

BIOLOGY

Grade: XII

Full Marks: 100 (75t + 25p)

Teaching Hours: 150

1. Introduction

Biology for Grade XII builds on the foundation of Biology and seeks to widen student's knowledge and practical understanding of the life process. It inculcates theoretical understanding, practical work out and analytical thinking. This course is designed to make the students better prepared for further studies in biological sciences.

2. General Objectives

The general objectives of this course are:

- a) To provide the concept of biology and encourage the learners to use the knowledge in day to day life
- b) To make the learners aware of the present development in the biological science with reference to genetics , physiological and human biology ,and
- c) To prepare the students to take up advanced studies in biology at university level and encourages learners to be familiar with elementary knowledge of biotechnology and to work in the field of health, agriculture and industrial sectors

3. Specific Objectives

On completion of the course, the students will be able to

- i. Describe the plant and animal tissue and anatomy structure of higher plants as well as their functional processes;
- ii. Explain the developmental processes of typical plant and animal types;
- iii. Explain the structure of human body-organs and systems;
- iv. Discuss the role of hormones controlling various organs;
- v. Describe common and socially significant human diseases;
- vi. Explain elementary genetics and its use in some technical fields; and
- vii. Describe the application of biology in health, agriculture and various industrial sectors.

BIOLOGY

Course Content

Section A (Botany)

Teaching hour: 75

Full marks: 37.5

Unit-1: Anatomy and Physiological of Organisms

- **Plant anatomy:** Types of tissues, meristematic and permanent tissues; Internal structure of dicot and monocot root, stem and leaf; Secondary growth of dicot stem.
- **Plant physiological:**
 - i. **Water relation:** Osmosis, diffusion, ascent of sap transpiration.
 - ii. **Photosynthesis:** Site of photosynthesis, mechanism and factors affecting photosynthesis
 - iii. **Respiration:** Types of respiration, mechanism and factors affecting respiration
 - iv. **Growth:** Plant growth hormones: Auxins, Gibberellin, Cytokine
 - v. **Plant movement:** Concept of growth and turgor movement.

Unit-2 : Genetics

Elements of heredity and variation; Genetic material (DNA and RNA), Genetic code, Gene pool, Genetic expression and its regulation; Basis of Mendelian genetics, Mendel's laws of inheritance, Concept of incomplete dominance and co-dominance, Multiple gene, Linkages, Crossing over, Mutation and its types and polyploidy. Sex- linked inheritance (X-linked gene for eye colour of Drosophila and colour blindness in man)

Unit-3: Developmental Biology

Reproduction and development of angiosperms – Asexual reproduction , Pollination, Development of male and female gametophyte , Fertilization and development of embryo (dicot and monocot)

Unit -4: Application of Biology

- Introduction to biotechnology , tissue culture, concept of breeding technique,
- Disease resistance plants, green manures
- Genetic engineering and its application

Unit wise weightage for Botany Grade XII

Title	Teaching hour	Marks	Types of questions asked in the examination		
			Very short question (1 mark)	Short questions (3 marks)	Long questions (7.5 or 8 marks)
1. Anatomy and Physiology of organisms	27	13.5	3	1 or 1 opt	1 or 1 opt (7.5 or marks)
2. Genetics	32	15	1 or 1 opt	2 or 1 opt	1 (18 marks)
3. Developmental Biology	10	5	2 or 1 opt	1	X
4. Application of Biology	8	4	1 or 1 opt	1	X
	75	37.5	7 quest. x 1 mark	5 quest. X 3 marks	2 quest. 7.5 marks & 8 marks
			Total 7 marks	Total 15 marks	Total 15.5 marks

Format of question model for biology Grade XII

Section A (Botany)

1) Answer in very short; any seven
Total question to be asked – 10

1 mark * 7 quest = 7 marks

2) Describe in brief; any five
Total questions to be asked -7

3 marks * 5 quest = 15 marks

3) Long answer questions (two questions)
one question is given as option as "or"

8 marks + 1.5 marks = 15.5 marks

Total = 37.5 mark

Note:

1. There will be separate answer sheets for section A (botany) and section B (Zoology)
2. Total exam time period of theory will be 3 hrs. For both the sections A and B.
3. Concerned examiners will evaluate both the papers separately
4. The pass marks is 27. The students must pass in Botany and Zoology jointly.

