

**ZOOLOGY SYLLABUS FOR V SEMESTER**  
**ZOOLOGY - PAPER – V**

**3-5-131**

**ANIMAL BIOTECHNOLOGY**

**Periods:60**

**Max. Marks:100**

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**Unit 1: Tools of Recombinant DNA technology - Enzymes and Vectors**

**Restriction modification systems:** Types I, II and III. Mode of action, nomenclature, applications of Type II restriction enzymes in genetic engineering

**DNA modifying enzymes and their applications:** DNA polymerases. Terminal deoxynucleotidyl transferase, kinases and phosphatases, and DNA ligases

**Cloning Vectors:** Plasmid vectors:pBR and pUC series, Bacteriophage lambda and M13 based vectors, Cosmids, BACs, YACs,

**Unit 2 Techniques of Recombinant DNA technology**

**Cloning:** Use of linkers and adaptors

**Gene delivery:** Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated delivery

**PCR:** Basics of PCR.

**DNA Sequencing:** Sanger's method of DNA sequencing- traditional and automated sequencing

**Hybridization techniques:** Southern, Northern and Western blotting,

**Genomic and cDNA libraries:** Preparation and uses

**UNIT 3 Animal Cell Technology**

**Cell culture media:** Natural and Synthetic

**Cell cultures:** primary culture, secondary culture, continuous cell lines; Protocols for Primary Cell Culture; Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero);

**Hybridoma Technology:** Cell fusion, Production of Monoclonal antibodies (mAb), Applications of mAb

**Stem cells:** Types of stem cells, applications

**Unit 4 Reproductive Technologies & Transgenic Animals**

**Manipulation of reproduction in animals:** Artificial Insemination, *In vitro* fertilization, super ovulation, Embryo transfer, Embryo cloning

**Unit 5 Applied Biotechnology**

**Industry:** Fermentation: Different types of Fermentation: Short notes on - Submerged & Solid state; batch, Fed batch & Continuous; Stirred tank, Air Lift, Fixed Bed and Fluidized; Downstream processing - Filtration, centrifugation, extraction, chromatography, spray drying and lyophilization

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**ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER**  
**ZOOLOGY - PAPER - V**  
**ANIMAL BIOTECHNOLOGY**

**Periods: 24**

**Max. Marks: 50**

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Any SIX of the following:

1. Maintenance and storage of *E. coli* DH5 alpha cells.
2. DNA quantification using agarose gel electrophoresis (by using lambda DNA as standard).
3. Preparation for insertion and vector for ligation.
4. Preparation of competent cells
5. Transformation of *E. coli* with plasmid DNA using CaCl<sub>2</sub>,
6. Techniques: Western Blot, Southern Hybridization, DNA Fingerprinting
7. Amplification of DNA by PCR
8. Packing and sterilization of glass and plastic wares for cell culture.
9. Preparation of culture media.

**SUGGESTED READING**

1. Brown TA. (2010). Gene Cloning and DNA Analysis. 6th edition. Blackwell Publishing, Oxford, U.K.
2. Clark DP and Pazdernik NJ. (2009). Biotechnology: Applying the Genetic Revolution. Elsevier Academic Press, USA
3. Primrose SB and Twyman RM. (2006). Principles of Gene Manipulation and Genomics, 7th edition. Blackwell Publishing, Oxford, U.K.
4. Sambrook J and Russell D. (2001). Molecular Cloning-A Laboratory Manual. 3rd edition. Cold Spring Harbor Laboratory Press
5. Wiley JM, Sherwood LM and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. McGraw Hill Higher Education
6. Brown TA. (2007). Genomes-3. Garland Science Publishers
7. Primrose SB and Twyman RM. (2008). Genomics: Applications in human biology. Blackwell Publishing, Oxford, U.K.
8. Animal Cells Culture and Media, D.C. Darling and S.J. Morgan, 1994. BIOS Scientific Publishers Limited.
9. Methods in Cell Biology, Volume 57, Jennie P. Mathur and David Barnes, 1998. Animal Cell Culture Methods Academic Press.
10. P.K. Gupta: Biotechnology and Genomics, Rastogi publishers (2003).
11. B.D. Singh: Biotechnology, Kalyani publishers, 1998 (Reprint 2001)

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## **ZOOLOGY SYLLABUS FOR V SEMESTER**

### **ZOOLOGY - PAPER - VI**

**3-5-132**

#### **ANIMAL HUSBANDRY**

**Periods:60**

**Max. Marks: 100**

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**UNIT – I**

**:**

**10 Hours**

General introduction to poultry farming. Principles of poultry housing. Poultry houses. Systems of poultry farming. Management of chicks, growers and layers. Management of Broilers.

**UNIT – II:**

**10 Hours**

Poultry feed management – Principles of feeding. Nutrient requirements for different stages of layers and broilers. Methods of feeding. Poultry diseases – viral, bacterial, fungal and parasitic (two each); symptoms, control and management.

