

**Name of the Programme:** M.Sc. Biotechnology

**Course Code:** GBT-607

**Title of the Course:** PLANT AND ANIMAL BIOTECHNOLOGY

**Number of Credits:** 2

**Effective from AY:** 2022-23

<b>Pre-requisites for the Course:</b>	Basic knowledge of molecular biology and recombinant DNA Technology	
<b>Course Objectives:</b>	1) The provide a comprehensive exposure to advances in animal and plant Biotechnology. 2) Student is expected to have a clear understanding of basic Biotechnology techniques to learn recent advances in the field.	
<b>Content:</b>	<p style="text-align: center;"><b><u>MODULE I</u></b></p> <p>General features of eukaryotic expression and vector systems. Gene transfer to animal cells. Transgenic mice methodologies, Transgenic poultry, Transgenic Fish, Embryo transfer technology, Gene targeting, Cloning live stock by nuclear transfer, Transgenic livestock, Ethics of cloning Disease resistant transgenics, animal models for disease study, Pharming, improving milk quality, improving traits, Xenografts, Toxological applications, knock outs.</p>	<b>No. of hours</b>  15
	<p style="text-align: center;"><b><u>MODULE II</u></b></p> <p>Strategies for Introducing Biotic and Abiotic Stress Resistance/Tolerance Bacterial resistance; Viral resistance; Fungal resistance; Insects and pathogens resistance; Herbicide resistance; Drought, salinity, thermal stress, flooding and submergence tolerance Genetic Engineering for Plant Architecture and Metabolism Seed storage proteins; Protein engineering; Vitamins and other value addition compounds; Source-sink relationships for yield increase; Post-harvest bioengineering; Plant architecture; Flowering behaviour Plants as Biofactories: Concept of biofactories; Fermentation and production of industrial enzymes, vitamins and antibiotics and other biomolecules; Cell</p>	15

	cultures for secondary metabolite production; Production of pharmaceutically important compounds; Bioenergy generation	
<b>Pedagogy:</b>	Lectures, tutorials, assignments	
<b>References/ Readings:</b>	<ol style="list-style-type: none"> <li>1. A. Bongso and E.H. Lee, Stem cells from bench to bed side World Scientific publisher, 2004.</li> <li>2. A. Slater, N. Scott, and Fowler, Plant Biotechnology: The genetic manipulation of plants. Oxford University Press, 2003.</li> <li>3. B. D. Singh, Plant Biotechnology. Kalyani Publisher, 2015.</li> <li>4. B.R Jordan. The Molecular Biology and Biotechnology of Flowering, CABI Publication, 2006.</li> <li>5. M. Denis, Plant Breeding and Biotechnology: Societal Context and the Future of Agriculture, Cambridge University Press, 2007.</li> <li>6. P. K. Gupta, Plant Biotechnology. Rastogi Publication, 2015.</li> <li>7. W. Neil. Phytoremediation: Methods and Reviews, Humana Press, 2007.</li> </ol>	
<b>Course Outcomes:</b>	<ol style="list-style-type: none"> <li>1. Students will be familiar with the principles and applications of different techniques used in plant and animal transformation.</li> <li>2. Students will learn to compare the pros and cons of transgenic plants in the environment.</li> <li>3. They will understand the role of rDNA technology in evolving plants for resistance to pest and disease, tolerance to herbicides and abiotic factors.</li> <li>4. They will learn about the different mechanisms of disease resistance, stress tolerance and products produced using genetic engineering in plants and animals.</li> </ol>	