

BALIKESİR UNIVERSITY
FACULTY OF SCIENCES AND LITERATURE

UNIVERSITY ELECTIVE COURSE INFORMATION FORM

Department / Division	Chemistry / Physical Chemistry		
Course Title	Historical Development of Scientific Thought		
Semester	Fall : X	Spring	
Language of Instruction	Turkish : X	English	
Course Credits	Theoretical : 2	Practical : -	Total Credits : 2
ECTS Credits	3		
Mode of Study	Formal Education		
Course Objective	The aim of this course is to analyze how scientific knowledge has emerged, developed, and gained acceptance throughout history from an interdisciplinary perspective. Within the scope of the course, it is aimed that students: • comprehend the development process of scientific thought, • evaluate the processes through which scientific theories emerge, • analyze the role of scientific discussions and differences of opinion, • interpret the interaction between science, society, and history, • understand the historical foundations of the modern scientific structure.		
Course Content	This course examines the development process of scientific thought from ancient times to the present, based on humanity’s effort to understand nature and matter. Within the scope of the course: • the nature and limits of scientific knowledge, • early systems of thought and conceptions of matter, • the emergence and systematization of experimental knowledge, • major transformation processes in scientific thought, • interactions and differences of opinion among scientists, • the social, economic, and political context of scientific knowledge will be addressed. Scientific developments will be evaluated not only through their outcomes but also through their formation processes, errors, discussions, and dynamics of change.		
Prerequisites	-		
Instructor(s)	Prof. Dr. Özkan DEMİRBAŞ	mail :ozkandemirbas@gmail.com	
Teaching Assistants	-	-	
Internship Status	-		
Course Resources	The Chemical History of a Candle – Michael Faraday, 1861 The Disappearing Spoon – Sam Kean, 2010 The Structure of Scientific Revolutions – Thomas S. Kuhn, 1962 A History of Chemistry – Bernadette Bensaude-Vincent & Isabelle Stengers, 1996		
Course Structure	Natural Sciences		
Planned Learning Activities and Methods	Lecture (Presentation), Interactive Discussion, Question–Answer Method, Text and Source Analysis, Concept Mapping, Problem-Based Learning, Small Group Discussions, Short Written Assessments, Conceptual Inquiry and Critical Thinking		

Assessment Methods

Course ECTS Workload Calculation Content

Semester Activities	Number	Contribution (%)	Activity	Number	Duration	Total Workload (Hours)
Midterm Exam	1	40	Course Hours	14	2	28
Quiz			Out-of-Class Study	14	2	28
Assignment			Midterm Exams	1	2	2
Attendance			Final Exam	1	2	2
Practical			Total Workload: 60 hours			
Project			ECTS Credits: 3			
Final Exam	1	60				

Learning Outcomes

Students who successfully complete this course will be able to:

- explain how scientific knowledge is produced,
- analyze the historical development of scientific thought,
- evaluate the processes through which scientific theories emerge,
- interpret the role of discussions and conflicts in science,
- analyze the relationship between science and society,
- evaluate scientific developments from a critical perspective.

Course Topics

Week	Topic	Preparation	Documents
1	What is science? Nature and limits of scientific knowledge		
2	Humanity's effort to understand nature: Early systems of thought		
3	Attempts to understand matter: Early approaches		
4	Knowledge, belief, and experiment: Early scientific practices		
5	Development of experiment: From observation to systematic knowledge		
6	Key turning points in scientific thought		
7	Method in science: Experiment, measurement, and validation		
8	How is scientific knowledge formed? Models, hypotheses, and laws		
9	Scientific errors and outdated approaches		
10	Scientific discussions and differences of opinion		
11	Scientific interaction networks: Dissemination of knowledge		
12	Science and society: Economic and political interactions		
13	Major transformation processes in scientific thought		
14	Modern understanding of science and the structure of knowledge		

Contribution to Program Outcomes

This course contributes to the development of students' interdisciplinary perspectives and strengthens their scientific thinking skills. The course not only enables students to acquire knowledge but also contributes at a moderate and high level to program outcomes by enhancing:

- Analytical and Critical Thinking Skills
- Scientific Literacy
- Interdisciplinary Approach
- Problem-Solving and Interpretation Skills
- Communication and Discussion Skills
- Independent Learning Competence
- Understanding the Relationship Between Science and Society