not only an essential part of human civilisation. They are also important for transforming business based on labour-intensive, low value-added activities to knowledge-intensive, high value-added activities. The continued success of business often depends on making creative and effective use of science and technology. Graduates will have many opportunities to work with science and technology establishments in their professional capacities as business executives, public administrators, legal practitioners, mass media professionals, etc. This course will help the students to understand the importance of technology and applied sciences in different aspects of our society from the past to the present through lectures, seminars and industrial visits. This course also intends to help the students to develop an appreciation for scientific inquiry and critical reasoning through group discussions and group projects; these basic skills are useful for students' career development in different disciplines.

This course aims to help students recognize the profound importance of technology and applied sciences in different aspects of our society from the past to the present and beyond. By explaining the basic methodologies and techniques of inquiry of scientists and engineering professionals, this integrative course also intends to help students to develop an appreciation for scientific inquiry and basic skills such as critical reasoning.

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.	Identify the principles of scientific methodology / reasoning as they are applied to solving everyday problems.			✓	
2.	Evaluate alternative methods / solutions comprehensively, using a wide array of criteria such as technological attributes, finances, ethics, impacts on the environment and etc.			✓	
3.	Analyze the relationships between science and technology and society as well as how they affect socio-economic developments.			✓	✓
4.	Apply teamwork skills in collaborative learning settings.		✓		
		N.A.			

* If weighting is assigned to CILOs, they should add up to 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 self-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. Teaching and Learning Activities (TLAs)

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

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lecture	Consist of lectures on selected science and technology topics.	✓	✓	✓		22 hrs (total)
Tutorial	Consist of group project meetings and presentations.	✓	✓	✓	✓	11 hrs (total)
Field trips/ Industrial visits etc.	Field trip will visit one/two related local industries, such as those located in the Science Park.	✓	✓	✓		6 hrs (total)

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	4		
Continuous Assessment: 60%						
In-class quiz, test and homework	✓	✓	✓	✓	60%	Altogether at least 5 quiz + homework will be issued
Examination: 40% (duration: 2 hours)						
Examination	✓	✓	✓	✓	40%	
					100%	

* The weightings should add up to 100%.

For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

5. Assessment Rubrics

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

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. In-class quiz, test and homework	<p>1.1 Ability to Describe the important factors and issues of certain disciplines of science and technology affecting the society.</p> <p>1.2 Ability to Evaluate and Integrate the information using process(es) of scientific reasoning to Identify facts from wishful thinking.</p> <p>1.3 Ability to Draw conclusions based on valid evidence or proof.</p> <p>1.4 Ability to Apply scientific results from past to present to formulate views for the future developments and impacts to society.</p>	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Examination	<p>2.1 Ability to Describe the basic principles of certain disciplines of science and technology.</p> <p>2.2 Ability to Describe the important factors and issues of certain disciplines of science and technology affecting the society.</p>	High	Significant	Moderate	Basic	Not even reaching marginal levels

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.)

- History of Technology Development and Its Impacts on Human Civilization
 - technological achievements in ancient China
 - comparisons of the science and technology development in China and other countries
- Discipline specific topics –
 - Physical Sciences
 - Life and Chemical Sciences
 - Electrical and Electronic Technology
 - Computer and Information Technology
- Technological and Socio-economic Development and Sustainability

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.)

2.2 Additional Readings

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

1.	A. Ede and L.B. Cormack, <i>A History of Science in Society, From Philosophy to Utility</i> . Peterborough, Broadview Press.
2.	Joseph Needham, <i>Science and civilisation in China</i> . Cambridge: Cambridge University Press.
3.	Whitfield, P., <i>History of Science</i> . Danbury, CT: Grolier Educational.
4.	Bridgstock et al., <i>Science, technology, and society: an introduction</i> . Cambridge, U.K.; New York: Cambridge University Press.
5.	Joerges, B. and Nowotny, H., <i>Social studies of science and technology: looking back, ahead</i> . Dordrecht; Boston: Kluwer Academic Publishers.
6.	Sismondo, S., <i>An introduction to science and technology studies</i> . Malden, MA: Blackwell Pub.
7.	Bridgstock et al., <i>科技與生活</i> . 台北市: 五南圖書出版股份有限公司.
8.	科技發展與人物編委會, <i>科技發展與人物</i> . 臺北市: 中國文化大學出版部.
9.	徐飛 ... [等] 著, <i>科技文明的代價: 科技發展的負面效應與對策研究</i> . 濟南市: 山東教育出版社.
10.	James E. McClellan III and Harold Dorn, <i>Science and technology in world history: an introduction</i> . Baltimore: Johns Hopkins University Press.
11.	Bunch, Bryan H., <i>The history of science and technology: a browser's guide to the great discoveries, inventions, and the people who made them from the dawn of time to today</i> . New York: Houghton Mifflin.
12.	Temple, Robert K. G., <i>The genius of China: 3,000 years of science, discovery, and invention</i> . London: Prion.

Online Resources:

BBC News (Science & Nature)

- <http://news.bbc.co.uk/2/hi/science/nature/default.stm>

New York Times

- Science Page <http://www.nytimes.com/pages/science/index.html>
- Technology Page <http://www.nytimes.com/pages/technology/index.html>

CNN / Technology

- <http://edition.cnn.com/TECH/>

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

GE PILO	Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)
PILO 1: Demonstrate the capacity for self-directed learning	CILO 3 – this CILO encourage independent learning and critical evaluation of information.
PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology	CILO 1, 2, 3 – all these 3 CILOs together help students to develop an appreciation for scientific inquiry and critical reasoning.
PILO 3: Demonstrate critical thinking skills	CILO 1, 2, 3 – all these 3 CILOs together help students to develop an appreciation for scientific inquiry and critical reasoning.
PILO 4: Interpret information and numerical data	CILO 2, 3 - the 2 CILOs together encourage students to evaluate and analyse information comprehensively and critically.
PILO 5: Produce structured, well-organised and fluent text	
PILO 6: Demonstrate effective oral communication skills	
PILO 7: Demonstrate an ability to work effectively in a team	CILO 4 - Students are required to work in groups in order to create a scientific documents and presentation.
PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues	
PILO 9: Value ethical and socially responsible actions	
PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation	CILO 1, 2, 3 - all these 3 CILOs together encourage students to develop an appreciation for scientific inquiry and critical reasoning. They also help students to analyse information and knowledge across disciplines.

GE course leaders should cover the mandatory PILOs for the GE area (Area 1: Arts and Humanities; Area 2: Study of Societies, Social and Business Organisations; Area 3: Science and Technology) for which they have classified their course; for quality assurance purposes, they are advised to carefully consider if it is beneficial to claim any coverage of additional PILOs. General advice would be to restrict PILOs to only the essential ones. (Please refer to the curricular mapping of GE programme: http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm.)

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task
Group Project Report