DEPARTMENT OF HORTICULTURE

FACULTY OF AGRICULTURAL SCIENCES

University of the Punjab, Lahore

Programme	B.Sc. (Hons.) Agriculture	Course Code	HORT-307	Credit Hours	3(2-1)
Course Title	**BREEDING OF HORTICULTURAL CROPS**				

Course Introduction

The breeding of horticultural crops is essential for advancing agricultural productivity, sustainability, and food security. Through selective breeding and modern biotechnological techniques, horticultural crop breeding aims to develop new varieties with enhanced traits such as improved yield, disease and pest resistance, better nutritional quality, and adaptability to various climatic conditions. This innovation ensures a steady supply of high-quality fruits, vegetables, flowers, and ornamental plants, meeting the demands of growing populations and changing consumer preferences.

Learning Outcomes

On the completion of the course, the students will be able:
To teach breeding methods for improvement of horticultural crops for quality and yields as per requirements of the growing population

	Course Content	Assignments/Readings
Week 1	**Unit-I** 1.1 Introduction to Horticultural crops 1.2 Importance	
Week 2	**Unit-II** 2.1 Principles of plant breeding	
	2.2 Importance	
Week 3	**Unit-III** 3.1 Reproductive systems in horticultural crops	
	3.3 Self incompatibility and male sterility	
Week 4	**Unit-IV** 4.1 Centre of origin	
Week 5	**Unit-V** 5.1 Cytological basis of breeding	
Week 6	**Unit-VI** 6.1 Heterosis	
Week 7	**Unit-VII** 7.1 Theories of heterosis	
Week 8	**Unit-VIII**	

	8.1 Role of mutation	
	8.2 polyploidy in breeding	
Week 9	**Unit-IX** 9.1 Somatic selection	
Week 10	**Unit-X** 10.1 Chimeras,	
	10.2 Apomixes	
Week 11	**Unit-XI** 11.1 Breeding objective 11.2 Methods of breeding of self and cross pollinated	
Week 12	**Unit-XII** 12.1 Improvement in fruit varieties	
Week 13	**Unit-XIII** 13.1 Germplasm conservation	
Week 14	**Unit-XIV** 14.1 Concept of genetic manipulation	
Week 15	**Unit-XV** 15.1 Transgenic plants	
Week 16	**Unit-XVI** 16.1 Marker Assisted Selection 16.2 Sustainable Environment	
PRACTICAL		
Week 1	Description of flowers of important fruits	
Week 2	Vegetables and ornamentals	
Week 3	Emasculation	
Week 4	Selfing and crossing techniques	
Week 5	Polyembryony tests	
Week 6	Pollen viability tests	
Week 7	Inducing polyploidy by chemicals.	
Week 8	Selection and Evaluation	
Week 9	Hybridization Techniques	

Week 10	Marker-Assisted Selection	
Week 11	Field Plot Design and Data Collection	
Week 12	Plant Tissue Culture	
Week 13	Genetic Transformation	
Week 14	Phenotyping	
Week 15	Data Analysis and Statistical Tools	
Week 16	Cross-Compatibility Testing	

Textbooks and Reading Material

1. Eliot, E.C.1982. Plants Breeding and Cytogenetics. McGraw Hill Book Co., New York, USA.
2. Fageria, M.S., P.S. Arya and Choudhary, A.K. 2000. Vegetable Crops (Vol. 1): Breeding and Seed Production. Kalyani Publisher, Ludhiana, New Delhi, India.
3. Moore, J.N. and J. Janick, 1983. Methods in Fruit Breeding. Purdue University Press, West Lafayette, Indiana.
4. Simmonds, N.W. 1981. Principles of Crop Improvement. Longman and Co., London.
5. Bassett, M.J. 1986. Breeding Vegetable Crops. Avi Publishing Co. Inc., Westport, Connecticut.

Teaching Learning Strategies

1. Lectures
2. Discussions
3. Presentations
4. Quiz
5. Assignments

Assignments: Types and Number with Calendar

1. Select a horticultural crop and identify 5 different varieties. Compare and contrast their characteristics, advantages, and disadvantages.
2. Analyze the pedigree of a horticultural crop variety, tracing its ancestry and identifying key breeding decisions

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.