Course Code : PLB 304
Course Title : Introductory Resistance Breeding
Credit Hours : 2 (2 + 0) Full Marks: 50 Theory: 50 Practical: 0

OBJECTIVES

Upon the completion of this course, the students will be able to understand Principles and Practices of Resistance Breeding.

I. SYLLABUS

Introduction to resistance breeding; natural enemies and their types; defence mechanisms against pathogens, parasites, insects; a great diversity in mechanisms for resistance; sources and test of resistance; stage of development, application of natural enemies, composition of inoculums, evaluation aspects; breeding for disease and insect resistance; breeding for drought, heat, mineral stresses and cold; selection procedures; durability of resistance and application of non durable resistance; development of resistant varieties in Nepal.

II. COURSE OUTLINE

A. Lecture

S.N.	Topics	No. of Lectures
1.	Introduction to resistance breeding (Biotic and Abiotic)	1
2.	Natural enemies and their types	2
	2.1 Natural enemies	
	2.2 Types of natural enemies	
3.	Defence mechanisms against pathogens, parasites, insects	3
	3.1 Defence mechanisms against pathogens, parasites	
	3.2 Gene for gene hypothesis	
	3.3 Defence mechanisms against insects	
4.	A great diversity in mechanisms for resistance	2
	4.1 Broad resistance, Non host resistance, Host range	
	4.2 Hypersensitivity resistance and Partial resistance, Supressors	
5.	Sources and test of resistance	2
	5.1 non host, mutations, genetic modification	
	5.2 field test and in vitro test	
6.	Stage of development, Application of natural enemies, Composition of inoculums and Evaluation aspects	3
	6.1 Stage of development and Application of natural enemies	
	6.2 Composition of inoculums	
	6.3 Evaluation aspects: Quantitative and Qualitative aspects	
7	Breeding for disease and insect resistance	2
	7.1 Breeding for disease resistance	
	7.2 Breeding for insect resistance	

8	Breeding for drought resistance	1
9	Breeding for heat resistance	1
10	Breeding for mineral stresses	1
11	Breeding for cold resistance	1
12.	Selection procedures	3
	12.1 Back crossing and recurrent selection	
	12.2 Molecular markers	
	12.3 Marker assisted selection	
13.	Durability of resistance and application of non durable resistance	4
	13.1 Durability of resistance	
	13.2 Application of non durable resistance	
	13.2.1 gene pyramiding	
	13.2.2 multilines, cultivar mixtures	
	13.2.3 integrated control	
14.	Development of resistant varieties in Nepal	4
	14.1 Cereal crops	
	14.2 Vegetable crops	
	14.3 Legumes	
	14.4 Oil seed crops	
	Total	**30**

REFERENCES

Jacobsen, E. 2010. Genetic Variation and Genetic Modification In Vitro. Wagenigen University and Research Centre. Wageningen. The Netherlands.

Johnsen, R., 1984. A critical analysis of durable resistance. Phytopath. 22: 309-330.

Knott, D. R., 1989. The effect of transfers of alien genes for leaf rust resistance on the agronomic and quality characteristics of wheat. Euphytica. 44: 65-72.

Niks, R. E. and W. H. Lindhout, 2010. Breeding for Resistance against diseases and pests. Wagenigen University and Research Centre. Wageningen. The Netherlands.

Singh, B.D., 2005. Plant Breeding: Principles and Methods (7th Ed.). Kalyani Publishers. New Delhi. India.