

**CORE COURSE IX - ANIMAL BIOTECHNOLOGY**

**UNIT -I**

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

**UNIT -II**

Animal cell culture: Fundamentals. Facilities and Applications. Media for Animal cells. Types of cell culture: Primary cell culture, secondary culture, cell transformation, cell lines, Insect 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 -III**

Genetic engineering in animals: methods of DNA transfer into animal cells- calcium phosphate co precipitation, micro-injection, electroporation, Liposome encapsulation, Biological vectors. Hybridoma technology, Vaccine production.

**UNIT -IV**

Gene therapy, mapping of human genome. RFLP and applications. DNA finger printing and Forensic Science. Molecular diagnosis of Genetic disorders.

**UNIT -V**

Transgenics: 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.

**REFERENCES:**

1. Freshney, E. D. 2000. Animal Cell Culture: A practical approach. John Wiley Pub., New York.
2. Mather, J.P. and Barnes, D. (Eds.). 1998. Animal Cell Culture Methods (Methods in Cell Biology. VOL. 57). Academic Press, London.
3. Butler, M. (Ed.). 1990. Mammalian Cell Biotechnology- A Practical Approach. Oxford Univ. Press, Oxford.
4. Singer, M. and P. Berg. (Ed.). 1997. Exploring Genetic Mechanisms. University Science Books, Sausalito, CA, USA.
5. E.J. Murray (Ed) .1991. Gene Transfer and Expression Protocols – Methods in Molecular Biology Vol.7. Humana Press, Totowa, NJ.
6. Watson, J.D., N.H. Hopkins, T.W. Roberts, J.A. Steitz and A.M. Weiner. 1987. Molecular Biology of Gene. Benjamin Cummins, San Francisco..
7. Watson, J.D., M. Gilman, J. Witkouski and M. Zoller. 1992. Recombinant DNA. Scientific American Books, New York
8. Puller, A. (Ed) .1993. Genetic Engineering of Animals. VCH Publishers, New York.
9. Balinsky, B.I. 1975. An Introduction to Embryology. Saunders, Philadelphia.
10. Beril, N.J. 1974. Developmental Biology. Tata McGraw -Hill Publishing Company Ltd. New Delhi