Yogi Divine Society inspired,

Sarvodaya Kelavani Samaj managed,

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot

(Affiliated to Saurashtra University, Rajkot)

Re-Accredited at 'A' Level by NAAC

STAR college Scheme & Status by MST-DBT

UGC- College with Potential for Excellence (CPE)

UGC-DDU KAUSHAL Kendra

GAAA – Highest Grade A-1 by KCG, Government of Gujarat

GPCB-Government of Gujarat approved Environment Audit Center

UGC-Autonomous College

DEPARTMENT OF BIOLOGY

Enclosure - I

DSE – Allied BOTANY
SEMESTER III

(With Biotechnology)

16UBTDA05	Plant Science	4 Hrs/Week	4 Credit

Objectives of Outcome :

After completion of this course, student will be able to :

- Define and describe morphology of plant sex organs, flower and process of development and fertilization of male and female gametophyte in plants, and Identify the internal anatomy of root stem of plants.
- Understand the process of evolution and origin of life
- Carry out preparation of sections and staining of plant organs for microscopic studies and also comprehend the basis of photobiology and plant movements.

Unit I: Evolution **10**

- Origin of species
- Catastrophism
- Origin and evolution of land plants
- Process of fossilization
- Adaptations, natural selection and patterns of evolution

UNIT II: Basics of plant anatomy **10**

- Plant anatomy : Introduction and organization of meristems
- Simple plant tissue (parenchyma, collenchyma and sclerenchyma)
- Complex plant tissue (xylem, phloem, secretary structure and periderm)

UNIT III: Secondary growth in plants **10**

- Primary structure of monocot root and stem
- Primary structure of dicot root and stem
- Secondary anomalous growth in stem with special reference to *Aristolochia* and *Salvodora*
- Secondary anomalous growth in root with special reference to carrot, radish and beet root

- Biological importance and function of secondary and anomalous structure in growth

UNIT IV: Basic of plant embryology **10**

- Structure and development and male and female gametophytes
- Fertilization
- Development and types of embryo
- Polyembryony and apomixis

Unit V: Sensory photobiology of plant **10**

- Structure, function and action of phytochromes, cryptochorome and phototropins
- Stomatal movement
- Photoperiodism
- Biological clocks
- Plant movement

16UBTDA07	Plant Science Practicals	3 Hrs/Week	1 Credit

Exe:-1. Study of anatomical details of monocot root and stem through permanent slides/temporary stain mounts/macerations/museum specimens with the help of suitable examples.

Exe:-2. Study of anatomical details of dicot root and stem through permanent slides/temporary stain mounts/macerations/museum specimens with the help of suitable examples.

Exe:-3. Mounting of embryo - monocot and dicot

Exe:-4. Study of different types of ovules through slide preparation/permanent slide/photographs

Exe:-5. Study of T.S. of anther and mounting of pollen grains

Exe:-6. Study of anomalous structure of stem through slide preparation (*Aristolochia* and *Salvodora*)

Exe:-7. Study of anomalous structure of root through slide preparation (carrot, radish and beet root)

Suggested Reading:

Text books

- Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, Vikas Publishing House. Delhi. 5th edition
- Sharma, P.D. (2010). Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
- Rastogi, V. B. (1994). Organic evolution. Kedernath Ramnath, India, 190.

Reference books

- Dickison, W.C. (2000). Integrative Plant Anatomy. Harcourt Academic Press, USA.
- Odum, E.P. (2005). Fundamentals of ecology. Cengage Learning India Pvt. Ltd., New Delhi. 5th edition.

- Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons. U. S.A. 4th edition.
- Raghavan, V. (2000). Developmental Biology of Flowering plants, Springer, Netherlands

DSE – Allied ZOOLOGY
SEMESTER IV

(With Biotechnology)

16UBTDA07	Animal Science	4 Hrs/Week	4 Credit

Course Outcome :

After completion of this course, student will be able to :

- Know about the basic principle and overview of animal classification.
- Understand the internal structure of organ and working principle of body.
- Define and describe process of fertilization and development of embryo in human.
- Understand the process of evolution and origin of life,

UNIT 1: Animal Classification **10**

1.1 Principle of Animal classification

1.2 General overview of Animal classification.

1.3 Non Chordates: General classification & Salient features of important nonchordate i.e. Protozoa, Porifera, Cnidaria, Platyhelminthes, Aschelminthes, Nematoda; Annelida, Arthropoda, Mollusca, Echinodermata

1.4 Chordates: Salient Features of Pisces, Amphibia, Reptilia, Aves and Mammalia.

UNIT 2: Animal tissues **8**

2.1 Epithelial tissue, connective tissue, muscular tissue, nervous tissue and types of Integumentary glands

2.2 Bones: structure and types, ossification, bone growth.

2.3 Nervous tissue: general organization, Myelinated and non myelineated nerve.

2.4 Muscle: histology of different types of muscle, ultra structure of skeletal muscle and cardiac muscle.

2.5 Molecular and chemical basis of muscle contraction

Unit 3: Human physiology **14**

3.1 Endocrine system: basic concept of hormone, Structure and function of various endocrine gland (Pituitary, Parathyroid, Adrenal, Ovary, Testis).

3.2 Digestive system: structure and functions of organs and glands involved in the digestive system, mechanism of digestion.

3.3 Respiratory and Circulatory System: Heart and its functioning, Circulatory pathway of blood and lymph, Bohr and Haldane effect, Chloride shift, cardiac cycle, cardiac output, Structure of lungs, mechanism of gaseous exchange.

3.4 Excretory system: Structure of mammalian nephron and kidney, physiology of urine formation, osmoregulations.

3.5 Nervous system: Type of nervous system, Structure and function of Brain, Propagation of nerve impulse through nerve fibers.

Unit 4: Basic of developmental biology **10**

4.1 Structure and functions of Testis and ovary in Human.

4.2 Gametogenesis: Spermatogenesis and structure of sperm, Oogenesis and structure of ovum, types of ova

4.3 Fertilization: Events of fertilization, mechanism of sperm transfer, polyspermy.

4.4 Cleavage, blastulation and gastrulation and organogenesis of Amphioxus.

4.5 Extra embryonic membranes, Placentation.

Unit 5: Evolution **8**

Evidences of organic evolution

5.1 Geological time scale

5.2 Species concept: isolating mechanisms and modes of speciation

5.3 Adaptation: definition, kinds of adaptations, adaptive radiation, convergence and divergence

5.4 Evolution of man

16UBTDA08	Animal Science Practical	4 Hrs/Week	1 Credit

Exe:-1. Study of whole mount of eggs, early cleavage stage, T.S. of blastula and gastrula of frog.

Exe:-2. Study and isolation of chick embryo: 18 hours, 24 hours, 36 hours, 48 hours and 72 hours.

Exe:-3. Study of T.S. of ovary, testis and placentation through permanent slide

Exe:-4. Preparation of temporary mounts: Squamous epithelium, Ciliated epithelium, Striated muscle fibres and nerve cells.

Exe:-5. Examination of permanent sections of mammalian skin, Cartilage, Bone, Pancreas, Testis, Ovary

Exe:-6. Study of all the biotic and abiotic components of any simple ecosystem- natural pond or terrestrial ecosystem or human modified ecosystem.

Exe:-7. Study of the life table and fecundity table, plotting of the three types of survivorship curves from the hypothetical data.

Suggested Reading:

Text books

- Gyton C. and Hall J.E.(2011)Textbook of Medical Physiology,11th edition,Elsevier,USA.
- Gilbert S.F. (2010) Developmental Biology (Sinauer) 10th edition.
- Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
- Mathur R (2010) Animal Behaviour, Rastogi Publications, Merrut
- Rastogi, V. B. (1994) Organic evolution. Kedernath Ramnath, India, 190.

Reference books

- Tortora, G.J. and Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition. John wiley & sons, Inc.
- Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functional Correlations. XII Edition. Lippincott W. & Wilkins