BIOLOGY

THEORY
COURSE STRUCTURE
CLASS : XI

One Paper **Time : 3 Hours** **70 Marks**

Unit	Topics	Marks
I.	Diversity of Living Organisms	07
II.	Structural Organisation in Plants and Animals	12
III.	Cell: Structure and Function	15
IV.	Plant Physiology	18
V.	Human Physiology	18
	Total =	**70**

Unit-I: Diversity of Living Organisms **25 Periods**

Chapter-1: The Living World

What is living? Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature; tools for study of taxonomy-museums, zoological parks, herbaria, botanical gardens.

Chapter-2: Biological Classification

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

Chapter-3: Plant Kingdom

Salient features and classification of plants into major groups - Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms; Angiosperms - classification upto class, characteristic features and examples; Plant life cycles and Alternation of generations.

Chapter-4: Animal Kingdom

Basis of classification; Salient features and classification of animals: non-chordates upto phyla level and chordates upto class level.

Unit-II : Structural Organisation in Plants and Animals **25 Periods**

Chapter-5: Morphology of Flowering Plants

Morphology and modifications of root, stem and leaf; Morphology of inflorescence, flower and seed; semi technical description of a typical flowering plant; description of Fabaceae, Solanaceae and Liliaceae.

Chapter-6: Anatomy of Flowering Plants

Tissues and tissue system; anatomy of dicotyledonous and monocotyledonous plants; secondary growth.

Chapter-7: Structural Organisation in Animals

Animal tissues; organ and organ systems; morphology and anatomy of earthworm, cockroach and frog.

Unit-III: Cell- Structure and Function **40 Periods**

Chapter-8: Cell-The Unit of Life

What is a cell? Cell theory; an overview of a cell; structure and function of prokaryotic and eukaryotic cells.

Chapter-9: Biomolecules

Analysis of chemical composition; Primary and Secondary Metabolites; Structure and function of Biomacromolecules: Proteins, Polysaccharides, Lipids and Nucleic acids.
Metabolism: Concept; metabolic basis for living; the living state.
Enzymes: Properties; mechanism of enzyme action; factors affecting enzyme activity; classification and nomenclature; co-factors

Chapter-10: Cell Cycle and Cell Division

Cell cycle, mitosis, meiosis and their significance.

Unit-IV: Plant Physiology **45 Periods**

Chapter-11: Transport in Plants

Means of different types of transport; Plant water relations: water potential, osmosis, plasmolysis, imbibition; long distance transport of water: types and mechanism of absorption of water; mechanism of movement of water up a plant; Transpiration and guttation; mechanism of uptake and transport of mineral nutrients and food.

Chapter-12: Mineral Nutrition

Essential minerals, macro and micronutrients and their role; deficiency symptoms; mineral toxicity;elementary idea of hydroponics as a method to study mineral nutrition; nitrogen metabolism,nitrogen cycle, biological nitrogen fixation- symbiotic and non-symbiotic.

Chapter-13: Photosynthesis in Higher Plants

Photosynthesis as a mean 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 C4pathways; factors affecting photosynthesis.

Chapter-14: Respiration in Plants

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

Growth: characteristic; phases of plant growth; growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinins, ethylene, ABA; seed dormancy;vernalisation; photoperiodism.

Unit-V: Human Physiology 45 Periods

Chapter-16: Digestion and Absorption

Alimentary canal and digestive glands, role of digestive enzymes and gastrointestinal hormones;Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats; calorific values of proteins, carbohydrates and fats; egestion; nutritional and digestive disorders - PEM,indigestion, constipation, vomiting, jaundice, diarrhoea.

Chapter-17: Breathing and Exchange of Gases

Respiratory organs in animals; 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 respiratorydisorders.

Chapter-18: Body Fluids and Circulation

Composition of blood, blood groups- ABO and Rh, 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.

Chapter-19: Excretory Products and Their Elimination

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.

Chapter-20: Locomotion and Movement

Types of movement - ciliary, flagellar, muscular; skeletal muscle- contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal system -myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

Chapter-21: Neural Control and Coordination

Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral nervous system; generation and conduction of nerve impulse; reflex action; sensory perception; sense organs; elementary structure and functions of eye and ear.

Chapter-22: Chemical Coordination and Integration

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.

