

**BTC DSC 302T**  
**ANIMAL BIOTECHNOLOGY**

**Contact Hours: 45**

**Full Marks = 100 [ESE (70) CCA (30)]**

**Course Objective:** *The Animal Biotechnology course aims to equip students with a comprehensive understanding of biotechnological techniques and their applications in animals. The objective is to introduce students to various gene transfer methods in animals, the production of transgenic animals, the role of biotechnology in managing animal diseases, techniques for animal propagation and cloning, the production of special secondary metabolites, the process of monoclonal antibody production, and the ethical considerations and challenges in gene therapy and human genetic engineering.*

**UNIT 1** (7 Lectures)

**Gene transfer methods in animals:** microinjection; embryonic stem cell; retrovirus and retroviral gene transfer method.

**UNIT 2** (12 Lectures)

**Transgenic Animals:** introduction; production of transgenic mice, cow, pig, sheep, goat and insect; application of transgenic animals. **Animal diseases need help of biotechnology:** foot and mouth disease, coccidiosis, trypanosomiasis, theileriosis - causative organism, clinical signs, mode of transmission and role of biotechnology.

**UNIT 3** (10 Lectures)

**Animal propagation:** artificial insemination; in-vitro fertilization; embryo transfer techniques (e.g. cow). **Animal cloning:** definition and methods (somatic cell nuclear transfer and embryo splitting).

**UNIT 4** (9 Lectures)

**Special secondary metabolites:** definition; methods of production (insulin, growth hormones, interferon, tissue plasminogen activator, factor VIII); application of special secondary metabolites. **Monoclonal antibodies:** definition; production process; application.

**UNIT 5** (7 Lectures)

**Gene therapy:** definition; types; application; challenges and ethical issues. **Human genetic engineering:** problems and ethics.

**Course Outcome:** Students will gain comprehensive knowledge and skills in animal biotechnology. They will master gene transfer techniques, transgenic animal production, and biotechnological disease management. Additionally, they will become proficient in animal propagation and cloning methods. Students will understand secondary metabolite production, monoclonal antibodies, gene therapy, and ethical considerations in human genetic engineering.

#### **SUGGESTED READING**

1. Butler, M. (2004). Animal cell culture and technology: The basics. II Edition. Bios scientific publishers.
2. Glick, B.R. and Pasternak, J.J. (2009). Molecular biotechnology- Principles and applications of recombinant DNA. IV Edition. ASM press, Washington, USA.
3. Griffiths, A.J.F., J.H. Miller, Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2009). An introduction to genetic analysis. IX Edition. Freeman & Co., N.Y., USA.
4. Srivastava, A. K., Singh, R. K. (2018). Animal Biotechnology. India: CBS Publishers & Distributors.
5. Singh, B., Mal, G., Gautam, S. K., Mukesh, M. (2019). Advances in Animal Biotechnology. Germany: Springer International Publishing.