DEPARTMENT OF AGRICULTURAL ECONOMICS AND MANAGEMENT

AGECO-311: FUNDAMENTALS OF AGRI-BUSINESS MANAGEMENT

B.Sc. (Ag.) Part Third Year, Cr. Hr. 2 (1+1) Batch A, Session 2015-16

Course teacher: Dr. G. L. Meena

S.No.	Topics	Date of Lectures
	Theory	
1	Agribusiness: Meaning, Definition, Structure of Agribusiness (Input, Farm, Product Sectors).	14.7.15*
2	Importance of Agribusiness in the Indian Economy	18.7.15
3	Agribusiness Management: Distinctive features	25.7.15
4	Importance, Definition of Management, Management Function.	1.8.15
5	Planning: Meaning, Definition, Type of plans (Purpose or Mission, Goals or Objectives, Strategies, Policies, Procedures, Rules, Programmes, Budget)	4.8.15*
6	Financial Management of Agribusiness: Importance of Financial Statements, Balance Sheet	11.8.15*
7	Profit and Loss Statement, Analysis of Financial Statements.	22.8.15
8	Agro-based Industries: Importance, Need	1.9.15*
9	Classification of Agro-based Industries	8.9.15*
10	Marketing Management: Meaning, Definition.	19.9.15
11	Marketing Mix: Basic of marketing mix	26.9.15
12	**Revision**	3.10.15
13	4Ps of Marketing Mix and Market segmentation	17.10.15
14	Product life cycle and Pricing Pricing Methods	31.10.15
15	Project: Definition, Project cycle and Appraisal and Evaluation techniques	21.11.15
	Note: ***Theory classes of this batch will be held on Saturday. Total scheduled classes will be 10 due to holiday on second Saturday of every month. It is not possible to complete syllabus in 10 classes. Therefore, I will teach some of theory in scheduled classes of practical which are marked by star (*)***	

Practical		
1	Balance Sheet	21.7.15
2	Profit and Loss Statements	28.7.15
3	Computation of NPV	18.8.15
4	Computation of BCR	25.8.15
5	Computation of Pay back period	15.9.15
6	Computation of ARR	22.9.15
7	Computation of IRR	29.9.15
	Revision	6.10.15
8	Computation of Break even Analysis	20.10.15
9	Enlisting of Agro-Based Industries	27.10.15
10	Study/Visit of Agro based Industries/Company	3.11.15

DEPARTMENT OF AGRICULTURAL ECONOMICS AND MANAGEMENT

AGECO-311: FUNDAMENTALS OF AGRI-BUSINESS MANAGEMENT

B.Sc. (Ag.) Part Third Year, Cr. Hr. 2 (1+1) Batch B, Session 2015-16

Course teacher: Dr. G. L. Meena

S.No.	Topics	Date of Lectures
	Theory	
1	Agribusiness: Meaning, Definition, Structure of Agribusiness (Input, Farm, Product Sectors).	13.7.15
2	Importance of Agribusiness in the Indian Economy	20.7.15
3	Agribusiness Management: Distinctive features	27.7.15
4	Importance, Definition of Management, Management Function.	3.8.15
5	Planning: Meaning, Definition, Type of plans (Purpose or Mission, Goals or Objectives, Strategies, Policies, Procedures, Rules, Programmes, Budget)	10.8.15
6	Financial Management of Agribusiness: Importance of Financial Statements, Balance Sheet	17.8.15
7	Profit and Loss Statement, Analysis of Financial Statements.	24.8.15
8	Agro-based Industries: Importance, Need Classification of Industries	31.8.15 7.9.15
9	Marketing Management: Meaning, Definition.	14.9.15
10	Marketing Mix: Basic of marketing mix	21.9.15
	Revision	28.9.15 5.10.15
11	4Ps of Marketing Mix	12.10.15
12	Market segmentation	19.10.15
13	Product life cycle	26.10.15
14	Pricing Pricing Methods	2.11.15
15	Project: Definition, Project cycle and Appraisal and	16.11.15
16	Evaluation techniques of project	23.11.15

Practical		
1	Balance Sheet	9.7.15
2	Balance Sheet	16.7.15
2	Profit and Loss Statements	23.7.15
3	Computation of NPV	30.7.15
3	Computation of NPV	6.8.15
4	Computation of BCR	13.8.15
5	Computation of Pay back period	20.8.15
6	Computation of ARR	27.8.15
6	Computation of ARR	3.9.15
7	Computation of IRR	10.9.15
8	Computation of Break even Analysis	17.9.15
8	Computation of Break even Analysis	24.9.15
	Revision	1.10.15 8.10.15
9	Enlisting of Agro-Based Industries	15.10.15
10	Study/Visit of Agro based Industries/Company	29.10.15
	Revision	19.11.15

COURSE CONTENT AND LECTURE SCHEDULE

U G Course Programme

Course No : **Agron 312**
Title of course : **Farming system and sustainable Agriculture**
Credit hrs : **2(1+1)**
Name of teachers : **Dr. S. L. Mundra and Dr. J. Choudhary**

(Theory)

S. No.	Topic	Batch and Date
1.	Farming system : definition, principles and scope	A 10.7.15
		B 25.7.15
2.	Sustainable agriculture –introduction, definition, goals and currents concepts	A 17.7.15
		B 1.8.15
3.	IFS models for wetlands	A 24.7.15
		B 25.8.15 *
4.	Indices of sustainability.	A 7.8.15
		B 7.8.15 *
5.	IFS models for integrated & dry land situations.	A 21.8.15
		B 22.8.15 *
6.	Emerging issues for present day technologies	A 28.8.15
		B 28.8.15*
7.	Components of farming system.	A 4.9.15
		B 4.9.15*
8.	Factors affecting ecological balance.	A 11.9.15
		B 11.9.15*
9.	Interactions among components of different enterprises.	A 18.9.15
		B 19.9.15
10.	Ameliorative measures and managements practices for sustainable agriculture for soil & water resources.	A 9.10.15
		B 9.10.15*
11.	Different constrained situation of land.	A 16.10.15
		B 17.10.15
12.	Ameliorative measures and managements practices for sustainable agriculture for rain water & I.P.M.	A 23.10.15
		B 23.1015*
13.	Resource management under different situation of land.	A 30.10.15
		B 31.10.15
14.	Land degradation and conservation of natural resources.	A 20.11.15
		B 21.11.15*
15.	Low cost and non-monetary inputs for wasteland and problematic soils.	A 21.11.15
		B 21.11.15*
16.	LEISA, LEIA & HELA: Irrigation problems. Wastelands & their developments.	A 22.11.15
		B 22.11.15*

(Practical) Agron 312

S. No.	Topic	Batch	Date
1.	Preparation of cropping scheme for irrigated situations.	A_1	13/07/2015
		A_2	15/07/2015
		B_1	17/07/2015
		B_2	17/07/2015 *
2.	Preparation of cropping scheme for dry land situations.	A_1	20/07/2015
		A_2	22/07/2015
		B_1	24/07/2015
		B_2	25/07/2015
3.	Study of existing farming system in nearby villages	A_1	27/07/2015
		A_2	29/07/2015
		B_1	31/07/2015
		B_2	01/08/2015
4.	Preparation of integrated farming system model for wetlands.	A_1	03/08/2015
		A_2	05/08/2015
		B_1	07/08/2015
		B_2	07/08/2015 *
5.	Preparation of integrated farming system model for dry lands.	A_1	10/08/2015
		A_2	10/08/2015 *
		B_1	12/08/2015
		B_2	12/08/2015 *
6.	Preparation of enriched FYM.	A_1	17/08/2015
		A_2	19/08/2015
		B_1	21/08/2015
		B_2	22/08/2015
7.	Preparation of Vermi compost.	A_1	24/08/2015
		A_2	26/08/2015
		B_1	28/08/2015
		B_2	28/08/2015 *
8.	Visit to urban waste recycling unit	A_1	02/09/2015
		A_2	02/09/2015 *
		B_1	04/09/2015
		B_2	04/09/2015 *
9.	Study of profitable utilization of agricultural waste.	A_1	07/09/2015
		A_2	09/09/2015
		B_1	11/09/2015
		B_2	11/09/2015 *
10.	Visit to poultry units of nearby areas	A_1	14/09/2015
		A_2	16/09/2015
		B_1	18/09/2015
		B_2	19/09/2015
11.	Study of dairy units of nearby areas	A_1	05/10/2015
		A_2	07/10/2015
		B_1	09/10/2015
		B_2	09/10/2015 *
12.	Visit to an organic farm to study various components and utilization	A_1	12/10/2015
		A_2	14/10/2015

		B_1	16/10/2015
		B_2	17/10/2015
13.	Visit to fisheries unit	A_1	19/10/2015
		A_2	19/10/2015 *
		B_1	23/10/2015
		B_2	23/10/2015 *
14.	Study of degraded lands	A_1	26/10/2015
		A_2	28/10/2015
		B_1	30/10/2015
		B_2	31/10/2015
15.	Study of horticultural unit to develop entrepreneurship.	A_1	02/11/2015
		A_2	02/11/2015 *
		B_1	03/11/2015
		B_2	03/11/2015 *
16.	Visit to mushroom unit.	A_1	16/11/2015
		A_2	18/11/2015
		B_1	20/11/2015
		B_2	21/11/2015

* Extra Class

COURSE CONTENT AND LECTURE SCHEDULE

P G Course Programme

Course No : **Agron 531**
Title of course : **Modern Concepts of Crop Production**
Credit hrs : **3 (3 + 0)**
Name of teachers : **Dr. J. Choudhary**

(Theory)

S. No.	Topic	Date
1. .	Crop growth analysis in relation to environment	08/07/2015
2.	Cont…	10/07/2015
3. .	Agro- ecological zones of Rajasthan and India	13/07/2015
4.	Cont..	15/07/2015
5. .	Quantitative agro-biological principles and inverse yield nitrogen law	17/07/2015
6.	Cont…	20/07/2015
7. .	Mitscherlich yield equation, its interpretation and applicability, Baule unit	22/07/2015
8.	Cont…	24/07/2015
9. .	Effect of lodging in cereals	27/07/2015
10.	Cont…	29/07/2015
11. .	Physiology of grain in cereals	31/07/2015
12.	Cont…	03/08/2015
13. .	Optimization of plant population and planting geometry in relation to different resources	05/08/2015
14.	Cont…	07/08/2015
15.	Cont…	10/08/2015
16. .	Concept of ideal plant type and crop modelling for desired crop yield	12/08/2015
17.	Cont…	14/08/2015
18.	Cont…	17/08/2015
19. .	Scientific principles of crop production	19/08/2015
20.	Cont…	21/08/2015
21.	Cont…	24/08/2015
22. .	Crop response production functions	28/08/2015
23.	Cont…	31/08/2015
24. .	Concept of soil plant relations, yield and environmental stress.	02/09/2015
25.	Cont…	04/09/2015
26.	Cont…	07/09/2015
27. .	Integrated Farming System	09/09/2015
28.	Cont…	11/09/2015
29.	Cont…	14/09/2015
30. .	Organic Farming	14/09/2015
31.	Cont…	16/09/2015
32.	Cont…	16/09/2015
33. .	Resource Conservation Technology	18/09/2015
34.	Cont…	18/09/2015
35.	Cont…	05/10/2015
36. .	Modern concept of tillage	07/10/2015
37.	Cont…	09/10/2015
38. .	Dry farming	12/10/2015

39.	Cont…	14/10/2015
40. .	Determining the nutrient needs for yield potentiality of crop plants	16/10/2015
41.	Cont…	19/10/2015
42.	Cont…	26/10/2015
43. .	Concept of nutrition and integrated nutrient management	28/10/2015
44.	Cont…	02/11/2015
45.	Cont…	16/11/2015
46. .	Precision agriculture	18/11/2015
47.	Cont…	18/11/2015
48.	Cont…	21/11/2015

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Syllabus

THEORY

S. No.	Topic	No. of Lectures
1.	Place of livestock in the national economy, different livestock programmes of Govt. of India.	2
2.	Important exotic and Indian breeds of cattle, buffalo, sheep and goat	3
3.	Measures and factors affecting fertility in livestock	2
4.	Reproductive behaviour like oestrus, parturition etc	1
5.	Milk secretion, milking of animals and factors affecting milk yield and composition	3
6.	Selection and breeding of livestock for higher milk and meat production	2
7.	Feeding and management of calves, growing heifers and milch animals and other classes and types of animals	3
8.	Housing principles, space requirements for different species of livestock	2
9.	Disease control measures, sanitation and care.	1
10.	Important breeds of poultry	1
11.	Methods of housing Poultry	1
12.	Breeding, feeding and management of Poultry	2
13.	Incubation, hatching and brooding of chicks	2
14.	Vaccination and prevention of diseases in Poultry	1
15.	Preservation and marketing of eggs, its economics and keeping quality.	2
16	Cost of production of milk, economical units of cattle, buffalo, sheep and goat.	2
	TOTAL	**30**

PRACTICALS

S.No.	TOPIC	NO. OF LECTURES
1.	Identification of farm animals	1
2.	Handling, and restraining of animals	1
3.	Breeding, feeding and production records	1
4.	Judging and culling of animals	3
5.	Feeding and ration formulation	2
6.	Hatching of eggs	1
7.	Housing and management of poultry	2
8.	Visit to livestock and poultry farms	2
9.	Economics of livestock and poultry production.	2
	TOTAL	**15**

REFERENCE BOOKS: -

1. A Text Book of Animal Husbandry G. C. Banerjee (1996) Published by Oxford and IBH.
2. Hand Book of Animal Husbandry (1990) I.C.A.R. New Delhi.
3. Livestock Production Management (2005).N S R Sastry and C K Thomas, Kalyani Publishers,New Delhi.
4. Poultry Production (1990). R.A. Singh, III Ed. Kalyani Pub. Ludhiana and Delhi

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Date wise lecture schedule

THEORY

BATCH - A

S.No.	Date	Lecture Topic
1	09.07.2015	Place of livestock in the national economy
2	13.07.2015	Different livestock programmes of Govt. of India
3	16.07.2015	Important exotic and Indian breeds of cattle,
4	20.07.2015	Important breeds of buffalo,
5	23.07.2015	Important exotic and Indian breeds of sheep and goat
6	27.07.2015	Measures and factors affecting fertility in livestock
7	30.07.2015	Measures and factors affecting fertility in livestock
8	03.08.2015	Reproductive behaviour like oestrus, parturition etc
9	06.08.2015	Milk secretion
10	10.08.2015	Milking of animals
11	13.08.2015	Factors affecting milk yield and composition
12	17.08.2015	Selection of livestock for higher milk and meat production
13	20.08.2015	Breeding of livestock for higher milk and meat production
14	24.08.2015	Feeding and management of calves
15	27.08.2015	Feeding and management of growing heifers
16	31.08.2015	Feeding and management of milch animals and other classes and types of animals
17	03.09.2015	Housing principles and systems of housing
18	07.09.2015	Space requirements for different species of livestock and housing management
19	10.09.2015	Disease control measures, sanitation and care.
20	14.09.2015	Important breeds of poultry
21	17.09.2015	Methods of housing Poultry
22	21.09.2015	Breeding management of Poultry
23	24.09.2015	Feeding management of Poultry
24	28.09.2015	Incubation and hatching of chicks
25	30.09.2015	Brooding of chicks
26	01.10.2015	Vaccination and prevention of diseases in Poultry
27	05.10.2015	Preservation and marketing of eggs and keeping quality.
28	08.10.2015	Economics of poultry production
29	12.10.2015	Cost of production of milk and economical units of cattle and buffalo
30	15.10.2015	Economics of sheep and goat farming

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Date wise lecture schedule

PRACTICAL

BATCH – A1

S.No.	Date	Lecture Topic
1	09.07.2015	Visit to livestock farm
2	16.07.2015	Visit to poultry farm
3	23.07.2015	Identification of farm animals
4	30.07.2015	Handling, and restraining of animals
5	06.08.2015	Breeding, feeding and production records
6	13.08.2015	Judging and culling of animals
7	20.08.2015	Judging and culling of animals
8	27.08.2015	Feeding of animals
9	03.09.2015	Ration formulation for milch animals
10	10.09.2015	Ration formulation for growing and pregnant animals
11	17.09.2015	Hatching of eggs
12	24.09.2015	Housing and management of chicks and growers
13	01.10.2015	Housing and management of layers
14	08.10.2015	Economics of livestock production.
15	15.10.2015	Economics of poultry production.

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Date wise lecture schedule

PRACTICAL
BATCH – A2

S.No.	Date	Lecture Topic
1	10.07.2015	Visit to livestock farm
2	17.07.2015	Visit to poultry farm
3	24.07.2015	Identification of farm animals
4	31.07.2015	Handling, and restraining of animals
5	07.08.2015	Breeding, feeding and production records
6	14.08.2015	Judging and culling of animals
7	21.08.2015	Judging and culling of animals
8	28.08.2015	Feeding of animals
9	04.09.2015	Ration formulation for milch animals
10	11.09.2015	Ration formulation for growing and pregnant animals
11	18.09.2015	Hatching of eggs
12	09.10.2015	Housing and management of chicks and growers
13	16.10.2015	Housing and management of layers
14	23.10.2015	Economics of livestock production.
15	30.10.2015	Economics of poultry production.

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Date wise lecture schedule

THEORY

BATCH – B Course Teacher Siddharth mishra

S.No.	Date	Lecture Topic
1	13.07.2015	Place of livestock in the national economy
2	15.07.2015	Different livestock programmes of Govt. of India
3	20.07.2015	Important exotic and Indian breeds of cattle,
4	22.07.2015	Important breeds of buffalo,
5	27.07.2015	Important exotic and Indian breeds of sheep and goat
6	29.07.2015	Measures and factors affecting fertility in livestock
7	03.08.2015	Measures and factors affecting fertility in livestock
8	05.08.2015	Reproductive behaviour like oestrus, parturition etc
9	10.08.2015	Milk secretion
10	12.08.2015	Milking of animals
11	17.08.2015	Factors affecting milk yield and composition
12	19.08.2015	Selection of livestock for higher milk and meat production
13	24.08.2015	Breeding of livestock for higher milk and meat production
14	26.08.2015	Feeding and management of calves
15	31.08.2015	Feeding and management of growing heifers
16	02.09.2015	Feeding and management of milch animals and other classes and types of animals
17	07.09.2015	Housing principles and systems of housing
18	09.09.2015	Space requirements for different species of livestock and housing management
19	14.09.2015	Disease control measures, sanitation and care.
20	16.09.2015	Important breeds of poultry
21	21.09.2015	Methods of housing Poultry
22	28.09.2015	Breeding management of Poultry
23	30.09.2015	Feeding management of Poultry
24	05.10.2015	Incubation and hatching of chicks
25	07.10.2015	Brooding of chicks
26	12.10.2015	Vaccination and prevention of diseases in Poultry
27	14.10.2015	Preservation and marketing of eggs and keeping quality.
28	19.10.2015	Economics of poultry production
29	26.10.2015	Cost of production of milk and economical units of cattle and buffalo
30	28.10.2015	Economics of sheep and goat farming

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Date wise lecture schedule

PRACTICAL
BATCH – B1

S.No.	Date	Lecture Topic
1	10.07.2015	Visit to livestock farm
2	17.07.2015	Visit to poultry farm
3	24.07.2015	Identification of farm animals
4	31.07.2015	Handling, and restraining of animals
5	07.08.2015	Breeding, feeding and production records
6	14.08.2015	Judging and culling of animals
7	21.08.2015	Judging and culling of animals
8	28.08.2015	Feeding of animals
9	04.09.2015	Ration formulation for milch animals
10	11.09.2015	Ration formulation for growing and pregnant animals
11	18.09.2015	Hatching of eggs
12	09.10.2015	Housing and management of chicks and growers
13	16.10.2015	Housing and management of layers
14	23.10.2015	Economics of livestock production.
15	30.10.2015	Economics of poultry production.

ANIP-211 LIVESTOCK PRODUCTION AND MANAGEMENT 3(2+1)

Date wise lecture schedule

PRACTICAL
BATCH – B2

S.No.	Date	Lecture Topic
1	14.07.2015	Visit to livestock farm
2	21.07.2015	Visit to poultry farm
3	28.07.2015	Identification of farm animals
4	04.08.2015	Handling, and restraining of animals
5	11.08.2015	Breeding, feeding and production records
6	18.08.2015	Judging and culling of animals
7	25.08.2015	Judging and culling of animals
8	01.09.2015	Feeding of animals
9	08.09.2015	Ration formulation for milch animals
10	15.09.2015	Ration formulation for growing and pregnant animals
11	22.09.2015	Hatching of eggs
12	29.09.2015	Housing and management of chicks and growers
13	06.10.2015	Housing and management of layers
14	20.10.2015	Economics of livestock production.
15	27.10.2015	Economics of poultry production.

DEPARTMENT OF PLANT PATHOLOGY, RCA, MPUAT, UDAIPUR

Lecture Schedule: M.Sc. (Ag.) I Semester 2015-16

Course No. P.Path. 512 Title: Plant Bacteriology Course Teacher: Dr Amit Trivedi
Credit Hrs: 3 (2+1)

Objective: To acquaint with plant pathogenic prokaryote (procarya) and their structure, nutritional requirements, survival and dissemination.

