

**FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION**  
**H-8/4, ISLAMABAD**

NO.1-6/FBISE/RES/CC/HSSC/1033

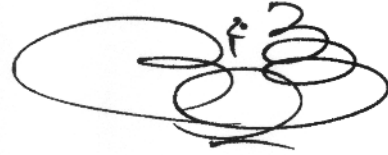
19 May 2017

**NOTIFICATION**

It is notified for information of all concerned that revised curriculum 2006 in the subject of Biology at HSSC level shall stand implemented w.e.f. the academic session 2017-2019. Accordingly, the students to be admitted in class-XI in August 2017 and subsequently promoted to class-XII in August 2018 shall be examined in accordance with the revised curriculum in HSSC Part-I and Part-II examinations to be held in the years 2018 and 2019 respectively. Contents of syllabus of class XI are enclosed herewith.

2. The book to be published by National Book Foundation, Islamabad may be consulted for reference and supplementary material.

3. A copy of the curriculum 2006 in the subjects of Biology for class XI is enclosed and also being hoisted on the FBISE's website [www.fbise.edu.pk](http://www.fbise.edu.pk) for the benefit of all stakeholders.



**(ZULFIQAR ALI RIZVI)**

Director Research  
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All heads of institutions affiliated  
with FBISE at HSSC level

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12. All Sectional Heads of FBISE, Islamabad

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H-84 ISLAMABAD**

17 May 2017

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10. Inspector, Website FBSE, Islamabad
11. Package, FBSE Sub-Office, Gilgit
12. All Sectional Heads of FBSE, Islamabad

# **BIOLOGY**

## **For Class-XI**

1. **CELL STRUCTURE AND FUNCTION**
  - 1.1 Techniques used in Cell Biology
  - 1.2 Cell Wall and Plasma Membrane – The Boundary Wall
  - 1.3 Cytoplasm and Organelles
  - 1.4 Prokaryotic and Eukaryotic Cells
  
2. **BIOLOGICAL MOLECULES**
  - 2.1 Biological Molecules in Protoplasm
  - 2.2 Importance of Water (Importance in Protoplasm and in Environment)
  - 2.3 Carbohydrates
    - 2.3.1 Classification (Monosaccharides, Disaccharides and Polysaccharides)
    - 2.3.2 Role of Carbohydrates
  - 2.4 Proteins
    - 2.4.1 Structure of Proteins (Amino Acids and Peptide Linkages)
    - 2.4.2 Classification of Proteins (Globular and Fibrous Proteins)
    - 2.4.3 Role of Proteins
  - 2.5 Lipids
    - 2.5.1 Classification (Acylglycerols, Phospholipids, Waxes and Terpenes)
    - 2.5.2 Role of Lipids
  - 2.6 Nucleic Acids
    - 2.6.1 Structure of Nucleic Acids (Nucleotides and Phosphodiester Linkage)
    - 2.6.2 Classification (RNA and DNA)
    - 2.6.3 Role of Nucleic Acids and nucleotides (DNA, RNA, ATP and NAD)
  - 2.7 Conjugated Molecules (Glycolipids, Glycoproteins, Lipoproteins and Nucleoproteins)
  
3. **ENZYMES**
  - 3.1 Structure of Enzymes
  - 3.2 Mechanism of Enzyme Action
  - 3.3 Factors affecting the Rate of Enzymatic Action (Temperature, pH, Enzyme Concentration and Substrate Concentration)
  - 3.4 Enzyme Inhibition (Competitive and Noncompetitive Inhibitors)
  - 3.5 Classification of Enzymes
  
4. **BIOENERGETICS**
  - 4.1 Photosynthesis
    - 4.1.1 Role of Light
    - 4.1.2 Role of Photosynthetic Pigments – Absorption Spectrum and Action Spectrum
    - 4.1.3 Role of Carbon dioxide
    - 4.1.4 Role of Water
    - 4.1.5 Mechanism of Photosynthesis
  - 4.2 Cellular Respiration
    - 4.2.1 Aerobic and Anaerobic respiration
    - 4.2.2 Mechanism of Respiration
    - 4.2.3 Synthesis of ATP -- Chemiosmosis and Substrate-level Phosphorylation
  - 4.3 Photorespiration
  
5. **ACELLULAR LIFE**
  - 5.1 Viruses - Discovery and Structure
  - 5.2 Parasitic Nature of Viruses
  - 5.3 Life Cycle of Bacteriophage
  - 5.4 Life Cycle of HIV
  - 5.5 Viral Diseases (Hepatitis, Herpes, Polio and Leaf curl virus disease of cotton)
  - 5.6 Prions and Viroids (Structure and examples of Diseases caused by them)
  
6. **PROKARYOTES**
  - 6.1 Taxonomy of Prokaryotes
  - 6.2 Archaea
  - 6.3 Bacteria; Ecology and Diversity
  - 6.4 Structure; Shape and Size of Bacteria
  - 6.5 Modes of Nutrition in Bacteria



