

Course Outline

Programme	ADP Home Economics	Course Code	NHPY- 110	Credit Hours	3(3+0)
Course Title	WHAT IS SCIENCE?				
Course Introduction					
This course introduces various fields of natural science, how scientists operate within these fields, what methods they deploy to make new discoveries, and how they communicate the advances in their fields to the world. The course starts with and an introduction to logic and the development of scientific approach. It discusses the modern use of the scientific method and the tools that scientists deploy to ensure that they produce authentic knowledge. Students are then introduced to the main branches of science including physics, chemistry and biology, their core underlying principles, major developments in these fields and their applications in modern life. Students will work on case studies to understand how scientists discover various workings of nature and check errors if these arise in their work. The final part of the course focusses on the skill to separate valid science from pseudoscience. Students are also exposed to the fundamentals of science communication and strategies to identify reliable bodies of knowledge.					
Learning Outcomes					
On the completion of the course, the students will: Clearly articulate the development of scientific thought through various parts of human history and compare it to the modern scientific method. Describe various branches of science, their underlying core ideas, and compare their applications. Using case studies and demonstrations, practice application of the scientific method in the natural sciences. Determine whether a given claim or belief is scientifically valid or not, and provide a clear rationale for doing so.					
Course Content			Assignments/Readings		
Week 1	Logic		Chalmers 4 th ed, p.39-40		
	Explanation: hypothetic deductive method		Carey 4 th ed., p.3-5, p.29-36		
Week 2	Observations, predictions and determinism		Carey, p.9-17, 36-37		
	Inductive reason		Chalmers chapter 4		
Week 3	Objectivity and universality; using instruments		Carey p.9-17, p.69-71		
	Aim of science: find testable and tested explanations, predictability		Chalmers ch.5		
Week 4	Inquiry about natural world in antiquity		HECTM week 2		
	Science in the medieval era: China, South Asia		HECTM week 3		
Week 5	Science in the Muslim middle east		HECTM week 3		
	Science in the Medieval Europe		HECTM week 4		
Week 6	Science in early Modern Europe		HECTM week 4		
	Modern science: Science change and extended theories		Hawkins, chapter 3 (first 3 pages)		

Week 7	Facts, models, laws and theories	Chalmers,p.1-5,-14, Gordonp.106- 110, Careyp.38-39, Hawkings, chapter 3(first3pages), Chalmers p.97-100
	Physics and its sub-branches	HECTMweek6
Week 8	Classical Physics	HECTMweek7
	Modern Physics	HECTMweek8
Week 9	Mid Term Exams	
Week 10	Chemistry and its sub-branches	HECTMweek6
	Chemistry	HECTMweek9
Week 11	Earth science-I	HECTMweek10
	Earth science-II	HECTMweek10
Week 12	Biology and its sub branches	HECTMweek6
	Biology	HECTMweek11
Week 13	Evolution	HECTMweek11
	Natural selection	HECTMweek11
Week 14	Cells in biology	HECTMweek12
	Genes, DNA and RNA	HECTMweek12
Week 15	Photosynthesis and Ecosystem	HECTMweek12
	Scales and levels in biology, levels of reality	HEC TM week 12 Chalmers,p.264-266
Week 16	Fallacies in the name of science	HEC TM week13 Carey,chapter6
	Pseudo science	HEC TM week 14Carey,p.123- 128
Week 17	Science communication, Science journals	HECTMweek15
	Pure and applied science, use of science, role of values in science	Carey, p.5-7, Cartwright,p.162-166
Week 18	Final Term Exams	

Textbooks and Reading Material

Textbooks:

“*What is This Thing Called Science?*” by A.F. Chalmers. Publisher: UQP. 4thed .2012.

“*A Beginner’s Guide to the Scientific Method*” by S. S. Carey, Wadsworth, 4thed. 2011.

HEC Teacher’s Manual (Natural Sciences) for “What is Science?”, 2021.

2.Suggested Readings

“A Briefer History of Time” by S. Hawking and L. M lodinow, Bantam Books, 2005.

“The History and Philosophy of Social Science” by Gordon,S. Routledge,1991.

Teaching Learning Strategies

Lecture-based learning through lectures and presentations. Technology-based learning -use of Multimedia etc.

Group learning through group assignments and discussion.

Assignments: Types and Number with Calendar

Quiz (Week 6): Science in the World

Assignment (Week 14): Difference Between DNA and RNA