Sr.No.	Topics	No. of Lectures	Date
	UNIT -1		
1	History of Plant Bacteriology and introduction to phytopathogenicprocaryaviz; bacteria, MLO's, spiroplasma and other fastidious procarya	3	9.7.15; 16.7.15; 23.7.15
2	Economic Importance of Phytopathogenic bacteria	1	25.7.15
	UNIT-2		
3	Evolution of bacteria	1	30.7.15
4	Classification and nomenclature of Phy-Bacteria	1	1.8.15
5	Pathovar concept of Phytopathogenic bacteria	1	6.8.15
6	List of important diseases caused by them and their management	3	13.8.15; 15.8.15; 20.8.15
	UNIT-3		
7	Growth of Bacteria	1	22.8.15
8	Nutrition requirements of Bacteria	1	27.8.15
9	Reproduction of Bacteria	1	3.9.15
10	Preservation of bacterial cultures	1	10.9.15
11	Variability among phytopathogenicprocarya	1	17.9.15
	UNIT-4		
12	General biology of bacteriophages,	1	19.9.15
13	L-form bacteria and plasmids	1	1.10.15
14	bdellovibrios	1	3.10.15
	UNIT-5		
15	Procaryotic inhibitors and their mode of action against phytopathogenic bacteria	2	8.10.15; 15.10.15
	UNIT-6		
16	Survival and dissemination of phytopathogenic bacteria	2	17.10.15; 27.10.15
17	Important crop diseases caused by bacteria and their management	3	29.10.15; 31.10.15; 19.11.15

Practicals:

Sr. No.	Topics	No. of Lectures	Date
1.	Isolation of Phytopathogenic-bacteria	1	14.7.15
2.	Purification of phytopathogenic-bacteria	1	21.7.15
3.	Identification of Phytopathogenic-bacteria	1	28.7.15
4.	Host inoculation of phytopathogenic-bacteria	1	4.8.15
5.	**Staining methods**: Gram staining, simple staining, capsule staining, flagella staining and spore staining	4	11.8.15; 18.8.15; 25.8.15; 1.9.15
6.	**Biochemical's test for identification and characterizations of phytopathogenic-bacteria**: Oxygen requirements, starch hydrolysis, gelatin liquefaction, H2S Production, Indole production, Ammonia Production, catalase test and bio-assay test for antibiotics	4	8.9.15; 15.9.15; 29.9.15; 6.10.15
7.	Serological characterization	1	20.10.15
8.	Isolation of Plasmid	1	27.10.15
9.	Use of anti-bacterial chemicals	1	3.11.15

Course No. STAT-511 Statistical Methods Session 2014-15 (First semester)
Date Wise Lecture Schedule of STAT 511 Cr. Hrs. 3(2+1)
Course Teacher: Dr (Mrs.) A. Mordia
Theory

S.No.	Lecture Topics	Batch A	Batch B
1.	Probability and Probability Distribution: Various definitions of probability	10th & 14th July	8th & 14th July
2.	Addition and multiplication laws of probability and simple problems based on them.	17th&21st July	15th &21st July
3.	Expectation of a random variable.	24th July	22nd july
4.	Moments, Skewness and Kurtosis.	28th July	28th july
5.	Binomial and Poisson distribution, their fitting and simple problems based on them.	4th & 7th August	29th July & 4th August
6.	Normal distribution, their properties and uses.	11th &14th August	5th & 11th August
7.	Sampling: Sampling v/s Complete enumeration .	18th August	11th August
8.	Probability and non probability sampling, S.R.S. with and without replacement.	21st August	12th August
9.	Test of significance: Hypothesis, null and Alternative hypothesis, type-I and type-II error, Level of significance, Critical region.	25th & 28th August	18th & 19th August
10.	One and two tailed tests, Procedure for testing of hypotheses.	1st Sept.	25th August
11.	Standard Normal deviate test for single mean, difference of two means.	4th & 8th Sept.	26th August & 1st Sept.
12.	Proportion, difference of proportion and confidence interval.	11th & 15th Sept.	2nd & 8th Sept.
13.	Students `t' test, for comparison involving one and two sample means.	18th Sept. & 6th Oct.	9th & 15th Sept.
14.	Paired `t' test, Confidence interval.	9th Oct.	16th Sept.
15.	Chi-square test for goodness of fit and independence of two attributes (2x2 and r x s contingency table) and Yate's correction for continuity.	16th,20th and 23rd Oct	6th ,7th and 14th Oct.
16.	Simple and partial correlation coefficients.	27th Oct.	20th Oct.
17.	Linear and multiple regressions, Partial regression coefficients, multiple correlation coefficients and their tests of significance.	30th Oct & 3rd Nov.	27th & 28th Oct.
18.	Design of Experiments: Analysis of C.R.D., R.B.D. and L.S.D. with one observation per cell.	17th, 20th 24th Oct	3rd, 17th & 18th and 24th Nov.
	Total Classes	31	32

Lecture Schedule of STAT 511
Practical

S.No.	Practical Lessons	Batch A	Batch B
1.	Simple problem based on probability.	13th &20th July	25th July& 1st Aug.
2.	Simple problems based on Binomial, Poisson and Normal distribution. Problem based on area tables of Normal distribution.	27th July & 31st Aug.	22nd Aug.&19th Sept.
3.	Draw simple random-sample of size 'n' from a given population of size 'N' with and without replacement scheme and obtain the estimate of (i) population mean (ii) population variance and (iii) standard error.	3rd Aug.	26th Sept.
4.	Standard normal deviate tests for testing (i) $\mu = \mu_{0,}$ (ii) $\mu_1 = \mu_{2,}$ Confidence interval.	10th Aug.	3rd Oct.
5.	't'-test for testing (i) $\mu = \mu_0$, (ii) $\mu_1 = \mu_{2,}$ Confidence interval	17th & 24th Aug.	17th & 31st Oct.
6.	Chi-square test for goodness of fit.	7th & 14th Sept.	21st Nov.
7.	Chi-square test for independence of two attributes, 2x2, r x s contingency table and Yate's Correction .	14th Sept. & 5th Oct.	*
8.	Fitting of Regression line (i) $Y = a+bX$ and test for $\beta_{yx} = 0$ (ii) $Y = a+b_1x_1 + b_2x_{2.}$	12th & 19th oct.	
9.	Partial correlation coefficients and its tests of significance.	26th Oct	
10.	Multiple correlation coefficients and its test by F-test.	2nd Nov.	
		16	16

* Due to holidays remaining course will be covered in extra classes

Course No. STAT- 622 Design of Experiments-II
Lecture Schedules of STAT-622 Cr. Hrs. 3(2+1)

Course Teacher : Dr. B. Upadhyay

Theory

S.No	Lecture Topics	Date
1.	Confounding in 3^3 and 3^4 factorial experiment in 9 plot blocks	7,9,14 and 16 July 2015
2.	Confounding in asymmetrical factorial experiments e.g. 3x2x2 and 3x3x2 in six plot blocks.	21,23,28 and 30 July 2015
3.	Fractional replication in factorial experiment e.g. 2^5 in ½ replicate, 2^5 in ¼ replicate, 3^3 in 1/3 replicate.	4,6,11 and 13 August 2015
4.	Incomplete block designs	18 and 20 August 2015
5.	Simple Lattice	25 and 27 August 2015
6.	Youden square design	1 and 3 September 2015
7.	Response surface study	8,10 and 15 September 2015
8.	First and second order designs	17,6 and 8 September 2015
9.	Method of determining optimum combination of factor levels	13 and 15 October 2015
10.	Group of experiments	20 and 22 October 2015
11.	Long term experiments	27 and 29 October 2015
12.	Rotational experiments.	3 and 17 November 2015

Lecture Schedules of STAT-622
Practical

S.No	Practical Lessons	Date
1.	Confounding in 3^3 in 9 plot blocks (Total and Partial)	10 and 17 July 2015
2.	Confounding in 3x 2 x 2 in 6 plot blocks	24 and 31 july 2015
3.	Fractional replication in 2^5 in ½ replicate	7 and 14 August 2015
4.	Analysis of BIBD	21 and 28 August 2015
5.	Analysis of Simple Lattice	4 and 11 September 2015
6.	Numerical problems on response surface study for second order rotatable designs	18 September and 9 October 2015
7.	Analysis of groups of experiments	16 and 23 October 2015
8.	Analysis of long terms experiments.	30 October 2015
9.	Analysis of non-orthogonal data	20 November 2015

Department of Agricultural Statistics and Computer Applications
Rajasthan College of Agriculture, Udaipur

Course No; STAT 624 **Title: Psychometrics**

Course Teacher: Dr H. K. Jain **Cr Hrs. 3(3+0)**

S.No	Lecture topic	Date of lecture
1	Introduction Psychometrics , application in social sciences	09-7-2015
2	Psychological tests; Meaning and applications	10-7-2015
3	Meaning of test and its applications	16-7-2015
4	Introduction about scales	17-7-2015
5	Types of tests in social research	23-7-2015
6	Projective tests	24-7-2015
7	Non-projective tests	25-7-2015
8	Procedures for developing a test	30-7-2015
9	Item analysis : Item collection	31-7-2015
10	Assignments based on item analysis	01-8-2015
11	Discrimination and difficulty indices	06-8-2015
12	Tests of item validation	07-8-2015
13	Final item selection	13-8-2015
14	Types of scores	14-8-2015
15	Score standardization	20-8-2015
16	Exercise on types of score used and their standardization	21-8-2015
17	Reliability of tests : meaning and kinds	22-8-2015
18	Exercise based on reliability tests	27-8-2015
19	Reliability of scales: meaning and kinds	28-8-2015
20	Numerical exercise based on reliability of scale	3-9-2015
21	Techniques of measuring different kinds of reliability	4-9-2015
22	Exercise based on measuring different kinds of reliability	10-9-2015
23	Validity of tests and scales : meaning and types	11-9-2015
24	Validity of scales : meaning and types	12-9-2015
25	Exercise on validity of tests	17-9-2015
26	Exercise on validity of scales	18-9-2015
27	Techniques of measuring different kinds of validity	19-9-2015
28	Social distance scale	01-10-2015
29	Development of social distance scale	03-10-2015
30	Socio-economic status scale	08-10-2015
31	Computational procedure for socio-economic status scale	09-10-2015
32	Adoption quotient	10-10-2015
33	Social participation scale	15-10-2015
34	Communication fidelity index	16-10-2015
35	Construction of communication fidelity index	17-10-2015
36	Rationality quotient	23-10-2015
37	Critical incident technique : meaning, its applicability	29-10-2015
38	Procedures involved in Critical incident technique	30-10-2015
39	Q-sort technique : meaning, its applicability	31-10-2015
40	Exercise based on Q-sort techniques	19-11-2015
	TOTAL	**40**

SYLLABUS & LECTURE SCHEDULE

Course No.: HORT 311
Course Title: Postharvest Management and Value Addition of Fruits and Vegetables
Batch: A **Periods:** Wednesday-2, Saturday-6
Venue: UG Class Block, Room Number-5

Syllabus:

Theory
Importance of post harvest in horticultural crops. Maturity indices of fruits and vegetables. Harvesting and post harvest handling of fruits and vegetables. Maturity and ripening process. Factors affecting ripening of fruits and vegetables. Pre harvest factors affecting quality on post harvest shelf life of fruits and vegetables. Factors responsible for deterioration of harvested fruits and vegetables. Chemicals used for hastening and delaying ripening of fruits and vegetables. Methods of storage- pre-cooling, pre-storage treatments, low temperature storage, controlled atmospheric storage, hypobaric storage, irradiation and low cost storage structures. Various methods of packing for export of mango, banana, grapes, kinnow, sweet orange, mandarin etc. Importance and scope of fruit and vegetable preservation in India. Principles of preservation by heat and low temperature, chemicals and fermentation. Unit lay out- selection of site and precautions for hygienic conditions of the unit. Preservation through canning and bottling, freezing, ultraviolet and ionizing radiations, dehydration and drying. Preparation of jams, jellies, marmalades, candies, crystallized and glazed fruits, preserves, chutneys, pickles, ketchup sauce and puree. Preparation of syrups, juices, squashes and cordials. Spoilage of canned products. Biochemical, enzymatic and microbial spoilage. Preservatives permitted and prohibited in India. Colours permitted and prohibited in India.

S. No.	Topic	Dates
1	Importance of post harvest in horticultural crops	08.07.2015
2	Maturity indices of fruits and vegetables	15.07.2015
3	Harvesting and post harvest handling of fruits and vegetables	22.07.2015
4	Maturity and ripening process	25.07.2015
5	Factors affecting ripening of fruits and vegetables	29.07.2015
6	Pre harvest factors affecting quality on post harvest shelf life of fruits and vegetables	01.08.2015
7	Factors responsible for deterioration of harvested fruits and vegetables Chemicals used for hastening and delaying ripening of fruits and vegetables	05.08.2015
8	Methods of storage- precooling, pre-storage treatments, low temperature storage	12.08.2015
9	Methods of storage- controlled atmospheric storage, hypobaric storage, irradiation and low cost storage structures	19.08.2015

10	Various methods of packing for export of mango, banana, grapes, kinnow, sweet orange, mandarin etc.	22.08.2015
11	Importance and scope of fruit and vegetable preservation in India	26.08.2015
12	Principles of preservation by heat, low temperature, chemical & fermentation	02.09.2015
13	Unit lay out- selection of site and precautions for hygienic conditions of the unit	09.09.2015
14	Preservation through canning and bottling,	16.09.2015
15	Preservation through freezing, ultraviolet and ionizing radiations	19.09.2015
16	Preservation through dehydration and drying	07.10.2015
17	Preparation of jams, jellies and marmalades	14.102015
18	Preparation of candies, crystallized, glazed fruits and preserves	17.10.2015
19	Preparation of chutneys, pickles, ketchup, sauces & puree	28.10.2015
20	Preparation of syrups, juices, squashes and cordials	31.10.2015
21	Spoilage of canned products, Biochemical, enzymatic and microbial spoilage	18.11.2015
22	Preservatives and colours permitted and prohibited in India	21.11.2015

SYLLABUS & LECTURE SCHEDULE

Course No.: HORT 311 **Class:** B.Sc. Ag. (Hons.) Pt. III **Credit Hours:** 3 (2+1)
Course Title: Postharvest Management and Value Addition of Fruits and Vegetables
Batch: B **Periods:** Wednesday-3, Friday-6
Venue: UG Class Block, Room Number-6

Syllabus:

Importance of post harvest in horticultural crops. Maturity indices of fruits and vegetables. Harvesting and post harvest handling of fruits and vegetables. Maturity and ripening process. Factors affecting ripening of fruits and vegetables. Pre harvest factors affecting quality on post harvest shelf life of fruits and vegetables. Factors responsible for deterioration of harvested fruits and vegetables. Chemicals used for hastening and delaying ripening of fruits and vegetables. Methods of storage- pre-cooling, pre-storage treatments, low temperature storage, controlled atmospheric storage, hypobaric storage, irradiation and low cost storage structures. Various methods of packing for export of mango, banana, grapes, kinnow, sweet orange, mandarin etc. Importance and scope of fruit and vegetable preservation in India. Principles of preservation by heat and low temperature, chemicals and fermentation. Unit lay out- selection of site and precautions for hygienic conditions of the unit. Preservation through canning and bottling, freezing, ultraviolet and ionizing radiations, dehydration and drying. Preparation of jams, jellies, marmalades, candies, crystallized and glazed fruits, preserves, chutneys, pickles, ketchup sauce and puree. Preparation of syrups, juices, squashes and cordials. Spoilage of canned products. Biochemical, enzymatic and microbial spoilage. Preservatives permitted and prohibited in India. Colours permitted and prohibited in India.

S. No.	Topic	Dates
1	Importance of post harvest in horticultural crops	08.07.2015
2	Maturity indices of fruits	10.07.2015
3	Maturity indices of vegetables	15.07.2015
4	Harvesting and post harvest handling of fruits and vegetables	17.07.2015
5	Maturity and ripening process	22.07.2015
6	Factors affecting ripening of fruits and vegetables	24.07.2015
7	Pre harvest factors affecting quality on post harvest shelf life of fruits and vegetables	29.07.2015
8	Factors responsible for deterioration of harvested fruits and vegetables	31.07.2015
9	Chemicals used for hastening and delaying ripening of fruits and vegetables	05.08.2015
10	Methods of storage- precooling, pre-storage treatments, low temperature storage	07.08.2015
11	Methods of storage- controlled atmospheric storage, hypobaric storage	12.08.2015

12	Methods of storage- irradiation and low cost storage structures	14.08.2015
13	Various methods of packing for export of mango, banana, grapes, kinnow, sweet orange, mandarin etc.	19.08.2015
14	Importance and scope of fruit and vegetable preservation in India	21.08.2015
15	Principles of preservation by heat and low temperature	26.08.2015
16	Principles of preservation by chemical and fermentation	28.08.2015
17	Unit lay out- selection of site and precautions for hygienic conditions of the unit	02.09.2015
18	Preservation through canning and bottling	04.09.2015
19	Preservation through freezing, ultraviolet and ionizing radiations	09.09.2015
20	Preservation through dehydration and drying	11.09.2015
21	Preparation of jams, jellies and marmalades	16.09.2015
22	Preparation of candies and crystallized fruits	18.09.2015
23	Preparation of glazed fruits and preserves	07.10.2015
24	Preparation of chutneys and pickles	09.10.2015
25	Preparation of ketchup, sauces & puree	14.10.2015
26	Preparation of syrups and juices	16.10.2015
27	Preparation of squashes and cordials	23.10.2015
28	Spoilage of canned products	28.10.2015
29	Biochemical, enzymatic and microbial spoilage	30.10.2015
30	Preservatives permitted and prohibited in India	18.11.2015
31	Colours permitted and prohibited in India	20.11.2015

SYLLABUS & LECTURE SCHEDULE

Class: M.Sc. Ag. (Hort) **Course No.:** HORT 532 **Credit Hours:** 3 (2 + 1)
Course Title: Post Harvest Technology of Horticultural crops
Theory Periods: Monday-1, Thursday-6 **Practical Periods:** Tuesday – 4,5
Venue: Seminar Room, Department of Horticulture (Theory), PHT Laboratory (Practical)

Syllabus Theory:

UNIT I: Maturity indices, harvesting practices for specific market requirements, influence of pre-harvest practices, enzymatic and textural changes, respiration, transpiration.
UNIT II: Physiology and biochemistry of fruit ripening, ethylene evolution and ethylene management, factors leading to post-harvest loss, pre-cooling.
UNIT III: Treatments prior to shipment, viz., chlorination, waxing, chemicals, biocontrol agents and natural plant products. Methods of storageventilated, refrigerated, MAS, CA storage, physical injuries and disorders.
UNIT IV: Packing methods and transport, principles and methods of preservation, food processing, canning, fruit juices, beverages, pickles, jam, jellies, candies.
UNIT V:Dried and dehydrated products, nutritionally enriched products, fermented fruit beverages, packaging technology, processing waste management, food safety standards.

Syllabus Practical

Analyzing maturity stages of commercially important horticultural crops, improved packing and storage of important horticultural commodities, physiological loss in weight of fruits and vegetables, estimation of transpiration, respiration rate, ethylene release and study of vase life extension in cut flower using chemicals, estimation of quality characteristics in stored fruits and vegetables, cold chain management - visit to cold storage and CA storage units, visit to fruit and vegetable processing units, project preparation, evaluation of processed horticultural products.

LECTURE SCHEDULE - THEORY

S. No.	Topic	Dates
1	Maturity indices	09.07.2015
2	Harvesting practices for specific market requirements	13.07.2015
3	Influence of pre-harvest practices on shelf life and quality	16.07.2015
4	Enzymatic and textural changes during ripening	20.07.2015
5	Respiration	23.07.2015
6	Transpiration	27.07.2015
7	Physiology and biochemistry of fruit ripening	30.07.2015
8	Ethylene evolution and ethylene management	03.08.2015
9	Factors leading to post-harvest loss	06.08.2015
10	Pre-cooling	10.08.2015
11	Treatments prior to shipment – chlorination, waxing, chemicals	13.08.2015
12	Biocontrol agents and natural plant products	17.08.2015
13	Methods of storage – ventilated and refrigerated	20.08.2015
14	Modified atmosphere packaging	24.08.2015

15	Controlled atmosphere storage	27.08.2015
16	Physical injuries and disorders.	03.09.2015
17	Packing methods and transport	07.09.2015
18	Principles of preservation	10.09.2015
19	Methods of preservation	14.09.2015
20	Canning	17.09.2015
21	Fruit juices, beverages	05.10.2015
22	Pickles	08.10.2015
23	Jams, jellies	12.10.2015
24	Candies	15.10.2015
25	Dried and dehydrated products	19.10.2015
26	Nutritionally enriched products	26.10.2015
27	Fermented fruit beverages	29.10.2015
28	Packaging technology	02.11.2015
29	Processing waste management	05.11.2015
30	Food safety standards	09.11.2015

LECTURE SCHEDULE: PRACTICALS

S. No.	Topic	Dates
1	Analyzing maturity stages of commercially important horticultural crops	14.07.2015
2	Improved packing and storage of important horticultural commodities	21.07.2015
3	Physiological loss in weight of fruits and vegetables	28.07.2015
4	Estimation of transpiration	04.08.2015
5	Estimation of respiration rate	11.08.2015
6	Estimation of ethylene release	18.08.2015
7	Study of vase life extension in cut flower using chemicals	25.08.2015
8	Estimation of quality characteristics in stored fruits and vegetables: Physical characteristics	01.09.2015
9	Estimation of quality characteristics in stored fruits and vegetables: TSS and Acidity	08.09.2015
10	Estimation of quality characteristics in stored fruits and vegetables: Ascorbic acid	15.09.2015
11	Estimation of quality characteristics in stored fruits and vegetables: Sugars	06.10.2015
12	visit to cold storage, CA storage and processing units	20.10.2015
13	Project preparation	27.10.2015
14	Evaluation of processed horticultural products: Chemical evaluation	03.11.2015
15	Evaluation of processed horticultural products: Textural and colourimetric	10.11.2015

SYLLABUS & LECTURE SCHEDULE

Course No.: HORT 623 **Class:** Ph.D. (Horticulture) **Credit Hours:** 3 (2+1)
Course Title: Advances in Growth regulation of Fruit Crops
Theory Periods: Monday-4, Friday-4
Practical Periods: Saturday 4,5
Venue: Seminar Room, Department of Horticulture

Syllabus: Theory

UNIT I: Ecophysiological influences on growth and development of fruit crops, flowering, fruit set- Crop load and assimilate partitioning and distribution.
UNIT II :Root and canopy regulation, study of plant growth regulators in fruit culture- structure, biosynthesis, metabolic and morphogenetic effects of different plant growth promoters and growth retardants.
UNIT III: Absorption, translocation and degradation of phytohormones – internal and external factors influencing hormonal synthesis, biochemical action, growth promotion and inhibition, canopy management for fertigated orchards.
UNIT IV:Growth regulation aspects of propagation, embryogenesis, seed and bud dormancy, fruit bud initiation, regulation of flowering, off season production.
UNIT V:Flower drop and thinning, fruit set and development, fruit drop, parthenocarpy, fruit maturity and ripening and storage, molecular approaches in crop growth regulation- current topics.

Syllabus: Practical

Root- shoot studies, quantifying the physiological and biochemical effects of physical and chemical growth regulation, bioassay and isolation through chromatographic analysis for auxins, gibberellins, experiments on growth regulation during propagation, dormancy, flowering, fruit set and fruit development stages.