BIOLOGY

(PRACTICAL)

CLASS-XI

Time : 3 Hours **Marks : 30** **Periods : 60**

1.	Experiments and spotting	**20 Marks**
2.	Record of one investigatory Project and Viva based on the Project.	**5 Marks**
3.	Class-record and Viva based on the experiments.	**5 Marks**
	Total =	**30 Marks**

A. List of Experiments.

1. Study and describe three locally available common flowering plants from each of the following families (Solanaceae, Fabaceae and Liliaceae) including dissection and display of floral whorls and anther and ovary to show number of chambers. Types of root (Tap and Adventitious); Stem (Herbaceous and woody); Leaf (arrangement, shape, venation, simple and compound).
2. Preparation and study of T.S. of dicot and monocot roots and stems (primary).
3. Study of osmosis by Potato osmometer.
4. Study of Plasmolysis in epidermal peels (e.g. Rhoeo leaves).
5. Study of distribution of stomata in the upper and lower surface of leaves.
6. Comparative study of the rates of traspiration in the upper and lower surface of leaves.
7. Tests for the presence of sugar, starch, proteins and fats. To detect them in suitable plant and animal materials.
8. Separation of plant pigments through paper chromatography.
9. To study the rate of respiration in flower buds/leaf tissues and germinating seeds.
10. To test the presence of urea in urine.
11. To detect the presence of sugar in urine/blood sample.
12. To detect the presence of albumin in urine.
13. To detect the presence of bile salts in urine.

B. Study/observation of the following (spotting)

1. Study parts of a compound microscope.
2. Study of the specimens and identification with reasons–Bacteria, Oscillatoria, Spirogyra, Rhizopus, Mushroom, Yeast, Liverwort, Moss, Fern, pines, one monocotyledonous plant and one dicotyledonous plant and one lichen.
3. Study of specimens and identification with reasons - Amoeba, Hydra, Liverfluke, Ascaris, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, Rohu, frog, lizard, pigeon and rabbit.
4. Study of tissues, and diversity in shapes and sizes of plant and animal cells (e.g. palisade cells, guard cells, parenchyma, collenyma, sclerenchyma, Xylem, Phloem, Sqamous epithelium, muscle fibres and mammalian blood smear) through temporary/permanent slides.
5. Study of mitosis in onion root tip cells and animal cells (grasshopper) from permanent slides.
6. Study of different modifications in root, stem and leaves.
7. Study and identification of different types of inflorescences.
8. Study of imbibitions in seeds/raisin.
9. Observation and comments on the experimental set up for showing :
   (a) Anaerobic respiration.
   (b) Phototropism.
   (c) Apical bud removal.
   (d) Suction due to transpiration.
10. To study human skeleton and different types of joints.
11. Study of external morphology of earthworm, cockroach and frog through models.

PRESCRIBED TEXTBOOKS : CLASS XI

1. Biology Text Book for Class XI
Published by : The Council of Higher Secondary Education, Manipur with copy right from the NCERT, New Delhi.

REFERENCE BOOKS :

1. A Textbook of Biology Book-I
by : R.C. Rajkhowa
Published by: Macmillan Publishers India Pvt. Ltd.

2. Elementary Biology Vol. I
By : K.N. Bhatia and M.P. Tyagi
Published by : Trueman Book Company, Jalandhar - 144 008.

3. Frank Senior Secondary Biology Practicals for Class XI (New Edition)
By Y.P. Purang & Vinay Kumar
Published by : Frank Bros & Co., (Publishers) Ltd., New Delhi - 110 002

4. Comprehensive Laboratory Manual in Biology for Class XI
By : Dr. J.P. Sharma
Published by : Laxmi Publications (P) Ltd., New Delhi - 110 002.

5. Biology Practical for Classes XI and XII
By : O. Binodkumar Singh
Published by : Students' Emporium

6. Practical Manual in Biology Class XI
By : Cinny Malhotra
Published by Dinesh & Co., Jalandhar - 144 008.

7. Modern Biology Vol. I
By : Veer Bala Rastogi & B. Kishore
Published by : Pitambar Publishing Company, New Delhi.

8. A Text Book of Biology for Class XI
By : P.S. Dhami and H.N. Shrivastava & G. Chopra
Published by : Pradeep Publications, Jalandhar - 144 008.

9. Companion Biology for Class XI
By : K. Bhatti.
Published by : S. Dinesh & Co. Jalandhar - 144 008.

10. Modern's abc of Biology for Class XI
By : Dr. B.B. Arora and Ashok Sabharwal
Published by : Modern Publishers, Jalandhar City.

11. A Textbook of Biology Practical Class XI
By: N. Mohendra Singh
Published by: Writers' Book Store,
Paona Bazar, Polo Ground Maning, Imphal.

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