Programme

M.Sc. Ag. Genetics and Plant Breeding

Programme Outcomes	By the end of this course, students will able to determine breeding methodology appropriate for plants with different mating systems, conduct basic statistical analyses related to plant breeding, to identify characteristics of self- and cross-pollinated plants, identify sources of genetic variation to conduct a breeding program, analyse journal articles related to cultivar development, conduct and analyse a selection experiment, communicate background information and original ideas related to breeding a specific crop.
Programme specific outcomes	Students will care the plants and make sure they stay healthy. They will also assist in genetic research of plant breeding collect specimens and samples and grow cultures of micro-organisms, prepare specimens for examination and perform experiments, write reports on results and findings, check the quality of plants, set up and maintain instruments and equipment, set up, operate and maintain laboratories for botanical breeding.
M.Sc. Ag. Genetics and Plant Breeding Jobs	After getting degree, students can make career or get job in agriculture ministries, research laboratories, agricultural scientist, ICAR, CSIR institute, DBT, DST, crop research directorates, educational institutes, plant breeding centers, genetic engineering, biotechnology companies, crop plantation facilities, firms, nurseries, agriculture departments etc.

Course outcomes (COs)

Course	Course outcomes (COs)
M. Sc. Genetics and Plant Breeding (1st Sem.)	
Principles of Genetics (GP 501)	CO-1: A thorough understanding of the basic principles of DNA structure, replication, transcription and translation CO-2: An understanding of basic chromosome structure, and the significance of chromosomal change in evolution CO-3: Development of the ability to carry out genetic analyses on data sets comprised of codominant genetic markers such as allozymes, microsatellites and SNPs, in order to quantify variation, gene flow and evolutionary divergence CO-4: The ability to carry out complex genetic tests on genetic data for the purposes of diversity study CO-5: Apply the principles of inheritance to plant breeding
Principles of Cytogenetics (GP 502)	CO-1: Evolution of various chromosomal aberrations (structural and numerical), their applications in alien gene transfer and hybrid seed development. CO-2: Pollen culture in haploid development and development of diploid inbreeds or hybrids or doubled isogenic lines from haploids that has got important applications in plant breeding. CO-3: With cytogenetic tools such as FISH and GISH (Genomic In Situ Hybridization) techniques, that rely on "painted chromosomes" approach, the behaviour of individual genomes, individual chromosomes, or chromosomal

	fragments in natural and artificial hybrids (particularly allopolyploids) can be analysed. CO-4: Another important application of plant cytogenetics is in validation of physical maps and guiding efficient choice of bacterial artificial chromosomes for sequencing of genomes using chromosome walking and chromosome jumping.
Principles of Plant Breeding (GP 503)	CO-1: Students will be well versed in practical emasculation and pollination methods of important crops. CO-2: To understand the various components to structure a plant breeding programme CO-3: Know the requirements in breeding for biotic and abiotic stress tolerant varieties. CO-4: Learn the impact of IPRs including PBR, PVP and PPVFRA CO-5: Students will acquire independent ability to carry out statistical analysis of data and Interpretation of results in breeding programs.
M. Sc. Genetics and Plant Breeding (2nd Sem.)	
Principles of Quantitative Genetics (GP 504)	CO-1: Analyse and evaluate literature involving quantitative genetic experiment CO-2: Design and analyse quantitative genetic experiments CO-3: Statistically analyse the phenotypic data of plant traits collected taking into account G X E interaction. CO-4: Manage breeding populations to maximize progress from selection for accomplishment of breeding objectives
Cell Biology and Molecular genetics (GP 508)	CO-1: Understand and apply the principles and techniques of Molecular biology. CO-2: Comprehensive understanding on Nucleic acids that provides insight into cellular and molecular mechanisms. CO-3: The knowledge on DNA control mechanism in terms of replication and recombination to design and execute gene manipulation research underlying social and environmental ventures. CO-4: The ability to synthesize, evaluate and understand molecular marker-based data.
M. Sc. Genetics and Plant Breeding (3rd Sem.)	
Biotechnology for Crop improvement (GP 509)	CO-1: Ability to apply the concepts and principles of plant tissue culture techniques on research problems pertinent to crop improvement CO-2: Dissemination of skills on usage of the acquired knowledge on practical biotechnology tools to augment need based research. CO-3: Technical knowhow and exhibition of contemporary knowledge in Biotechnology for economic utilization. CO-4: Compile and interpret results applying tools of biotechnology research. CO-5: Applying learned process to undertake sustainable exploitation of plant and microbial resources in an environmentally-sensitive manner.
Heterosis Breeding	CO-1: Learn about mechanisms of heterosis.

(GP 507)	CO-2: understand Divergence and Genetic Distance analyses. CO-3: Development of inbreeds and parental lines CO-4: learn about hybrid seed production.