BIOLOGY

(Code No. 044)

CLASS – XI (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 of teaching Biology

- 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.

BIOLOGY (Code No. 044)
COURSE STRUCTURE
CLASS XI (2021 -22)

EVALUATION SCHEME		
Theory		
Units	**Term – I**	**Marks**
I	Diversity of Living Organisms: Chapter - 1, 2, 3 and 4	15
II	Structural Organization in Plants and Animals: Chapter – 5 and 7	08
III	Cell: Structure and Function: Chapter – 8 and 9	12
Units	**Term – II**	**Marks**
III	Cell: Structure and Function: Chapter – 10	05
IV	Plant Physiology: Chapter - 13,14 and 15	12
V	Human Physiology: Chapter –17, 18, 19, 20, 21 and 22	18
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	**4**
One Minor Experiment	Experiment No. – 2	Experiment No. - 5, 6, 7	**3**
Part B			
Spotting (3 Spots of 1 mark each)	B1,B2,B3	B4,B5	**3**
Practical Record + Investigatory Project& Record + Viva Voce			**5**
Total			**15**

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

THEORY

Term – I

UNIT WISE SYLLABUS

Unit-I **Marks:7**

Chapter-1: The Living World

Key Words: Biodiversity, Flora, Fauna, Classification Taxonomy, Taxon, Species,

What is living? Biodiversity; Need for classification; three domains of life; concept of species and taxonomical hierarchy; binomial nomenclature.

Chapter-2: Biological Classification

Key Words : Classification, Monera, Lichens, Mycorrhiza Symbiosis, Phycobiont, Mycobiont, Retrovirus, Viroids.

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids.

Practical; Exp B1: Parts of a compound microscope.

Exp B2: Specimens/slides/models and identification with reasons - Bacteria, *Oscillatoria,Spirogyra, Rhizopus*, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.

Activity; Study of biodiversity around your neighborhood and prepare a herbarium file.

Unit-2 **Marks:8**

Chapter-3: Plant Kingdom

Key Words: Chlorophyceae, Phaeophyceae, Rhodophyceae, Peat moss, Sporophylls, Antheridium,

Salient features and classification of plants into major groups - Algae, Bryophyta, Pteridophyta and Gymnospermae. (salient and distinguishing features and a few examples of each category).

Chapter-4: Animal Kingdom

Key Words : Chordates, Non chrodates, Vertebrates, Invertebrate Symmetry, coelom, Metameric segmentation, Oviparous, Viviparous.

Salient features and classification of animals, non-chordates up to phyla level and chordates up to class level (salient features and distinguishing features of a few examples of each category). (No live animals or specimen should be displayed.)

Practical; Exp B3: Virtual specimens/slides/models and identifying features of - *Amoeba, Hydra,* liverfluke, *Ascaris*, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.

Activity- Collect plant specimen each from following divisions such as algae,pteridophytes,bryophytes,gymnosperms and angiosperms present around your neighbourhood.

Unit-3 **Marks: 8**

Chapter-5: Morphology of Flowering Plants

Key Words : Morphology, Parenchyma, Collechyma, tapel,monoadelphus,diadelphus.

Morphology of inflorescence and flower, Description of 01 family: Solanaceae or Liliaceae (to be dealt along with the relevant experiments of the Practical Syllabus).

Chapter-7: Structural Organization in Animals

Key Words : Tissues, Muscles, Striated and Non striated muscles cardiac muscles, Neuron.

Animal tissues.

Practical; Exp1: Study and describe a locally available common flowering plant, from any one family: Solanaceae or Liliaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams).

Activity- Take 5 flowers available in your locality and list the type of aestivation each of the following possess with well labeled diagrams.

Unit-4 **Marks : 6**

Chapter-8: Cell-The Unit of Life

Key Words : Prokaryotic and Eukaryotic cell, cytoplasm Middle lamella, cytoskeleton, Semiautonomous, Autophagosome,chromosome, chromatids, centromere.

Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant

cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system, endoplasmic reticulum, golgi bodies, lysosomes, vacuoles, mitochondria, ribosomes, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus.

Practical; Exp2: Study of osmosis by Potato osmometer.

Activity- Explanation of each organelle to be demonstrated by the students in the class using white board.

