Course Code and Course Title	Thai วทศน ๒๘๓ ธรรมชาติและปรัชญาของวิทยาศาสตร์ English SCGI 283 Nature and Philosophy of Science
Number of Credits	(3-0-6) (Lecture 3 hours–Laboratory0 hour/week - Self-Study 6 hours/ week)
Curriculum and Course Type	Program of Study Bachelor's Degree Program in Bioinnovation (International Program, Multidisciplinary Program) Course Type Major Course
Course Coordinator	Assoc. Prof. Wannapong Triampo, Ph.D. Address: Department of Physics, Faculty of Science, Mahidol University 272 Rama VI Road, Ratchathewi District, Bangkok 10400, THAILAND Tel. 02-201-5770-1 e-mail: wtriampo@gmail.com, wannapong.tri@mahidol.edu
Semester/Year of Study	Academic Year 2021 First Semester (1/2021) / First Year
Prerequisite	None
Co-requisite	None
Day/Time/Study Site Location	Thursday / 10.30-13.30 Faculty of Science, Mahidol University, Salaya Campus (ONLINE)
Date of Latest Revision	27 July 2021

Course Learning Outcomes (CLOs)

After successful completion of this course, students will be able to:

1) CLO1 Explain key laws, theories, and principles of science in the context of application.
2) CLO2 Compare and contrast key concepts of the philosophy of science in the context of 21st century
3) CLO3 Analyze the scientific process used in solving the problem in real life.
4) CLO4 Propose inquiry-based scientific model suitable for given situation or problem

Course Description

Nature and philosophy of science; the history and origin of science; the measurement and scientific discovery; from Galileo to Einstein; science and STEM as inquiry; biology: theory and lab; chemistry: theory and Lab; physics: theory and lab; integrated science; contemporary science and technology

Credit hours / trimester

Lecture (Hours)	Additional class (Hours)	Laboratory/field trip/internship (Hours)	Self- study (Hours)
45 hours (3 hours x 15 weeks)	-		90 hours (6 hour/ 15 weeks)

Number of hours that the lecture provides individual counseling and guidance

1 hour / week or student requirement during prescribed date and time

Evaluation of the CLOs

Learning Measurement and Evaluation

a. Formative Assessment

Quiz & feedback for all CLOs.

b. Summative Assessment

(1) Tool and weight for measurement and evaluation

Course Learning Outcomes		Measurement method			Weight (%)
		Class Participation & Group Discusion	Written Exam	Class Project (Individual & Group)	
CLO1	Explain key laws, theories, and principles of science science in the context of application	5%	15%	-	20%
CLO2	Compare and contrast key concepts of the philosophy of science in the context of 21st century	5%	15%	-	20%
CLO3	Analyze the scientific process used in solving the problem in real life.	5%	15%	-	20%
CLO4	Propose inquiry-basedd scientific model suitable for given situation or problem	5%	15%	20%	40%
	Total	**20%**	**60%**	**20%**	**100%**

Note: Students have the right to request a review of a grade and appeal evaluation decisions

(Mahidol University Disciplinary Measures 2010)

(2) Grading System

After completion of the evaluation process, each student is assigned a criterion-referenced grade (as shown in the table below). Evaluation and achievement will be justifying according to Faculty and University code, conducted by grading system of A, B+, B, C+, C, D and F. To pass this course, student must earn a grade of a least D.

Total Percentage of Evaluation	Below 40	40-44	45-49	50-59	60-69	70-79	80-89	90-100
Grade	F	D	D+	C	C+	B	B+	A

D is considered a minimal level for students to achieve learning outcomes.

Teaching Schedule 1st Semester of Academic Year 2021

1. Lesson plan

Week	Topic	Number of hours			Teaching methods/ multimedia	Instructors
		Lecture	Laboratory	Self-study		
1 12 Aug	Introduction of course discipline and class orientation. What is the nature and philosophy of Science?	3	0	6	Active lecture	**Wannapong** Triampo or Invited instructors
2 19 Aug	What is the nature and philosophy of Science?	3	0	6	Active lecture	
3 26 Aug	The history of science	3	0	6	Active lecture	
4 2 Sep	The history of science	3	0	6	Group discussion Active lecture	
5 9 Sep	Measurement for discovery in Science	3	0	6	Active lecture	
6 16 Sep	Measurement for discovery in Science	3	0	6	Active lecture	
7 23 Sep	From Galileo to Einstein	3	0	6	Active lecture	
8 30 Sep	From Galileo to Einstein	3	0	6	Active lecture	
9 7 Oct	**Midterm examination**					
10 14 Oct	Science and STEM as Inquiry	3	0	6	Active lecture	**Wannapong** Triampo or Invited instructors
11 21 Oct	Science and STEM as Inquiry	3	0	6	Group discussion Active lecture	
12	Biology: Theory and Lab	3	0	6	Group discussion Active lecture	

Week	Topic	Number of hours			Teaching methods/ multimedia	Instructors
		Lecture	Labora-tory	Self-study		
28 Oct						
13 4 Nov	Chemistry: Theory and Lab	3	0	6	Active Lecture, Group discussion	
14 11 Nov	Physics: Theory and Lab	3	0	6	Active Lecture, Group discussion	
15 18 Nov	Integrated science	3	0	6	Active Lecture, Group discussion Project-based learning	
16 25 Nov	Contemporary science and technology	3	0	6	Active Lecture, Project-based learning	
17	**Final examination**					
	Total hours	45	0	90		

Suggested texts

- Samir Okasha, Philosophy of Science: A Very Short Introduction, 2002. Oxford Lnixersity Press
- James Ladyman, Understanding Philosophy of Science, Routledge, London, and New York: 2002. 304 pages
- **Frederick Aicken, The Nature of Science, Heinemann;** Subsequent edition, 1991, 162 pages

Electronic Information and Websites

- Nature and Philosophy of Science by Wannapong Triampo (Hands-out)

@ www.ilearnsci.com by Wannapong Triampo