

<b>INSTITUTE</b>	<b>FACULTY OF AGRICULTURE</b>
<b>PROGRAM</b>	<b>BACHELOR OF SCIENCE (Hons.) AGRICULTURE</b>
<b>SEMESTER</b>	<b>6</b>
<b>COURSE TITLE</b>	<b>CROP IMPROVEMENT-II (RABI CROPS)</b>
<b>COURSE CODE</b>	<b>16AS0607</b>
<b>COURSE CREDITS</b>	<b>2</b>

**Objective:**

- 1 To acquire knowledge regarding botany of rabi crops.
- 2 To provide the basic skills regarding emasculation and pollination of rabi crops.
- 3 To gain knowledge regarding hybrid seed production of rabi crops by explaining breeding methods and breeding objectives.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Student will be able to remember the evolutionary history of important field crops along with their centre of origin, its wild species and wild relatives that can be utilized in crop improvement.
- 2 Student will develop the understanding of germplasm conservation, utilization, and center of origin of various rabi field crops, genetics of qualitative and quantitative characters, and their inheritance.
- 3 Student will be able to apply breeding procedures and objectives in different crop important for the development of improved varieties.
- 4 Student will be able to differentiate seed production technology in different classes of rabi field crop.

**Pre-requisite of course:** Students should have basic knowledge regarding rabi crops.

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
1	0	2	50	30	20	25	25

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>1</b> Botanical Name, family, chromosome number, centre of origin, nature of pollination, list of wild relatives (donor parents for different characters), distributions of species of 14 selected crops (wheat, chickpea, mustard, sunflower, potato, lucerne, sugarcane, tomato, brinjal, chilies, onion, garlic, cumin and coriander)	2

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
2	<b>2</b> Floral biology as well as study of genetics of qualitative and quantitative characters of wheat, chickpea, mustard, sunflower, potato, lucerne, sugarcane, tomato, brinjal, chilies, onion, garlic, cumin and coriander	3
3	<b>3</b> Breeding methods of wheat, chickpea, mustard, sunflower, potato, lucerne, sugarcane, tomato, brinjal, chilies, onion, garlic, cumin and coriander	2
4	<b>4</b> Major breeding objectives (including quality parameters) of wheat, chickpea, mustard, sunflower, potato, lucerne, sugarcane, tomato, brinjal, chilies, onion, garlic, cumin and coriander; Ideotype concept for wheat, mustard and tomato	3
5	<b>5</b> Climate resilient crop varieties for future. e.g., short-duration crops and high temperature tolerance in wheat and chickpea	2
6	<b>6</b> International, National and State level research station and varieties/hybrids released of wheat, chickpea, mustard, sunflower, potato, lucerne, sugarcane, tomato, brinjal, chilies, onion, garlic, cumin and coriander	2
<b>Total Hours</b>		<b>14</b>

### Suggested List of Experiments:

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>1</b> Emasculation and hybridization techniques wheat	2
2	<b>2</b> Emasculation and hybridization techniques in chickpea	2
3	<b>3</b> Emasculation and hybridization techniques in mustard and sunflower	2
4	<b>4</b> Emasculation and hybridization techniques in potato and sugarcane	2
5	<b>5</b> Emasculation and hybridization techniques in Lucerne	2
6	<b>6</b> Emasculation and hybridization techniques in tomato, brinjal and chilies	2
7	<b>7</b> Emasculation and hybridization techniques in onion and garlic	2
8	<b>8</b> Emasculation and hybridization techniques in cumin and coriander	2

### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
9	<b>9</b> Maintenance breeding of different rabi crops	2
10	<b>10</b> Detailed procedure of hybrid seed production of mustard, sunflower, and onion	2
11	<b>11</b> Visit to seed production plots and submission of report	2
12	<b>12</b> Visit to AICRP plots of different field crops and submission of report	2
<b>Total Hours</b>		<b>24</b>

### Textbook :

- 1 NA, NA, NA, NA

### References:

- 1 Breeding of Field Crops, Breeding of Field Crops, Chopra, V. L., Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 2000
- 2 Breeding of Horticultural Crops – Principles and Practices, Breeding of Horticultural Crops – Principles and Practices, Kumar, N., New India Publishing Agency, New Delhi, 2006
- 3 Vegetable Breeding — Principles and Practices, Vegetable Breeding — Principles and Practices, Ram. H. H., Kalyani Publishers, 2005
- 4 Advances in Plant Breeding Vol. I and II, Advances in Plant Breeding Vol. I and II, Mandal, A. K., Ganguli, P. K. and Banerjee, S. P., CBS Publishers and Distributors, New Delhi, 1991

### Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking
25.00	25.00	30.00	10.00	5.00	5.00

### Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms.

**Instructional Method:**

- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.