**UNIT – III:**

**10 Hours**

Selection, care and handling of hatching eggs. Egg testing. Methods of hatching. Brooding and rearing. Sexing of chicks.

**UNIT- IV:**

**20 Hours**

Breeds of Dairy Cattle and Buffaloes – Definition of breed; Classification of Indian Cattle breeds, exotic breeds and Indian buffalo breeds. Systems of inbreeding and crossbreeding. Housing of dairy animals – Selection of site for dairy farm; systems of housing – loose, housing system. Conventional dairy barn. Cleaning and sanitation of dairy farm. Weaning of calf. Castration and dehorning. Deworming and Vaccination programme. Records to be maintained in a dairy farm.

**UNIT - V:**

**10 Hours**

Care and management of dairy animals - Care and management of calf, heifer, milk animal, dry and pregnant animal, bulls and bullocks.

**ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER**

**ZOOLOGY –PRACTICAL - VI**

**ANIMAL HUSBANDRY**

**Periods:24**

**Max. Marks: 50**

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1. Study of various breeds of layers and broilers (photographs)
2. Identification of disease causing organisms in poultry birds (as per theory)
3. Study of the anatomy of a poultry bird by way of dissecting a bird. (Demonstration)
4. Study of various activities in a poultry farm (layers and broilers) and submission of a report.
5. Study of various breeds of cattle (photographs/microfilms)
6. Study of various activities carried out in a dairy farm and submission of a report.

**ZOOLOGY MODEL PAPER FOR V SEMESTER**

**ZOOLOGY PAPER-V**

**ANIMAL BIO-TECHNOLOGY**

**Time: 3 hrs**

**Max Marks:75**

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- I. Answer any **FIVE** of the following: 5x5=25 marks  
Draw labeled diagrams wherever necessary

1. Restriction Enzymes
2. DNA Polymerase
3. PBR Vector
4. Microinjection Technique
5. PCR
6. Cryopreservation
7. In Vitro Fertilization
8. Chromatography

- II. Answer any **FIVE** of the following 5x10=50 marks  
Draw labeled diagrams wherever necessary

9. Describe DNA modifying enzymes and their applications  
OR

Describe cloning vectors with examples

10. Enumerate recombinant DNA technology  
OR

Describe the techniques involved in gene delivery system.

11. Define animal cell technology and describe the various cell culture techniques  
OR

Define Hybridoma Technology

12. Describe reproductive technologies in animals  
OR

Define Embryo Transfer and Embryo cloning

13. Describe different types of fermentation mechanisms  
OR

Enumerate the processes involved in Downstream processing

ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER 2017-18

ANIMAL BIO-TECHNOLOGY

Time: 2 hrs

Max Marks:50

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1. Major experiment: prepare the vector for ligataion 20 marks
  2. Minor Experiment: Prepare the competent cells 10 marks
  3. Identify the spotters describe e important characters with labeled diagram 2x5=10 marks
    - a. PCR
    - b. Clone- Dolly
  4. Certified Record 10 marks

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50 marks

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*[Signature]* (Chair person)  
*[Signature]*

**ZOOLOGY MODEL PAPER FOR V SEMESTER**

**ELECTIVE - ZOOLOGY PAPER-VI**

**ANIMAL HUSBANDRY**

**Time: 3 hrs**

**Max Marks:75**

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- I. Answer any **FIVE** of the following: 5x5=25 marks  
Draw labeled diagrams wherever necessary
1. Poultry farming
  2. Broilers
  3. Poultry feed management
  4. Methods of Hatching
  5. Cross breeding
  6. Cleaning and Sanitation of Dairy Farm
  7. Vaccination Programme
  8. Care and Management in Milk animal
- II. Answer any **FIVE** of the following 5x10=50 marks  
Draw labeled diagrams wherever necessary
9. Describe the Principles of Poultry  
OR  
Describe different methods of management of Chiks, Growers and Layers
10. Describe nutrient requirements for Layers and Broilers  
OR  
Enumerate various Poultry diseases, symptoms, control and managements.
11. Describe the construction of Hatchery  
OR  
Describe the methods of Hatching in Hatchery.
12. Describe the classification of Indian Cattle  
OR  
Describe housing of Dairy animals
13. Describe Care taken in Dairy Animals  
OR  
Describe the various managements of Dairy animals



**ZOOLOGY PRACTICAL SYLLABUS FOR V SEMESTER**

**ELECTIVE-ZOOLOGY PRACTICAL-VI**

**ANIMAL HUSBANDARY**

**Time: 2 hrs**

**Max Marks:50**

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|---|--------------|
| 1. Draw a neat labeled diagram of Digestive system peginon/ Fowl          | 10 marks     |
| 2. Poultry/Cattle 4 spotters<br>Photographs of any three Birds/Cattle     | 4x5=20 marks |
| 3. Submission of a report regarding various activities in a poultary form | 10 marks     |
| 4. Certified Record   | 10 marks     |

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50 marks  
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