Unit-5 **Marks:6**

Chapter-9: Biomolecules

Key Words : Biomolecules, Macromolecules, Micromolecules, Saccharides, Polypetide, Nucleic acids, Enzymes, Activation energy, cofactors.

Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzymes- types, properties, enzyme action.

Activity- Make a table of 20 amino acids categorized in essential and non essential amino acids with their abbreviations.

Term – II

Unit-6 **Marks: 9**

Chapter-10: Cell Cycle and Cell Division

Key Words : Cell division, Equational division, ,Reductional division, Spindle apparatus, Karyokinesis, cytokinesis.

Cell cycle, mitosis, meiosis and their significance

Chapter-13: Photosynthesis in Higher Plants

Key Words : Photosynthesis, Photosystem, Photophosphorylation, Kranz anatomy, chemiosmotic hypothesis.

Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C3 and C4 pathways; factors affecting photosynthesis.

Practical ; Exp3: Separation of plant pigments through paper chromatography.

Exp4: Study of distribution of stomata in the upper and lower surfaces of leaves.

Exp B5: Mitosis in onion root tip cells and animal cells (grasshopper) from permanent slides.

Activity- Prepare a flowchart on light and dark reactions in photosynthesis.

Unit-7 **Marks : 8**

Chapter-14: Respiration in Plants

Key Words : Aerobic and Anaerobic respiration, Fermentation Glycolysis, Amphibolic, Respiratory quotient.

Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient.

Chapter-15: Plant - Growth and Development

Key Words : Growth development, Differentiation, Hormones, Inhibitors Stress hormone, Dormancy, Vernalisation, Photoperiodism.

Growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA.

Practical; Exp3: Study of the rate of respiration in flower buds/leaf tissue and germinating seeds.

Activity- Process of fermentation in brewing industry.

Unit-8 **Marks : 6**

Chapter-17: Breathing and Exchange of Gases

Key Words : Breathing, Respiration, Trachea, Alveoli, Tidal volume, Residual volume, Total lung capacity.

Respiratory organs in animals (recall only); Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volume; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.

Chapter-18: Body Fluids and Circulation

Key Words : Circulation, Coagulation, Value, Heart beat, cardiac cycle, stroke volume, Heart sounds.

Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

Activity- Show the mechanism of blood pressure by hand-on demonstration.

Unit-9 **Marks : 6**

Chapter-19: Excretory Products and their Elimination

Key Words : Excretion, Osmoregulation, Malpighian body, Malpighian tubule, Nephron, Amonotelism, Ureotelism and Uricotelism, Haemodialysis.

Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system – structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH and diabetes insipidus; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney, Kidney transplant.

Chapter-20: Locomotion and Movement

Key Words : Locomotion, Movement, Skeletal Muscle, Smooth muscle Myofibril, Sacromere, Sacroplasmic reticulum, Tetanus, Arthritis

Skeletal muscle, contractile proteins and muscle contraction.

Practical; Exp4; Test for presence of sugar in urine.

Exp5: Test for presence of albumin in urine.

Exp B5: Tissues and diversity in shape and size of animal cells (squamous epithelium, smooth,skeletal and cardiac muscle fibers and mammalian blood smear) through temporary/permanent slides.

Activity- Prepare a poster that encourages organ donation.

Unit-10 **Marks : 6**

Chapter-21: Neural Control and Coordination

Key Words : Neuron, Resting potential, Action potential, Polarised, Depolarised, Impulse, Reflex action, Sensory and motor neuron, Blind spot, yellow spot, Rods and cones.

Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral nervous system; generation and conduction of nerve impulse.

Chapter-22: Chemical Coordination and Integration

Key Words: Endocrine gland, Exocrine gland, Hormone, Hyperglycemia, Hypoglycemia, Diabetes, Testes, Ovary.

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, gonads; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.

Note: Diseases related to all the human physiological systems to be taught in brief.

Activity- Prepare a chart on the endocrine glands with associated hormones and its major functions.

Assessment Areas (Theory) 2021-22Class XI

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.

- **Analyze, Evaluate and Create**

  Interpret, analyse, compare, contrast, examine, evaluate, discuss, construct, etc.
