



ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

Secondary School Certificate (SSC)

Examination Syllabus

General Science

X

**Based on Provincial Revised
Curriculum
(Sindh)**



PREFACE

The Ziauddin University Examination Board (ZUEB) was established under **Sindh ACT XLI 2018**, with the primary objective of enhancing the quality of education in Sindh. ZUEB is responsible for administering examinations for the **Secondary School Certificate (SSC)** and **Higher Secondary School Certificate (HSSC)** in alignment with the most recent revisions to the **National Curriculum**, as outlined by the **Directorate of Curriculum Assessment and Research (DCAR), Sindh**. Through its ordinance, ZUEB is mandated to provide examination services for both English, Urdu, and Sindhi medium candidates from private schools across Sindh. This examination syllabus reflects ZUEB's dedication to achieving the educational goals set by the provincial authorities.

In collaboration with subject professors, ZUEB has developed a comprehensive syllabus for each subject. It is important to distinguish between the syllabus and the curriculum. The syllabus serves as a guide for both teachers and students, outlining the key areas of focus within the subject. It provides students with a clear understanding of what is expected of them in their studies and helps them prepare effectively for their exams. This examination syllabus incorporates all cognitive outcomes derived from the **Provincial Curriculum Statement**, ensuring that assessments are both valid and reliable. While the focus is primarily on the cognitive domain, significant emphasis is placed on the application of knowledge and understanding.

The syllabus is made available to all stakeholders via the ZUEB website to assist affiliated schools in planning their teaching. It is crucial to note that the syllabus, rather than the prescribed textbook, forms the foundation of ZUEB examinations. Additionally, this syllabus supports the development of learning materials for both students and teachers. ZUEB remains committed to supporting students undertaking the SSC and HSSC courses by facilitating their learning outcomes through this detailed syllabus document.

To further assist in the learning process, ZUEB provides a dedicated **e-resource tab** on its website, offering both text-based and video content on various subjects. These 15–20-minute instructional videos, created around key subject concepts, allow students to learn at their own pace and convenience. The videos can be used as a reinforcement tool to revisit lessons already taught or as pre-lesson material. This initiative is an ongoing effort, and new videos will continue to be uploaded.

We encourage all students and educators to make the most of these resources for a more enriched and flexible learning experience.

Sincerely,

Saleem Ahmed

Manager Social Sciences

Ziauddin University Examination Board

INTRODUCTION

The study of science is a fundamental component of a comprehensive education, empowering students to grasp the intricacies of the natural world and cultivate critical thinking skills. In the Pakistani context, science education plays a pivotal role in equipping students with the knowledge and skills necessary to navigate the complexities of the modern world. By delving into the fundamental principles of science, students can develop a profound understanding of the world around them, from the intricate mechanisms of living organisms to the vast expanse of the universe. As Carl Sagan aptly observed, "Science is a way of thinking much more than it is a body of knowledge."

Teaching science is essential because it fosters curiosity, creativity, and critical thinking in students. By engaging with scientific concepts and processes, students acquire essential skills, such as observation, experimentation, and analysis, which are valuable in a wide range of academic and professional pursuits. Science education also enables students to make informed decisions about issues that impact their lives and the world around them, from environmental sustainability to healthcare and technological innovation.

The scope of science education at secondary level is comprehensive, encompassing a broad spectrum of topics in physics, chemistry, and biology. Students explore the fundamental laws of physics, including motion, energy, and forces, as well as the principles of chemistry, such as atomic structure and chemical reactions. In biology, students study the diversity of life, from cells to ecosystems, and develop an understanding of the intricate relationships between living organisms and their environment. By mastering these scientific concepts, students become able to pursue careers in science, technology, engineering, and mathematics (STEM) fields, as well as other areas that require critical thinking and problem-solving skills.

The study of science has far-reaching implications for individuals and society, enabling us to address complex challenges, drive innovation, and improve the human condition. By emphasizing science education, we empower students to become curious, informed, and engaged citizens who can contribute to Pakistan's development and progress. As Marie Curie wisely observed, "One never notices what has been done; one can only see what remains to be done," underscoring the importance of scientific inquiry in driving progress and innovation. By investing in science education, we can unlock the potential of future generations and equip them to tackle the complex challenges of the 21st century.

STANDARDS of GENERAL SCIENCE SUBJECT GRADE X

Following standards have been framed for Grade X General Science Education. These standards are followed by bench marks. These bench marks further divided into student learning outcomes for each learning area.

These are the details of each standard:

Standard 1: Life Science

Students will be able to understand, explain and differentiate between the structure, characteristics and basic needs of living things, the processes of life, and will also investigate the diversity of life and how living things interact with each other and their environment.

Standard 2: Physical Science

Students will analyze (quantitatively and qualitatively) the structures, properties, forms, and patterns in matter and energy, predict changes and interactions, and evaluate theories and structures using knowledge of chemistry and physics.

