

**School of Chemistry**  
**University of the Punjab, Lahore**  
**Course Outline**  
**Semester 4**

<b>Programme</b>	BS Chemistry	<b>Course Code</b>		<b>Credit Hours</b>	2
<b>Course Title</b>	<b>Natural Science II (NS-II)</b>				
<b>Course Introduction</b>					
<p>This course imparts a basic understanding of everyday science to the students (science + other discipline)</p> <p>This course is intended to give students a broad understanding of those sub-disciplines that comprise the natural sciences and to provide students with an understanding of the history, philosophy, and social contributions of science. It will introduce students to current issues of particular concern to both science and society. This course will cover the following topics and student will have knowledge of;</p> <ul style="list-style-type: none"> <li>Overview of the philosophical background of natural science development</li> <li>Survey of historical events that contributed to the development of natural science</li> <li>Description and explanation of the main branches of natural science</li> <li>Importance of interdisciplinary fields in natural science</li> <li>Relationship between natural science and modern technology</li> <li>Understanding the position and role of natural science in modern society</li> <li>Issues regarding the interface between society and natural science</li> <li>Reciprocal influence of natural science and culture in today's society</li> <li>Ethical, social, and cultural aspects of natural science and technology today</li> </ul> <p>Definition and Categorization of Natural Sciences: Introduction to natural sciences: Definition and scope, Categorization of natural sciences: Physics, Chemistry, Biology, Earth Sciences, and Astronomy, Interdisciplinary fields and their importance, Philosophical Background of Natural Science Development:, Overview of the philosophical foundations of natural sciences, Key philosophers and their contributions to the development of science, The scientific method and its evolution. Historical Development of Natural Sciences: Major historical events that shaped the natural sciences, Significant discoveries and their impact on scientific progress, The role of key figures in the advancement of natural sciences, Main Branches of Natural Science, Detailed exploration of the main branches: Physics, Chemistry, Biology, Earth Sciences, and Astronomy, Key concepts and principles in each branch, Recent advancements and ongoing research in these fields. Natural Science and Modern Technology: Relationship between natural sciences and technological advancements, Examples of how natural science drives technological innovation, Impact of technology on scientific research and vice versa. Natural Science in Modern Society: The role and importance of natural sciences in contemporary society, Contributions of natural sciences to societal development, Public perception and understanding of natural sciences. Science and Society Interface: Major issues at the interface between science, technology, and society, Case studies of science influencing societal change, The reciprocal influence of society on scientific research. Ethical, Social, and Cultural Aspects of Natural Science: Ethical considerations in scientific research and technological development, Social and cultural impacts of scientific discoveries, Current debates on ethical issues in natural sciences.</p>					

### Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. Identify and define key elements of the sub-disciplines that comprise the natural sciences.
2. Discuss the natural sciences, particularly their historical context, philosophical background, and role in society.
3. Explain some of the major issues arising from the interface between natural science, technology, and society.
4. Recognize the ethical, social, and cultural concerns connected to certain modern developments/discoveries within the natural sciences.

Course Content		Assignments/Readings
<b>Week 1</b>	Definition of Natural Sciences: Introduction to natural sciences: Physics, Chemistry, Biology, Earth Sciences, and Astronomy	
	Scope of natural sciences	
<b>Week 2</b>	Categorization of natural sciences: Physics, Chemistry, Biology, Earth Sciences, and Astronomy	
	Interdisciplinary fields and their importance	
<b>Week 3</b>	Historical Development of Natural Sciences: Major historical events that shaped the natural sciences	
<b>Week 4</b>	Significant discoveries and their impact on scientific progress	
	The role of key figures in the advancement of natural sciences	
<b>Week 5</b>	Main Branches of Natural Science Detailed exploration of the main branches: Physics, Chemistry, Biology, Earth Sciences, and Astronomy	

<b>Week 6</b>	Key concepts and principles in each branch	
	Recent advancements and ongoing research in these fields	
<b>Week 7</b>	Midterm exam	
	Natural Science and Modern Technology: Relationship between natural sciences and technological advancements	
<b>Week 8</b>	Examples of how natural science drives technological innovation	
	Impact of technology on scientific research and vice versa	
<b>Week 9</b>	Natural Science in Modern Society: The role and importance of natural sciences in contemporary society	
<b>Week 10</b>	Contributions of natural sciences to societal development	
	Public perception and understanding of natural sciences	
<b>Week 11</b>	Ethical, Social, and Cultural Aspects of Natural Science: Ethical considerations in scientific research and technological development	
<b>Week 12</b>	Social and cultural impacts of scientific discoveries Current debates on ethical issues in natural sciences	
	Final term exam	

<b>Reading Material</b>			
<ol style="list-style-type: none"> <li>Gal, O. (2021). The origins of modern science: From antiquity to the scientific revolution. Cambridge University Press.</li> <li>Bryson, B. (2003). A short history of nearly everything. Broadway Books.</li> <li>Kuhn, T. S. (1970). The structure of scientific revolutions. University of Chicago Press.</li> <li>Cantor, G. N., Christie, J. R. R., Hodge, M. J. S., &amp; Olby, R. C. (Eds.). (2006). Companion to the history of modern science. Taylor &amp; Francis.</li> <li>Cohen, H. F. (2010). How modern science came into the world: Four civilizations, one 17th-century breakthrough. Amsterdam University Press.</li> <li>Brush, S. G. (1988). The history of modern science: A guide to the second scientific revolution, 1800-1950. Iowa State University Press.</li> <li>Zilsel, E., &amp; Zilsel, P. (2013). The social origins of modern science. Springer Netherlands.</li> </ol>			
<b>Teaching Learning Strategies</b>			
<ol style="list-style-type: none"> <li>Class lectures</li> <li>Quiz</li> <li>Assignments</li> <li>presentation</li> </ol>			
<b>Assignments: Types and Number with Calendar</b>			
<ol style="list-style-type: none"> <li>Assignment # 1: Before mid</li> <li>Assignment # 2: Before final</li> </ol>			
<b>Assessment</b>			
<b>Sr. No.</b>	<b>Elements</b>	<b>Weightage</b>	<b>Details</b>
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.