LECTURE SCHEDULE: Theory

S. No.	Topic	Dates
1	Ecophysiological influences on growth and development of fruit crops flowering	08.07.2015
2	Crop load and assimilate partitioning and distribution	10.07.2015
3	Root and canopy regulation	15.07.2015
4	Auxins- Structure and biosynthesis	17.07.2015
5	Auxins- Metabolic and morphogenetic effects	22.07.2015
6	Gibberellins- Structure and biosynthesis	24.07.2015
7	Gibberellins- Metabolic and morphogenetic effects.	29.07.2015
8	Cytokinins- Structure and biosynthesis.	31.07.2015
9	Cytokinins- Metabolic and morphogenetic effects.	05.08.2015
10	ABA- Structure and biosynthesis	07.08.2015
11	ABA- Metabolic and morphogenetic effects.	12.08.2015
12	Ethylene- Structure and biosynthesis	14.08.2015
13	Ethylene- Metabolic and morphogenetic effects.	19.08.2015
14	Third generation PGRs – Structure and biosynthesis.	21.08.2015
15	Third generation PGRs – Metabolic and morphogenetic effects.	26.08.2015

16	Growth retardants- Structure and biosynthesis	28.08.2015
17	Growth retardants- Metabolic and morphogenetic effects.	02.09.2015
18	Absorption, translocation and degradation of phytohormones	04.09.2015
19	Internal and external factors influencing hormonal synthesis	09.09.2015
20	Biochemical action	11.09.2015
21	Growth promotion and inhibition	16.09.2015
22	Canopy management for fertigated orchards.	18.09.2015
23	Growth regulation aspects of propagation	07.10.2015
24	Embryogenesis	09.10.2015
25	Seed and bud dormancy	14.10.2015
26	Fruit bud initiation, regulation of flowering	16.10.2015
27	Off season production	23.10.2015
28	Flower drop and thinning	28.10.2015
29	Fruit set, development, fruit drop and parthenocarpy	30.10.2015
30	Fruit maturity, ripening and storage	18.11.2015
31	Molecular approaches in crop growth regulation.	20.11.2015

Practical

S. No.	**Topic**	**Dates**
1	Experiments on root- shoot studies	25.07.2015
2	Quantifying the physiological and biochemical effects of physical and chemical growth regulation	01.08.2015
3	bioassay and isolation through chromatographic analysis for auxins	22.08.2015
4	Experiments on growth regulation during propagation, dormancy flowering, fruit set and fruit development stages.	19.09.2015
5	Experiments on growth regulation during dormancy	17.10.2015
6	Experiments on growth regulation during flowering and fruit set	31.10.2015
7	Experiments on growth regulation during fruit development stages.	21.11.2015

DEPARTMENT OF AGRICULTURAL ECONOMICS AND MANAGEMENT

Course No. - AGECO 211 Cr. Hrs. 2 (1+1) Batch A

Title- Agricultural Finance and Cooperation

Theory			
S. No.	**Topics**	**Lectures**	**Date**
1	Meaning, Nature and Scope of Agricultural Finance	1	14.07.2015
2	Meaning, Definition, Need and Classification of Agricultural credit.	1	21.07.2015
3	Classification of Agricultural credit, 3 Rs of Credit Analysis	1	28.07.2015
4	5Cs and7 Ps of Credit Analysis Repayment Plans	1	4.08.2015
5	Repayment Plans ,Nationalization of Commercial Banks	1	11.08.2015
6	Lead bank scheme	1	18.08.2015
7	Revision		25.08.2015
8	Regional Rural Banks	1	01.09.2015
9	Meaning and Objectives of higher financing agencies Via.: RBI, NABARD, World Bank	1	08.09.2015
10	Meaning, Objectives, Advantage of Crop Insurance and its laminations in Application	1	15.09.2015
11	Scale of Finance	1	22.09.2015
12	Revision		29.09.2015
13	Cooperative Credit Structure	1	06.10.2015
14	PACS and FSCS	1	20.10.2015
15	History of Indian Cooperative Movement	1	27.10.2015
16	Philosophy, Principle of Agricultural Cooperation	1	03.11.2015
17	Successful cooperative systems in Gujarat and Maharashtra	1	17.11.2015
18	Revision	1	24.11.2015

DEPARTMENT OF AGRICULTURAL ECONOMICS AND MANAGEMENT

Course No. - AGECO 211 Cr. Hrs. 2 (1+1) Batch A

Title- Agricultural Finance and Cooperation

Practical			
1	Estimation of credit needs and determining unit cost.	1	26.07.2015
2	Analysis of Balance of sheet	1	01.08.2015
3	Analysis of Income statement	1	22.08.2015
4	Analysis of Cash flow analysis	1	19.09.2015
5	Straight end repayment plan , Balloon repayment plan	1	03.10.2015
6	Amortized even repayment plan	1	17.10.2015
7	Amortized decreasing repayment plan, Compounding & Discounting method	1	31.10.2015
8	Visit/Study of PACS/DCCB	1	21.11.2015
9	Visit/Study of Apex Banks/ RRBs, CBs/ NABARD.	1	28.11.2015
11	Revision	1	28.11.2015

DEPARTMENT OF AGRICULTURAL ECONOMICS AND MANAGEMENT

Course No. - AGECO 211 Cr. Hrs. 2 (1+1) Batch B

Title- Agricultural Finance and Cooperation

Theory			
S. No.	**Topics**	**Lectures**	**Date**
1	Meaning, Nature and Scope of Agricultural Finance	1	25.07.2015
2	Meaning, Definition, Need and Classification of Agricultural credit.	1	1.08.2015
3	Classification of Agricultural credit, 3 Rs of Credit Analysis	1	22.08.2015
4	5Cs and7 Ps of Credit Analysis Repayment Plans	1	19.09.2015
5	Repayment Plans ,Nationalization of Commercial Banks	1	26.09.2015
6	Lead bank scheme	1	01.102015
7	Regional Rural Banks	1	03.10.2015
8	Meaning and Objectives of higher financing agencies Via.: RBI, NABARD, World Bank	1	08.10.2015
9	Revision	1	15.10.2015
10	Meaning, Objectives, Advantage of Crop Insurance	1	29.10.2015
11	Laminations & Application of Crop Insurance	1	31.01.2015
12	Scale of Finance, Cooperative Credit Structure, PACS and FSCS	1	19.11.2015
13	History of Indian Cooperative Movement	1	21.11.2015
14	Philosophy, Principle of Agricultural Cooperation	1	26.11.2015
15	Successful cooperative systems in Gujarat and Maharashtra	1	28.11.2015
16	Revision	1	28.11.2015

DEPARTMENT OF AGRICULTURAL ECONOMICS AND MANAGEMENT

Course No. - AGECO 211 Cr. Hrs. 2 (1+1) Batch B

Title- Agricultural Finance and Cooperation

Practical			
1	Estimation of credit needs and determining unit cost.	1	09.07.2015
2	Analysis of Balance of sheet	1	16.07.2015
3	Analysis of Income statement	1	23.07.2015
4	Analysis of Cash flow analysis	1	30.07.2015
5	Straight end repayment plan , Balloon repayment plan	1	06.08.2015
6	Amortized even repayment plan	1	13.08.2015
7	Amortized decreasing repayment plan	1	20.08.2015
8	Visit/Study of PACS/DCCB	1	27.08.2015
9	Visit/Study of Apex Banks/ RRBs, CBs/ NABARD.	1	03.09.2015
11	Compounding and Discounting	1	10.09.2015
12	Revision	1	17.09.2015
13	Revision	1	24.09.2015

Department of Plant Pathology, RCA, MPUAT, Udaipur

Title: Agricultural Microbiology Course Teacher: Dr. Rakesh Shah & Dr. R. N. Bunker
Course No.: P.Path-111 (THEORY) Credit Hrs : 3(2+1)

S. No.	Topics	No. of Lectures	Date BATCH-A	Date: BATCH- B
1.	**Introduction,** History of Microbiology: Spontaneous generation theory, Role of Microbes in fermentation, Germ theory of disease	**3**	**10, 13 &17 July 2015**	**8, 14 &15 July 2015**
2.	Protection against infection, applied areas of microbiology	**2**	**20 & 24 July 2015**	**21 & 22 July 15**
3.	**Interaction**, Metabolism in bacteria: Chemoautotrophy Photo autotrophy, respiration, fermentation.	**3**	**27, 31 July & 3 Aug.**	**28 &2 9 July & 4 Aug. 15**
4.	Bacteriophages: Structure & properties of bacterial viruses, Lytic and lysogenic cycles,viroids , prions.	**3**	**7, 10 & 14 Aug. 15**	**5, 11 &12 Aug. 15**
5.	**Quiz**, Bacterial genetics: Gene expression, Genetic recombination, transformation, conjugation and transduction	**3**	**17, 21 & 24 Aug. 15**	**18, 19 & 25 Aug. 15**
6.	Genetic engineering, Plasmids, episomes, genetically modified organisms	**3**	**28 Aug., 4 & 7 Sept.15**	**26 Aug. & 8 & 9 Sept. 15**
7.	**Interaction**, Soil Microbiology: Microbial groups in soil, Microbial transformation of carbon, nitrogen, phosphorus, and sulphur.	**3**	**11, 14 & 18 Sept.15**	**15, 16 & 29 Sept. 15**
8.	Biological Nitrogen fixation.	**1**	**5 Oct. 2015**	**30 Sept. 15**
9	Microbes in composting	**1**	**9 Oct. 2015**	**6 Oct. 15**
10.	Beneficial microorganisms in agriculture: Biofertilizer (bacterial cyanobacterial and fungal)	**3**	**12, 16 &19 Oct. 2015**	**7, 14 & 20 Oct. 15**
11.	Microbial pesticides: Microbial agents for control of plant diseases	**2**	**23 &26 Oct. 2015**	**17 & 18 Nov. 15**
12.	Biodegradation & Biodegradable plastics,	**1**	**2 Nov. 2015**	**19 Nov. 15**
13.	Biogas production	**1**	**16 Nov. 2015**	**20 Nov. 15**
14.	Revision	**1**	**20 Nov. 2015**	**23 Nov.15**

Suggested Readings:

Mukherjee, N. ;Gosh T. (1998). Agricultural Microbiology, Kalyani Publishers, New Delhi.

Coyne,Mark.S. (1999). Soil Microbiology: An explanatory approach, Delmas Publishers, ITA.

Biswas, T.D. and Mukherjee, S.K. (1990). Text Book of Soil Sciences, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Rao, N.S. (2000) Soil Microbiology, Oxford & IBH Publishing Co.Pvt.Ltd.,New Delhi.

Pelczar,Michael,J.; Chan, E.C.S. and Krieg, N.R. 2001. Microbiology, Fifth Edition, Tata McGraw Hill Publishing Company, New Delhi.

PRACTICAL COURSE (BATCH-A) Dr. R. N. Bunker

Course No.: P.Path-111 Credit Hrs : 3(2+1)

S. No.	Topic	No. of Lectures	Date	
			BATCH-A1	BATCH-A2
1.	General instructions, familiarizations with instruments, materials, glasswares, etc. in a microbiology laboratory.	**1**	**9 July 15**	**14 July 15**
2.	Practice of aseptic methods: Evaluation of aseptic technique with nutrient broth tubes, Evaluation of aseptic technique with a nutrient agar plate.	**2**	**16 & 23 July 15**	**21 & 28 July 15**
3.	Methods of sterilization and preparation of media: Preparation of nutrient broth, nutrient agar plates, nutrient agar slant and nutrient agar stab by moist heating	**2**	**30 & 6 Aug. 15**	**4 & 11 Aug. 15**
4.	Sterilization of glassware by dry heating, sterilization of nutrient broth by filtration.	**2**	**13 & 20 Aug.15**	**18 & 25 Aug. 15**
5.	Plating method for isolation and purification of bacteria: Isolation of bacteria by streak plate method,	**1**	**27 Aug.15**	**8 Sept. 15**
6.	Isolation of aerobic spore forming bacteria by enrichment using streak plate method, checking of purity of a bacterial culture by streak plating method.	**2**	**10 & 17 Sept.15**	**15 Sept. & 6 Oct. 15**
7.	Identification of bacteria by staining method and biochemical tests	**1**	**8 Oct.15**	**20 Oct. 15**
8.	Morphological examination of bacteria by simple and differential staining	**1**	**15 Oct.15**	**27 Oct. 15**
9.	Different biochemical tests for identification of bacterial cultures.	**1**	**29 Oct. 15**	**3 Nov. 15**
10.	Enumeration of bacteria: Enumeration of bacteria by stain slide method, Enumeration of bacteria by most probable number method, Enumeration of bacteria by pour plate method and spread plate method.	**2**	**19 & 23 Nov. 15**	**17 & 24 Nov. 15**

Suggested Readings:

Mukherjee, N. ;Gosh T. (1998). Agricultural Microbiology, Kalyani Publishers, New Delhi.

Coyne,Mark.S. (1999). Soil Microbiology: An explanatory approach, Delmas Publishers, ITA.

Biswas, T.D. and Mukherjee, S.K. (1990). Text Book of Soil Sciences, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Rao, N.S. (2000) Soil Microbiology, Oxford & IBH Publishing Co.Pvt.Ltd.,New Delhi.

Pelczar,Michael,J.; Chan, E.C.S. and Krieg, N.R. 2001. Microbiology, Fifth Edition, Tata McGraw Hill Publishing Company, New Delhi.

Course No.: P.Path-111 Credit Hrs : 3(2+1)

PRACTICAL COURSE (BATCH- B) Dr. Rakesh Shah

Course No.: P.Path-111 Credit Hrs : 3(2+1)

S. No.	Topic	No. of Lectures	Date	
			BATCH-B1	BATCH-B2
1.	General instructions, familiarizations with instruments, materials, glasswares, etc. in a microbiology laboratory.	**1**	**10 July 15**	**13 July 15**
2.	Practice of aseptic methods: Evaluation of aseptic technique with nutrient broth tubes, Evaluation of aseptic technique with a nutrient agar plate.	**2**	**17 & 24 July 15**	**20 & 27 July 15**
3.	Methods of sterilization and preparation of media: Preparation of nutrient broth, nutrient agar plates, nutrient agar slant and nutrient agar stab by moist heating	**2**	**31 July & 7 Aug. 15**	**3 & 10 Aug. 15**
4.	Sterilization of glassware by dry heating, sterilization of nutrient broth by filtration.	**2**	**14 & 21 Aug.15**	**17 & 24 Aug. 15**
5.	Plating method for isolation and purification of bacteria: Isolation of bacteria by streak plate method,	**1**	**28 Aug.15**	**7 Sept. 15**
6.	Isolation of aerobic spore forming bacteria by enrichment using streak plate method, checking of purity of a bacterial culture by streak plating method.	**2**	**4 & 11 Sept.15**	**14 Sept. & 5 Oct. 15**
7.	Identification of bacteria by staining method and biochemical tests	**1**	**18 Sept. 15**	**12 Oct. 15**
8.	Morphological examination of bacteria by simple and differential staining	**1**	**9 Oct.15**	**19 Oct. 15**
9.	Different biochemical tests for identification of bacterial cultures.	**1**	**16 Oct. 15**	**26 Oct. 15**
10.	Enumeration of bacteria: Enumeration of bacteria by stain slide method, Enumeration of bacteria by most probable number method, Enumeration of bacteria by pour plate method and spread plate method.	**2**	**23 & 30 Oct. 15**	**2 & 16 Nov. 15**

Suggested Readings:

Mukherjee, N. ;Gosh T. (1998). Agricultural Microbiology, Kalyani Publishers, New Delhi.

Coyne,Mark.S. (1999). Soil Microbiology: An explanatory approach, Delmas Publishers, ITA.

Biswas, T.D. and Mukherjee, S.K. (1990). Text Book of Soil Sciences, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Rao, N.S. (2000) Soil Microbiology, Oxford & IBH Publishing Co.Pvt.Ltd.,New Delhi.

Pelczar,Michael,J.; Chan, E.C.S. and Krieg, N.R. 2001. Microbiology, Fifth Edition, Tata McGraw Hill Publishing Company, New Delhi.

Lecture and Practical Schedule for MBB 311

Introductory Biochemistry (2 + 1)

Theory:

S. No.	Topics	No. of classes	No. of Theory Classes schedule	
			Batch A	Batch B
1	Introduction and importance of bio chemistry	1	Week 1	Week 1
2	Plant cell, cell wall and it's role in live stock food and paper industry	1	Week1	Week1
3	Amino acids, classification, chemistry	1	Week1	Week1
4	Proteins, definition, classification, peptides	1	Week1	Week1
5	Structure of protein, denaturation of protein, conjugate proteins, properties of proteins oligomeric proteins, nutritional importance of proteins.	2	Week2	Week2
6	Enzymes, properties of enzymes, classification Km , IU, turn over no., factors affecting enzyme activity, coenzymes and co- factors, isoenzymes, regulation of enzyme activity. Immobilized enzymes and their industrial application	2	Week3	Week3
7	Lipids, definition ,classification, saponification, rancidity, iodine number, acid value, bio membrane	2	Week4	Week4
8	Carbohydrate, classification, chemistry of glucose, mutarotation, isomers of sugars, polysaccharides.	2	Week5	Week5
9	DNA, RNA, nucleotides and nucleosides, replication, transcription, translation, genetic code, ribosomes.	2	Week6	Week6
10	Glycolysis, substrate level synthesis of ATP, LD, AD.	1	Week7	Week7
11	Oxidative degradation of fatty acids	1	Week7	Week7
12	TCA	1	Week8	Week8
13	ETC, oxidative phosphorylation	1	Week8	Week8
14	Plastic nylon and bio degradable plastic	1	Week9	Week9
15	Pentose phosphate pathway and its significance	1	Week9	Week9
16	Biosynthesis of starch, gluconeogenesis and glycogenesis	2	Week10	Week10
17	Biosynthesis of lipids : fatty acid synthesis and TG synthesis	2	Week11	Week11
18	Biosynthesis of proteins	2	Week 12	Week 12
19	Biosynthesis of DNA and RNA	2	Week13	Week13
20	Secondary metabolites, Alkoloids	1	Week14	Week14
21	Phenols and terpenes and terpenoids and their industrial applications	1	Week14	Week14
22	Paints varnishes and lubricants	1	Week15	Week15
23	Biodiesel	1	Week15	Week15
24	Soaps and detergents	1	Week16	Week16
25.	Revision	6	Week16-18	Week16- 18

Practicals:

S. No.	Practical	No. of classes	Practical class Schedule	
			Batch A	Batch B
1	Estimation of chlorophyll in plant tissue	1	Week1-2	Week1-2
2	Estimation of protein by Folin Lowry method	1	Week3-4	Week3-4
3	Protein denaturation	1	Week5-6	Week5-6
4	Extaction and estimation of DNA	2	Week7-10	Week7-10
5	Separation of plant pigments by paper chromatography	1	Week11	Week11
6	Resolution of lipids by TLC	1	Week12	Week12
7	Estimation of amylase activity in germinating seeds	1	Week13-15	Week13-15
8	Estimation of water soluble sugats	1	Week16	Week16
9	Estimation of fatty acids by GLC	1	Week17-18	Week17-18

Lecture and Practical Schedule for MBB 511
PRINCIPLES OF BIOTECHNOLOGY (2+1)

Theory:

S.No.	Topic	Lecture	No. of Theory Classes schedule
1	History, scope and importance	2	Week1
2	DNA structure and function	2	Week2
3	DNA modifying enzymes	2	Week3
4	Vectors and Methods of recombinant DNA technology	4	Week4-5
5	Nucleic acid hybridization	1	Week6
6	Gene libraries	1	Week6
7	PCR amplification	2	Week7
8	Plant and animal cell, tissue culture techniques and their applications	2	Week8
9	Molecular markers and their applications	2	Week9
10	DNA sequencing	2	Week10
11	Applications of gene cloning in basic and applied research	2	Week11
12	Genetic engineering and transgenics	2	Week12
13	Genomics, transcriptomics and proteomics	2	Week13
14	General application of biotechnology in Agriculture, Medicine, Animal husbandry, Environmental remediation, Energy production and Forensics	4	Week14-15
15	Public perception of biotechnology and Bio-safety and bioethics issues	2	Week16
16	Intellectual property rights in biotechnology	2	Week17
17	Revision	2	Week18
	Total lectures	36	

Practicals:

Sr.No.	Topic	Practices	No. of Practical schedule
1	PCR: RAPD and Primer designing	1	Week1
2	Isolation of Genomic DNA	2	Week 2-3
3	Agarose gel electrophoresis	1	Week4
4	Qualitative and quantitative analysis of DNA	1	Week5
5	DNA sequencing	1	Week6
6	Molecular marker analysis	1	Week7
7	Restriction Digestion	1	Week8
8	Transformation	2	Week9-10
9	Plant tissue culture	3	Week11-13
10	Visit to Industry	2	Week 14
11	Revision, Assignments	4	Week 15-18

Lecture and Practical Schedule for MBB 513

MOLECULAR CELL BIOLOGY (3+0)*

S. No.	Topic	Lecture	No. of Theory Classes schedule
1	General structure and constituents of cell	1	Week 1
2	Similarities and distinction between plant and animal cells	1	week 1
3	Cell wall	1	Week 1
4	Cell membrane	1	week 2
5	Structure and composition of biomembranes	2	Week 2
6	cell surface related functions	2	Week 3
7	Nucleus	1	Week 3
8	Chloroplasts	3	Week 4
9	Mitochondria	3	Week 5
10	Ribosomes	2	Week 7
11	Lysosomes, Peroxisomes	1	Week 7
12	Term paper	3	Week 8
13	Endoplasmic reticulum, Microbodies, Golgi apparatus, Vacuoles	3	Week 9
14	Organellar genomes and their manipulation, Ribosomes in relation to cell growth and division	3	Week 10
15	Cyto-skeletal elements	3	Week 11
16	Cell division and regulation of cell cycle	3	Week 12
17	Membrane transport	3	Week 13
18	Transport of water, ion and biomolecules	3	Week 14
19	Signal transduction mechanisms	3	Week 15
20	Protein targeting.	3	Week 16
21	Revision	6	Week 17-18

Lecture and Practical Schedule for MBB 622

ADVANCES IN MICROBIAL BIOTECHNOLOGY (2+1)

S. No.	Lecture Topic	Number of Lectures for each topic	No. of Theory Classes schedule
	Theory		
1.	Fermentative metabolism and development of bioprocessing technology	2	Week 1
2.	Processing and production of recombinant products	2	Week 2
3.	Isolation, preservation and improvement of industrially important microorganisms	2	Week 3
4.	Immobilization of enzymes and cells	2	Week 4
5.	Batch, plug flow and chemostate cultures, Computer simulations	1	Week 5
6.	Fed-batch and mixed cultures	1	Week 6
7.	Scale-up principles; Down stream processing etc	2	Week 7
8.	Current advances in production of antibiotics, Vaccines and biocides,	2	Week 8
9.	Steroid transformation	1	Week 9
10.	Bioreactors	1	Week 9
11.	Bioprocess engineering	1	Week 10
12.	Production of non-microbial origin products by genetically engineered microorganisms	1	Week 10
13.	Concept of probiotics and applications of new tools of biotechnology for quality feed/food production	1	Week 11
14.	Microorganisms and proteins used in probiotic, Lactic acid bacteria as live vaccines	1	Week 11
15.	Factors affecting delignification	1	Week 12
16.	Bioconversion of substrates	1	Week 12
17.	Anti-nutritional factors present in feeds	1	Week 13
18.	Single cell protein, Bioinsecticides, Biofertilizers	1	Week 13
19.	Recent advances in microbial biotechnology	2	Week 14
20.	Revision and Term Paper	8	Week 15-18
	Practical		
1.	Enrichment culture and isolation of agriculturally important microorganisms	2	Week 1-2
2.	Isolation of antibiotic producing microorganisms	2	Week 3-4
3.	Isolation of industrially important microorganisms, their maintenance and improvement.	2	Week 5-6
4.	Production of industrial compounds such as industrial alcohol/ citric acid/lactic acid and their recovery.	4	Week 7-10
5.	Study of bio-reactors and their operations.	2	Week 11-13
6.	Demonstration of bioinsecticides / biofertlizers production.	2	Week 14-15

Department of Plant Pathology, RCA, MPUAT- Udaipur

Title: Detection and Diagnosis of Plant Diseases, Course teacher: Dr. R. N. Bunker

M. Sc. (Ag.), Ist Semester, Course PL PATH- 513, Credit Hrs. 3 (0+3), Non Core course (Session 2015-16)

S. No.	Topic	No. of lecture	Date
1.	**Introduction**: To impart training on various methods/techniques /instruments used in the study of plant diseases/pathogens	2	9 &13 July 2015
2.	Different types of culture media and their Preparation for cultivation of fungi and Bacteria	3	15, 16 & 20 July 15
3.	**Isolation and purification:** Pure culture techniques, use of selective media to isolate pathogens	4	22, 23, 27 & 29 July 2015
4.	Methods to prove Koch's postulates with biotroph and necrotroph Pathogens (**Interaction to students**)	4	30 July and 3, 5,6 Aug. 2015
5.	Preservation of plant pathogens and disease specimens. (1) Dry preservation, (2) Wet preservation (3) Green preservation	3	10, 12 & 13 Aug.15
6.	Use of haemocytometer, micrometer, centrifuge and pH meter **(Quize)**	5	17, 19, 20, 24 & 26 Aug. 2015
7.	Microscopic techniques and staining methods, image analysis Software and phase contrast system	4	27 Aug. and 2, 3 &7 Sept. 2015
8.	Spectrophotometer, ultracentrifuge and electrophoretic apparatus for disease diagnostics,	5	9, 10, 14, 16 &17 Sept. 2015
9.	Serological and molecular techniques for detection of plant pathogens.	5	1, 5, 7, 8 &12 Oct. 2015
10.	Evaluation of fungicides, bactericides and bioagents *in vitro*	5	14, 15, 19, 26 & 28 Oct. 2015
11.	Data collection and preparation of manuscripts.	3	29 Oct., 2 & 16 Nov
12.	**Revision**	3	18, 19 and 23 Nov. 2015

Suggested Readings:

Aneja, K.R.(Ed.) 2003. Experiments in Microbiology, Plant Pathology and Biotechnology. IV Edition, New Age International (P) Ltd.

Baudoin ABAM, Hooper GR, Mathre DE & Carroll RB. 1990. *Laboratory Exercises in Plant Pathology: An Instructional Kit*. Scientific Publ., Jodhpur.

Vishunawat K. and S J Kolte 2005: Essentials of Phytopathological Techniques. Kalyani Publication, New Delhi

Dhingra OD & Sinclair JB. 1986. *Basic Plant Pathology Methods*. CRC Press, London, Tokyo.

Fox RTV. 1993. *Principles of Diagnostic Techniques in Plant Pathology*. CABI Wallington.

Mathews REF. 1993. *Diagnosis of Plant Virus Diseases*. CRC Press, Boca Raton, Tokyo.

Pathak VN. 1984. *Laboratory Manual of Plant Pathology*. Oxford & IBH, New Delhi.