Standard 3: Earth and Space Science

Students will understand and explain the structure, processes, and interactions among the Earth's systems. They will also explain scientific theories about the origin and evolution of the Earth and the universe, and investigate how we learn about the universe.

Standard 4: Skills

Students will develop the skills required for scientific inquiry, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions, and for reflecting on scientific knowledge and its application.

Standard 5: Attitudes

Students will be encouraged to develop attitudes that support the responsible acquisition and application of scientific and technological knowledge for the mutual benefit of self, society, and the environment.

Standard 6: Science, Technology, Society, and the Environment (STSE)

Students will develop an understanding of the nature of science and technology, the relationship between science and technology and of the social and environmental context of science and technology.

Key

K = Knowledge

U = Understanding

A = Application and other higher order cognitive skills

CRQs = Constructed Response Questions

ERQs = Extended Response Questions

CA = Classroom Activity

ECA = Extended Classroom Activity

(ECAs are not to be assessed under examination condition)

Syllabus General Science X

Topics & Sub-topics	Student Learning Outcome	Cognitive Level ¹		
A: ELECTRICITY IN EVERYDAY LIFE	Student will be able to:	K	U	A
Static charges, their characteristics and effects	A-1 Describe the characteristics and effects of static charges. A-2 Explain static charges in terms of electron transfer. A-3 Explain practical applications of static and current electricity (e.g., household appliances)		*	
Practical uses of static and current electricity, and their impact on everyday life	A-4 Identify problems related to electrostatic charge in everyday situations and evaluate solutions (e.g., use of an electrostatic paint sprayer for uniform paint; use of static straps to reduce charge build-up in automobiles; Use of electrostatic precipitators to decrease pollution; use of lightning rods to protect buildings.		*	
Electrical circuits used in everyday life	A-5 Describe household wiring and its typical components (e.g., parallel circuits with switches, fuses, circuit breakers, outlets)		*	
Safety measures	A-6 Develop a solution to a practical problem related to the use of electricity in home, school, or community (e.g., choose an appropriate fuse or circuit breaker for a specific circuit). A-7 Identify the safety measures to avoid and handle electric hazards.		*	*
Social, economic, and environmental costs and benefits of the methods of electrical energy production used in Pakistan	A-8 Propose a plan for a self-contained system to generate energy, using renewable energy resources, to meet the energy requirements of a dwelling, farm, or community in Pakistan.			*
Careers in Electrical Technologies	A-9 Describe careers that involve electrical technologies, and use print and electronic media to identify the knowledge and skill requirements of such careers.		*	

Topics & Sub-topics	Student Learning Outcome	Cognitive Level		
B: CHEMICAL REACTIONS AND THEIR PRACTICAL APPLICATIONS	Student will be able to:	K	U	A
Chemical reactions in everyday life and their practical applications	B-1 Recognize those characteristics which indicate that a chemical reaction has taken place. B-2 Use scientific nomenclature to identify common consumer products (e.g., identify ingredients in food products or cosmetics from the labels).		*	*
Chemical reactions in technological products and processes	B-3 Investigate applications of acid-base reactions in common products and processes (e.g., prepare soap from oil and sodium hydroxide and compare its lather formation with that of commercial soaps). B-4 Relate chemical reactions to familiar processes encountered in everyday life (e.g., reactions in film processing, food processing, fabric and hair dyeing, agriculture, pulp-and-paper and mineral processing) and identify careers that require knowledge of such processes			*
Methods for the disposal of waste chemicals	B-5 Research the methods, impact and safety consequences of chemical disposal in Pakistan, and recommend appropriate disposal methods (e.g., dumping car batteries, tyres, plastics, paints, or metals in landfill sites).			ECA
Topics & Sub-topics	Student Learning Outcome	Cognitive Level ²		
C: BIOTECHNOLOGY	Student will be able to:	K	U	A
Nucleus & hereditary material (Chromosomes, genes, RNA, DNA)	C-1 Describe the structure and function of nucleus and importance of hereditary material (Chromosomes, genes, RNA, DNA) found in it. C-2 Identify the relationships among nucleic acids (DNA and RNA), genes and chromosomes.		*	
Transfer of genetic information and DNA replication	C-3 Describe the molecular basis of heredity including DNA replication. C-4 Describe the purposes and processes of cellular reproduction. Cell division (Mitosis and Meiosis)		*	
Genetic disorders,	C-5 Explain the common genetic disorders e.g. Thalassemia,		*	

