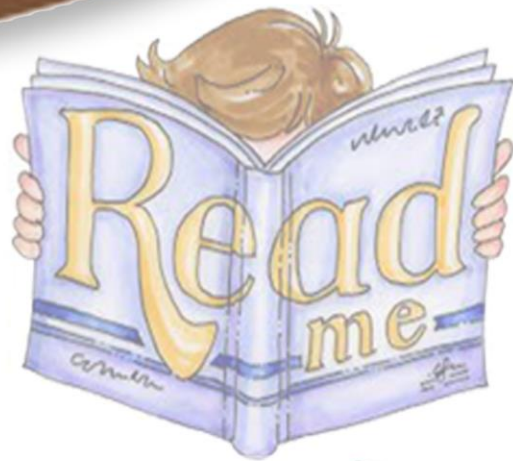


Syllabus



course syllabus



Preface

The present syllabus reinforces the ideas introduced in the lower classes while the students learn new concepts besides getting an exposure to contemporary areas of the subject. The syllabus also aims at emphasizing on the underlying principles that are common to both animals and plants as well as highlighting the relationship of biology with other areas of knowledge.

The format of the syllabus allows a simple, clear, consequential flow of concepts without any jarring jumps. The syllabus also stresses on the connection of the study of Biology to real life problems, use of biological discoveries/innovations in everyday life - in environment, industry, health and agriculture. The updated syllabus also focuses on reducing the curriculum load while ensuring that ample opportunities and scope for learning and appreciating basic concepts of the subject continue to be available within its framework.

The prescribed syllabus is expected to

- Promote understanding of basic principles of biology
- Encourage learning of emerging knowledge and its relevance to individual and society
- Promote rational/specific attitude to issues related to population, environment and Development
- Enhance awareness about environmental issues and problems and the appropriate solutions
- Create awareness amongst the learners about variations amongst the living, and developing respect for the diversities and to appreciate that the most complex biological phenomena are also built on essentially simple processes.

It is expected that the students would get an exposure to various branches

Class XII

One Paper Time: 3 Hours, Marks: 70

Unit	Topics	Marks
I	Reproduction	14
II	Genetics and evolution	18
III	Biology and human welfare	14
IV	Biotechnology and its applications	10
V	Ecology and environment	14
		70

UNIT I: Reproduction

Reproduction in organisms

Reproduction, a characteristic feature of all organisms for continuation of species; Asexual reproduction Modes of reproduction-Asexual and sexual reproduction; Modes-Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

Sexual reproduction in flowering plant

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 and fruit formation.

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).

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 idea for general awareness).

UNIT II: Genetics and evolution

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 disorder in humans - Thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

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.

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

Health and Disease

Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology - vaccines; Cancer, HIV and AIDs; Adolescence, drug and alcohol abuse.

Improvement in food production

Plant breeding, tissue culture, single cell protein, Biofortification, Apiculture and Animal husbandry.

Microbes in human welfare

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

UNIT IV: Biotechnology and its application

Principles and process of biotechnology:

Genetic engineering (Recombinant DNA technology).

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

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.

Ecosystems

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

Biodiversity and its conservation

Concept 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.

Environmental issues

Air pollution and its control; Water pollution and its control; Agrochemicals and their effects; Solid waste management; Radioactive waste management; Greenhouse effect and global warming; Ozone depletion; Deforestation; Any three case studies as success stories addressing environmental issues..

Practical

Time: 3 Hours

Marks: 30, 60 Periods

Topics	Marks
1. Experiments and spotting	20
2. Record of one investigatory project and Viva based on the project	5
3. Class record and Viva based on experiments	5
	30

List of experiments

1. Dissect the given flower and display different whorls. Dissect anther and ovary to show number of chambers.
2. Study pollen germination on a slide.
3. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity of soil. Correlate with the kinds of plants found in them.

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4. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organisms.
 5. Study the presence of suspended particulate matter in air at the two widely different sites.
 6. Study of plant population density by quadrature method.
 7. Study of plant population frequency by quadrature method.
 8. Prepare a temporary mount of onion root tip to study mitosis
 9. To study the effect of the different temperatures and three different pH on the activity of salivary amylase on starch.

Study/observation of the following (Spotting)

1. Study of flowers adapted to pollination by different agencies (wind, insect)
2. Study of pollen germination on stigma through a permanent slide.
3. Study and identify stages of gamete development i.e. T.S. testis and T.S. ovary through permanent slides. (from any mammal)
4. Study meiosis in onion bud cell or grass hopper testis through permanent slide.
5. Study of T.S. of blastula through permanent slide.
6. Study Mendelian inheritance using seeds of different colour/size of any plant.
7. Study prepared pedigree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, and colour blindness.
8. Exercise on controlled pollination-Emasculation, tagging and bagging.
9. To identify common disease causing organisms like *Ascaris*, *Entamoeba*, *Plasmodium*,
10. Ringworm through permanent slide or specimen. Comment on symptoms of diseases that they cause.
11. Study two plants and two animals found in xerophytic condition. Comment upon their adaptations/morphological.
12. Study plants and animals found in aquatic conditions. Comment upon their adaptations/morphological.

Recommended Textbooks

A text book in Biology, published by NCERT