

Course Code	Course Name	Credits
26BT011	ANIMAL BIOTECHNOLOGY	04

Course Objectives

- Understand the fundamental concepts of embryology
- Understand principles of cell culture, molecular diagnostics, and genetic improvement of livestock.
- Biotechnological applications of Animal tissue culture, Animal products, production & improvement of them.
- Comprehend the safety regulations and ethical considerations regarding GMOs.
- Equip the students with the advanced tools and techniques used in biotechnology to acquire skills to pursue a career in biotechnology.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Acquire knowledge on limitations and challenges in animal cell tissue culture.
- Know the applications of animal Biotechnology.
- Execute the application of recombinant DNA technology in designing research project.
- Enable students to make a strategy to manipulate genetic structure of an organism for improvement of any trait.
- Evaluate and discuss public and ethical concerns over the use of animal Biotechnology.

Unit 1 - Embryology (12 Hrs.)

Gametogenesis and fertilization in animals, Molecular events during fertilization, genetic regulations in embryonic development - Invitro fertilization and embryo transfer, Collection and preservation of embryo, culture of embryos, culture of embryonic stem cells and its applications.

Unit 2 - Animal cell culture (13 Hrs.)

Preparation and sterilization of various tissue culture media. Types of cell culture: Primary cell culture, secondary culture, cell transformation, cell lines, stem cell cultures, cell viability and cytotoxicity. Biology of cultured cells, measurement of growth, cell synchronization, senescence and apoptosis Organ culture. Cryopreservation.

Unit 3 - Genetic engineering in animals (10 Hrs.)

GMO (Genetically modified organism), Methods of DNA transfer into animal cells, Biological vectors. Hybridoma technology, Vaccine production.

Unit 4 – Elasticity (13 Hrs.)

Gene therapy: Mapping of human genome. RFLP and applications. DNA fingerprinting and Forensic Science. Molecular diagnosis of Genetic disorders.

Unit 5 - Transgenics: (12 Hrs.)

Transgenic animals. Production and recovery of products from animal tissue cultures: cytokines, Plasminogen activators, Blood clotting factors, Growth hormones- Transgenic animals – Merits and demerits -Ethical issues in animal biotechnology.

Reference Books:

1. Freshney, E. D. Animal Cell Culture: A practical approach. John Wiley Pub. New York. 2000.
2. Mather, J.P. and Barnes, D. (Eds.). Animal Cell Culture Methods (Methods in Cell Biology. Vol. 57). Academic Press, London. 1998.
3. Butler, M. (Ed.). Mammalian Cell Biotechnology -A Practical Approach. Oxford Univ. Press, Oxford. 1990.
4. Singer, M. and P. Berg. (Ed.). Exploring Genetic Mechanisms. University Science Books, Sausalito, CA, USA. 1997.
5. E.J. Murray (Ed). Gene Transfer and Expression Protocols-Methods in Molecular Biology Vol.7. Humana Press, Totowa, NJ.1991.
6. Watson, J.D., N.H.Hopkins, T.W.Roberts, J.A.Steitz and A.M. Weiner. Molecular Biology of Gene. Benjamin Cummins, San Francisco. 1987.
7. Watson, J.D., M. Gilman, J. Witkouski and M.Zoller. Recombinant DNA. Scientific American Books, New York.1992.