Genetic Engineering and Biotechnology	sickle cell anemia, and down syndrome)			
	C-6 Explain Cloning, transgenic plants & animals		*	
Careers in Reproductive Biology	C-7 Analyze the role of genetic engineering and biotechnology in the present world.			*
	G-8 Explain the use of Bio-Technology & Genetic Engineering in the field of Agriculture, Forensic, Livestock, Dairy Products, Food processing and Pharmaceutical		*	
	C-9 Investigate careers that require an understanding of reproductive biology.			*
Topics & Sub-topics	Student Learning Outcome	Cognitive Level ³		
D: WATER RESOURCES	Student will be able to:	K	U	A
Forms of water	D-1 Recognize the various forms of water available on Earth (Oceans, seas, lakes, rivers, springs, glaciers, underground water.		*	
Fresh water resources; particularly in Pakistan	D-2 Identify the amount of fresh water available on Earth with an emphasis on Pakistan.		*	
Utilization of water resources in Pakistan and emerging issues	D-3 Describe the existing ways of utilization of water resources in Pakistan		*	
	D-4 Explain the issues and problems Pakistan is facing in utilizing the water resources effectively for its people		*	
	D-5 Identify methods of reclamation and conservation of water.		*	
Growing demand for water resources	D-6 Describe the implication of the growing demand of water in the world.		*	
Threats to water resources	D-7 Explain the water resources are facing serious threats such as pollution, climate change, urban growth and landscape changes (deforestation) that are mainly caused by human activity.		*	
Sustainable development of water resources, e.g. potable water system	D-8 Suggest ideas for the sustainable development of water resources in Pakistan			*

Topics & Sub-topics	Student Learning Outcome	Cognitive Level ⁴		
E: ENVIRONMENTAL PROBLEMS AND MANAGEMENT	Student will be able to:	K	U	A
Regional and global environmental problems and Natural Disasters	E-1 Identify the regional and global environmental problems such as ozone depletion, global warming, acid rain, greenhouse effect, desertification and climate change, solid and hazardous wastes		*	
	E-2 Describe the natural disasters caused by earthquakes, storms including El-Nino and La-Nina.		*	
Legislation or Laws on pollution	E-3 Identify the legislation or laws on environmental problems such as ozone depletion, global warming, air pollution, water pollution, drinking water quality, and toxic substances.		*	
Control strategies for treating air and water pollutants	E-4 Describe the control strategies that can be used for treating air and water pollutants.		*	
Protection at individual level	E-5 Describe the harmful effects of the excessive use of TV, Mobiles, computer on individuals' health.		*	
Topics & Sub-topics	Student Learning Outcome	Cognitive Level		
F: SCIENCE, TECHNOLOGY AND DEVELOPMENT	Student will be able to:	K	U	A
Functions and uses of	F-1 Describe the principle of lasers and optical fiber system		*	
Lasers and optical fiber	F-2 describe their functions and uses of lasers and optical		*	

system	fiber system in different fields with examples			
Modern methods of medical diagnostic and treatments	F-3 Describe the functions and uses of X-rays, Ultrasound, ECG, EEG, MRI, CT-Scan, radiography, radiotherapy, chemotherapy and angiographies		*5	
Information technology	F-4 Describe the technologies such as computer telephone, fax, computer, TV, radio, mobiles used in the modern information age		*	
SUPARCO	F-5 Explain the contribution SUPARCO has made in the development of our country and list their future plans.		*	

Scheme of Assessment

Subject: General Science

Grade: X

Table 1: Number of Student Learning Outcomes by Cognitive Level

Topic No.	Topics	No. of Sub-topics	SLOs ⁶			Total
			K	U	A	
1	A: Electricity in Everyday Life	6	--	7	2	9
2	B: Chemical Reactions and their Practical Applications	3	--	1	4	5
3	C: Biotechnology	5	--	7	2	9
4	D: Water Resources	6	--	7	1	8
5	E: Environmental Problems and Management	4	--	5	--	5
6	F: Science, Technology and Development	4	--	5	--	5
	Total	28	--	32	9	41
	Percentage		0%	78%	22%	100%

Table 2: Exam Specification

Topic No.	Topics	Assessment Items Distribution		
		MCQs	CRQs	ERQs
1	A: Electricity in Everyday Life	2	2	--
2	B: Chemical Reactions and their Practical Applications	2	2	--
3	C: Biotechnology	3	1	2
4	D: Water Resources	2	1	1
5	E: Environmental Problems and Management	2	2	1
6	F: Science, Technology and Development	4	2	1
	Total	15	10	5

Table 3: Marks Distribution Section-wise

Sections in Exam Paper⁷	A	B	C	Total
Types of Assessment Items in each Section	MCQs	CRQs	ERQs	
Total number of Items given in each Section	15	10	5	
Number of Items to be attempted in each Section	15	6	3	
Maximum Marks for each Item	1	5	10	
(Marks for each item x No. of items)	1 x 15=	5 x 6=	10 x 3=	
Maximum Marks for each Section	15	30	30	75
Percentage	20%	40%	40%	100%