SYLLABUS – 2024- 2025

CLASS – **XII**

SUBJECT – **BIOLOGY**

Total Marks – 70 **Practical - 30**

COURSE STRUCTURE

UNIT-VI : REPRODUCTION

Chapter-2: Sexual Reproduction in Flowering Plants

Flower structure; development of male and female gametophytes, pollination types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

Chapter-3: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis spermatogenesis and oogenesis; menstrual cycle, fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

UNIT-VII: GENETICS AND EVOLUTION

Chapter-5: Principles of Inheritance and Variation

Heredity and variation: Mendelian inheritance; deviations from Mendelism incomplete dominance, co- dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination in humans, birds and honey bee, linkage and crossing over, sex linked inheritance haemophilia, colour blindness; Mendelian disorders in humans thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Chapter-6: Molecular Basis of Inheritance

Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging: DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

Chapter-7: Evolution

Origin of life, biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy-Weinberg's principle; adaptive radiation; human evolution.

UNIT-VIII: BIOLOGY AND HUMAN WELFARE

Chapter-8: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

Chapter-10: Microbes in Human Welfare

Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicioususe.

UNIT-IX: BIOTECHNOLOGY AND ITS APPLICATIONS

Chapter-11: Biotechnology - Principles and Processes

Genetic Engineering (Recombinant DNA Technology).

Chapter-12: Biotechnology and its Applications

Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms - Bt crops; transgenic animals, biosafety issues, biopiracy and patents.

UNIT-X ECOLOGY AND ENVIRONMENT

Chapter-13: Organisms and Populations

Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth and death rate, age distribution. (Topics excluded: Organism and its Environment, Major Aboitic actors, Responses to Abioitic Factors, Adaptations)

Chapter-14: Ecosystem

Ecosystems: Patterns, components, productivity and decomposition; energy flow, pyramids of number, biomass, energy (Topics excluded: Ecological Succession and Nutrient Cycles).

Chapter-15: Biodiversity and its Conservation

Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

CLASS- XII
SUB- BIOLOGY

HALF-YEARLY EXAMINATION: 2024-2025
BLUE-PRINT OF DISTRIBUTION OF MARKS

Marks: 70

Chapters/ Unit	Topics 1 Mark	MCQ (1 Mark)	VSA (1 Mark)	SA-I (2 Marks)	SA-II (3 Marks)	LA-I (4 Marks)	LA-II (5 Marks)	Total Marks	Unit Total
VI. Reproduction	**Ch-2:** Sexual Reproduction in Flowering plants সপুষ্পক উদ্ভিদে যৌনজনন	1x1	1x1	2x1	3x1	4x1	-	11	28
	Ch-3: Human Reproduction মানুষের জনন	1x1	1x1	2x2	-	-	5x1	11	
	Ch-4: Reproductive Health জননগত স্বাস্থ্য	1x2	1x2	2x1	-	-	-	06	
VII. Genetics & Evolution	**Ch-5:** Principles of Inheritance & variation বংশানুসরণ ও প্রকরণের নীতিসমূহ	1x1	1x1	-	3x1	4x1	5x1	14	31
	Ch-6: Molecular Basis of Inheritance বংশগতির আনবিক ভিত্তি	1x2	1x1	2x1	3x1	4x1	-	12	
	Ch-7: Evolution বিবর্তন	1x2	1x1	2x1	-	-	-	05	
VIII. Biology & Human Welfare	**Ch-8:** Human Health and Diseases মানুষের স্বাস্থ্য ও রোগ	1x1	1x1	2x1	3x1	-	-	07	11
	Ch-10: Microbes in Human Welfare মানবকল্যাণে অনুজীব	-	1x2	2x1	-	-	-	04	
Total		**1x10 (10)**	**1x10 (10)**	**2x8 (16)**	**3x4 (12)**	**4x3 (12)**	**5x2 (10)**	**70 (37)**	**70**

CLASS- XII
SUB- BIOLOGY

PRE-BOARD/ BOARD FINAL EXAMINATION: 2024-2025

Unit	Title	Marks
VI	Reproduction (জনন)	**16**
VII	Genetics and Evolution (বংশগতি এবং বিবর্তন)	**20**
VIII	Biology and Human Welfare (মানবকল্যাণে জীববিদ্যা)	**12**
IX	Biotechnology and its Applications (জীবপ্রযুক্তিবিদ্যা এবং এর প্রয়োগ)	**12**
X	Ecology and Environment (বাস্তুবিদ্যা এবং পরিবেশ)	**10**
Total		**70**

