

BIOLOGY

(Code No. 044)

CLASS – XII (2021-22)

RATIONALE:

The present curriculum provides the students with updated concepts along with an extended exposure to contemporary areas of the subject. The curriculum also aims at emphasizing the underlying principles that are common to animals, plants and microorganisms as well as highlighting the relationship of Biology with other areas of knowledge. The format of the curriculum allows a simple, clear, sequential flow of concepts. It relates the study of biology to real life through the use of technology. It links the discoveries and innovations in biology to everyday life such as environment, industry, health and agriculture. The updated curriculum focuses on understanding and application of scientific principles, while ensuring that ample opportunities and scope for learning and appreciating basic concepts continue to be available within its framework.

OBJECTIVES:

- promote understanding of basic principles of Biology
- encourage learning of emerging knowledge and its relevance to individual and society
- promote rational/scientific attitude towards issues related to population, environment and development
- enhance awareness about environmental issues, problems and their appropriate solutions
- create awareness amongst the learners about diversity in the living organisms and developing respect for other living beings
- appreciate that the most complex biological phenomena are built on essentially simple processes

It is expected that the students would get an exposure to various branches of Biology in the curriculum in a more contextual and systematic manner as they study its various units.

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COURSE STRUCTURE

CLASS XII (2021 - 22)

EVALUATION SCHEME		
Theory		
Units	Term – I	Marks
VI	Reproduction: Chapter - 2, 3 and 4	15
VII	Genetics and Evolution: Chapter – 5 and 6	20
Units	Term - II	Marks
VIII	Biology and Human Welfare: Chapter – 8 and 10	14
IX	Biotechnology and its Applications: Chapter – 11 and 12	11
X	Ecology and Environment: Chapter – 13 and 15	10
Total Theory (Term – I and Term – II)		70

Practicals Term – I	15
Practicals Term – II	15
Total	100

PRACTICALS

Max. Marks: 15 for each Term

Evaluation Scheme			
	TERM – I	TERM – II	MARKS
Part A			
One Major Experiment	Experiment No. – 1	Experiment No. – 3	4
One Minor Experiment	Experiment No. – 2	Experiment No. – 4, 5	3
Part B			
Spotting (3 Spots of 1 mark each)	Experiment- i,ii,iii,iv,v	Experiment- vi,vii.	3
Practical Record + Investigatory Project & Record + Viva Voce			5
Total			15

Practical should be conducted alongside the concepts taught in theory classes.

THEORY

TERM - I

Unit-1

Chapter-2: Sexual Reproduction in Flowering Plants

Keyword: vegetative reproduction, juvenile phase, senescent phase, dioecious, monoecious, pericarp, syngamy, meiocyte.

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; outbreeding 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.

Practical; Exp 1): Prepare a temporary mount to observe pollen germination.

Exp i); Flowers adapted to pollination by different agencies (wind, insects, birds).

Activity; Collect unisexual and bisexual flowers of any three species.

Unit-2

Chapter-3: Human Reproduction

Keywords: Human reproduction, testis, ovary, gametogenesis, spermatogenesis, oogenesis, follicular atresia, menarche, ovulation, menopause, cleavage, implantation.

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

Keywords; Reproductive health, contraception, contraceptive devices, venereal diseases.

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).

Practical; Exp ii); Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).

Exp iii); Meiosis in onion bud cell or grasshopper testis through permanent slides.

Exp iv); T.S. of blastula through permanent slides (Mammalian).

Activity; Draw diagram to show various stages of menstrual cycle.

Unit-3

Chapter-5: Principles of Inheritance and Variation

Keywords: Heredity, Variations, Alleles, Phenotype, Genotype, Homozygote, Heterozygote,

Dominant allele, Recessive allele, Pleiotropy, Multiple allelism, Co dominance, Monohybrid, Dihybrid.

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 human being, 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.

Practical; Exp v); Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colourblindness.

Activity ; Prepare family tree to show the inheritance of blood group in your family.

Unit-4

Chapter-6: Molecular Basis of Inheritance

Keywords: Replication, ori of replication, Nucleosome, Transcription, Replication fork.

Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription,

Practical; Exp 2; Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

Unit-5

Chapter-6: Molecular Basis of Inheritance

Keywords: Translation, Silent mutations, Frame shift mutation, Operon, DNA probe.

genetic code, translation; gene expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

Activity; Draw diagram to explain salient features of genetic code.

TERM - II

Unit-6

Chapter-8: Human Health and Diseases

Keywords: Pathogens, antibodies, antigens, immunity, interferons, allergy, cancer, metastasis, tumours, retroviruses, drug abuse, adolescence, addiction.

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.

Practical; Exp 3; Prepare a temporary mount of onion root tip to study mitosis.

Exp vi); Common disease - causing organisms like *Ascaris*, *Entamoeba*, *Plasmodium*, any fungus causing ringworm through permanent slides, models or virtual images.

Comment on symptoms of diseases that they cause.

Activity; Symptoms and preventive measures of covid19.

Unit-7

Chapter-10: Microbes in Human Welfare

Keywords: Plant breeding, germplasm, apiculture, somaclones, explant, implant, plant tissue culture, biofortification Prions, fermentors, Flocs, antibiotics, biogas, Baculo viruses .

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

Practical. Exp 4; Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organism

Unit-8

Chapter-11: Biotechnology - Principles and Processes

Keywords: Transgenic, gene cloning, plasmid, recombinant DNA, recognition site, palindromes, Genetic Engineering (Recombinant DNA Technology).

Activity; Draw diagram to explain the concept of recombinant DNA technology.

Chapter-12: Biotechnology and its Application

Keywords: Humulin, vaccine, electroporation, gene therapy, microinjection, gene gun.

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.

Activity; Assignment on 'Role of Biotechnology in human health'

Unit-9

Chapter-13: Organisms and Populations

Keywords: Habitat, Niche, ecosystem, Birth rate, Mortality rate, Primary succession, climax community, obligate parasites 10% law, Mutualism.

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.

Practical; Exp 5; 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.

Unit-10

Chapter-15: Biodiversity and its Conservation

Keyword: Biodiversity hotspots, endangered animals, Biosphere e-waste, Nuclear waste, Aforestation, Ozone depletion, Global warming, sacred forests, Cryopreservation

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.

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

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

Activity; Prepare a list of Ramsar sites and Sacred grooves near you.

Assessment Areas (Theory) 2021-22 Class XII

Biology (044)

Competencies	
Demonstrate Knowledge and Understanding	50%
Application of Knowledge / Concepts	30%
Analyse, Evaluate and Create	20%

Note:

- Internal choice would be provided.

Suggestive verbs for various competencies

- **Demonstrate, Knowledge and Understanding**
State, name, list, identify, define, suggest, describe, outline, summarize, etc.
 - **Application of Knowledge/Concepts**
Calculate, illustrate, show, adapt, explain, distinguish, etc.
 - **Analyse, Evaluate and Create**
Interpret, analyse, compare, contrast, examine, evaluate, discuss, construct, etc.
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