- 6.6 Growth and Reproduction in Bacteria
- 6.7 Importance of Bacteria (Beneficial and Harmful bacteria)
- 6.8 The Bacterial Flora of Humans
- 6.9 Control of Harmful Bacteria
- 7. PROTISTS AND FUNGI**
  - 7.1 Protists – The Evolutionary Relationships
  - 7.2 Major groups of Protists (protozoa, algae, myxomycota, oomycota)
  - 7.3 General characteristics of Fungi
  - 7.4 Diversity among Fungi (zygomycota, ascomycota, basidiomycota)
  - 7.5 Importance of Fungi
- 8. DIVERSITY AMONG PLANTS**
  - 8.1 The Evolutionary Origin of Plants
  - 8.2 Nonvascular Plants (General characteristics)
  - 8.3 Seedless Vascular Plants (General characteristics)
    - 8.3.1 Evolution of Leaf
  - 8.4 Seed Plants
    - 8.4.1 Evolution of Seed
    - 8.4.2 Gymnosperms (General characteristics)
    - 8.4.3 Angiosperms (General characteristics and Life cycle)
- 9. DIVERSITY AMONG ANIMALS**
  - 9.1 Characteristics of animals
  - 9.2 Criteria for animal classification
  - 9.3 Diversity in Animals
    - 9.3.1 Invertebrates
    - 9.3.2 Vertebrates
- 10. FORM AND FUNCTIONS IN PLANTS**
  - 10.1 Nutrition in Plants
  - 10.2 Gaseous Exchange in Plants
  - 10.3 Transport in Plants
    - 10.3.1 Uptake of Water by Roots and Pathways
    - 10.3.2 Ascent of Sap
    - 10.3.3 Opening and Closing of Stomata
    - 10.3.4 Translocation of Organic Matter
  - 10.4 Homeostasis in Plants (Osmotic adjustments and Thermoregulation in Plants)
  - 10.5 Support in Plants (Support in Herbaceous and Woody Plants)
  - 10.6 Growth and Development in Plants
    - 10.6.1 Tissues for Growth – Apical and Lateral Meristems
    - 10.6.2 Primary and Secondary Growth
  - 10.7 Growth Responses in Plants
    - 10.7.1 Plant Growth Regulators (PRGs)
    - 10.7.2 Geotropism and Phototropism
    - 10.7.3 Photoperiodism
    - 10.7.4 Vernalization
- 11. DIGESTION**
  - 11.1 Digestive System of Man
    - 11.1.1 Alimentary Canal; Structural and Functional details
    - 11.1.2 Role of Accessory Glands (Liver and Pancreas)
  - 11.2 Disorders related to Digestive system and Food habits (Ulcer, Food Poisoning, Dyspepsia, Obesity, Anorexia Nervosa, Bulimia Nervosa)
- 12. CIRCULATION**
  - 12.1 Blood Circulatory System of Man
    - 12.1.1 Heart
      - 12.1.1.1 Structure of Heart
      - 12.1.1.2 Passage of Blood through Heart
      - 12.1.1.3 Heartbeat and its Control
      - 12.1.1.4 Electrocardiogram
    - 12.1.2 Blood Vessels (Arteries, Capillaries and Veins)

- 12.1.2.1 Vascular Pathway
- 12.1.2.2 Rate of Blood Flow in Blood Vessels
- 12.1.3 Blood Pressure and its Measurement
- 12.2 Cardiovascular Disorders
  - 12.2.1 Thrombosis
  - 12.2.2 Heart Problems
    - 12.2.2.1 Causes and Diagnosis (Angiography)
    - 12.2.2.2 Treatment (Coronary Bypass, Angioplasty, Open Heart Surgery) and  
Preventions
  - 12.2.3 Hypertension (Causes, Related Diseases and Preventions)
- 12.3 Lymphatic System of Man

13. **IMMUNITY**

- 13.1 First Line of Defense (Skin, Digestive Tract, Air Passageway)
- 13.2 Second Line of Defense – The Nonspecific Defenses
  - 13.2.1 Killing Cells of Blood
  - 13.2.2 Protective Proteins
  - 13.2.3 Inflammatory Response
  - 13.2.4 Temperature Response
- 13.3 Third Line of Defense – The Specific Defenses
  - 13.3.1 Inborn and Acquired immunity
  - 13.3.2 Cell mediated and Antibody mediated immunity
  - 13.3.3 Disorders of Immune system (Allergies, Autoimmune Diseases, Transplant  
Rejections)

12.1.3	Cardiovascular Disorders	12.1
12.1.3.1	Thrombosis	
12.1.3.2	Heart Failure	
12.2.1	Causes and Diagnosis (Angiography)	
12.2.2	Treatment (Coronary Bypass, Angioplasty, Open Heart Surgery) and	
12.2.3	Prevention	
12.2.3.1	Hypertension (Causes, Related Diseases and Prevention)	
12.2.3.2	Lymphatic System of Man	
<b>IMMUNITY</b>		
13.1	First Line of Defense (Skin, Digestive Tract, Air Passageway)	13
13.2	Second Line of Defense - The Non-specific Defenses	
13.2.1	Killing Cells of Blood	
13.2.2	Toxic Proteins	
13.2.3	Inflammatory Response	
13.2.4	Temperature Response	
13.3	Third Line of Defense - The Specific Defenses	
13.3.1	Innate and Acquired Immunity	
13.3.2	Cell mediated and Antibody mediated immunity	
13.3.3	Defects of immune system (Allergies, Autoimmune Diseases, Transplant	
	Rejection)	