Forster D & Taylor SC. 1998. *Plant Virology Protocols: From Virus Isolation to Transgenic Resistance*. *Methods in Molecular Biology*. Humana Press, Totowa, New Jersey.

Trigiano RN, Windham MT & Windham AS. 2004. *Plant Pathology- Concepts and Laboratory Exercises*. CRC Press, Florida.

Chakravarti BP. 2005. *Methods of Bacterial Plant Pathology*. Agrotech, Udaipur

PL PATH 511 **MYCOLOGY** **2+1**
(Core Course)

Lecture Schedule

Title	No. of Lecture	Date
(1) Introduction, definition of different terms, basic concepts.	3	8,10 and 15th July 2015
(2) Importance of mycology in agriculture, relation of fungi to human affairs,	2	22 and 24th July 2015
(3) History of mycology.	1	29th July 2015
(4) Concepts of nomenclature and classification,	2	5 and 7th August 2015
(5) Fungal biodiversity,	2	12 and 14th August 2015
(6) Reproduction in fungi.	5	19,21,26,28th August and 2nd September 2015
(7) The comparative morphology, ultra structure, characters of different groups of fungi up to generic level according to latest classification based on Kingdoms and Phyla *viz.,* Protozoa, Chromista, and Fungi. Myxomycota, Oomycota, Chytridiomycota, Zygomycota, Basidiomycota, Ascomycota.	13	9,11,16,30th Sep, 7,9,14,16,23,28th October 2015
(8) Fungi imperfecti.	2	30 October, 4th November 2015
(9) Lichens types and importance,	2	6 and18th November 2015
(10)Fungal genetics and variability in fungi.	2	20 and 27th November 2015.

Practical

Detailed comparative study of different groups of fungi; collection, identification and preservation of specimens. Isolation and identification of plant pathogenic fungi.

Title: Diseases of Horticultural Crops and Their Management

Course No. P. Path. 311 Credit Hrs. 3(2+1)

Theory: Lecture schedule:

S.No.	Topic	No. of Lectures	Date
Theory: Economic importance, symptoms, causes, disease cycle and integrated management of diseases of			
1.	**Citrus:** canker, Decline (Dieback, Gummosis,CTV)	2	
2.	**Mango**: Anthracnose, malformation and powdery mildew,	2	
3.	**Banana**: Panama wilt, buncy top,	2	
4.	**Grape-vine**: Downy mildew, Anthracnose;	2	
5.	**Papaya:** Foot rot, ring spot	2	
6.	**Guava:** wilt, Anthracnose	2	
7.	**Ber:** Powdery mildew, **Aonla**: Rust	1	
8.	**Tomato:** Early blight, leaf curl, potato virus and TSWV	2	
9.	**Chilli:** Dieback, leaf curl, mosaic	2	
10.	**Brinjal:** Little leaf, Phomopsis blight	1	
11.	**Okra:** Yellow vein mosaic, Powdery mildew	1	
12.	**Potato:** Late blight, leaf roll, mosaic PVX, PVY	2	
13.	**Cabbage & cauliflower:** Damping off, Black rot	2	
14.	**Onion:** Purple blotch, smudge, **Ginger**: Rhizome rot	2	
15.	**Cumin-**wilt, blight & Powdery mildew	2	
16.	**Rose**: Powdery mildew, **Chrysanthemum**: Rust, **Gladiolus**: corn rot and wilt	2	

Practical:

S.No.	Topic	No. of Lectures
1.	Study of symptoms, etiology, and specific control measures of the following crop diseases: citrus , guava, papaya, ber, mango, grapes, Banana, Anola, chilli, brinjal, okra, crucifers, cucurbits, potato, tomato, ginger, onion, cumin, rose and gladiolus, Chryasanthemum.	12
2.	Field visits at appropriate time during the semester,	3
3.	**Note**: Student should submit at least 25 pressed well mounted specimens in 3 installments during the semester.	3

Suggested Readings:

Singh, R.S. 2000. Diseases of fruit crops: Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.

Cook, A.A. 1981 Diseases of tropical and sub-tropical field, fiber and oil plants: Mac Millan Publishing Co., New York.

Rangaswamy, G. and Mahadevan, A. 2001. Diseases of Crop Plants in India: Prentice Hall of India Pvt. Ltd., New Delhi.

Sohi, H.S. 1992. Diseases of Ornamental Plants in India. ICAR, New Delhi

Singh, R. S. 1985. Disease of vegetable crops: Oxford & IBH publishing Co. Pvt. Ltd. New Delhi.

Thind, T.S. 2001. Diseases of fruits and vegetables and their management. Klyani Publishers, New Delhi.

Arun Arya 2004. Tropical fruits Diseases and pests. Kalyani publishers, New Delhi.

Singh S.J. 1996, Advances in Diseases of fruits crops in India. kalyani Publisher, Ludhiana (Punjab, New Delhi)

Gupta, V.K. & Paul, Y.S. 2001: Diseases of vegetable crops, Kalyani Publisher, Ludhiana (Punjab, New Delhi)

Dr. R.S. Ratnoo
Teacher Incharge
Year. 2015-16

Department of Plant Pathology
Rajasthan College of Agriculture, Udaipur
Lecture Schedule

PL PATH-538 EPIDEMOLOGY AND FORECASTING OF PLANT DISEASES AND ASSESMENT OF LOSSES Course Teacher:Dr Amit Trivedi

S. No	Topic	No. of lectures	dates
Theory			
1.	Epidemic concept	01	9.7.15
2.	Historical Development	02	13.7.15; 16.7.15
3.	Socio-economic importance of plant disease epidemics	02	20.75; 23.7.15
4.	Pathometery and crop growth stages	02	27.7.15; 30.7.15
5.	Epidemic growth and analysis	03	3.8.15; 6.8.15; 10.8.15
6.	Climatic changes and plant diseases	02	13.8.15; 17.8.15
7.	Common and Natural Logarithms	01	20.8.15
8.	Function fitting area under disease progress curve and correction factors	01	24.8.15
9.	Innoculum dynamics	03	27.8.15; 7.9.15; 10.9.15
10.	Population biology of Pathogens – Temporal and Spatial variability in plant pathogens	02	14,9,15; 17.9.15
11.	Survey, surveillance and vigilance	01	28.9.15
12.	Disease appraisal crop loss assessment and models	02	1.10.15; 5.10.15
13.	Principles and pre-requisites of forecasting	02	8.10.15; 12.10.15
14.	Systems and factors affecting various components of forecasting	02	15.10.15; 19.10.15
15.	Some early forecasting procedures based on weather and inoculam potential	02	26.10.15; 29.10.15
16.	Modeling disease growth and disease prediction	02	2.11.15; 16.11.15
Practical			
1.	Measuring diseases	02	14.7.15; 21.7.15
2.	Spore dispersal and trapping	02	28.7.15; 4.8.15
3.	Weather recording, survey	03	11.8.15; 18.8.15; 25,8,15
4.	Multiplication of inoculum	02	8.9.15; 15.9.15
5.	Computerized data analysis	02	29.9.15; 6.10.15
6.	Function fitting	02	20.10.15; 27.10.15
7.	Model preparation and validation	02	3.11.15; 17.11.15

Lecture Schedule
B Sc Ag Part I Semester First 2015-16
PBG 111: PRINCIPLES OF GENETICS "A" Batch Cr. Hr. 3(2+1)

S.No.	Lecture Topic	No of Lecture	Date of class
1.	History of Genetics. Ultra structure of typical plant cell	1	14.7.15
2.	Physical and chemical nature of protoplasm	1	21.7. 15
3.	Cell organelles: cell wall, plasma membrane and nucleus	1	25.7.15
4.	Mitochondria, chloroplast, Endosplamic reticulum, golgi body and ribsomes	1	28.7.15
5.	Chromosome structure, types and function	1	1.8.15
6.	Chemical composition of chromosome, karyotype and idiogram	1	4.8.15
7.	Mitotic cell division and its significance	1	11.8.15
8.	Meiotic cell division and significance	1	18.8.15
9.	DNA, its structure and function	1	22.8.15
10.	Different forms of DNA, their replication & repair system	1	25.8.15
11.	RNA: structure, function and types	1	1.9.15
12.	Transcription, translation, genetic code and protein synthesis	1	8.9.15
13.	Mendel's laws of inheritance	1	15.9.15
14.	Gene interaction, their types, modification of F2 ratios	1	19.9.15
15.	Multiple alleles: characteristics, ABO blood group and Rh blood group system etc.	1	6.10.15
16.	Inheritance of quantitative and qualitative characters and differences between them	1	17.10.15
17.	Pleiotrophism, penetrance and expressivity	1	20.10.15
18.	Cytoplasmic inheritance: its characteristic features and differences between chromosomal and cytoplasmic inheritance	1	27.10.15
19.	Crossing over: Mechanism, estimation of crossing over percentage and its impact on producing recombinants	1	31.10.15
20.	Linkage :types and its detection	1	3.11.15
21.	Numerical chromosomal aberrations and origin of crop species	1	17.11.15

22.	Structural chromosomal aberrations	1	21.11.15
23.	Mutation: characteristics, classification and induction	1	24.11.15

Practical Schedule: PBG 111: PRINCIPLES OF GENETICS "A1" Batch

Each practical class is of two periods

Exercise.	Name of Exercise/Lecture	Date of practical
1	Introduction to microscope and study of typing plant cell	15.7.15
2	Preparation and use of fixatives and stains	22.7.15
3	Preparation of micro slides and identification of various stage of mitosis	29.7.15
	Preparation of micro slides and identification of various stage of mitosis	5.8.15
4	Preparation of micro slides and identification of various stage of meiosis	12.8. 15
	Preparation of micro slides and identification of various stage of meiosis	19.8.15
5	Study of mono hybrid, dihybrid and trihybrid ratios	26.8.15
6	Study of test of goodness of fit of genetic ratios	2.9.15
7	Study of different types of gene interactions and modification of typical dihybrid F2	9.9.15
	Study of different types of gene interactions and modification of typical dihybrid F2	16.9.15
8	Study and detection of linkage in F2 progeny	7.10.15
	Study and detection of linkage in test cross progeny	14.10.15
9	Induction of polyploidy using colchicines	28.10.15
10	Induction of chromosomal aberrations using chemicals	18.11.15

SUGGESTED READING:

*Gupta, P.K. 2004. Cytology, Genetics and evolution. Rastogi Publications, Meerut.(Hindi Edition).

*Kaushik, M.P. 2003. A Text Book of Modern Botany. Prakash Publications, Muzaffarnagar (U.P.). *Klug, W.W. and Cummings, M.R. 2005. Concepts of genetics Pearson Education (Singapore) Pvt.
Ltd., Indian Branch, Pratap Ganj, New Delhi.

*Singh, B.D. 2001. Fundamentals of Genetics, Kalyani Publishers, New Delhi.

*Strickberger, M.W. 2001. Genetics. Prentice Hall of India Pvt. Ltd., New Delhi.

Practical Schedule: PBG 111: PRINCIPLES OF GENETICS "A2" Batch
Each practical class is of two periods

S. No.	Name of Exercise/Lecture	Date of practical
1	Introduction to microscope and study of typing plant cell	13.7.15
2	Perparation and use of fixatives and stains	20.7.15
3	Perparation of micro slides and identification of various stage of mitosis	27.7.15
	Perparation of micro slides and identification of various stage of mitosis	3.8.15
4	Perpartion of micro slides and identification of various stage meiosis	10.8.15
	Perpartion of micro slides and identification of various stage meiosis	17.8.15
5	Study of monohybrid, dihybrid and Trihybrid ratios	24.8.15
6	Study of test of goodness of fit of genetic ratios	31.8.15
7	Study of different types of gene interactions and modification of typical dihybrid F2	7.9.15
	Study of different types of gene interactions and modification of typical dihybrid F2	14.9.15
8	Study and detection of linkage in F2 and test cross progeny	5.10.15
	Study and detection of linkage in F2 and test cross progeny	12.10.15
9	Induction of polyploidy using colchicines	19.10
10	Induction of chromosomal aberrations using chemicals	26.10.15
11	Review classes	2.11.15,16.11.15 & 23.11.15

Lecture Schedule: First Semester

PBG-111 PRINCIPLES OF GENETICS 3(2+1) B

S.No.	Topic	Lecture	Date of class
1.	History of Genetics	1	10.7.15
2.	Ultra structure of typical plant cell		
3.	Physical and chemical nature of protoplasm	1	17.7. 15
4.	Cell organelles: cell wall, plasma membrane and nucleus	1	24.7.15
5.	Mitochondria, chloroplast, Endosplamic reticulum, golgi body and ribsomes	1	25.7.15
6.	Chromosome structure, types and function	1	31.7.15
7.	Chemical composition of chromosome, karyotype and idiogram	1	1.8.15
8.	Mitotic cell division and its significance	1	7.8.15
9.	Meiotic cell division and significance	1	21.8.15
10.	DNA, its structure and function	1	22.8.15
11.	Different forms of DNA, their replication & repair system	1	28.8.15
12.	RNA: structure, function and types	1	4.9.15
13.	Transcription, translation, genetic code and protein synthesis	1	11.9.15
14.	Mendel's laws of inheritance	1	18.9.15
15.	Gene interaction, their types, modification of F2 ratios	1	19.9.15
16.	Multiple alleles: characteristics, ABO blood group and Rh blood group system etc.	1	9.10.15
17.	Inheritance of quantitative and qualitative characters and differences between them	1	16.10.15
18.	Pleiotrophism, penetrance and expressivity	1	17.10.15
19.	Cytoplasmic inheritance: its characteristic features and differences between chromosomal and cytoplasmic inheritance	1	23.10.15
20.	Crossing over: Mechanism, estimation of crossing over percentage and its impact on producing recombinants	1	
21.	Linkage :types and its detection	1	30.10.15
22.	Numerical chromosomal aberrations and origin of crop species	1	31.10.15
23.	Structural chromosomal aberrations	1	20.11.15
24.	Mutation: characteristics, classification and induction	1	21.11.15

Practical PBG-111 -PRINCIPLES OF GENETICS B1			
S. No.	Name of exercise	Practical	Date of practical
1	Introduction to microscope and study of typing plant cell	1	16.7.15
2	Perparation and use of fixatives and stains	1	23.7.15
3	Perparation of micro slides and identification of various stage of mitosis	2	30.7.& 6.8.15
4	Perpartion of micro slides and identification of various stage meiosis	2	13.8.& 20.8.15
5	Study of monohybrid ratios	1	27.8.15
6	Study of dihybrid ratios	1	
7	Stydy of Trihybrid Ratios	1	3.9.15
8	Study of test of goodness of fit of genetic ratios	1	10.9.15
9	Study of different types of gene interactions and modification of typical dihybrid F2	2	17.9. & 8.10.15
10	Study and detection of linkage in F2 and test cross progeny	2	15.10 & 29.10.15
11	Induction of polyploidy using colchicines	1	19.11.15
12	Induction of chromosomal aberrations using chemicals	1	

Practical PBG-111 PRINCIPLES OF GENETICS B2			
S. No.	Name of exercise	Practical	Date of practical
1	Introduction to microscope and study of typing plant cell	1	14.7.15
2	Preparation and use of fixatives and stains	1	21.7.15
3	Preparation of micro slides and identification of various stage of mitosis	2	28.7.& 4.8.15
4	Preparation of micro slides and identification of various stage meiosis	2	11.8.& 18.8.15
5	Study of monohybrid ratios	1	25.8.15
6	Study of dihybrid ratios	1	1.9.15
7	Stydy of Trihybrid Ratios	1	8.9.15
8	Study of test of goodness of fit of genetic ratios	1	15.9.15
9	Study of different types of gene interactions and modification of typical dihybrid F2	2	6.10. & 20.10.15
10	Study and detection of linkage in F2 and test cross progeny	2	27.10 & 3.11.15
11	Induction of polyploidy using colchicines	1	17.11.15
12	Induction of chromosomal aberrations using chemicals	1	

Lecture Schedule: First Semester

PBG-211 **Principles of Plant Breeding** **3(2+1) A**

S.No.	Topic	Lecture	Date of class
1.	Introduction to ecological classification of plants.	1	10.7.15
2.	Introduction to taxonomical classification of plants.	1	13.7.15
3.	Plant breeding and its historical development.	1	17.7. 15
4.	Nature of plant breeding and its role.	1	20.7.15
5.	Different modes of reproduction: Sexual, asexual and vegetative and their role in plant breeding.	1	24.7.15
6.	Self-incompatibility types, genetic control and use in plant breeding.	1	27.7.15
7.	Male sterility types, genetic control and use in plant breeding.	1	31.7.15
8.	Apomixes types and role in plant breeding.	1	3.8.15
9.	Inheritance of qualitative and quantitative characters and heritability.	1	7.8.15
10.	Pure line theory and genetic basis of selection.	1	10.8.15
11.	Introduction to inbreeding depression and heterosis	1	17.8.15
12.	Theories of heterosis	1	21.8.15
13.	Review classes	1	24.8.15
14.	Hardy-Weinberg law	1	28.8.15
15.	Center of diversity	1	31.8.15
16.	Plant genetic resources	1	4.9.15
17.	Domestication, Introduction and acclimatization.	1	7.9.15
18.	Different type of improved genotypes	1	11.9.15
19.	Development of homozygous varieties	1	14.9.15
20.	Development of multilines	1	18.9.15
21.	Intra population improvement methods	1	9.10.15
22.	Inter population improvement methods	1	12.10.15
23.	Development of inbred lines	1	16.10.15
24.	Development of hybrids	1	19.10.15
25.	Development of synthetics	1	23.10.15
26.	Development of composites	1	26.10.15
27.	Development of clones	1	30.10.15
28.	Polyploidy in relation to plant breeding	1	2.11.15
29.	Mutation breeding- methods, uses, nature of gene mutation, mutagenic agents.	1	16.11.15
30.	Use of biotechnology in plant breeding	1	20.11.15
31.	Procedure for release of new variety.	1	23.11.15

Practical **PBG-211** **Principles of Plant Breeding** **A1**			
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	14.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	21.7 & 28.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	4.8.15
4.	Study of TS of ovaries of different plants	1	11.8.15
5.	Mounting of different ovules and their study	1	18.8.15
6.	Study of microsporogenesis	1	25.8.15
7.	Study of megasporogenesis	1	1.9.15
8.	Study of pollen viability	1	8.9.15
9.	Study of pollen size and shape	1	15.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	20.10 & 27.10.15
11.	Identification of male sterility in sorghum	1	3.11.15
12	Review class	1	17.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**A2**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	16.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	23.7 &30.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	6.8.15
4.	Study of TS of ovaries of different plants	1	13.8.15
5.	Mounting of different ovules and their study	1	20.8.15
6.	Study of microsporogenesis	1	27.8.15
7.	Study of megasporogenesis	1	3.9.15
8.	Study of pollen viability	1	10.9.15
9.	Study of pollen size and shape	1	17.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	8 & 15.10.15
11.	Identification of male sterility in sorghum	1	19.11.15

Lecture Schedule: First Semester

PBG-211 Principles of Plant Breeding 3(2+1) B

S.No.	Topic	Lecture	Date of class
1.	Introduction to ecological classification of plants.	1	8.7.15
2.	Introduction to taxonomical classification of plants.	1	
3.	Plant breeding and its historical development.	1	15.7. 15
4.	Nature of plant breeding and its role.	1	22.7.15
5.	Different modes of reproduction: Sexual, asexual and vegetative and their role in plant breeding.	1	25.7.15
6.	Self-incompatibility types, genetic control and use in plant breeding.	1	29.7.15
7.	Male sterility types, genetic control and use in plant breeding.	1	1.8.15
8.	Apomixes types and role in plant breeding.	1	5.8.15
9.	Inheritance of qualitative and quantitative characters and heritability.	1	12.8.15
10.	Pure line theory and genetic basis of selection.	1	19.8.15
11.	Introduction to inbreeding depression and heterosis	1	22.8.15
12.	Theories of heterosis	1	26.8.15
13.	Hardy-Weinberg law	1	
14.	Center of diversity	1	2.9.15
15.	Plant genetic resources	1	
16.	Domestication, Introduction and acclimatization.	1	
17.	Different type of improved genotypes	1	9.9.15
18.	Development of homozygous varieties	1	
19.	Development of multilines	1	16.9.15
20.	Intra population improvement methods	1	19.9.15
21.	Inter population improvement methods	1	7.10.15
22.	Development of inbred lines	1	14.10.15
23.	Development of hybrids	1	
24	Development of synthetics	1	17.10.15
25.	Development of composites	1	
26.	Development of clones	1	28.10.15
27.	Polyploidy in relation to plant breeding	1	31.10.15
28.	Mutation breeding- methods, uses, nature of gene mutation, mutagenic agents.	1	
29.	Use of biotechnology in plant breeding	1	18.11.15
30.	Procedure for release of new variety.	1	21.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**B1**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	13.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	20 &27.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	3.8.15
4.	Study of TS of ovaries of different plants	1	10.8.15
5.	Mounting of different ovules and their study	1	17.8.15
6.	Study of microsporogenesis	1	24.8.15
7.	Study of megasporogenesis	2	31.8. & 7.9.15
8.	Study of pollen viability	1	14.9.15
9.	Study of pollen size and shape	1	5.10.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	12 &19.10.15
11.	Identification of male sterility in sorghum	1	26.10.15
12	Review class		2 .11.15&16.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**B2**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	10.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	17&24.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	31.7.15
4.	Study of TS of ovaries of different plants	1	7.8.15
5.	Mounting of different ovules and their study	1	21.8.15
6.	Study of microsporogenesis	1	28.8.15
7.	Study of megasporogenesis	1	4.9.15
8.	Study of pollen viability	1	11.9.15
9.	Study of pollen size and shape	1	18.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	9 &16.10.15
11.	Identification of male sterility in sorghum	1	23.10.15
12.	Review class	2	30.10 & 20.11.15

Lecture Schedule: First Semester

PBG- 511 PRINCIPLES OF GENETICS 3(2+1)

S.No.	Topic	Lecture	Date of class
1.	Historical perspective of Genetics	1	10.7.15
2.	Mendelian Principle of Genetics	1	
3.	Inheritance of Simple Characters in monohybrid and dihybrid Crosses.	1	15.7. 15
4.	Type of Gene interactions.	1	17.7.15
5.	Concept and types of Linkage.	1	22.7.15
6.	Detection of Linkage through F_2 and test cross ratios.	1	24.7.15
7.	Phenomenon of crossing over and its estimation.	1	29.7.15
8.	Multiple alleles with some classical examples.	2	31.7 & 5.8.15
9.	Mechanisms of sex determination in animals and plants.	1	7.8.15
10.	Sex linked, sex influenced and sex limited characters, their inheritance with suitable example.	1	12.8.15
11.	Recombination test and *cis*- trans test or complementation test.	1	19.8.15
12.	Complex loci or pseudo alleles, fine structure of gene in Eukaryotes and Genetic control of metabolism.	1	21.8.15
	Review class	1	26.8.15
13.	Genetic material, nature, organization and structure.	1	28.8.15
14.	Replication of genetic material.	1	
15.	Genetic code, transcription and translation.	1	2.9.15
16.	Gene regulation in prokaryotes.	1	4.9.15
17.	Gene regulation in Eukaryotes.	1	9.9.15
18.	Split genes, transcriptional and post transcriptional regulation, Dynamic nature of genome.	1	11.9.15
19.	Classification and Characteristic of mutation.	2	16.9.15 &18.9.15
20.	Induction and Detection of mutation.	2	7.10 & 9.10.15
	Review class	1	14.10.15
21.	Environmental influence on gene expression. Extra nuclear inheritance.	1	16.10.15
22.	Extra-nuclear and Polygenic inheritance.	1	23.10.15
23.	Population genetics, Hardy- Weinberg equilibrium, changes in gene and genotype frequencies	2	28.10 & 30.10.15
24.	Human genetics, genetic disorders and gene therapy.	2	18.11& 20.11.15

