



National Taiwan University of Science and Technology

2019 Summer Program

PHIL 210 Science, Reason, and Reality

Course Outline

Term: July 01-August 02,2019

Class Hours: 16:00-17:50 (Monday through Friday)

Course Code: PHIL 210

Instructor: Dr. Job Chen

Home Institution: Clemson University

Office Hours: TBA and by appointment

Email: zhuoc@clemson.edu

Credit: 4

Class Hours: According to the regulations of Minister of Education, R.O.C, 18 class hours could be counted as 1 academic credit in all universities in Taiwan. This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

Course Description:

This class addresses some of the central issues in the development and philosophy of science. It will raise questions such as: What is the difference between science and non-science? Do the methods employed by scientists vary historically? Is science objective? Do scientific theories inform us of the truth about the world? Students who take this class will have knowledge of the major themes of recent and contemporary scientific development and critical thinking about science. They will also have experience of the methods of critical analysis and argument employed in the philosophy of science and a background on which to base further study in the area.

Course Objectives:

Science purports to provide us with our best methods for gaining knowledge about the world---the goal of

this course is to critically evaluate those methods. We will do so by studying actual scientific practice in the history of science and discussing the many philosophical issues that arise along the way. Our survey of the history of science will touch upon physics and astronomy, chemistry, the earth sciences, and evolutionary biology and genetics from the enlightenment through the 20th century. Specific topics will include: the relation of science with religion, race, gender, and ideologies; the relation of science with technology and society; and the nature of scientific knowledge.

Students who successfully complete this subject will:

- gain a general comprehension of the major recent advances in our philosophical understanding of the nature and structure of science;
- understand the roles of experience and reasoning in contributing to this structure;
- have experience with methods of critical analysis and argument employed in the philosophy of science, leading to improved general reasoning and analytical skills.

Required Textbooks:

Peter J. Bowler and Iwan Rhys Morus. *Making Modern Science: A Historical Survey*.

Grading & Evaluation:

Assignments (40%) – Midterm exam (30%) – Final exam (30%)

Grades will be distributed as 90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D; and below 60% = F.

Intermediary assignments will be posted throughout the course, to help students assess their needs and to ensure that all the important topics are well understood. Assignments are also an opportunity for students to ask questions concerning unclear notions, as the main objective is not to grade but to help everyone reach an optimal level of comprehension.

Midterm and final exams will target all topics previously covered in class. Lecture notes and assignments are important to succeed in the midterm and final exams, yet some questions will be specifically intended to stimulate students' critical thinking.

Attendance is extremely important for success in this class. It is expected that each student will commit fully to the assignments and readings required. Exams will cover the required texts as well as material presented or discussed in class.

Course Schedule

Week 1

Session 1: Course Introduction



Session 2: Scientific revolution

Session 3: Chemical revolution

Session 4: Conservation of energy

Week 2

Session 1: Age of the earth

Session 2: Darwinian revolution

Session 3: New biology

Session 4: Ecology and environmentalism

Week 3

Session 1: Continental drift I

Session 2: Continental drift II

Session 3: Twentieth-century physics I

Session 4: Twentieth-century physics II

Week 4

Session 1: Cosmological revolution I

Session 2: Cosmological revolution II

Session 3: Human sciences I

Session 4: Human sciences II

Week5 Philosophical implications

Session 1: Organization of science

Session 2: Biology and ideology

Session 3: Science and religion I

Session 4: Science and religion II