CLASS- XII
SUB- BIOLOGY

PRE-BOARD/ BOARD FINAL EXAMINATION: 2024-2025

BLUE-PRINT OF DISTRIBUTION OF MARKS

Unit	Chapter	Topics 1 Mark	MCQ (1 Mark)	VSA (1 Mark)	SA-I (2 Marks)	SA-II (3 Marks)	LA-I (4 Marks)	LA-II (5 Marks)	Total Marks	Unit Total
VI	2	Sexual Reproduction in Flowering plants সপুষ্পক উদ্ভিদে যৌনজনন	1x1	1x1	-	-	4x1	-	6	16
	3	Human Reproduction মানুষের জনন	-	1x1	-	-	-	5x1	6	
	4	Reproductive Health জননগত স্বাস্থ্য	1x1	-	-	3x1	-	-	4	
VII	5	Principles of Inheritance & variation বংশানুসরণ ও প্রকরণের নীতিসমূহ	1x1	1x1	-	3x1	-	-	5	20
	6	Molecular Basis of Inheritance বংশগতির আনবিক ভিত্তি	1x1	-	-	3x1	-	5x1	9	
	7	Evolution বিবর্তন	1x1	1x1	2x2	-	-	-	6	
VIII	8	Human Health and Diseases মানুষের স্বাস্থ্য ও রোগ	-	1x1	2x1	-	4x1	-	7	12
	10	Microbes in Human Welfare মানবকল্যাণে অনুজীব	1x2	1x1	2x1	-	-	-	5	
IX	11	Biotechnology: Principle and Processes জীবপ্রযুক্তি বিদ্যা: মূলনীতি ও পদ্ধতিসমূহ	1x1	-	2x1	-	4x1	-	7	12
	12	Biotechnology and its Application জীবপ্রযুক্তি বিদ্যা ও এর প্রয়োগসমূহ	1x1	1x2	2x1	-	-	-	5	

X	13	Organisms and Population জীবসমূহ ও পপুলেশন বাস্তুতন্ত্র	-	1x1	-	3x1	-	-	4	10
	14	Ecosystem বাস্তুতন্ত্র	-	-	2x1	-	-	-	2	
	15	Biodiversity & Conservation জীববৈচিত্র্য এবং সংরক্ষণ	1x1	1x1	2x1	-	-	-	4	
Total			**1x10 (10)**	**1x10 (10)**	**2x8 (16)**	**3x4 (12)**	**4x3 (12)**	**5x2 (10)**	**70 (37)**	**70**

CLASS- XII
SUB- BIOLOGY

PRACTICALS

Time: 3 Hours Max. Marks: 30

Evaluation Scheme		Marks
One Major Experiment 5		**5**
One Minor Experiment 2& 3		**4**
Slide Preparation 1 & 4		**5**
Spotting		**7**
Practical Record + Viva voce	(Credit to the Students' work over the academic session may be given)	**4**
Attendance		**5**
	Total	**30**

A: List of Experiments

1. Prepare a temporary mount to observe pollen germination.
2. Study the plant population density by quadrat method.
3. Study the plant population frequency by quadrat method.
4. Prepare a temporary mount of onion root tip to study mitosis.
5. Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

B. Study and Observe the following (spotting):

1. Flowers adapted to pollination by different agencies (wind, insects, birds).
2. Pollen germination on stigma through a permanent slide or scanning electron micrograph
3. Identification of stages of gamete development, ie., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides (Mammalian).
6. Mendelian inheritance using seeds of different colour/sizes of any plant.
7. Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness.
8. Controlled pollination - emasculation, tagging and bagging.
9. Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides, models or virtual images or specimens. Comment on symptoms of diseases that they cause.
10. Models specimen showing symbolic association in root modules of leguminous plants, Cuscuta on host, lichens.
11. Flash cards models showing examples of homologous and analogous organs.

CLASS- XII
SUB- BIOLOGY

PRACTICAL EXAMINATION FOR VISUALLY IMPAIRED STUDENTS CLASS XII

EVALUATION SCHEME

Max. Marks: 30 Time: 02 Hours

Topic	Marks
Identification/Familiarity with the apparatus	**5**
Written test (Based on given / prescribed practicals)	**10**
Practical Records	**5**
Viva	**10**
Total	**30**

General Guidelines

▲ The practical examination will be of two hour duration. A separate list of ten experiments is included here.

▲ The written examination in practicals for these students will be conducted at the time of practical examination of all other students.

▲ The written test will be of 30 minutes duration.

▲ The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.

▲ A writer may be allowed to such students as per TBSE examination rules.

▲ All questions included in the question paper should be related to the listed practicals. Every question should require about two minutes to be answered.

▲ These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.

▲ The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.

▲ Questions may be generated jointly by the external/internal examiners and used for assessment.

▲ The viva questions may include questions based on basic theory/principle/concept, apparatus/ materials/chemicals required, procedure, precautions, sources of error etc.

A. Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)

Beaker, flask, petriplates, soil from different sites - sandy, clayey, loamy, small potted plants, aluminium foil, paint brush, test tubes, starch solution, iodine, ice cubes, Bunsen burner/spirit lamp/water bath, large flowers, Maize inflorescence, model of developmental stages highlighting morula and blastula of frog, beads/seeds of different shapes/size/texture Ascaris, Cactus/Opuntia (model).

B. List of Practicals

1. Study of flowers adapted to pollination by different agencies (wind, insects).

2. Identification of T.S of morula or blastula of frog (Model).

3. Study of Mendelian inheritance pattern using beads/seeds of different sizes/texture.

4. Preparation of pedigree charts of genetic traits such as rolling of tongue, colour blindness.

5. Study of emasculation, tagging and bagging by trying out an exercise on controlled pollination.

6. Identify common disease causing organisms like Ascaris (model) and learn some common symptoms of the disease that they cause.

7. Comment upon the morphological adaptations of plants found in xerophytic conditions.

Note: *The above practicals may be carried out in an experiential manner rather than recording observations.*