Practical PBG-511 PRINCIPLES OF GENETICS			
S. No.	Name of exercise	Practical	Date of practical
1.	Life cycle of plant & cell division.	1	13.7.15
2.	Study of mitotic cell division	1	20.7.15
3.	Study of meiotic cell division.	1	27.7.15
4.	Study of life cycle of Drosophila	1	3.8.15
5.	Handling and maintenance of Drosophila under artificial laboratory conditions.	2	10.8.& 17.8.15
6.	Study of Monohybrid crosses in Pea/Drosophila.	1	24.8.15
7.	Study of dihybrid crosses in Pea/Drosophila	1	31.8.15
8.	Kinds of gene interaction in plant species	2	7.9 &14.9.15
9.	Detection of linkage and crossing over.	2	5.10 & 12.10.15
10.	Study of inheritance pattern in Human families (ptc test etc.).	1	19.10.15
11.	Allelic frequencies of cross-pollinated crops and their populations.	1	26.10.15
12	Method of DNA Isolation and its demonstration.	1	2.11.15
13	Various molecular techniques and their significance (demonstration)	2	16.10 & 23.10.15

PBG 512 CELL BIOLOGY AND MOLECULAR GENETICS 3 (3+0)

S.No.	**Topic**	**Lectures**	**Date of class**
1	Ultrastructure of the cell; Differences between eukaryotic and prokaryotic cells	1	9.7.15
2	Macromolecules; Structure and function of cell wall, nuclear membrane and plasma membrane	1	14.7.15
3	Cellular Organelles – nucleus, plastidschloro/ chromoplast, mitochondria endoplasmic reticulum, Golgi complex, lysosomes, peroxisomes.	1	16.7.15
4	Bioenergetics; Ultrastructure and function of mitochondria and biological membranes; Chloroplast and other photosynthetic organelles	2	21.7 & 23.7.15
5	Interphase nucleus- Structure and chemical composition;	1	25.7.15
6	Cell division and physiology of cell division.	1	28.7.15
7	Historical background of molecular genetics; Genetic material in organisms	1	30.7.15
8	Structure and properties of nucleic acid, DNA transcription and its regulation – Transcription factors and their role; Genetic code	2	1.8.15 & 4.8.15

9	DNA sequencing	1	6.8.15
10	Regulation of protein synthesis in prokaryotes and eukaryotes – ribosomes, t -RNAs and translational factors	3	11 &13.8.15
11	Transposable elements	1	18.8.15
12	Review class	1	20.8.15
13	Mechanisms of recombination in prokaryote	2	22.8 & 25.8.15
14	DNA organization in eukaryotic chromosomes	2	27.8 &1.9.15
15	DNA content variation,	1	3.9.15
16	Types of DNA sequences – Unique and repetitive sequences; Mini satellites and micro satellites	2	8 & 10.9.15
17	Structural and functional genomics.	1	15.9.15
18	Marker assisted selection.	2	17 & 19.9.15
19	Molecular mapping & tagging of genes	2	6 & 8.10.15
20	Gene amplification and its significance;	2	15&17.10.15
21	Proteomics and protein-protein interaction	2	2 & 22.10.15
22	Signal transduction;	2	29&31.10.15
23	Genes in development	2	3& 17.11.15
24	Cancer and cell aging	2	19&21.11.15

PBG 513 Principles of Plant Breeding 3(2+1)

S.No.	Topic	Lectures	Date of class
1	Plant Breeding and its objectives and Historical development-Pre and post Mendelien era	1	9.7.15
2	Center of biodiversity and its significance	1	13.7.15
3	Mode of reproduction and its significance in plant breeding	1	16.7.15
4	Type of gene action and their role in plant breeding, Heritability, Genetic advance and combining ability	1	20.7.15
5	Domestication and introduction	1	23.7.15
6	Pure line theory, pure line selection and mass selection	1	27.7.15
7	Pedigree selection	1	30.7.15
8	Bulk selection, single seed decent method and doubled haploidy methods	1	3.8.15
9	Back cross methods and Multi line breeding	1	6.8.15
10	Diallel selective matting approach	1	10.8.15
11	Breeding methods for cross pollinated crops. Intra population improvement methods- Mass selection	1	13.8.15
12	Half sib, full sib, S1 and S2 selection	1	17.8.15
13	Inter population improvement methods- Half sib and full sib method	1	20.8.15
14	Heterosis and its basis	1	24.8.15

15	Review class	1	27.8.15
16	Development of inbred lines	1	31.8.15
17	Development of hybrids	1	3.9.15
18	Development of synthetics and Composites	1	7.9.15
19	Prediction of performance	1	10.9.15
20	Inbred line improvement	1	14.9.15
21	Review class	1	17.9.15
22	Seed production of inbred lines and hybrids	1	5.10.15
23	Breeding for clonally propagated crops-Colonel selection and apomixes	1	8.10.15
24	Self-incompatibility and male sterility in crop plants and their commercial exploitation	1	12.10.15
25	Concept of plant ideotype and its role in crop improvement	1	15.10.15
26	Mutation breeding	1	19.10.15
27	Breeding for abiotic and biotic stresses	1	26.10.15
28	Procedure for release of new varieties	1	29.10.15
29	Maintenance breeding and Participatory Plant Breeding	1	2.11.15
30	Plant breeders' rights and regulations for plant variety protection and farmers rights	2	16 & 19.11.15
31	Review class	1	23.11.15

Practical PBG 513 Principles of Plant Breeding 3(2+1)

S.No.	Topic	Lectures	Date of class
1	Flower structure and biology of different self and cross pollinated crops	1	15.7.15
2	Emasculation and crossing in sorghum	1	22.7.15
3	Emasculation and crossing in pigeon pea	1	29.7.15
4	Emasculation and crossing in cotton	1	5.8.15
5	Hybridisation in maize	2	12.8.15 & 19.8.15
6	Hybrid seed production in sorghum using male sterility	2	26.815& 2.9.15
7	Breeder seed production in sorghum	1	9.9.15
8	Breeder seed production of inbred lines in maize	1	16.9.15
9	Maintenance of experimental record	2	7.10.15
10	Analysis of variance and mean comparison	1	14.10.15
11	Calculation of variability parameters and their interpretation	2	28.10.15 &18.11.15

PBG 532 Breeding for biotic and abiotic stress resistance 3(2+1)

S.No.	Topic	Lecture	Date of class
1.	Importance of plant breeding with special reference to biotic and abiotic stress resistance; Classification of biotic stresses.	1	9.7.15
2.	Major pests and diseases of economically important crops - Concepts in insect and pathogen resistance;	1	13.7.15
3.	Analysis and inheritance of resistance variation;	1	16.7.15
4.	Host defence responses to pathogen invasions- Biochemical and molecular mechanisms;	1	20.7.15
5.	Acquired and induced immunity and systemic acquired resistance (SAR);	1	23.7.15
6.	Host-pathogen interaction, gene-for-gene hypothesis, molecular evidence for its operation and exceptions;	1	27.7.15
7.	Concept of signal transduction and other host-defense mechanisms against viruses and bacteria.	1	30.7.15
8.	Types and genetic mechanisms of resistance to biotic stresses – Horizontal and vertical resistance in crop plants.	1	3.8.15
9.	Quantitative resistance/Adult plant resistance and Slow rusting resistance	1	6.8.15
10.	Classical and molecular breeding methods - Measuring plant resistance using plant fitness;	2	10 &13.8.15
11.	Behavioural, physiological and insect gain studies.	1	17.8.15
12.	Gene pyramiding methods and their implications.	1	20.8.15
13.	Classification of abiotic stresses - Stress inducing factors –moisture stress/drought and water logging & submergence;	2	24.8 & 27.8.15
14.	Acidity, salinity/alkalinity/sodicity ; High/low temperature, wind stresses, etc.	2	31.8.15& 3.9.15
15.	Stress due to soil factors and mineral toxicity; Physiological and Phenological responses.	2	7.9 & 10.9.15
16.	Emphasis of abiotic stresses in developing breeding methodologies.	1	14.9.15
17.	Genetics of abiotic stress resistance;	1	17.9.15
18.	Genes and genomics in breeding cultivars suitable to low water regimes, high temperatures;	1	8.10.15
19.	Utilizing MAS procedures for identifying resistant types in important crop like rice / sorghum / wheat / cotton etc;	2	12 & 15.10.15

20.	Breeding for resistance to stresses caused by toxicity, deficiency and pollutants/contaminants in soil, water and environment.	2	19 &26.10.15
21.	Exploitation of wild relatives as a source of resistance to biotic and abiotic factors in major field crops	2	29.10 & 2.11.15
22.	Transgenics in management of biotic and abiotic stresses	1	16.11.15
23.	Use of toxins, protease inhibitors, lectins, chitnases and Bt for diseases and insect pest management- Achievements.	2	19& 23.11.15
	Practical :Breeding for biotic and abiotic stress resistance		
1	Phenotypic screening techniques for sucking pests and chewing pests	1	14.7.15
2	Traits to be observed at plant and insect level	1	21.7.15
3	Phenotypic screening techniques for nematodes and borers;	1	28.7.15
4	Breeding strategies - weeds – ecological, environmental impacts on the crops;	1	4.8.15
	Review class	1	11.8.15
5	Breeding for herbicide resistance -	1	18.8.15
6	Evaluating the available populations like RIL, NIL etc. for pest resistance;	1	25.8.15
7	Use of standard MAS procedures	1	1.9.15
8	Phenotypic screening methods for diseases symptoms and data recording caused by fungi and bacteria;	1	8.9.15
9	Review class	1	15.9.15
10	Screening crops for drought and flood resistance or factors to be considered and breeding strategies	1	6.10.15
11	Screening varieties of major crops for acidity and alkalinity- their effects and breeding strategies;	1	20.10.15
12.	Understanding the climatologically parameters and predisposal of biotic and abiotic stress factors- ways of combating them.	1	27.10.15
13	Review class	1	3.11.15 & 17.11.15

PBG 534 Breeding for cereals, forages and seed spices 3(3+0)

Theory

S.No.	Topic	Lecture	Date of class
1.	Rice: Evolution and distribution of species and forms - wild relatives and germplasm	1	14.7.15
2.	Genetics of rice – cytogenetic and genome relationship	1	
3.	Rice Breeding objectives- yield, quality characters,	1	16.7.15
4.	Biotic and abiotic stress resistance in rice .	1	
5.	Hybrid rice breeding- potential and outcome - Aerobic rice and its implications.	2	21.7& 23.7.15
6.	Wheat: Evolution and distribution of species and forms - wild relatives and germplasm	1	25.7.15
7.	Wheat cytogenetic and genome relationship;	1	
8.	Wheat Breeding objectives yield, quality characters,	1	28.7 & 30.7 .15
9.	Biotic and abiotic stress resistance, exploitation of heterosis in wheat	2	
10	Sorghum: Evolution and distribution of species and forms - wild relatives and germplasm	1	1.8.15
11	Sorghum- cytogenetic and genome relationship	1	
12	Sorghum Breeding objectives- yield, quality characters	1	4.8.15
13	Biotic and abiotic stress resistance in sorghum	1	
14	Pearl millet: Evolution and distribution of species and forms - wild relatives and germplasm;	1	6.8.15
15	Pearl millet Cytogenetic and genome relationship;	1	
16	Review class		11.8.15
17	Pearl millet Breeding objectives- yield, quality characters.	1	13.8.15
18	Maize: Evolution and distribution of species and forms - wild relatives and germplasm	1	18.8.15
19	Maize Cytogenetic and genome relationship;	1	
20	Maize Breeding objectives: yield, quality characters	1	20.8.15
21	QPM and Bt maize – strategies and implications	2	22 & 25.8.15
22	Heterosis breeding attempts taken in Sorghum, Pearl Millet and Maize;	2	27.8 & 1.9.15
23	Minor millets: Evolution and distribution of species and forms - wild relatives and germplasm;	1	3.9.15
24	Minor millets Cytogenetic and genome relationship	1	
25	Small millets: breeding objectives yield, quality characters	1	8. 9.15
26	Review class	1	10.9.15
27	Forage legumes: Evolution and distribution of species and forms; Wild relatives and germplasm;	1	15.9.15
28	Forage legumes Cytogenetic and genome relationship;	1	17.9.15
29	Forage legumes breeding objectives- yield, quality characters.	1	
30	Seed spices: Evolution and distribution of species and forms - wild relatives and germplasm;	1	19.9.15
31	Seed spices breeding objectives- yield, quality characters and palatability studies.	1	6.10.15
32	Distinguishing features of popular released varieties in Rice and Sorghum , Wheat, Pearl millet, Maize and other millets, forage legumes	2	8.10.15 & 15.10.15

			&17.10.15
33	Application to DUS testing of popular released varieties	2	20.10 & 27.10.15
34	Maintenance of seed purity - Nucleus and Breeder Seed Production.	2	29.10 & 31.10.15
35	Review class	2	3.11.15&17.11.15

PBG 621 Crop Evolution 3 (3+0)

Theory

S.No.	Topic	Lecture	Date of class
1.	Origin and evolution of species;	1	9.7.15
2.	Centers of diversity/origin, diffused centers;	1	14.7.15
3.	Domestication and uniformity – Characteristics of early domestication and changes	1	15.7.15
4.	Time and place of domestication;	1	16.7.15
5.	Patterns of evolution and domestication-examples and Case studies.	2	21.7& 22.7.15
6.	Concept of gene pools and crop evolution;	1	23.7.15
7.	Selection and Genetic drift - Consequences.	1	28.7.15
8.	Speciation and The process of speciation	1	29.7.15
9.	Reproductive isolation barriers	1	30.7.15
10.	Genetic differentiation during speciation	1	4.8.15
11.	Hybridization and extinction	1	5.8.15
12.	Distant hybridization and introgression- Inter-specific hybridization, inter-generic hybridization,	1	6.8.15
13.	Distant hybridization and introgression - scope and limitations, techniques to overcome the limitations;	1	11.8.15
14.	Exploitation of natural variation and Early attempts to increase variation	1	12.8.15
15.	Gene transfer into cultivated species, tools and techniques;	2	13.8 &18.8.15
16.	Validation of transferred genes and their expression;	1	19.8.15
17.	Processes in crop evolution and stabilization of polyploids, cytogenetic and genetic stabilization;	2	20.8& 25.8.15
18.	Genome organization and Transgenesis in crop evolution.	1	26.8.15
19.	Multifactorial genome ,Intragenomic interaction and Intergenomic interaction	1	27.8.15
20.	Genome introgression and Controlled introgressions.	1	1.9.15
21.	Methods to study crop evolution	1	2.9.15
22.	Contemporary Methods – Based on morphological features ,Cytogenetic analysis, Allozyme variations	2	3.9 & 8.9.15

23.	Crop evolution – DNA markers, genome analysis and comparative genomics.	2	9& 10.9. 15
24.	Evolutionary significance of polyploidy,	1	15.9.15
25.	Evolution of crop plants through ploidy manipulations;	1	16.9.15
26.	Polyploids: methods, use of autopolyploid;	1	17.9.15
27.	Haploidy-method of production and use;	1	7.10.15
28.	Allopolyploids- synthesis of new crops;	1	8.10.15
29.	Case studies – Cereals and Pulses	1	14 & 15.10.15
30.	Case studies –Oilseeds and vegetables,	1	20 & 27.10.15
31.	Case studies –Fibre crops and Plantation crops	1	28 & 29.10.15
32.	Case studies –Forage crops and Tuber crops	1	13 & 17.11.15
33.	Case studies –Medicinal Plants.	1	18 & 19.11.15

PBG 526 BREEDING FOR LEGUMES, OILSEEDS, FIBRE AND VEGETATIVE PROPAGATED CROPS 3 (3+0)

S.No.	Topic	Lectures	Date of class
1	Pigeonpea: Evolution and distribution of species and forms; Wild relatives and germplasm; Genetics, cytogenetics and genome relationship	1	10.7.15
2	Morphological and molecular descriptors used for differentiating the accessions; Breeding objectives- yield, quality characters	1	13.7.15
3	Biotic and abiotic stress *etc* - Hybrid technology; maintenance of male sterile, fertile and restorer lines, progress made at ICRISAT and other Institutes.	1	17.7.15
4	Chickpea: Evolution and distribution of species and forms - Wild relatives and germplasm	1	20.7.15
5	Cytogenetics and genome relationship; Breeding objectives- yield, quality characters.	1	24.7.15
6	Biotic and abiotic stress etc; Protein quality improvement; Conventional and modern plant breeding approaches, progress made. Breeding for anti nutritional factors.	1	25.7.15
7	Other pulses: Greengram, blackgram, cowpea, mothbean: Evolution, cytogenetics and genome relationship; Learning the descriptors;	1	27.7.15
8	Breeding objectives- yield, quality characters, biotic and abiotic stress etc;	1	31.7.15
9	Interspecific crosses attempted and its implications, reasons for	1	1.8.15

	failure, ways of overcoming them.		
10	Groundnut: Evolution and distribution of species and forms; Wild relatives and germplasm; Cytogenetics and genome relationship	1	3.8.15
11	Pod and kernel characters	1	7.8.15
12	Breeding objectives- yield, quality characters, biotic and abiotic stress etc.	1	10.8.15
13	Rapeseed and Mustard: Breeding objectives, utilization of wild relatives for yield and quality improvement, biotic and abiotic stress etc	1	17.8.15
14	Oil quality – characteristics in different oils; Evolution and distribution of species and forms		21.8 .15
15	Wild relatives and germplasm; Genetics, cytogenetics and genome relationship.	1	22.8.15
16	Soybean: Breeding objectives, utilization of wild relatives for yield and quality improvement, biotic and abiotic stress etc	1	24.8.15
17	Oil quality – characteristics; Evolution and distribution of species and forms;	1	28.8.15
18	Wild relatives and germplasm; Genetics, cytogenetics and genome relationship.	1	4.9.15
19	Other oilseed crops: castor and sesame: Evolution and distribution of species and forms; Wild relatives and germplasm;	1	7.9.15
20	Cytogenetics and genome relationship; breeding objectives- yield, quality characters.	1	14.9.15
21	Breeding objectives- yield, quality characters.	1	18.9.15
22	Cotton: Evolution of cotton; Breeding objectives- yield, quality characters, biotic and abiotic stress etc	1	19 .9.15
23	Development and maintenance of male sterile lines – Hybrid development and seed production.	1	9.10.15
24	Scenario of Bt cottons, evaluation procedures for Bt cotton.	1	12.10.15
25	Sugarcane: Evolution and distribution of species and forms; Wild relatives and germplasm.,	1	16.10.15
26	Cytogenetics and genome relationship.	1	17.10.15
27	Breeding objectives yield, quality characters and achievements.	1	19.10.15
28	Potato: Evolution and distribution of species and forms; Wild relatives and germplasm.,	2	23 & 26.10.15
29	Cytogenetics and genome relationship.	1	30.10.15
30	Breeding objectives yield, quality characters and achievements.	1	31.10.15
31	Distinguishing features of the released varieties in pulses, oilseeds, cotton and vegetative propagated crops. Maintenance of seed purity and seed production.	2	2.11 & 16.11.15
32	Overall review of complete course.	2	20.11 & 21.11.15

Lecture Schedule
B Sc Ag Part I Semester First 2015-16
PBG 111: PRINCIPLES OF GENETICS "A" Batch Cr. Hr. 3(2+1)

S.No.	Lecture Topic	No of Lecture	Date of class
1.	History of Genetics. Ultra structure of typical plant cell	1	14.7.15
2.	Physical and chemical nature of protoplasm	1	21.7. 15
3.	Cell organelles: cell wall, plasma membrane and nucleus	1	25.7.15
4.	Mitochondria, chloroplast, Endosplamic reticulum, golgi body and ribsomes	1	28.7.15
5.	Chromosome structure, types and function	1	1.8.15
6.	Chemical composition of chromosome, karyotype and idiogram	1	4.8.15
7.	Mitotic cell division and its significance	1	11.8.15
8.	Meiotic cell division and significance	1	18.8.15
9.	DNA, its structure and function	1	22.8.15
10.	Different forms of DNA, their replication & repair system	1	25.8.15
11.	RNA: structure, function and types	1	1.9.15
12.	Transcription, translation, genetic code and protein synthesis	1	8.9.15
13.	Mendel's laws of inheritance	1	15.9.15
14.	Gene interaction, their types, modification of F2 ratios	1	19.9.15
15.	Multiple alleles: characteristics, ABO blood group and Rh blood group system etc.	1	6.10.15
16.	Inheritance of quantitative and qualitative characters and differences between them	1	17.10.15
17.	Pleiotrophism, penetrance and expressivity	1	20.10.15
18.	Cytoplasmic inheritance: its characteristic features and differences between chromosomal and cytoplasmic inheritance	1	27.10.15
19.	Crossing over: Mechanism, estimation of crossing over percentage and its impact on producing recombinants	1	31.10.15
20.	Linkage :types and its detection	1	3.11.15
21.	Numerical chromosomal aberrations and origin of crop species	1	17.11.15

22.	Structural chromosomal aberrations	1	21.11.15
23.	Mutation: characteristics, classification and induction	1	24.11.15

Practical Schedule: PBG 111: PRINCIPLES OF GENETICS "A1" Batch

Each practical class is of two periods

Exercise.	Name of Exercise/Lecture	Date of practical
1	Introduction to microscope and study of typing plant cell	15.7.15
2	Preparation and use of fixatives and stains	22.7.15
3	Preparation of micro slides and identification of various stage of mitosis	29.7.15
	Preparation of micro slides and identification of various stage of mitosis	5.8.15
4	Preparation of micro slides and identification of various stage of meiosis	12.8. 15
	Preparation of micro slides and identification of various stage of meiosis	19.8.15
5	Study of mono hybrid, dihybrid and trihybrid ratios	26.8.15
6	Study of test of goodness of fit of genetic ratios	2.9.15
7	Study of different types of gene interactions and modification of typical dihybrid F2	9.9.15
	Study of different types of gene interactions and modification of typical dihybrid F2	16.9.15
8	Study and detection of linkage in F2 progeny	7.10.15
	Study and detection of linkage in test cross progeny	14.10.15
9	Induction of polyploidy using colchicines	28.10.15
10	Induction of chromosomal aberrations using chemicals	18.11.15

SUGGESTED READING:

*Gupta, P.K. 2004. Cytology, Genetics and evolution. Rastogi Publications, Meerut.(Hindi Edition).

*Kaushik, M.P. 2003. A Text Book of Modern Botany. Prakash Publications, Muzaffarnagar (U.P.). *Klug, W.W. and Cummings, M.R. 2005. Concepts of genetics Pearson Education (Singapore) Pvt.
Ltd., Indian Branch, Pratap Ganj, New Delhi.

*Singh, B.D. 2001. Fundamentals of Genetics, Kalyani Publishers, New Delhi.

*Strickberger, M.W. 2001. Genetics. Prentice Hall of India Pvt. Ltd., New Delhi.

