

ACHARYA NAGARJUNA UNIVERSITY - UG SYLLABUS

Group: B.Sc **Subject:** ANIMAL BIOTECHNOLOGY **Year:** III **Sem:** V

Unit-I:

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-II:

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-III:

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); Organ culture; Cryopreservation of cultures.

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

Stem cells: Types of stem cells, applications

Unit-IV:

Reproductive Technologies & Transgenic Animals:

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

Transgenic Animals: Strategies of Gene transfer; Transgenic - sheep, - fish; applications

Unit-V:

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

Agriculture: fisheries – monoculture in fishes, polyploidy in fishes; DNA fingerprinting.