Time schedule for questions

Very short questions – 1 mark - maximum 1 min

Short questions- 3 marks -maximum 7-8 min

Long question- 8 or 7.5 marks – maximum 23-24 min

Course Content

Section A (Zoology)

Teaching hour: 75

Full marks: 37.5

Unit -1: Animal Tissues

Epithelial; connective, muscular and nervous tissues

Unit-2 : Developmental Biology

- i. **Development of frog:** Fertilization, cleavage, morulation, blastulation, gastrulation, formation of germinal layers, coelom and tissue formulation.
- ii. Gametogenesis in animal.

Unit-3 : Human Biology And health

- Nutrition; digestive organs and digestion of food.
- Respiratory organs and mechanism.
- Circulation: Blood, heart and its action , arterial and venous systems (Major arteries and veins), Blood groups, Rh-factor, Blood pressure and lymph (Definition)
- Excretion: Excretory organs, mechanism of urine formation, osmoregulation and homeostatic mechanism (temperature regulation, kidney and liver control system).
- Nervous co-ordination: Types of nervous system, structure and function of brain, Transmission of nerve impulse.
- Endocrinology: Structures, function and disorders of pituitary, thyroid, parathyroid, pancreas and adrenal glands.
- Sense organs: Structure and functions and disorders of pituitary, thyroid, parathyroid, pancreas and adrenal glands.
- Sense organs: Structure and function of eye and ear
- Human population: Growth , problem and control strategies
- Human Diseases:
 - a) Socially significant: Drug abuse, alcoholism and smoking
 - b) Communicable : Typhoid, Tuberculosis, Ascariasis and AIDs
 - c) Non-communicable: Cancer
 - d) Concept of malaria and hepatitis

Unit-4 : Application of Biology

- Antibiotics vaccines
- Tissue and organs transplantation
- Test-tube baby
- Introduction to poultry farming and fish farming

Zoology Practical Grade XII

1. Experiments of biochemistry

- a) Experiment to demonstrate the action of saliva on starch
 - b) Experiment to detect the presence of starch in a given solution.
 - c) Experiment to detect the presence of sugar in urine
 - d) Experiment to detect the presence of protein in a given solution (hen's albumen)
 - e) Study the effect of temperature, ethyl alcohol, and pH on enzymatic action of saliva.
 - f) Measurement of human blood-pressure with sphygmomanometer.
2. *Study the permanent slides of different types of animal tissues:*
Squamous, columnar, cuboidal, areolar, adipose, hyaline and bone
 3. *Study the permanent slides of following histological organs of mammal:*
Skin, stomach, intestine, liver, pancreas, kidney, lung, testis and ovary
 4. Study the bones of rabbit (Articulate and disarticulate) or models of human bones.
 5. Study of embryological permanent slides of frog : Cleavage, Blastula and gastrula
 6. Dissection of a mammal so as to expose its:
 - i. General anatomy
 - ii. Alimentary canal;
 - iii. Arterial and venous systems;
 - iv. Brain;
 - v. Reproductive organs.

Botany Practical Grade XII

1. Experiments on plant physiology

- a) Experiment to demonstrate the process of osmosis
 - b) Experiment to demonstrate the process of ascent of sap
 - c) Experiment to demonstrate the unequal transpiration from two surfaces of dorsiventral
 - d) Experiment to demonstrate that the chlorophyll is essential for photosynthesis
 - e) Experiment to demonstrate the rate of transpiration by Ganong's photometer
 - f) Experiment to demonstrate that the carbon dioxide is essential for photosynthesis
 - g) Experiment to demonstrate the process of evolution of oxygen during photosynthesis
 - h) Experiment to demonstrate the aerobic and anaerobic respiration
 - i) Study on effect of growth hormones on germination and shoot elongation
 - j) Demonstration of plant tissue culture
 - k) Demonstration of yeast culture
 - l) Preparation of DNA control
2. **Demonstration of Mendelian Genetics using maize cob:**
 - I. To demonstrate segregation of characters in a monohybrid cross
 - II. To demonstrate independent assortment of characters in a dihybrid cross

3. Study the permanent slides of different types of simple , permanent and complex plant tissues
4. Demonstration of vegetative propogation
5. Study the permanent slides of
 - i. TS on anther
 - ii. L.S of ovule of dicot plant
 - iii. Structure of embryo
6. Preparation of temporary slide of following plant materials
 - i. T.S of dicot root, stem and leaf
 - ii. T.S of monocot root stem and leaf