Practical Schedule: PBG 111: PRINCIPLES OF GENETICS "A2" Batch
Each practical class is of two periods

S. No.	Name of Exercise/Lecture	Date of practical
1	Introduction to microscope and study of typing plant cell	13.7.15
2	Perparation and use of fixatives and stains	20.7.15
3	Perparation of micro slides and identification of various stage of mitosis	27.7.15
	Perparation of micro slides and identification of various stage of mitosis	3.8.15
4	Perpartion of micro slides and identification of various stage meiosis	10.8.15
	Perpartion of micro slides and identification of various stage meiosis	17.8.15
5	Study of monohybrid, dihybrid and Trihybrid ratios	24.8.15
6	Study of test of goodness of fit of genetic ratios	31.8.15
7	Study of different types of gene interactions and modification of typical dihybrid F2	7.9.15
	Study of different types of gene interactions and modification of typical dihybrid F2	14.9.15
8	Study and detection of linkage in F2 and test cross progeny	5.10.15
	Study and detection of linkage in F2 and test cross progeny	12.10.15
9	Induction of polyploidy using colchicines	19.10
10	Induction of chromosomal aberrations using chemicals	26.10.15
11	Review classes	2.11.15,16.11.15 & 23.11.15

Lecture Schedule: First Semester

PBG-111 PRINCIPLES OF GENETICS 3(2+1) B

S.No.	Topic	Lecture	Date of class
1.	History of Genetics	1	10.7.15
2.	Ultra structure of typical plant cell		
3.	Physical and chemical nature of protoplasm	1	17.7. 15
4.	Cell organelles: cell wall, plasma membrane and nucleus	1	24.7.15
5.	Mitochondria, chloroplast, Endosplamic reticulum, golgi body and ribsomes	1	25.7.15
6.	Chromosome structure, types and function	1	31.7.15
7.	Chemical composition of chromosome, karyotype and idiogram	1	1.8.15
8.	Mitotic cell division and its significance	1	7.8.15
9.	Meiotic cell division and significance	1	21.8.15
10.	DNA, its structure and function	1	22.8.15
11.	Different forms of DNA, their replication & repair system	1	28.8.15
12.	RNA: structure, function and types	1	4.9.15
13.	Transcription, translation, genetic code and protein synthesis	1	11.9.15
14.	Mendel's laws of inheritance	1	18.9.15
15.	Gene interaction, their types, modification of F2 ratios	1	19.9.15
16.	Multiple alleles: characteristics, ABO blood group and Rh blood group system etc.	1	9.10.15
17.	Inheritance of quantitative and qualitative characters and differences between them	1	16.10.15
18.	Pleiotrophism, penetrance and expressivity	1	17.10.15
19.	Cytoplasmic inheritance: its characteristic features and differences between chromosomal and cytoplasmic inheritance	1	23.10.15
20.	Crossing over: Mechanism, estimation of crossing over percentage and its impact on producing recombinants	1	
21.	Linkage :types and its detection	1	30.10.15
22.	Numerical chromosomal aberrations and origin of crop species	1	31.10.15
23.	Structural chromosomal aberrations	1	20.11.15
24.	Mutation: characteristics, classification and induction	1	21.11.15

Practical PBG-111 -PRINCIPLES OF GENETICS B1			
S. No.	Name of exercise	Practical	Date of practical
1	Introduction to microscope and study of typing plant cell	1	16.7.15
2	Perparation and use of fixatives and stains	1	23.7.15
3	Perparation of micro slides and identification of various stage of mitosis	2	30.7.& 6.8.15
4	Perpartion of micro slides and identification of various stage meiosis	2	13.8.& 20.8.15
5	Study of monohybrid ratios	1	27.8.15
6	Study of dihybrid ratios	1	
7	Stydy of Trihybrid Ratios	1	3.9.15
8	Study of test of goodness of fit of genetic ratios	1	10.9.15
9	Study of different types of gene interactions and modification of typical dihybrid F2	2	17.9. & 8.10.15
10	Study and detection of linkage in F2 and test cross progeny	2	15.10 & 29.10.15
11	Induction of polyploidy using colchicines	1	19.11.15
12	Induction of chromosomal aberrations using chemicals	1	

Practical PBG-111 PRINCIPLES OF GENETICS B2			
S. No.	Name of exercise	Practical	Date of practical
1	Introduction to microscope and study of typing plant cell	1	14.7.15
2	Preparation and use of fixatives and stains	1	21.7.15
3	Preparation of micro slides and identification of various stage of mitosis	2	28.7.& 4.8.15
4	Preparation of micro slides and identification of various stage meiosis	2	11.8.& 18.8.15
5	Study of monohybrid ratios	1	25.8.15
6	Study of dihybrid ratios	1	1.9.15
7	Stydy of Trihybrid Ratios	1	8.9.15
8	Study of test of goodness of fit of genetic ratios	1	15.9.15
9	Study of different types of gene interactions and modification of typical dihybrid F2	2	6.10. & 20.10.15
10	Study and detection of linkage in F2 and test cross progeny	2	27.10 & 3.11.15
11	Induction of polyploidy using colchicines	1	17.11.15
12	Induction of chromosomal aberrations using chemicals	1	

Lecture Schedule: First Semester

PBG-211 **Principles of Plant Breeding** **3(2+1) A**

S.No.	Topic	Lecture	Date of class
1.	Introduction to ecological classification of plants.	1	10.7.15
2.	Introduction to taxonomical classification of plants.	1	13.7.15
3.	Plant breeding and its historical development.	1	17.7. 15
4.	Nature of plant breeding and its role.	1	20.7.15
5.	Different modes of reproduction: Sexual, asexual and vegetative and their role in plant breeding.	1	24.7.15
6.	Self-incompatibility types, genetic control and use in plant breeding.	1	27.7.15
7.	Male sterility types, genetic control and use in plant breeding.	1	31.7.15
8.	Apomixes types and role in plant breeding.	1	3.8.15
9.	Inheritance of qualitative and quantitative characters and heritability.	1	7.8.15
10.	Pure line theory and genetic basis of selection.	1	10.8.15
11.	Introduction to inbreeding depression and heterosis	1	17.8.15
12.	Theories of heterosis	1	21.8.15
13.	Review classes	1	24.8.15
14.	Hardy-Weinberg law	1	28.8.15
15.	Center of diversity	1	31.8.15
16.	Plant genetic resources	1	4.9.15
17.	Domestication, Introduction and acclimatization.	1	7.9.15
18.	Different type of improved genotypes	1	11.9.15
19.	Development of homozygous varieties	1	14.9.15
20.	Development of multilines	1	18.9.15
21.	Intra population improvement methods	1	9.10.15
22.	Inter population improvement methods	1	12.10.15
23.	Development of inbred lines	1	16.10.15
24.	Development of hybrids	1	19.10.15
25.	Development of synthetics	1	23.10.15
26.	Development of composites	1	26.10.15
27.	Development of clones	1	30.10.15
28.	Polyploidy in relation to plant breeding	1	2.11.15
29.	Mutation breeding- methods, uses, nature of gene mutation, mutagenic agents.	1	16.11.15
30.	Use of biotechnology in plant breeding	1	20.11.15
31.	Procedure for release of new variety.	1	23.11.15

Practical **PBG-211** **Principles of Plant Breeding** **A1**			
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	14.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	21.7 & 28.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	4.8.15
4.	Study of TS of ovaries of different plants	1	11.8.15
5.	Mounting of different ovules and their study	1	18.8.15
6.	Study of microsporogenesis	1	25.8.15
7.	Study of megasporogenesis	1	1.9.15
8.	Study of pollen viability	1	8.9.15
9.	Study of pollen size and shape	1	15.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	20.10 & 27.10.15
11.	Identification of male sterility in sorghum	1	3.11.15
12	Review class	1	17.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**A2**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	16.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	23.7 &30.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	6.8.15
4.	Study of TS of ovaries of different plants	1	13.8.15
5.	Mounting of different ovules and their study	1	20.8.15
6.	Study of microsporogenesis	1	27.8.15
7.	Study of megasporogenesis	1	3.9.15
8.	Study of pollen viability	1	10.9.15
9.	Study of pollen size and shape	1	17.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	8 & 15.10.15
11.	Identification of male sterility in sorghum	1	19.11.15

Lecture Schedule: First Semester

PBG-211 Principles of Plant Breeding 3(2+1) B

S.No.	Topic	Lecture	Date of class
1.	Introduction to ecological classification of plants.	1	8.7.15
2.	Introduction to taxonomical classification of plants.	1	
3.	Plant breeding and its historical development.	1	15.7. 15
4.	Nature of plant breeding and its role.	1	22.7.15
5.	Different modes of reproduction: Sexual, asexual and vegetative and their role in plant breeding.	1	25.7.15
6.	Self-incompatibility types, genetic control and use in plant breeding.	1	29.7.15
7.	Male sterility types, genetic control and use in plant breeding.	1	1.8.15
8.	Apomixes types and role in plant breeding.	1	5.8.15
9.	Inheritance of qualitative and quantitative characters and heritability.	1	12.8.15
10.	Pure line theory and genetic basis of selection.	1	19.8.15
11.	Introduction to inbreeding depression and heterosis	1	22.8.15
12.	Theories of heterosis	1	26.8.15
13.	Hardy-Weinberg law	1	
14.	Center of diversity	1	2.9.15
15.	Plant genetic resources	1	
16.	Domestication, Introduction and acclimatization.	1	
17.	Different type of improved genotypes	1	9.9.15
18.	Development of homozygous varieties	1	
19.	Development of multilines	1	16.9.15
20.	Intra population improvement methods	1	19.9.15
21.	Inter population improvement methods	1	7.10.15
22.	Development of inbred lines	1	14.10.15
23.	Development of hybrids	1	
24	Development of synthetics	1	17.10.15
25.	Development of composites	1	
26.	Development of clones	1	28.10.15
27.	Polyploidy in relation to plant breeding	1	31.10.15
28.	Mutation breeding- methods, uses, nature of gene mutation, mutagenic agents.	1	
29.	Use of biotechnology in plant breeding	1	18.11.15
30.	Procedure for release of new variety.	1	21.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**B1**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	13.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	20 &27.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	3.8.15
4.	Study of TS of ovaries of different plants	1	10.8.15
5.	Mounting of different ovules and their study	1	17.8.15
6.	Study of microsporogenesis	1	24.8.15
7.	Study of megasporogenesis	2	31.8. & 7.9.15
8.	Study of pollen viability	1	14.9.15
9.	Study of pollen size and shape	1	5.10.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	12 &19.10.15
11.	Identification of male sterility in sorghum	1	26.10.15
12	Review class		2 .11.15&16.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**B2**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	10.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	17&24.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	31.7.15
4.	Study of TS of ovaries of different plants	1	7.8.15
5.	Mounting of different ovules and their study	1	21.8.15
6.	Study of microsporogenesis	1	28.8.15
7.	Study of megasporogenesis	1	4.9.15
8.	Study of pollen viability	1	11.9.15
9.	Study of pollen size and shape	1	18.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	9 &16.10.15
11.	Identification of male sterility in sorghum	1	23.10.15
12.	Review class	2	30.10 & 20.11.15

Lecture Schedule: First Semester

PBG- 511 PRINCIPLES OF GENETICS 3(2+1)

S.No.	Topic	Lecture	Date of class
1.	Historical perspective of Genetics	1	10.7.15
2.	Mendelian Principle of Genetics	1	
3.	Inheritance of Simple Characters in monohybrid and dihybrid Crosses.	1	15.7. 15
4.	Type of Gene interactions.	1	17.7.15
5.	Concept and types of Linkage.	1	22.7.15
6.	Detection of Linkage through F_2 and test cross ratios.	1	24.7.15
7.	Phenomenon of crossing over and its estimation.	1	29.7.15
8.	Multiple alleles with some classical examples.	2	31.7 & 5.8.15
9.	Mechanisms of sex determination in animals and plants.	1	7.8.15
10.	Sex linked, sex influenced and sex limited characters, their inheritance with suitable example.	1	12.8.15
11.	Recombination test and *cis*- trans test or complementation test.	1	19.8.15
12.	Complex loci or pseudo alleles, fine structure of gene in Eukaryotes and Genetic control of metabolism.	1	21.8.15
	Review class	1	26.8.15
13.	Genetic material, nature, organization and structure.	1	28.8.15
14.	Replication of genetic material.	1	
15.	Genetic code, transcription and translation.	1	2.9.15
16.	Gene regulation in prokaryotes.	1	4.9.15
17.	Gene regulation in Eukaryotes.	1	9.9.15
18.	Split genes, transcriptional and post transcriptional regulation, Dynamic nature of genome.	1	11.9.15
19.	Classification and Characteristic of mutation.	2	16.9.15 &18.9.15
20.	Induction and Detection of mutation.	2	7.10 & 9.10.15
	Review class	1	14.10.15
21.	Environmental influence on gene expression. Extra nuclear inheritance.	1	16.10.15
22.	Extra-nuclear and Polygenic inheritance.	1	23.10.15
23.	Population genetics, Hardy- Weinberg equilibrium, changes in gene and genotype frequencies	2	28.10 & 30.10.15
24.	Human genetics, genetic disorders and gene therapy.	2	18.11& 20.11.15

Practical PBG-511 PRINCIPLES OF GENETICS			
S. No.	Name of exercise	Practical	Date of practical
1.	Life cycle of plant & cell division.	1	13.7.15
2.	Study of mitotic cell division	1	20.7.15
3.	Study of meiotic cell division.	1	27.7.15
4.	Study of life cycle of Drosophila	1	3.8.15
5.	Handling and maintenance of Drosophila under artificial laboratory conditions.	2	10.8.& 17.8.15
6.	Study of Monohybrid crosses in Pea/Drosophila.	1	24.8.15
7.	Study of dihybrid crosses in Pea/Drosophila	1	31.8.15
8.	Kinds of gene interaction in plant species	2	7.9 &14.9.15
9.	Detection of linkage and crossing over.	2	5.10 & 12.10.15
10.	Study of inheritance pattern in Human families (ptc test etc.).	1	19.10.15
11.	Allelic frequencies of cross-pollinated crops and their populations.	1	26.10.15
12	Method of DNA Isolation and its demonstration.	1	2.11.15
13	Various molecular techniques and their significance (demonstration)	2	16.10 & 23.10.15

PBG 512 CELL BIOLOGY AND MOLECULAR GENETICS 3 (3+0)

S.No.	**Topic**	**Lectures**	**Date of class**
1	Ultrastructure of the cell; Differences between eukaryotic and prokaryotic cells	1	9.7.15
2	Macromolecules; Structure and function of cell wall, nuclear membrane and plasma membrane	1	14.7.15
3	Cellular Organelles – nucleus, plastidschloro/ chromoplast, mitochondria endoplasmic reticulum, Golgi complex, lysosomes, peroxisomes.	1	16.7.15
4	Bioenergetics; Ultrastructure and function of mitochondria and biological membranes; Chloroplast and other photosynthetic organelles	2	21.7 & 23.7.15
5	Interphase nucleus- Structure and chemical composition;	1	25.7.15
6	Cell division and physiology of cell division.	1	28.7.15
7	Historical background of molecular genetics; Genetic material in organisms	1	30.7.15
8	Structure and properties of nucleic acid, DNA transcription and its regulation – Transcription factors and their role; Genetic code	2	1.8.15 & 4.8.15

9	DNA sequencing	1	6.8.15
10	Regulation of protein synthesis in prokaryotes and eukaryotes – ribosomes, t -RNAs and translational factors	3	11 &13.8.15
11	Transposable elements	1	18.8.15
12	Review class	1	20.8.15
13	Mechanisms of recombination in prokaryote	2	22.8 & 25.8.15
14	DNA organization in eukaryotic chromosomes	2	27.8 &1.9.15
15	DNA content variation,	1	3.9.15
16	Types of DNA sequences – Unique and repetitive sequences; Mini satellites and micro satellites	2	8 & 10.9.15
17	Structural and functional genomics.	1	15.9.15
18	Marker assisted selection.	2	17 & 19.9.15
19	Molecular mapping & tagging of genes	2	6 & 8.10.15
20	Gene amplification and its significance;	2	15&17.10.15
21	Proteomics and protein-protein interaction	2	2 & 22.10.15
22	Signal transduction;	2	29&31.10.15
23	Genes in development	2	3& 17.11.15
24	Cancer and cell aging	2	19&21.11.15

PBG 513 Principles of Plant Breeding 3(2+1)

S.No.	Topic	Lectures	Date of class
1	Plant Breeding and its objectives and Historical development-Pre and post Mendelien era	1	9.7.15
2	Center of biodiversity and its significance	1	13.7.15
3	Mode of reproduction and its significance in plant breeding	1	16.7.15
4	Type of gene action and their role in plant breeding, Heritability, Genetic advance and combining ability	1	20.7.15
5	Domestication and introduction	1	23.7.15
6	Pure line theory, pure line selection and mass selection	1	27.7.15
7	Pedigree selection	1	30.7.15
8	Bulk selection, single seed decent method and doubled haploidy methods	1	3.8.15
9	Back cross methods and Multi line breeding	1	6.8.15
10	Diallel selective matting approach	1	10.8.15
11	Breeding methods for cross pollinated crops. Intra population improvement methods- Mass selection	1	13.8.15
12	Half sib, full sib, S1 and S2 selection	1	17.8.15
13	Inter population improvement methods- Half sib and full sib method	1	20.8.15
14	Heterosis and its basis	1	24.8.15

15	Review class	1	27.8.15
16	Development of inbred lines	1	31.8.15
17	Development of hybrids	1	3.9.15
18	Development of synthetics and Composites	1	7.9.15
19	Prediction of performance	1	10.9.15
20	Inbred line improvement	1	14.9.15
21	Review class	1	17.9.15
22	Seed production of inbred lines and hybrids	1	5.10.15
23	Breeding for clonally propagated crops-Colonel selection and apomixes	1	8.10.15
24	Self-incompatibility and male sterility in crop plants and their commercial exploitation	1	12.10.15
25	Concept of plant ideotype and its role in crop improvement	1	15.10.15
26	Mutation breeding	1	19.10.15
27	Breeding for abiotic and biotic stresses	1	26.10.15
28	Procedure for release of new varieties	1	29.10.15
29	Maintenance breeding and Participatory Plant Breeding	1	2.11.15
30	Plant breeders' rights and regulations for plant variety protection and farmers rights	2	16 & 19.11.15
31	Review class	1	23.11.15

Practical PBG 513 Principles of Plant Breeding 3(2+1)

S.No.	Topic	Lectures	Date of class
1	Flower structure and biology of different self and cross pollinated crops	1	15.7.15
2	Emasculation and crossing in sorghum	1	22.7.15
3	Emasculation and crossing in pigeon pea	1	29.7.15
4	Emasculation and crossing in cotton	1	5.8.15
5	Hybridisation in maize	2	12.8.15 & 19.8.15
6	Hybrid seed production in sorghum using male sterility	2	26.815& 2.9.15
7	Breeder seed production in sorghum	1	9.9.15
8	Breeder seed production of inbred lines in maize	1	16.9.15
9	Maintenance of experimental record	2	7.10.15
10	Analysis of variance and mean comparison	1	14.10.15
11	Calculation of variability parameters and their interpretation	2	28.10.15 &18.11.15

PBG 532 Breeding for biotic and abiotic stress resistance 3(2+1)

S.No.	Topic	Lecture	Date of class
1.	Importance of plant breeding with special reference to biotic and abiotic stress resistance; Classification of biotic stresses.	1	9.7.15
2.	Major pests and diseases of economically important crops - Concepts in insect and pathogen resistance;	1	13.7.15
3.	Analysis and inheritance of resistance variation;	1	16.7.15
4.	Host defence responses to pathogen invasions- Biochemical and molecular mechanisms;	1	20.7.15
5.	Acquired and induced immunity and systemic acquired resistance (SAR);	1	23.7.15
6.	Host-pathogen interaction, gene-for-gene hypothesis, molecular evidence for its operation and exceptions;	1	27.7.15
7.	Concept of signal transduction and other host-defense mechanisms against viruses and bacteria.	1	30.7.15
8.	Types and genetic mechanisms of resistance to biotic stresses – Horizontal and vertical resistance in crop plants.	1	3.8.15
9.	Quantitative resistance/Adult plant resistance and Slow rusting resistance	1	6.8.15
10.	Classical and molecular breeding methods - Measuring plant resistance using plant fitness;	2	10 &13.8.15
11.	Behavioural, physiological and insect gain studies.	1	17.8.15
12.	Gene pyramiding methods and their implications.	1	20.8.15
13.	Classification of abiotic stresses - Stress inducing factors –moisture stress/drought and water logging & submergence;	2	24.8 & 27.8.15
14.	Acidity, salinity/alkalinity/sodicity ; High/low temperature, wind stresses, etc.	2	31.8.15& 3.9.15
15.	Stress due to soil factors and mineral toxicity; Physiological and Phenological responses.	2	7.9 & 10.9.15
16.	Emphasis of abiotic stresses in developing breeding methodologies.	1	14.9.15
17.	Genetics of abiotic stress resistance;	1	17.9.15
18.	Genes and genomics in breeding cultivars suitable to low water regimes, high temperatures;	1	8.10.15
19.	Utilizing MAS procedures for identifying resistant types in important crop like rice / sorghum / wheat / cotton etc;	2	12 & 15.10.15

20.	Breeding for resistance to stresses caused by toxicity, deficiency and pollutants/contaminants in soil, water and environment.	2	19 &26.10.15
21.	Exploitation of wild relatives as a source of resistance to biotic and abiotic factors in major field crops	2	29.10 & 2.11.15
22.	Transgenics in management of biotic and abiotic stresses	1	16.11.15
23.	Use of toxins, protease inhibitors, lectins, chitnases and Bt for diseases and insect pest management- Achievements.	2	19& 23.11.15
	Practical :Breeding for biotic and abiotic stress resistance		
1	Phenotypic screening techniques for sucking pests and chewing pests	1	14.7.15
2	Traits to be observed at plant and insect level	1	21.7.15
3	Phenotypic screening techniques for nematodes and borers;	1	28.7.15
4	Breeding strategies - weeds – ecological, environmental impacts on the crops;	1	4.8.15
	Review class	1	11.8.15
5	Breeding for herbicide resistance -	1	18.8.15
6	Evaluating the available populations like RIL, NIL etc. for pest resistance;	1	25.8.15
7	Use of standard MAS procedures	1	1.9.15
8	Phenotypic screening methods for diseases symptoms and data recording caused by fungi and bacteria;	1	8.9.15
9	Review class	1	15.9.15
10	Screening crops for drought and flood resistance or factors to be considered and breeding strategies	1	6.10.15
11	Screening varieties of major crops for acidity and alkalinity- their effects and breeding strategies;	1	20.10.15
12.	Understanding the climatologically parameters and predisposal of biotic and abiotic stress factors- ways of combating them.	1	27.10.15
13	Review class	1	3.11.15 & 17.11.15

PBG 534 Breeding for cereals, forages and seed spices 3(3+0)

Theory

S.No.	Topic	Lecture	Date of class
1.	Rice: Evolution and distribution of species and forms - wild relatives and germplasm	1	14.7.15
2.	Genetics of rice – cytogenetic and genome relationship	1	
3.	Rice Breeding objectives- yield, quality characters,	1	16.7.15
4.	Biotic and abiotic stress resistance in rice .	1	
5.	Hybrid rice breeding- potential and outcome - Aerobic rice and its implications.	2	21.7& 23.7.15
6.	Wheat: Evolution and distribution of species and forms - wild relatives and germplasm	1	25.7.15
7.	Wheat cytogenetic and genome relationship;	1	
8.	Wheat Breeding objectives yield, quality characters,	1	28.7 & 30.7 .15
9.	Biotic and abiotic stress resistance, exploitation of heterosis in wheat	2	
10	Sorghum: Evolution and distribution of species and forms - wild relatives and germplasm	1	1.8.15
11	Sorghum- cytogenetic and genome relationship	1	
12	Sorghum Breeding objectives- yield, quality characters	1	4.8.15
13	Biotic and abiotic stress resistance in sorghum	1	
14	Pearl millet: Evolution and distribution of species and forms - wild relatives and germplasm;	1	6.8.15
15	Pearl millet Cytogenetic and genome relationship;	1	
16	Review class		11.8.15
17	Pearl millet Breeding objectives- yield, quality characters.	1	13.8.15
18	Maize: Evolution and distribution of species and forms - wild relatives and germplasm	1	18.8.15
19	Maize Cytogenetic and genome relationship;	1	
20	Maize Breeding objectives: yield, quality characters	1	20.8.15
21	QPM and Bt maize – strategies and implications	2	22 & 25.8.15
22	Heterosis breeding attempts taken in Sorghum, Pearl Millet and Maize;	2	27.8 & 1.9.15
23	Minor millets: Evolution and distribution of species and forms - wild relatives and germplasm;	1	3.9.15
24	Minor millets Cytogenetic and genome relationship	1	
25	Small millets: breeding objectives yield, quality characters	1	8. 9.15
26	Review class	1	10.9.15
27	Forage legumes: Evolution and distribution of species and forms; Wild relatives and germplasm;	1	15.9.15
28	Forage legumes Cytogenetic and genome relationship;	1	17.9.15
29	Forage legumes breeding objectives- yield, quality characters.	1	
30	Seed spices: Evolution and distribution of species and forms - wild relatives and germplasm;	1	19.9.15
31	Seed spices breeding objectives- yield, quality characters and palatability studies.	1	6.10.15
32	Distinguishing features of popular released varieties in Rice and Sorghum , Wheat, Pearl millet, Maize and other millets, forage legumes	2	8.10.15 & 15.10.15

