# DR APJ ABDUL KALAM UNIVERSITY, INDORE

B.Sc. Under Graduate Semester wise Syllabus
(w.e.f. session 2017-2018)

**Class: - B.Sc.**

**Semester:- III Semester**

**Subject:-Zoology (BSZ 303T)**

**Paper:- Cell biology and Developmental Biology**

**Marks 85+15 CCE**

| | |
|---|---|
| Unit-I | 1. History of Cell Biology.<br>2. Cell Theory, Prokaryotic and eukaryotic Cells.<br>3. Microscopy : Principle and application of Compound microscope & Electron microscope.<br>4. Structure and transport across the plasma membrane.<br>5. Extra nuclear organization of cell. |
| Unit-II | 1. Nuclear organization of cell.<br>2. Nucleo cytoplasmic interactions.<br>3. Amitosis, mitosis and meosis.<br>4. Cell death: Necrosis and Apoptosis. |
| Unit-III | 1. Spermatogenesis<br>2. Oogenesis<br>3. Fertilization<br>4. Parthenogenesis<br>5. Patterns of cleavage. |
| Unit-IV | 1. Frog and Chick embryology up to the formation of three germinal layers.<br>2. Fate map construction in frog and chick.<br>3. Gastrulation in Frog and chick up to the formation of germinal layers. |
| Unit-V | 1.Concept of competence<br>2. Determination and differentiation<br>3. Extra embryonic membranes in chick<br>4. Concept of regeneration<br>5. Stem cells. |

(w.e.f. session 2017-2018)

## Practical

## Subject: - Zoology (BSZ 303P)

1. Study of type of cells through histological preparations
2. Study of embryological slides
3. Study of embryo, through window preparation in fertilized bird egg
4. Smear/ squash preparation techniques
5. Study of mitosis, meiosis, oogenesis, spermatogenesis

## Distribution of Marks

**Time 3 hours** **Maximum Marks: 50**

| | | Marks Allotted |
|---|---|---|
| 1. | Spotting (5 spots) | 10 |
| 2. | Squash preparation/ smear preparation | 05 |
| 3. | Identification of embryological stages (2 slides)/ window preparation | 07 |
| 4. | Identification of stage in cell division | 05 |
| 5. | Microtomy techniques/ double or single staining | 08 |
| 6. | Viva | 10 |
| 7. | Record | 05 |
| | Total | 50 |

# DR APJ ABDUL KALAM UNIVERSITY, INDORE

B.Sc. Under Graduate Semester wise Syllabus
(w.e.f. session 2017-2018)

**Class: - B.Sc.**

**Semester:- IV Semester**

**Subject:- Zoology (BSZ403T)**

**Paper:- Genetics**

**Marks 85+15 CCE**

**Heredity & Variation, Gene and Genetic Material**

1. Chromosome: The Physical basis of heredity and transmitters of heredity.
2. Types of chromosomes: Lampbrush, salivary gland and Beta Chromosomes
3. Nucleocytoplasmic interactions : Ultra structure of nucleus, nucleolus, Role of nucleus and nucleolus in nucleocytoplasmic interactions including Synthesis & Export of RNA, transport of proteins
4. Heredity and Variation : Sources of variation, Genotype, phenotype and environmental variations (elementary idea )
   -Mendel's laws of heredity
   -Kinds of variations
   -Genetic basis of variation.
5. (a) Chemistry of Gene; Nucleic Acids and their structure.
   (b) Concept of DNA replication.
   (c) Nucleosome (Solenoid model).
   (d) Split genes, overlapping genes and Pseudo genes.
   (e) Genetic Code.

**Unit II: Linkage and Chromosomal Aberrations**

1. Gene Linkage: Kinds and Theories of linkage, significance of linkage.
2. Crossing over: Types and mechanism.
3. Theories of sex determination.
4. Sex linked inheritance ( Haemophilia, Colour blindness )

**Unit III: Cytoplasmic Inheritance, Gene Expression and Regulation**

1. Cytoplasmic inheritance: Maternal effect on limnea (Shell Coiling), Kappa particles in Paramecium.
2. Transcription in Prokaryotes and Eukaryotes
3. Translation in Eukaryotes
4. Gene Expression: Regulation of protein synthesis, transcription in Prokaryotes and Eukaryotes.
5: Gene Expression: Lac operon model

**Unit IV: Mutation and Applied Genetics**

1. Mutation
2. Structural and numerical changes in chromosomes.
3. Causes of mutation.
4. Mutagens- classification, Types & effects.

**Unit V: Human Genetics & Genetic Engineering**

1. Human chromosomes, Elementary idea of Human Genome Project
2. Common genetic diseases in man (Autosomal syndromes, sex chromosome syndromes, diseases due to mutation-Sickle cell anaemia, Albinism & Alkaptonuria.
3. Multiple factors and blood groups.
5. Techniques used in recombinant DNA technology. Construction of Chimeric DNA, Elementary idea of plasmids & vectors.

6.Gene cloning and Polymerase Chain Reaction (PCR) ,Gel Electrophoresis,Northern & Southern Blotting.

7. Gene therapy.
8. DNA finger printing.

(w.e.f. session 2017-2018)

**Practical**

**Subject: -Zoology (BSZ403P)**

1. Identification of spots related to theory.
2. Squash preparation of onion root tip /Chironomous larva salivary gland/grass hopper testis.
3. Study of instruments techniques related to applied genetics – PCR, Gel electrophoresis, DNA fingerprinting etc.
4. Problems based on genetics.
5. Study of chromosomal DNA (Isolation and demonstration)

**Distribution of Marks**

**Time 3 hours** **Maximum Marks: 50**

| | Marks Allotted |
|---|---|
| 1. Spotting ( 5 Spots) | 10 Marks |
| 2. Squash preparation | 05 Marks |
| 3. Study of instruments / techniques related to applied genetics | 05 Marks |
| 4. Problems on Genetics | 10 Marks |
| 5. Viva-Voce | 05 Marks |
| 6. Extraction of chromosomal DNA | 05 Marks |
| 7. Practical Record and Collection | 10 Marks |
| Total | 50 Marks |

## Suggested Books for B.Sc. Zoology

1. Books of Granth Academy
2. Parker & Haswell: Text Book of Zoology Vol-I & II
3. Jordan, E.L. and Verma, P.S.: Chordata Zoology
4. Nigam, H.C.: Zoology of Chordates
5. Rastogi, V.B.: Developmental Biology
6. Arora, M.P.: Embryology
7. Karp: Cell and Molecular Biology
8. Sheelar & Bianchi: Cell and Molecular Biology
9. Lewin: Genetics (Latest editionStrickberger: Genetics
10. Berry, A.K. Animal Physiology and Biochemistry
11. Prosser: Comparative Animal Physiology
12. Lehninger: Biochemistry
13. Bisen, P.S. Laboratory Protocols in Applied Life Sciences
14. Bisen, P.S.: Introduction to Instrumentation in Life Sciences
15. Odum, E.P.: Fundamental Ecology
16. Agrawal, K.C.: Biodiversity
17. Colbert: Evolution
18. Natrajan, S.S.: A Manual; of Fresh Water Aquaculture
19. Sharma, P.D.: Environmental Biology & Toxicology
20. Swaroop & Pathak: Laboratory Techniques in Modern Biology