Punjab Board

SYLLABUS

2023-2024

BIOLOGY
(Code No. 054)
2023-24
CLASS-XII

Chapter 1 Sexual reproduction in flowering plants:
Flower structure; Development of male and female gametophytes; Pollination- types, agencies and examples; Outbreedings 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 2 Human Reproduction:
Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis-spermatogenesis & oogenesis; Menstrual cycle; Fertilisation, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).

Chapter 3 Reproductive health:

Need for reproductive health and prevention of sexually transmitted diseases {STD); Birth control - Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies-IVF, ZIFT, GIFT {Elementary ideas for general awareness}.

Unit II. Genetics and Evolution

Chapter 4 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, 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 5 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 and human genome project; DNA finger printing.

Chapter 6 Evolution:

Origin of life; Biological evolution and evidences for biological

evolution (Paleontological, Comparative anatomy, embryology and molecular evidence); 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 III. Biology and Human Welfare
Chapter 7 Human Health and Disease:

Pathogens/parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, dengue chickengunia, ring worm); Basic concepts of immunology-vaccines; Cancer, HIV and AIDS;

Adolescence, drug and alcochol abuse.

Chapter 8 Microbes in human welfare:

In household food processing, industrial production, sewage treatment, energy generation and Microbes as biocontrol agents and biofertilizers, Antibiotics- production.

Unit IV. Biotechnology and its applications

Chapter 9 Biotechnology: Principles and processes:

Genetic engineering (Recombinant DNA technology).

Chapter 10 Biotechnology and its applications

Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; genetically modified organisms-Bt crops; Transgenic Animals; Biosafety issues-Biopiracy and patents.

Unit V. Ecology and environment

Chapter 11 Organisms and populations

Organisms and environment: Habitat and niche; Population and ecological adaptations; Population interactions-mutualism, competition, predation, parasitism; Population attributes-growth, birth rate and death rate, age distribution.

Chapter 12 Ecosystem:

Patterns, components; productivity and decompositions; Energy flow; Pyramids of number, biomass, energy; Nutrients cycling (carbon and phosphorous); Ecological succession; Ecological Services-Carbon fixation, pollination, oxygen release.

Chapter 13 Biodiversity and Conservation:
Concepts of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries.

A. List of Experiments 60 Periods

1. Study pollen germination on *a* slide.
2. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity. Correlate with the kinds of plants found in them.

3. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organism.

4. Study the presence of suspended particulate matter in air at two widely different sites.

5. Study the plant population density by quadrat method.

6. Study the plant population frequency by quadrat method.

7. Prepare a temporary mount of onion root tip to study mitosis.

8. Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch.

9. Isolate DNA from available plant material such as spinach, green pea seeds, papaya etc.

B. Study/observation of the following (Spotting)

1. Flowers adapted to pollination by different agencies (wind, insects, birds).

2. Pollen germination on stigma through a permanent slide.

3. Identification of stages of gamete development, i.e., 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 or specimens. Comment on symptoms of diseases that they cause.

10. Two plants and two animals (models/virtual images) found in xeric conditions. Comment upon their morphological adaptations.

11. Two plants and two animals (models/virtual images) found in aquatic conditions. Comment upon their morphological adaptations.