UNIVERSITY OF SARGODHA

DEPARTMENT OF PLANT BREEDING AND GENETICS

COURSE OUTLINE SPRING 2022

Course Tittle: INTRODUCTORY PLANT BREEDING

Course Code: PLBG-5202

Credit Hours: 3(2-1)

Instructor: Dr. USMAN SALEEM

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DESCRIPTION& OBJECTIVES

To make the students know about:

* Basic concepts of plant breeding
* Reproductive mechanisms in major crops
* Application of genetic principles in crop improvement
* Breeding methods in self and cross pollinated crops

READINGS

1. Khan, M.A and M. Ahmad. 2008. Plant Breeding. Daya Publishing House, New Dehli, India.
2. Sleper, D.A and J.M. Poehlman.2006. Breeding Field Crops. 5th ed. Iowa State University Press, Ames, USA.
3. Chahal, G.S. and S.S Gosal. 2003. Principles and Procedures of Plant Breeding. Narosa Publishing House New Dehli India.
4. Singh, B.D. 2003. Plant breeding: Principles and Methods. Kalyani Publisher, New Dehli India
5. Singh, P. 2003. Essentials of Plant breeding.Kalyani Publisher, New Dehli India.
6. Sadaqat, H. A., I. A. Khan and T. M. Khan. 2007. Introductory Plant Breeding. 2nd ed. Study aid foundation for education, University of Agriculture, Faisalabad

CONTENTS

1. Introduction to plant breeding and its role in crop improvement.
2. Reproductive systems in major crop plants.
3. Genetic variation and its exploitation, creation of variation through genetic recombination, mutation and heteroploidy.
4. Breeding self-pollinated crops: introduction, mass selection, pure line selection; hybridization, pedigree method, bulk method and backcross techniques.
5. Breeding cross-pollinated crops: introduction, mass selection, recurrent selection, development and evaluation of inbred lines, development of hybrids, synthetic and composite populations.
6. Breeding colonaly propagated crops.
7. New trends in plant breeding.

COURSE SCHEDULE

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| Week | Topics and Readings |
| 1. | The concept of plant breeding, Book 6; Chapter 1 Pg 1-3, Book 2; Chapter 1 Pg 3-4, 8-10, Role of plant breeding in crop improvement, Book 6; Chapter 1 Pg 3-4,Book 2; Chapter 1: 10-16, Flower and various parts of typical flower |
| 2. | Reproductive systems in major crop plants, Book 4; Chapter 4 Pg 58-62, Strategy of plant breeding, Book 6; Chapter 1 Pg 3, Book 2; Chapter 4-6. Structural modifications in flowers |
| 3. | Variation and its types, Book 6; Chapter 2 Pg 5-7, Book 2; Chapter 3: 85-86. Sources of hereditary variation, Book 6; Chapter 2 Pg 8-10,Book 2; Chapter 5- 6, Mode of pollination in flowers |
| 4. | Artificial creation of variability through heteroploidy, Book 6; Chapter 3 Pg 12-13, Book 4; Chapter 33: 732-761, Autopolyploidy, Book 6; Chapter 3 Pg 13-18, Book 4; Chapter 33: 742-749 |
| 5. | Allopolyploidy, Book 6; Chapter 3 Pg 18-24, Book 4; Chapter 33: 750-760, |
| 6. | Aneuploidy, Book 6; Chapter 3 Pg 24-28, Book 2; Chapter 5, Pg 96-99. Haploidy/Monoploidy, Book 6; Chapter 3 Pg 29-31, Book 2; Chapter 5: 99-104. Selfing and crossing techniques in Barley |
| 7. | Structural changes in Chromosomes, Book 6; Chapter 4 Pg 32-36, Selfing and crossing techniques in Barley (Field Demonstration) |
| 8. | Artificial creation of variability through mutation, Book 6; Chapter 5 Pg 37-42  Book 4; Chapter 32 :698-731, Course discussion, Selfing and crossing techniques in Cotton |
| 9. | Review of course  **Mid examination** |
| 10. | Breeding self-pollinated crops: introduction, Mass selection method, Book 6; Chapter 6 Pg 45-49, Book 4; Chapter 14-15: 255-269, pureline selection, Book 6; Chapter 6 Pg 48-49, Book 4; Chapter 15: 261-266 |
| 11. | Hybridization, pedigree method, Bulk method, Book 6; Chapter 6 Pg 51-62  Book 4; Chapter 16-17 Pg 270-301, Selfing and crossing techniques in Oats |
| 12. | Hybridization, pedigree method, Bulk method, Book 6; Chapter 6 Pg 51-62  Book 4; Chapter 16-17 Pg 270-301, |
| 13. | backcross method, Book 6; Chapter 6 Pg 59-62, Book 4; Chapter 18-305-308, Selfing and crossing techniques in Sorghum |
| 14. | Breeding cross-pollinated crops: introduction, Book 6; Chapter 7, Pg 45-46,63  Book4: Chapter 21, Mass and recurrent selection, Book 6; Chapter 7Pg 45-49  Book4: Chapter 21: 367-395. Selfing and crossing techniques in rice |
| 15. | Development and evaluation of inbred lines, Book4: Chapter22: 400-406, Development of hybrids, Book4: Chapter22: 406-410, Chromosome number of important crop plants, Development of senthetic variety, Book 6; Chapter 7,Pg 63-77, Book4: Chapter22: 425-433 |
| 16. | Synthetic and composite populations, Book 6; Chapter 7,Pg 63-77,  Book4: Chapter22: 425-433. Breeding Clonally Propagated Crops, Book 6; Chapter 8 Pg 78-81, Selfing and crossing techniques in maize and (Field Demonstration) |
| 17. | Biotechnology and plant breeding, Book 4: 789-846 |
| 18. | **Final Examination** |

RESEARCH PROJECT

ASSESSMENT CRITERIA

Sessional: 8 (Class Attendance: 2, Presentation: 4, Assignments: 2)

Mid Term Test: 12

Final Term Test: 20

RULES AND REGULATIONS

1: 80 % class attendance is required to get 2 Marks.

2: Assignments submitted after deadlines get no reward.