			&17.10.15
33	Application to DUS testing of popular released varieties	2	20.10 & 27.10.15
34	Maintenance of seed purity - Nucleus and Breeder Seed Production.	2	29.10 & 31.10.15
35	Review class	2	3.11.15&17.11.15

PBG 621 Crop Evolution 3 (3+0)

Theory

S.No.	Topic	Lecture	Date of class
1.	Origin and evolution of species;	1	9.7.15
2.	Centers of diversity/origin, diffused centers;	1	14.7.15
3.	Domestication and uniformity – Characteristics of early domestication and changes	1	15.7.15
4.	Time and place of domestication;	1	16.7.15
5.	Patterns of evolution and domestication-examples and Case studies.	2	21.7& 22.7.15
6.	Concept of gene pools and crop evolution;	1	23.7.15
7.	Selection and Genetic drift - Consequences.	1	28.7.15
8.	Speciation and The process of speciation	1	29.7.15
9.	Reproductive isolation barriers	1	30.7.15
10.	Genetic differentiation during speciation	1	4.8.15
11.	Hybridization and extinction	1	5.8.15
12.	Distant hybridization and introgression- Inter-specific hybridization, inter-generic hybridization,	1	6.8.15
13.	Distant hybridization and introgression - scope and limitations, techniques to overcome the limitations;	1	11.8.15
14.	Exploitation of natural variation and Early attempts to increase variation	1	12.8.15
15.	Gene transfer into cultivated species, tools and techniques;	2	13.8 &18.8.15
16.	Validation of transferred genes and their expression;	1	19.8.15
17.	Processes in crop evolution and stabilization of polyploids, cytogenetic and genetic stabilization;	2	20.8& 25.8.15
18.	Genome organization and Transgenesis in crop evolution.	1	26.8.15
19.	Multifactorial genome ,Intragenomic interaction and Intergenomic interaction	1	27.8.15
20.	Genome introgression and Controlled introgressions.	1	1.9.15
21.	Methods to study crop evolution	1	2.9.15
22.	Contemporary Methods – Based on morphological features ,Cytogenetic analysis, Allozyme variations	2	3.9 & 8.9.15

23.	Crop evolution – DNA markers, genome analysis and comparative genomics.	2	9& 10.9. 15
24.	Evolutionary significance of polyploidy,	1	15.9.15
25.	Evolution of crop plants through ploidy manipulations;	1	16.9.15
26.	Polyploids: methods, use of autopolyploid;	1	17.9.15
27.	Haploidy-method of production and use;	1	7.10.15
28.	Allopolyploids- synthesis of new crops;	1	8.10.15
29.	Case studies – Cereals and Pulses	1	14 & 15.10.15
30.	Case studies –Oilseeds and vegetables,	1	20 & 27.10.15
31.	Case studies –Fibre crops and Plantation crops	1	28 & 29.10.15
32.	Case studies –Forage crops and Tuber crops	1	13 & 17.11.15
33.	Case studies –Medicinal Plants.	1	18 & 19.11.15

PBG 526 BREEDING FOR LEGUMES, OILSEEDS, FIBRE AND VEGETATIVE PROPAGATED CROPS 3 (3+0)

S.No.	Topic	Lectures	Date of class
1	Pigeonpea: Evolution and distribution of species and forms; Wild relatives and germplasm; Genetics, cytogenetics and genome relationship	1	10.7.15
2	Morphological and molecular descriptors used for differentiating the accessions; Breeding objectives- yield, quality characters	1	13.7.15
3	Biotic and abiotic stress *etc* - Hybrid technology; maintenance of male sterile, fertile and restorer lines, progress made at ICRISAT and other Institutes.	1	17.7.15
4	Chickpea: Evolution and distribution of species and forms - Wild relatives and germplasm	1	20.7.15
5	Cytogenetics and genome relationship; Breeding objectives- yield, quality characters.	1	24.7.15
6	Biotic and abiotic stress etc; Protein quality improvement; Conventional and modern plant breeding approaches, progress made. Breeding for anti nutritional factors.	1	25.7.15
7	Other pulses: Greengram, blackgram, cowpea, mothbean: Evolution, cytogenetics and genome relationship; Learning the descriptors;	1	27.7.15
8	Breeding objectives- yield, quality characters, biotic and abiotic stress etc;	1	31.7.15
9	Interspecific crosses attempted and its implications, reasons for	1	1.8.15

	failure, ways of overcoming them.		
10	Groundnut: Evolution and distribution of species and forms; Wild relatives and germplasm; Cytogenetics and genome relationship	1	3.8.15
11	Pod and kernel characters	1	7.8.15
12	Breeding objectives- yield, quality characters, biotic and abiotic stress etc.	1	10.8.15
13	Rapeseed and Mustard: Breeding objectives, utilization of wild relatives for yield and quality improvement, biotic and abiotic stress etc	1	17.8.15
14	Oil quality – characteristics in different oils; Evolution and distribution of species and forms		21.8 .15
15	Wild relatives and germplasm; Genetics, cytogenetics and genome relationship.	1	22.8.15
16	Soybean: Breeding objectives, utilization of wild relatives for yield and quality improvement, biotic and abiotic stress etc	1	24.8.15
17	Oil quality – characteristics; Evolution and distribution of species and forms;	1	28.8.15
18	Wild relatives and germplasm; Genetics, cytogenetics and genome relationship.	1	4.9.15
19	Other oilseed crops: castor and sesame: Evolution and distribution of species and forms; Wild relatives and germplasm;	1	7.9.15
20	Cytogenetics and genome relationship; breeding objectives- yield, quality characters.	1	14.9.15
21	Breeding objectives- yield, quality characters.	1	18.9.15
22	Cotton: Evolution of cotton; Breeding objectives- yield, quality characters, biotic and abiotic stress etc	1	19 .9.15
23	Development and maintenance of male sterile lines – Hybrid development and seed production.	1	9.10.15
24	Scenario of Bt cottons, evaluation procedures for Bt cotton.	1	12.10.15
25	Sugarcane: Evolution and distribution of species and forms; Wild relatives and germplasm.,	1	16.10.15
26	Cytogenetics and genome relationship.	1	17.10.15
27	Breeding objectives yield, quality characters and achievements.	1	19.10.15
28	Potato: Evolution and distribution of species and forms; Wild relatives and germplasm.,	2	23 & 26.10.15
29	Cytogenetics and genome relationship.	1	30.10.15
30	Breeding objectives yield, quality characters and achievements.	1	31.10.15
31	Distinguishing features of the released varieties in pulses, oilseeds, cotton and vegetative propagated crops. Maintenance of seed purity and seed production.	2	2.11 & 16.11.15
32	Overall review of complete course.	2	20.11 & 21.11.15

TENTATIVE LECTURE SHEDULE

NEMA 511 PRINCIPALS OF NEMATOLOGY © 3(2+1)

M.Sc. I Semester

Theory

Course Teacher: Dr. A.U. Siddiqui

UNITS	Title	No. of Lectures	Tentative Date
UNIT I	History and growth of Nematology; nematode habitats and diversity- plant, animal and human parasites; useful nematodes (with special reference to EPNs and *C elegance*); economic importance of nematodes to agriculture, horticulture and forestry	7	8, 10, 15, 17, 22, 24, July,15
UNIT II	Gross morphology of plant parasitic nematodes; broad classification, nematode biology, physiology and ecology.	6	29, 31, July, 5, 7, 12, 14, Aug., 15
UNIT III	Types of parasitism; nature of damage and general symptomatology; interaction of plant parasitic nematodes with other organisms.	6	21,26,28,Aug., 15, 2, 4, 9, Sept. 15
UNIT IV	Plant nematode relationships, cellular responses to infection by important phytonematodes; physiological specialization among phytonematodes.	7	15,11,16,18,30, Sept., 7,9, Oct.15,
UNIT V	Principles and practices of nematode management; integrated nematode management.	6	14,16,28,30, Oct., 18,20, Nov.15

TENTATIVE PRACTICAL SCHEDULE

S. No.	Title	No. of practical classes	Tentative Date
1	Studies on kinds of nematodes- free-living, animal, insect and plant parasites.	2	9, 6, July,15
2	Soil sampling, nematode extraction from soil.	2	23,30, July,15
3	Extraction of migratory endoparasites.	2	6, 13, Aug,15
4	Staining for sedentary semiendoparasite and endoparasites.	2	20,27, Aug,15
5	Examination of different life stages of important plant parasitic nematodes.	3	3,10,17,Sept.15
6	Examination of symptoms of important plant parasitic nematodes.	3	24Sept,1,8,Oct,15
7	Histopathology of important plant parasitic nematodes.	3	15,29,Oct,19,Nov15

TENTATIVE LECTURE SHEDULE

NEMA 512 NEMATOLOGICAL TECHNIQUES © 3(1+2)

M.Sc. I Semester

Theory

Course Teacher: Dr. H.K. Sharma

UNITS	Title	No. of Lectures	Tentative Date
UNIT I	Principles and use of light, scanning and transmission electron microscopes, and other laboratory equipments.	2	9/7/15 16/715
UNIT II	Survey and surveillance methods, collection of soil and plant samples.	2	23/7/15 30/7/15
	Cobb sieving and decanting technique & Baermann funnel assembly technique.	2	6/8/15 13/8/15
	Seinhorst two flask extraction technique, centrifugal flotation technique, extraction of nematodes from plant material & estimation of population densities	2	20/8/15 27/8/15
UNIT III	.Killing, fixing, clearing, preservation and mounting nematodes nematodes	2	3/9/15 10/9/15
	Measurements, preparation of perineal patterns, vulval cones of cyst nematodes, en-face views and body section of nematodes	2	17/9/15 24/9/15
UNIT IV	*In vitro* and *in vivo* culturing techniques of plant parasitic, bacteriophagous, mycophagus and omnivorous nematodes.	2	1/10/15 8/10/15
UNIT V	Staining nematodes in plant tissues, microtomy for histopathological studies, collection of plant root exudates and their bioassay & preparation of plant materials for exhibition.	2	15/10/15 29/1015
UNIT VI	Application of molecular techniques in Nematology	1	19/11/15

TENTATIVE PRACTICAL SCHEDULE

S. No.	Title	No. of practical classes	Tentative Date
1	Collection of soil and plant samples	2	10/7/15, 14/7/15
2	Extraction of nematodes from soil by Baermann funnel assembly technique & Cobb sieving and decanting technique.	2	17/7/15, 21/7/15
3	Osterbrink elutriator system for extraction of nematode.	2	24/7/15, 28/7/15
4	Sugar centrifugal floatation technique.	2	31/7/15, 4/8/15
5	Extraction of cysts from soil.	2	7/8/15, 11/8/15
6	Extraction of nematodes from plant material.	1	14/8/15
7	Estimation of nematode population densities.	1	18/8/15
8	Staining plant material for nematodes.	1	21/8/15
9	Killing and fixing of nematodes.	1	25/8/15
10	Clearing nematodes by slow and Seinhorst's methods.	1	28/8/15
11	Preparation of temporary, semipermanent and permanent mounts.	3	1/9/15, 4/9/15, 8/9/15
12	Measurements, drawing of nematodes.	2	11/9/15, 15/9/15
13	Microphotography and special preparation of nematodes.	2	18/9/15, 22/9/15
14	Preparation of perineal patterns of nematodes.	3	29/9/15, 6/10/15, 9/10/15
15	Preparation of vulval cones of cyst nematodes & en-face and body sections.	3	16/10/15, 20/10/15, 23/10/15
16	Collection of root exudates & preparation of exhibits of nematode diseased plant material	2	27/10/15, 30/10/15,
17	*In vitro* culturing techniques of nematodes- callous culture, excised root and carrot disc techniques.	2	3/11/15, 17/11/15,
18	Isolation and mass multiplication of EPNs.	2	20/11/15, 24/11/15,

TENTATIVE LECTURE SHEDULE
NEMAT- 513 STRUCTURAL AND FUNCTIONAL ORGANIZATION OF NEMATODES © 3(2+1)

M.Sc. I Semester
Theory

Course Teacher: Dr. A.U. Siddiqui

UNITS	Title	No. of Lectures	Tentative Date
UNIT I	Introduction and general organization of nematode body.	7	9,14,16,21,23,28,30, July15
UNIT II	Morphology and anatomy of nematode cuticle, hypodermis, musculature and pseudocoelom.	7	4, 6, 11, 13, 18, 20, 25, Aug., 15
UNIT III	Digestive system- structural variations of stoma, oesophagus, intestine and rectum in nematodes.	7	27, Aug., 1, 3, 8, 10, 15,17, Sept.15
UNIT IV	Reproductive system- terminology and variations in female and male reproductive systems, nemic eggs and sperms, types of reproduction, spermatogenesis and oogenesis.	7	22, 24, 29, Sept.15, 1, 6, 8, Oct. 15
UNIT V	Types and structure of excretory-secretory systems; nervous system and associated sense organs.	8	15, 20, 27, 29, Oct., 3, 17, 19, 24, Nov., 15

TENTATIVE PRACTICAL SCHEDULE

S. No.	Title	No. of practical classes	Tentative Date
1	Studies on variations in nematode shapes and sizes	2	8, 15, July., 15
2	Morphological details of cuticle, cuticular markings and ornamentation	3	22, 29, July., 5 Aug.,15
3	Variations in stoma	2	12, 19, Aug.,15
4	Variations in oesophagus & rectum.	2	26, Aug., 2, Sept., 15
5	Types and parts of female and male reproductive systems	3	9, 16, 30, Sept., 15
6	Types and parts of sense organs.	2	7, 14, Oct., 15
7	Types and parts of excretory system.	2	28, Oct., 18, Nov., 15

TENTATIVE LECTURE SCHEDULE
M.Sc. (Ag) COURSE NEMAT-531
(NEMATODE BIOLOGY AND PHYSIOLOGY)
III rd Semester

Course Teacher: Dr. B.L.Baheti **Credit hrs : 3 (2+1)**

S. No.	Topic of Lecture	No. of Lectures	Tentative Date
1	Introduction	1	8.7.15
2	Host finding and invasion in nematodes	2	14/15.7.15
3	Feeding in nematodes	2	21/22.7.15
4	Hatching in nematodes	1	28.7.15
5	Moulting in nematodes	2	29.7.15/4.8.15
6	Survival of nematodes	2	5/11.8.15
7	Life cycle patterns in different types of nematodes	4	11/12/18/19.8.15
8	Reproduction in nematodes	2	25/26.8.15
9	Gametogenesis in nematodes	1	1.9.15
10	Embryogenesis and post embryogenesis in nematodes	2	2/8.9.15
11	Chemical composition of nematodes	2	9/15.9.15
12	Hydrolytic enzymes in nematodes	2	16/29.9.15
13	Pseudocoelome and function of transport, respiration	2	30.9/6.10.15
14	Physiology of digestive system, intermediary metabolism	2	7/14.10.15
15	Osmoregulation, physiology of excretory-secretory and neuromuscular systems	3	20/27/28.10.15
16	Revision/Remaining part	4	3/17/18/24.11.15

TENTATIVE PRACTICAL SCHEDULE

S. No.	Topic of Practical	No. of Practicals	Tentative Date
1	Introduction	1	13.7.2015
2	Studies on embryogenesis and post-embryogenesis in nematodes	2	20/27.7.2015
3	Hatching in nematodes	2	3/10.8.2015
4	Moulting in nematodes	2	17/24.8.2015
5	Life cycle and development of nematodes	4	31.8/7/14/28.9.2015
6	Feeding in nematodes	2	5/12.10.2015
7	Enzymatic assay by electrophoresis techniques	2	19/26.10.2015
8	Revision/Remaining Part	3	2/16/23.11.2015

TENTATIVE LECTURE SHEDULE

NEMA 532 NEMATODE INTERACTIONS WITH OTHER ORGANISM 3(2+1)

M.Sc. III Semester

Theory

Course Teacher: Dr. A.U. Siddiqui

UNITS	Title	No. of Lectures	Tentative Date
UNIT I	Concept of interaction and its importance in disease complexes and their management involving nematode and other organisms.	7	9, 13, 16, 20, 23, 27, 30, July, 15
UNIT II	Interaction of plant parasitic nematodes with wilt causing fungal pathogens.	7	3, 6, 10, 13, 17, 20, 24, Aug., 15
UNIT III	Interaction of plant parasitic nematodes with root rot and other fungal pathogens.	7	27 Aug., 3, 7, 10, 14, 17, 21, Sept., 15
UNIT IV	Interaction of plant parasitic nematodes with bacterial pathogens, other nematode species and arthropods.	7	24, 28, Sept., 1, 5, 8, 12, 15, Oct. ,15
UNIT V	Virus transmission by nematodes.	7	19, 26, 29, Oct., 2, 16, 19, 23, Nov.,15

TENTATIVE PRACTICAL SCHEDULE

S. No.	Title	No. of practical classes	Tentative Date
1	Green-house experiments to study the role of plant parasitic nematodes in wilt causing fungal and bacterial pathogens.	6	14, 21, 28, July., 4, 11, 18, Aug., 15
2	Green-house experiments to study the role of plant parasitic nematodes in rot causing fungal and bacterial pathogens.	6	25, Aug., 1, 8, 15, 22, 29, Sept., 15
3	Green-house experiments to study the role of plant parasitic nematodes in bacterial pathogens.	6	6, 20, 27, Oct., 3, 17, 24, Nov., 15

TENTATIVE LECTURE SHEDULE

NEMAT 533 NEMATODE MANAGEMENT 3(2+1)

M.Sc. III Semester

Theory

Course Teacher: Dr. Subhash Bhargava / Dr. M.K. Sharma

No.	Lecture Topic	No. of Lectures	Tentative Date
1.	Concepts & history of nematode management	2	8, 14,July,15
2.	Crop loss estimation,cost benefit ration & pest risk analysis	2	15, 21,July,15
3.	Management of economically important plant nematodes by using physical practices	3	22, 28,July,15
4.	Management through cultural practices	3	29July, 4,5, Aug., 15
5.	Merits and demerits of cultural and physical practices	3	11, 12, 18, Aug., 15
6.	Management of plant parasitic nematode through chemical nematicide	3	19, 25, 26, Aug., 15
7.	Advantage and disadvantage of chemical method and principals involved	2	1, 2, Sept., 15
8.	Plant resistance	2	8, 9, Sept., 15
9.	Role of plant resistance in nematode management	2	15, 16, Sept., 15
10	Identification of host resistance to the nematode	2	22, 29, Sept., 15
11	Exploitation of host resistance to nematode	2	30 Sept., 6 Oct,15
12	Significance of plant quarantine in nematode management	2	7, 14, Oct,15
13	Concept of integrated nematode management	3	20, 27, 28, Oct,15
14	Use of integrated pest management in nematode management	4	3, 17, 18, 24, Nov.,15

PRACTICALS

S. No.	Title	No. of practicals	Tentative Date
1.	Demonstration of physical method for management of nematode diseases	2	10, 17,July,15
2.	Chemical treatment of seeds & seedlings	2	7, 14, Aug., 15
3.	Chemical treatment of nurseries and field for the management of plant parasitic nematodes	2	21, 28, Aug., 15
4.	Use of soil amendments for the management of plant parasitic nematodes	2	4, 11, Sept.,15
5.	Nematophagus fungi for the management of plant parasitic nematodes	2	18 Sept., 9, Oct., 15
6.	Use of resistant varieties against plant parasitic nematodes, crop rotation and use of fertilizers for the management of nematodes	2	16, 23, Oct., 15
7.	Use of various combinations of resistant varieties, cultural practices and judicious use of chemicals to keep nematode population below economical threshold level	2	30, Oct., 20, Nov.15

TENTATIVE LECTURE SHEDULE

NEMAT 621 Current Topics in Nematode Disease Development & Host resistance
Ph.D. II Semester 3 (2+1)

Theory:
Course Teacher: Dr. H.K. Sharma

S. No	Title	Lectures	Tentative Date
1	Mechanism of pathogenesis	3	13, 14, 20, July, 2015
2	Cytological and biochemical changes induced by nematode feeding	3	21, 27, 28, July, 15
3	Plant defence system against nematodes	3	3, 4, 10, Aug., 15
4	Phytoalexins etc. & their role in nematode management	3	11, 17, 18, Aug., 15
5	Genetic basis of plant resistance to nematodes	3	24, 25, 31, Aug., 15
6	Identification of resistance genes against economically important nematodes	4	1, 7, 8, 14, Sept. 15
7	Various methods of biotechnology for developing resistance	4	15, 21, 22, 28, Sept. 15
8	Resistance markers	3	29, Sept. , 5 , 6, Oct. 15
9	Incorporation of resistance by conventional breeding program.	3	12, 19, 20, Oct. , 15
10	Transgenic approaches for resistance.	4	26, 27, Oct., 2,3, Nov. 15
11	Influence of micro organism on plant- nematode interactions	4	16, 17, 23, 24, Nov. , 15

TENTATIVE PRACTICAL SCHEDULE

S. No	Title	No. of practical classes	Tentative Date
1	Demonstration of microtomy	3	13, 20, 27, July, 2015
2	Histopathological changes in plants due to nematode	3	3, 10, 17, July, 2015
3	Techniques for screening varieties against nematode	4	24 July, 7, 14, 21, Sept.15
4	Field experiments for screening varieties against nematodes	4	28 Sept., 5, 12, 19, Oct.15
5	Field experiments for histopathological studies	4	26 Oct., 2, 16, 23, Nov.15

TENTATIVE LECTURE SHEDULE

NEMAT. 622. ADVANCED NEMATODE TECHNIQUES 3 (1+2)
Ph.D. II Semester
Theory
Course Teacher: Dr. A.U. Siddiqui / Dr. H.K. Sharma

UNITS	Title	No. of Lectures	Tentative Date
UNIT I	Principles and use of light microscopy, electron microscopy (SEM, TEM),	3	14,21,28, July,15
UNIT II	Spectrophotometry and electrophoresis; cytological, serological and molecular techniques and their applications in Nematology	3	4,11,18, Aug.,15
UNIT III	*In vitro* culturing of phytophagous nematodes using callus, excised roots, carrot disc techniques; Culturing of mycophagous nematodes;	4	25Aug., 1,8,15, Sept ,15
UNIT IV	Nematicidal residue analysis; Liquid and gas chromatography, HPLC; Experimental designs	4	22,29, Sept.15, 6, 20, Oct.15
UNIT V	Computer application for modelling and prediction of yield losses; Preparation, validation and presentation of research findings	4	27,Oct., 3, 17, 24, Nov.15

TENTATIVE PRACTICAL SCHEDULE

S. No	Title	No. of practical classes	Tentative Date
1	*In vitro* culturing of phytophagus nematodes by callus.	4	10, 17, 24, 25, July, 15
2	*In vitro* culturing of phytophagus nematodes by carrot disc.	4	31 July, 7, 14, 21, Aug.15
3	*In vitro* culturing of phytophagus nematodes by excised root techniques.	4	22, 28, Aug., 4,11, Sept.15
4	Culturing of mycophagous nematodes	3	18, 19, 26 Sept.,15
5	Nematode enzymatic assays employing electrophoretic techniques	3	3, 9, 16, Oct.15
6	Extraction and estimation of nematicidal residues in soil.	3	17, 23, 30, Oct.15
7	Extraction and estimation of nematicidal residues in plants.	3	31 Oct., 20, 21 Nov.15

TENTATIVE LECTURE SCHEDULE
OF Ph.D. COURSE NEMAT-623
(ADVANCES IN BIOLOGICAL CONTROL OF NEMATODES)
II nd Semester

Course Teacher: Dr. B.L.Baheti **Credit hrs : 3 (2+1)**

S. No.	Topic of Lecture	No. of Lectures	Tentative Date
1	Introduction	1	8.7.2015
2	History and concepts of biological control	2	10/15.7.2015
3	Isolation, identification, host specificity, mode of action, culturing and field application potential of promising fungal bio-control agents against nematodes	4	17/22/24/29.7.2015
4	Isolation, identification, host specificity, mode of action, culturing and field application potential of promising bacterial bio-control agents against nematodes	3	31.7/5/7.8.2015
5	Isolation, identification, host specificity, mode of action, culturing and field application potential of promising predacious nematodes for the management of plant parasitic nematodes	2	12/14.8.2015
6	Isolation, identification, host specificity, mode of action, culturing and field application potential of promising mites as bio-control agents of nematodes	2	19/21.8.2015
7	Nematoxin producing organisms and antagonistic plants	3	21/26/28.82015
8	Mass culturing of bio-control agents	2	2/4.9.2015
9	Formulation of bio-control agents	1	9.9.2015
10	Quality control for bio-control agents	2	11/16.9.2015
11	Bio-safety of bio-control agents	1	18.9.2015
12	Registration protocols of bio-control agents	2	30.9/7.10.2015
13	Use of botanicals in nematode management	1	9.10.2015

14	Mode of action of botanicals in nematode management	2	14/16.10.2015
15	Role of organic amendment in nematode management	2	23/28.10.2015
16	Revision/Remaining part	3	30.10/18/20.11.2015

TENTATIVE PRACTICAL SCHEDULE

S. No.	Topic of Practical	No. of Practicals	Tentative Date
1	Introduction	1	14.7.2015
2	Isolation of potential bio-control agents	2	21/28.7.2015
3	Identification of bio-control agents	2	4/11.8.2015
4	*In vitro* testing of potential bio-control agents	3	18/25.8/1.9.2015
5	Culturing and mass production techniques of bio-control agents	3	8/15/29.9.2015
6	Formulation and application techniques of selected bio-control agents	2	6/20.10.2015
7	Botanicals and organic amendments in nematode management	2	27.10/3.11.2015
8	Revision/Remaining Part	2	17/24.11.2015

TENTATIVE LECTURE SCHEDULE

NEMAT-624 ADVANCED NEMATODE ECOLOGY 3 (2+1)

Theory Ph.D (II Sem.)

