

GENERAL EDUCATION, KMITL

COURSE SYLLABUS

Course Code	96642022	Course Title	Philosophy of science				
Total Credits	3 (3-0-6)	Semester / Year of Study	1/2025	Section		Date- Time	Thursday 9:00-12:00
Course Description (English)	The course provides a study of the thing we call “science”, together with its nature and methodology. The topics cover the meaning of science, reality, the nature of scientific observations, scientific theories and their discovery and formation, scientific explanations and predictions, the problem of induction, scientific rationality, the nature of scientific knowledge, concepts of truth, hypothesis testing, hypothesis confirmation, hypothesis falsification, logic of scientific method, and scientific progress.						
Course Coordinator	Trinnapop Boonseng						
Course Instructors	Trinnapop Boonseng						
Teaching Assistant (if any)	-						
Counselling Schedule	Line Group,1_2025  Monday- Friday 8.00-18.00.			Teaching Language	☐ Thai ☒ English ☐ Others, please specify.....		
Website or Online Teaching Method (if any)	-						

Course Learning Outcome

1. Students should have good knowledge of the key concepts, arguments, and positions in the philosophy of science.
2. Students can explain an understanding of the main problems in the philosophy of science.
3. Students can analyze and critically engage with contemporary work in the philosophy of science.
4. Students can understand the principles of philosophical problems in physics, biology, and psychology.
5. Students can express, develop and defend their views through written work and productive discussion with others.
6. Students can understand some of how philosophy is relevant to our understanding of human nature and human knowledge.

General Education Learning Outcome: GE-LO	
GE-LO	Value
☒ GE-LO-1 Analytical and Critical Thinking	4
☒ GE-LO-2 Complex Problem Solving	2
☒ GE-LO-3 Creativity	3
☐ GE-LO-4 Interpersonal Skills	
☒ GE-LO-5 Integrity and Perseverance	1
☒ GE-LO-6 Active Learning and Learning Strategies	3
☐ GE-LO-7 Resilience, Stress Tolerance and Flexibility	
☐ GE-LO-8 Leadership and Social Influence	
☒ GE-LO-9 Communication	2
☐ GE-LO-10 Entrepreneurship and Startup	
☐ GE-LO-11 Digital Quotient Literacy and Digital Media Production	
Total Value	<u>15</u>
Career Readiness Modules	
☐ Employee ☐ Self-employed ☐ Business Owner ☐ Investor ☒ None	

Teaching Plan and Evaluation Plan

Week	Topic/Sub-topic	Activities	Notes
1	Introduction to the course	Lecture	
2	What is science? And how the ancient Greeks relate to the philosophy of science.	Lecture & activity	
3	Scientific Inference I (Introduction of deductive & inductive inference)	Lecture & activity	*Assignment 1
4	Scientific Inference II (Causal inference)	Lecture & activity	*Team presentation I
5	Scientific Inference III (Probability and rule of conditionalization in scientific inference)	Lecture & activity	*Assignment 2
6	Explanation in Science I (Hempel's covering law model of explanation and causality)	Lecture & activity	
7	Explanation in Science II (Explanation and reduction)	Lecture & activity	*Team presentation II
8	Quiz		
9	Realism vs Antirealism	Lecture & activity	*Assignment 3
10	Scientific Change and Scientific Revolutions	Lecture & activity	*Team presentation III
11	Philosophical Problems in Physics, Biology and Psychology part I	Lecture & activity	*Assignment 4

Week	Topic/Sub-topic	Activities	Notes
12	Philosophical Problems in Physics, Biology and Psychology part II	Lecture & activity	Team presentation IV
13	Final Presentation Instructions group I	Individual Presentation	
14	Final Presentation Instructions group II	Individual Presentation	
15	Final Presentation Instructions group II	Individual Presentation	

Evaluation Plan

Assessment Activities	Value	Score	Week of Evaluation	Notes
1. Attendance	1	4	semester	Do not be absent more than three times.
2. Assignments	4	16	Week 3,5,9 and 11	Submitted the home work in the class or as assigned by the teachers
3. Quizzes	2	8	Week 8	No submission / Blank paper / Plagiarism = 0 score in the quiz.
4. Team presentation	4	16	Week 4,7,10 and 12	Time management will depend on the number of students in the class.
5. Final Presentation	4	16	Week 13-Week15	Week 13-15 15-20 min individual presentation
Total	15	60		

Evaluation criteria

☐ Group-based								
☒ Standard-based								
Grade	A	B+	B	C+	C	D+	D	F
Score (60 points)	57-60	49-56.9	41-48.9	34-40.9	27-33.9	21-26.9	15-20.9	0-14.9
☐ Satisfactory/Unsatisfactory (S/U)								
Grade	S				U			
Score (60 points)	30-60				0-29.9			

