Course Title	:	The Process of Science
Course Code	:	CCC8013 (to replace CLD9022, effective 2019-20)
Recommended Study Year	:	Year 2
No. of Credits/Term	:	3
Mode of Tuition	:	Two 1-hour lectures, 1 hour tutorial/lab
Class Contact Hours	:	Two 1-hour lectures each week, 1 hour lab/tutorial each week
Category	:	Common Core Curriculum
Discipline	:	Nil
Prerequisite	:	Nil
Co-requisite	:	Nil
Exclusion	:	Nil
Exemption Requirement	:	Nil

Brief Course Description:

This course will introduce students to the process of science and the role that science plays in today's world. Students will meet twice per week for 1-hour lectures and for once each week in a 1-hour tutorial/lab section. The lecture portion will develop the students' understanding of how science works, the role of science in the world, and introduce some of the great challenges in science and technology facing the human population today. Instructional methods will include lectures, short videos, small group class activities, and individual reflection and writing. The lab portion will introduce students to the process of science and allow them to conduct their own independent research project. Where appropriate, this course will use technology to allow "flipped classrooms".

Aims:

The aims of this course are to introduce students to the process of science and give them an appreciation and the ability to think critically of the power, and limitations, of science as a way of learning about the world. In addition, this course will examine the role of science in helping to address many of the global challenges facing us today.

Learning Outcomes (LOs):

Upon completion of this course, students will be able to:

1. Define science and compare/contrast it to other ways of learning about the world.
2. Successfully apply the "hypothesis testing protocol".
3. Discuss when and why scientists use statistics to help test hypotheses and correctly apply the appropriate statistical analysis.
4. Design, conduct, analyze, and report on the results of an independent research project.
5. Think critically about and discuss examples of how proper use or misuse of science can affect society.
6. Think critically about and discuss the role of science in solving grand/global challenges.

Indicative Content:

Scientific methods

Experimental design/hypothesis testing

Basic statistical analyses

History of science

Scientific revolutions

Pseudoscience and mistrust of science

Big data

Artificial intelligence

Mathematical reasoning in science

Grand/global challenges in science and technology

Teaching Method:

Students will meet twice per week for 1-hour lectures (large lecture hall) and for once each week in a 1-hour tutorial/lab section small (approx. 20 students).

Measurement of Learning Outcomes:

Intended Learning Outcomes

Assessment Method	1	2	3	4	5	6
Lecture Exam	X				X	X
Debate/Written Assignment	X				X	X
Quizzes & Assignments (Lab and Lecture)		X	X		X	X
Lab Exam		X	X			
Research Report		X		X		

Course Assessment:

Debate / written assignment	10%
Lecture Quizzes and Assignments (in-class, take-home and online)	30%
Midterm Exams (1 lecture, 1 lab)	20%

Lab Quizzes and Assignments (in-class, take-home and online)	20%
Research Report	20%

Lab Research Projects

Lab projects will attempt to (1) focus on topics familiar and interesting to students, (2) address topics that provide meaningful and interesting questions based on a basic understanding of relevant theory, (3) allows for low-tech data collection, or (4) allows students to work with large currently-existing data sets.

Essential Readings:

The Scientific Endeavor: A Primer on Scientific Principles and Practice. 2000. J. A. Lee.

The Process of Science. 2004. M. A. McGinley.

Supplementary Readings:

Supplementary Readings from a variety of sources will be uploaded on moodle.

Important Notes

1. Students are expected to spend a total of 9 hours (i.e. 3 hours of class contact and 6 hours of personal study) per week to achieve the course learning outcomes.
2. Students shall be aware of the University regulations about dishonest practice in course work, tests and examinations, and the possible consequences as stipulated in the Regulations Governing University Examinations (http://www.ln.edu.hk/reg/docs/arue.pdf). In particular, plagiarism, being a kind of dishonest practice, is "the presentation of another person's work without proper acknowledgement of the source, including exact phrases, or summarised ideas, or even footnotes/citations, whether protected by copyright or not, as the student's own work". Students are required to strictly follow university regulations governing academic integrity and honesty. Plagiarism (unattributed copying) will be heavily penalized and may attract zero mark and disciplinary action.
3. Students are required to submit writing assignment(s) using Turnitin.
4. To enhance students' understanding of plagiarism, a mini-course "Online Tutorial on Plagiarism Awareness" is available on https://pla.ln.edu.hk/.