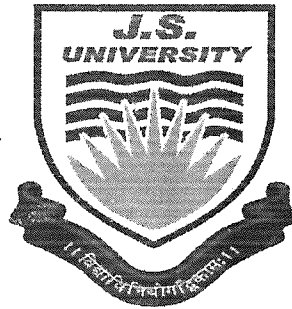


J.S. University, Shikohabad

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VALUE ADDED COURSE

**Livestock Breeding and Genetics: Improving
Animal Productivity and Health**

Faculty of Agricultural Sciences

	J.S. University, Shikohabad Faculty of Agricultural Sciences	Value Added Course
		AGVAC-24

Livestock Breeding and Genetics: Improving Animal Productivity and Health


Learning Objectives:

The course can be designed for professionals, students, researchers, and practitioners in the field of animal science, veterinary science, agriculture, and related fields, who are interested in livestock breeding and genetics for improving animal productivity and health. Overall, the value-added course on Livestock Breeding and Genetics: Improving Animal Productivity and Health can provide participants with comprehensive knowledge and practical skills to enhance their understanding of livestock breeding and genetics, and their application in improving animal productivity and health. With practical sessions, case studies, industry visits, and guest lectures, participants can gain hands-on experience and real-world insights, making them well-equipped to contribute to the livestock industry with enhanced expertise and skills.

Course Outcomes:

Upon completion of this course, students will be able to:

1. Understand the principles of livestock breeding and genetics, including genetics of quantitative and qualitative traits, breeding methods, selection criteria, and genetic improvement techniques.
2. Gain knowledge on reproductive technologies, such as artificial insemination, embryo transfer, and in-vitro fertilization, and their application in improving animal productivity and health.
3. Develop skills in data collection, analysis, and interpretation for genetic improvement of livestock populations, including estimation of genetic parameters, breeding value prediction, and selection index calculation.
4. Learn about the importance of genetic diversity, conservation of genetic resources, and managing inbreeding in livestock populations to ensure long-term sustainability and health of animal populations.
5. Understand the genetic management practices and genetic diversity in livestock population.

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Duration: 8-10 weeks (depending on the pace of the student)

Intake: 60 students

Course Modules (Syllabus):

Module-1

Introduction to Livestock Breeding and Genetics

Basic principles of animal breeding and genetics
 Importance of genetics in livestock production
 Overview of genetic improvement programs in livestock
 Genetic traits for improving animal productivity, health, and welfare

Module-2

Animal Reproduction and Selection

- Reproductive physiology and management in livestock
- Selection principles and techniques for breeding stock
- Genetic evaluation methods and tools for identifying superior animals
- Genetic parameters and genetic trends in livestock populations

Module-3

Breeding Strategies and Genetic Improvement Programs

- Breeding systems and mating designs in livestock breeding
- Genetic selection methods: selection index, genomic selection, and marker-assisted selection
- Breeding for specific traits: milk production, meat quality, disease resistance, and reproductive performance
- Breeding programs for different livestock species: dairy cattle, beef cattle, sheep, goats, pigs, and poultry

Module-4

Quantitative and Molecular Genetics

- Quantitative genetics principles and applications in livestock breeding
- Genetic variance and heritability estimation
- Molecular genetics tools and techniques in livestock breeding, including DNA markers, genomics, and gene editing
- Ethical considerations and challenges in the use of molecular genetics in livestock breeding



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Module-5

Genetic Management and Genetic Diversity

- Genetic management practices: inbreeding, crossbreeding, and outcrossing
- Importance of maintaining genetic diversity in livestock populations
- Conservation and utilization of indigenous and rare livestock breeds
- Strategies for managing genetic risks and minimizing inbreeding depression

Assessment:

- Weekly quizzes and assignments
- Final project on designing and implementing livestock breeding and genetics plan.

Reference books:

1. Animal Breeding: Principles and Practice" by Dr. W.R. Singleton
2. "Principles of Animal Breeding" by R.D. Mochrie
3. "Applied Animal Breeding" by H.H. Cole

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