Scoring criteria according to Assessment Plan

Assessment Activities	Learning Outcomes	Value	ระดับคะแนน			
			4 (Excellent)	3 (Good)	2 (Fair)	1 (Poor)
1. Attendance	GE-LO-5	1	Punctual attendance is required for at least 12 sessions, excluding the final presentation week.	Punctual attendance for 9–11 sessions is acceptable, excluding the week of the final presentation.	Punctual attendance for 7–8 sessions is acceptable, excluding the week of the final presentation.	Less than 7 times punctuality , excluding the week of the final presentation.
2.1 Assignment 1	GE-LO-1	1	Demonstrates clear and logical scientific inference by systematically analyzing data or evidence, formulating and testing hypotheses, and drawing well-supported conclusions. Effectively integrates theory and empirical evidence.	Demonstrates clear and logical scientific inference by systematically analyzing data or evidence, formulating and testing hypotheses, and drawing well-supported conclusions.	Demonstrates clear and logical scientific inference by systematically analyzing data or evidence, formulating and testing hypotheses,	Demonstrates clear and logical scientific inference by systematically analyzing data or evidence, formulating.
2.2 Assignment 2	GE-LO-6	1	Actively engages with scientific content through self-directed learning. Demonstrates thoughtful reflection on scientific inference/realism versus antirealism/ modern science and learning	Demonstrates a reasonable understanding of scientific inference and attempts to connect it with scientific inference/realism versus antirealism/	Limited engagement in learning activities. Makes minimal reference to scientific reasoning or philosophy of science topics. Learning strategies are poorly	No evidence of active learning, scientific reflection, or application of strategies. No engagement with concepts like scientific inference/realism
2.3 Assignment 3	GE-LO-6	1				
2.4 Assignment 4	GE-LO-6	1				

Assessment Activities	Learning Outcomes	Value	ระดับคะแนน			
			4 (Excellent)	3 (Good)	2 (Fair)	1 (Poor)
			strategies. Applies learning strategies effectively.	modern science. Reflection is evident but could be deeper.	applied or not demonstrated.	versus antirealism/ Modern science.
3. Quiz	GE-LO-2	2	Cover all objectives in scientific inference and solve 80% of the scientific problem of the question.	Cover some objectives in scientific inference and solve 60% of the scientific problem of the question.	Cover some objectives in scientific inference and solve less than 50% of the scientific problem of the question.	Not cover any objectives of the question
4.1 Group Presentation 1	GE-LO-1	1	The group delivers a clear, well-analyzed presentation with strong critical reasoning and evidence. Ideas are logically structured. The presentation is well-timed and concise.	Good reasoning with relevant support.	Limited reasoning. The presentation lacks focus or is somewhat confusing, slightly over or under time.	There is no clear critical thought.
4.2 Group Presentation 2	GE-LO-1	1		Some parts may be slightly rushed or prolonged, but overall, it is within acceptable time.		Presentation is significantly off-time and lacks organization.
4.3 Group Presentation 3	GE-LO-3	1	Demonstrates a high level of creativity with original ideas that are unique and meaningful. Effectively applies prior knowledge in new and unexpected ways.	Shows good creative thinking. Offers new perspectives on problems or topics and uses varied techniques or	It relies heavily on standard or familiar approaches. Shows little effort in applying creative or alternative ideas.	No evidence of creative thinking. Ideas are copied, routine, or lacking any novel contribution.
4.4 Group Presentation 4	GE-LO-3	1				

Assessment Activities	Learning Outcomes	Value	ระดับคะแนน			
			4 (Excellent)	3 (Good)	2 (Fair)	1 (Poor)
				viewpoints in presentation.		
5 Individual Presentation	GE-LO-1	1	The student delivers a clear, well-analyzed presentation with strong critical reasoning and evidence. Ideas are logically structured. The presentation is well-timed and concise.	Good reasoning with relevant support. Some parts may be slightly rushed or prolonged, but overall, it is within acceptable time.	Limited reasoning. The presentation lacks focus or is somewhat confusing, slightly over or under time.	There is no clear critical thought. Presentation is significantly off-time and lacks organization.
	GE-LO-3	1	Demonstrates a high level of creativity with original ideas that are unique and meaningful. Effectively applies prior knowledge in new and unexpected ways.	Shows good creative thinking. Offers new perspectives on problems or topics and uses varied techniques or viewpoints in presentation.	It relies heavily on standard or familiar approaches. Shows little effort in applying creative or alternative ideas.	No evidence of creative thinking. Ideas are copied, routine, or lacking any novel contribution.
	GE-LO-9	2	The content is clearly and logically structured. Slides are visually effective, well-designed, and support the message. Confident and	The content is mostly well-organized. The slides are appropriate and readable. Responds to questions clearly, though with minor	The content has some structure but may lack clarity and flow. Slides are basic or cluttered. Q&A responses are brief or partially unclear.	There is no clear structure in the presentation. Slides are ineffective or missing. Unable to respond meaningfully to audience questions.

Assessment Activities	Learning Outcomes	Value	ระดับคะแนน			
			4 (Excellent)	3 (Good)	2 (Fair)	1 (Poor)
			thoughtful responses to audience questions.	hesitation. The content is mostly well-organized. The slides are appropriate and readable. Responds to questions clearly, though with minor hesitation.		