Course Teacher : Dr. M.K. Sharma

S. No.	Topics	No of Lectures	Date
1.	Principles and basis of nematode ecology	03	8th, 9th & 10th July, 2015
2.	Community analysis	01	16th, July, 2015
3	Population estimation models	03	23rd, 24th & 30th July, 2015
4.	Role of nematodes in the food web, habitat and niche characteristics	04	6th, 7th 13th & 14th Aug, 2015
5.	Effects of biotic stresses on host-parasite interaction	02	20th & 21st Aug, 2015
6.	Effects abiotic stresses on host-parasite interaction	02	27th & 28th Aug, 2015
7.	Environmental extremes and	04	3rd, 4th, 10th, & 11th Sept, 2015
8.	survival strategies of nematodes	02	17th & 18th Sept, 2015
9.	Biochemical and molecular basis of nematode survival	03	1st, 8th, 9th Oct, 2015
10.	Modeling of population dynamics in relation with crop performance	03	15th 16th & 23rd Oct, 2015
11.	Ecological considerations in nematode management	02	29th & 30th Oct, 2015
12.	Data interpretation and systems simulation	03	18th , 19th & 20th Nov, 2015

TENTATIVE PRACTICAL SCHEDULE

NEMAT-624 ADVANCED NEMATODE ECOLOGY 3 (2+1)

Practical Ph.D (II Sem.)

Course Teacher : Dr. M.K. Sharma

S. No.	Topics	No of Lectures	Date
1.	Studies on vertical distribution patterns	03	15th , 22nd, & 29th, July, 2015
2.	Studies on horizontal distribution patterns	03	5th, 12th & 19th Aug, 2015
3	Studies on community analysis	04	26th Aug, & 2nd, 9th 16th Sept, 2015
4.	Studies on population density v/s crop yield relationships	02	7th & 14th Oct, 2015
5.	Studies on effect of biotic factors	01	28th Oct, 2015
5	Studies on effect of abiotic factors	01	18th Nov, 2015

PL PATH 531 **Plant Virology**
(Core Course) **Credit hr: 3 (2+1)**

Course Teacher: - Dr. Pokhar Rawal
Dr. Rakesh Shah*

Objective: - To acquaint with structure, virus-vector relationship, biology and management of plant viruses

Theory:

S. No.	Topic	No. of scheduled lecture & Date
1.	History of Plant Viruses	01 = 8 July, 2015
2.	Origin and evaluation of plant viruses	01=10 July, 2015
3.	Composition of Plant Viruses	01=15 July, 2015
4.	Structure of different group of Plant Viruses	01=17 July, 2015
5.	Plant Virus Nomenclature	01=22 July, 2015
6.	Plant Virus Classification	01=24 July, 2015
7.	Genome organization	01=29 July, 2015
8.	Replication of Plant Viruses	01=31 July, 2015
9.	Spread of Plant viruses	01=5 August,2015
10.	Symptomatology of important plant viral diseases	02=7 & 12 August,2015
11.	Transmission of Plant viruses	01=14 August,2015
12.	Chemical and physical properties of plant viruses	01=19 August,2015
13.	Host virus interaction	01=21 August,2015
14.	Virus vector relationship	01=26 August,2015
15.	Purification of plant viruses	01=28 August,2015
16.	Electron Microscopy	01=2 September,2015
17.	Protein and nucleic acid based diagnostics	02=4 & 9 September,2015
18.	Mycoviruses,	01=11 September,2015
19.	Phytoplasma	01=16 September,2015
20.	Arbo-and baculoviruses	01=18 September,2015
21.	Satellite viruses, Satellite RNAs,	01=30 September,2015
22.	Phages, Viroids, Pirions	01=7 October,2015
23.	Principles of working of electron microscope & ultra-microtome	01=9 October,2015
24.	Mechanism of host plant resistance	02=14 & 16 October,2015
25.	Genetic engineering	02=23 & 28 October,2015
26.	Management of plant viral diseases	01=30 October,2015
	Total Lectures=	30
Practical		
1.	Study of symptoms caused by plant viruses	03=13, 20 & 27 July, 2015
2.	Transmission assay of plant viruses	04=3,10,17 & 24 August, 2015
3.	Physical properties of Plant viruses	01=7 September,2015
4.	Purification of Plant Viruses	02=14 &21 September,2015
5.	Methods of raising antisera	01=28 Sept.,2015
6.	Serological test	02=5 &12 October,2015
7.	Electron microscopy and ultratomy	01=19 October, 2015
8.	PCR	01=26 October, 2015
	Total Practical=	15

*** During leave period**

Note: - In case of absentee of students in scheduled lecture & practical class, topic will be treated as covered.

Lecture Schedule
B Sc Ag Part I Semester First 2015-16
PBG 111: PRINCIPLES OF GENETICS "A" Batch Cr. Hr. 3(2+1)

S.No.	Lecture Topic	No of Lecture	Date of class
1.	History of Genetics. Ultra structure of typical plant cell	1	14.7.15
2.	Physical and chemical nature of protoplasm	1	21.7. 15
3.	Cell organelles: cell wall, plasma membrane and nucleus	1	25.7.15
4.	Mitochondria, chloroplast, Endosplamic reticulum, golgi body and ribsomes	1	28.7.15
5.	Chromosome structure, types and function	1	1.8.15
6.	Chemical composition of chromosome, karyotype and idiogram	1	4.8.15
7.	Mitotic cell division and its significance	1	11.8.15
8.	Meiotic cell division and significance	1	18.8.15
9.	DNA, its structure and function	1	22.8.15
10.	Different forms of DNA, their replication & repair system	1	25.8.15
11.	RNA: structure, function and types	1	1.9.15
12.	Transcription, translation, genetic code and protein synthesis	1	8.9.15
13.	Mendel's laws of inheritance	1	15.9.15
14.	Gene interaction, their types, modification of F2 ratios	1	19.9.15
15.	Multiple alleles: characteristics, ABO blood group and Rh blood group system etc.	1	6.10.15
16.	Inheritance of quantitative and qualitative characters and differences between them	1	17.10.15
17.	Pleiotrophism, penetrance and expressivity	1	20.10.15
18.	Cytoplasmic inheritance: its characteristic features and differences between chromosomal and cytoplasmic inheritance	1	27.10.15
19.	Crossing over: Mechanism, estimation of crossing over percentage and its impact on producing recombinants	1	31.10.15
20.	Linkage :types and its detection	1	3.11.15
21.	Numerical chromosomal aberrations and origin of crop species	1	17.11.15

22.	Structural chromosomal aberrations	1	21.11.15
23.	Mutation: characteristics, classification and induction	1	24.11.15

Practical Schedule: PBG 111: PRINCIPLES OF GENETICS "A1" Batch

Each practical class is of two periods

Exercise.	Name of Exercise/Lecture	Date of practical
1	Introduction to microscope and study of typing plant cell	15.7.15
2	Preparation and use of fixatives and stains	22.7.15
3	Preparation of micro slides and identification of various stage of mitosis	29.7.15
	Preparation of micro slides and identification of various stage of mitosis	5.8.15
4	Preparation of micro slides and identification of various stage of meiosis	12.8. 15
	Preparation of micro slides and identification of various stage of meiosis	19.8.15
5	Study of mono hybrid, dihybrid and trihybrid ratios	26.8.15
6	Study of test of goodness of fit of genetic ratios	2.9.15
7	Study of different types of gene interactions and modification of typical dihybrid F2	9.9.15
	Study of different types of gene interactions and modification of typical dihybrid F2	16.9.15
8	Study and detection of linkage in F2 progeny	7.10.15
	Study and detection of linkage in test cross progeny	14.10.15
9	Induction of polyploidy using colchicines	28.10.15
10	Induction of chromosomal aberrations using chemicals	18.11.15

SUGGESTED READING:

*Gupta, P.K. 2004. Cytology, Genetics and evolution. Rastogi Publications, Meerut.(Hindi Edition).

*Kaushik, M.P. 2003. A Text Book of Modern Botany. Prakash Publications, Muzaffarnagar (U.P.). *Klug, W.W. and Cummings, M.R. 2005. Concepts of genetics Pearson Education (Singapore) Pvt.
Ltd., Indian Branch, Pratap Ganj, New Delhi.

*Singh, B.D. 2001. Fundamentals of Genetics, Kalyani Publishers, New Delhi.

*Strickberger, M.W. 2001. Genetics. Prentice Hall of India Pvt. Ltd., New Delhi.

Practical Schedule: PBG 111: PRINCIPLES OF GENETICS "A2" Batch
Each practical class is of two periods

S. No.	Name of Exercise/Lecture	Date of practical
1	Introduction to microscope and study of typing plant cell	13.7.15
2	Perparation and use of fixatives and stains	20.7.15
3	Perparation of micro slides and identification of various stage of mitosis	27.7.15
	Perparation of micro slides and identification of various stage of mitosis	3.8.15
4	Perpartion of micro slides and identification of various stage meiosis	10.8.15
	Perpartion of micro slides and identification of various stage meiosis	17.8.15
5	Study of monohybrid, dihybrid and Trihybrid ratios	24.8.15
6	Study of test of goodness of fit of genetic ratios	31.8.15
7	Study of different types of gene interactions and modification of typical dihybrid F2	7.9.15
	Study of different types of gene interactions and modification of typical dihybrid F2	14.9.15
8	Study and detection of linkage in F2 and test cross progeny	5.10.15
	Study and detection of linkage in F2 and test cross progeny	12.10.15
9	Induction of polyploidy using colchicines	19.10
10	Induction of chromosomal aberrations using chemicals	26.10.15
11	Review classes	2.11.15,16.11.15 & 23.11.15

Lecture Schedule: First Semester

PBG-111 PRINCIPLES OF GENETICS 3(2+1) B

S.No.	Topic	Lecture	Date of class
1.	History of Genetics	1	10.7.15
2.	Ultra structure of typical plant cell		
3.	Physical and chemical nature of protoplasm	1	17.7. 15
4.	Cell organelles: cell wall, plasma membrane and nucleus	1	24.7.15
5.	Mitochondria, chloroplast, Endosplamic reticulum, golgi body and ribsomes	1	25.7.15
6.	Chromosome structure, types and function	1	31.7.15
7.	Chemical composition of chromosome, karyotype and idiogram	1	1.8.15
8.	Mitotic cell division and its significance	1	7.8.15
9.	Meiotic cell division and significance	1	21.8.15
10.	DNA, its structure and function	1	22.8.15
11.	Different forms of DNA, their replication & repair system	1	28.8.15
12.	RNA: structure, function and types	1	4.9.15
13.	Transcription, translation, genetic code and protein synthesis	1	11.9.15
14.	Mendel's laws of inheritance	1	18.9.15
15.	Gene interaction, their types, modification of F2 ratios	1	19.9.15
16.	Multiple alleles: characteristics, ABO blood group and Rh blood group system etc.	1	9.10.15
17.	Inheritance of quantitative and qualitative characters and differences between them	1	16.10.15
18.	Pleiotrophism, penetrance and expressivity	1	17.10.15
19.	Cytoplasmic inheritance: its characteristic features and differences between chromosomal and cytoplasmic inheritance	1	23.10.15
20.	Crossing over: Mechanism, estimation of crossing over percentage and its impact on producing recombinants	1	
21.	Linkage :types and its detection	1	30.10.15
22.	Numerical chromosomal aberrations and origin of crop species	1	31.10.15
23.	Structural chromosomal aberrations	1	20.11.15
24.	Mutation: characteristics, classification and induction	1	21.11.15

Practical PBG-111 -PRINCIPLES OF GENETICS B1			
S. No.	Name of exercise	Practical	Date of practical
1	Introduction to microscope and study of typing plant cell	1	16.7.15
2	Perparation and use of fixatives and stains	1	23.7.15
3	Perparation of micro slides and identification of various stage of mitosis	2	30.7.& 6.8.15
4	Perpartion of micro slides and identification of various stage meiosis	2	13.8.& 20.8.15
5	Study of monohybrid ratios	1	27.8.15
6	Study of dihybrid ratios	1	
7	Stydy of Trihybrid Ratios	1	3.9.15
8	Study of test of goodness of fit of genetic ratios	1	10.9.15
9	Study of different types of gene interactions and modification of typical dihybrid F2	2	17.9. & 8.10.15
10	Study and detection of linkage in F2 and test cross progeny	2	15.10 & 29.10.15
11	Induction of polyploidy using colchicines	1	19.11.15
12	Induction of chromosomal aberrations using chemicals	1	

Practical PBG-111 PRINCIPLES OF GENETICS B2			
S. No.	Name of exercise	Practical	Date of practical
1	Introduction to microscope and study of typing plant cell	1	14.7.15
2	Preparation and use of fixatives and stains	1	21.7.15
3	Preparation of micro slides and identification of various stage of mitosis	2	28.7.& 4.8.15
4	Preparation of micro slides and identification of various stage meiosis	2	11.8.& 18.8.15
5	Study of monohybrid ratios	1	25.8.15
6	Study of dihybrid ratios	1	1.9.15
7	Stydy of Trihybrid Ratios	1	8.9.15
8	Study of test of goodness of fit of genetic ratios	1	15.9.15
9	Study of different types of gene interactions and modification of typical dihybrid F2	2	6.10. & 20.10.15
10	Study and detection of linkage in F2 and test cross progeny	2	27.10 & 3.11.15
11	Induction of polyploidy using colchicines	1	17.11.15
12	Induction of chromosomal aberrations using chemicals	1	

Lecture Schedule: First Semester

PBG-211 **Principles of Plant Breeding** **3(2+1) A**

S.No.	Topic	Lecture	Date of class
1.	Introduction to ecological classification of plants.	1	10.7.15
2.	Introduction to taxonomical classification of plants.	1	13.7.15
3.	Plant breeding and its historical development.	1	17.7. 15
4.	Nature of plant breeding and its role.	1	20.7.15
5.	Different modes of reproduction: Sexual, asexual and vegetative and their role in plant breeding.	1	24.7.15
6.	Self-incompatibility types, genetic control and use in plant breeding.	1	27.7.15
7.	Male sterility types, genetic control and use in plant breeding.	1	31.7.15
8.	Apomixes types and role in plant breeding.	1	3.8.15
9.	Inheritance of qualitative and quantitative characters and heritability.	1	7.8.15
10.	Pure line theory and genetic basis of selection.	1	10.8.15
11.	Introduction to inbreeding depression and heterosis	1	17.8.15
12.	Theories of heterosis	1	21.8.15
13.	Review classes	1	24.8.15
14.	Hardy-Weinberg law	1	28.8.15
15.	Center of diversity	1	31.8.15
16.	Plant genetic resources	1	4.9.15
17.	Domestication, Introduction and acclimatization.	1	7.9.15
18.	Different type of improved genotypes	1	11.9.15
19.	Development of homozygous varieties	1	14.9.15
20.	Development of multilines	1	18.9.15
21.	Intra population improvement methods	1	9.10.15
22.	Inter population improvement methods	1	12.10.15
23.	Development of inbred lines	1	16.10.15
24.	Development of hybrids	1	19.10.15
25.	Development of synthetics	1	23.10.15
26.	Development of composites	1	26.10.15
27.	Development of clones	1	30.10.15
28.	Polyploidy in relation to plant breeding	1	2.11.15
29.	Mutation breeding- methods, uses, nature of gene mutation, mutagenic agents.	1	16.11.15
30.	Use of biotechnology in plant breeding	1	20.11.15
31.	Procedure for release of new variety.	1	23.11.15

Practical **PBG-211** **Principles of Plant Breeding** **A1**			
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	14.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	21.7 & 28.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	4.8.15
4.	Study of TS of ovaries of different plants	1	11.8.15
5.	Mounting of different ovules and their study	1	18.8.15
6.	Study of microsporogenesis	1	25.8.15
7.	Study of megasporogenesis	1	1.9.15
8.	Study of pollen viability	1	8.9.15
9.	Study of pollen size and shape	1	15.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	20.10 & 27.10.15
11.	Identification of male sterility in sorghum	1	3.11.15
12	Review class	1	17.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**A2**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	16.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	23.7 &30.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	6.8.15
4.	Study of TS of ovaries of different plants	1	13.8.15
5.	Mounting of different ovules and their study	1	20.8.15
6.	Study of microsporogenesis	1	27.8.15
7.	Study of megasporogenesis	1	3.9.15
8.	Study of pollen viability	1	10.9.15
9.	Study of pollen size and shape	1	17.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	8 & 15.10.15
11.	Identification of male sterility in sorghum	1	19.11.15

Lecture Schedule: First Semester

PBG-211 Principles of Plant Breeding 3(2+1) B

S.No.	Topic	Lecture	Date of class
1.	Introduction to ecological classification of plants.	1	8.7.15
2.	Introduction to taxonomical classification of plants.	1	
3.	Plant breeding and its historical development.	1	15.7. 15
4.	Nature of plant breeding and its role.	1	22.7.15
5.	Different modes of reproduction: Sexual, asexual and vegetative and their role in plant breeding.	1	25.7.15
6.	Self-incompatibility types, genetic control and use in plant breeding.	1	29.7.15
7.	Male sterility types, genetic control and use in plant breeding.	1	1.8.15
8.	Apomixes types and role in plant breeding.	1	5.8.15
9.	Inheritance of qualitative and quantitative characters and heritability.	1	12.8.15
10.	Pure line theory and genetic basis of selection.	1	19.8.15
11.	Introduction to inbreeding depression and heterosis	1	22.8.15
12.	Theories of heterosis	1	26.8.15
13.	Hardy-Weinberg law	1	
14.	Center of diversity	1	2.9.15
15.	Plant genetic resources	1	
16.	Domestication, Introduction and acclimatization.	1	
17.	Different type of improved genotypes	1	9.9.15
18.	Development of homozygous varieties	1	
19.	Development of multilines	1	16.9.15
20.	Intra population improvement methods	1	19.9.15
21.	Inter population improvement methods	1	7.10.15
22.	Development of inbred lines	1	14.10.15
23.	Development of hybrids	1	
24	Development of synthetics	1	17.10.15
25.	Development of composites	1	
26.	Development of clones	1	28.10.15
27.	Polyploidy in relation to plant breeding	1	31.10.15
28.	Mutation breeding- methods, uses, nature of gene mutation, mutagenic agents.	1	
29.	Use of biotechnology in plant breeding	1	18.11.15
30.	Procedure for release of new variety.	1	21.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**B1**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	13.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	20 &27.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	3.8.15
4.	Study of TS of ovaries of different plants	1	10.8.15
5.	Mounting of different ovules and their study	1	17.8.15
6.	Study of microsporogenesis	1	24.8.15
7.	Study of megasporogenesis	2	31.8. & 7.9.15
8.	Study of pollen viability	1	14.9.15
9.	Study of pollen size and shape	1	5.10.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	12 &19.10.15
11.	Identification of male sterility in sorghum	1	26.10.15
12	Review class		2 .11.15&16.11.15

Practical	**PBG-211**	**Principles of Plant Breeding**	**B2**
S. No.	Name of exercise	Practical	Date of practical
1.	Calculation of mean, range, variance, standard deviation, standard error and CV	1	10.7.15
2.	Identification of hydrophytes, mesophytes and xerophytes	2	17&24.7.15
3.	Flower structure and biology of different self and cross pollinated crops	1	31.7.15
4.	Study of TS of ovaries of different plants	1	7.8.15
5.	Mounting of different ovules and their study	1	21.8.15
6.	Study of microsporogenesis	1	28.8.15
7.	Study of megasporogenesis	1	4.9.15
8.	Study of pollen viability	1	11.9.15
9.	Study of pollen size and shape	1	18.9.15
10.	Emasculation and hybridization in self pollinated and often cross pollinated crops	2	9 &16.10.15
11.	Identification of male sterility in sorghum	1	23.10.15
12.	Review class	2	30.10 & 20.11.15

Lecture Schedule: First Semester

PBG- 511 PRINCIPLES OF GENETICS 3(2+1)

S.No.	Topic	Lecture	Date of class
1.	Historical perspective of Genetics	1	10.7.15
2.	Mendelian Principle of Genetics	1	
3.	Inheritance of Simple Characters in monohybrid and dihybrid Crosses.	1	15.7. 15
4.	Type of Gene interactions.	1	17.7.15
5.	Concept and types of Linkage.	1	22.7.15
6.	Detection of Linkage through F_2 and test cross ratios.	1	24.7.15
7.	Phenomenon of crossing over and its estimation.	1	29.7.15
8.	Multiple alleles with some classical examples.	2	31.7 & 5.8.15
9.	Mechanisms of sex determination in animals and plants.	1	7.8.15
10.	Sex linked, sex influenced and sex limited characters, their inheritance with suitable example.	1	12.8.15
11.	Recombination test and *cis*- trans test or complementation test.	1	19.8.15
12.	Complex loci or pseudo alleles, fine structure of gene in Eukaryotes and Genetic control of metabolism.	1	21.8.15
	Review class	1	26.8.15
13.	Genetic material, nature, organization and structure.	1	28.8.15
14.	Replication of genetic material.	1	
15.	Genetic code, transcription and translation.	1	2.9.15
16.	Gene regulation in prokaryotes.	1	4.9.15
17.	Gene regulation in Eukaryotes.	1	9.9.15
18.	Split genes, transcriptional and post transcriptional regulation, Dynamic nature of genome.	1	11.9.15
19.	Classification and Characteristic of mutation.	2	16.9.15 &18.9.15
20.	Induction and Detection of mutation.	2	7.10 & 9.10.15
	Review class	1	14.10.15
21.	Environmental influence on gene expression. Extra nuclear inheritance.	1	16.10.15
22.	Extra-nuclear and Polygenic inheritance.	1	23.10.15
23.	Population genetics, Hardy- Weinberg equilibrium, changes in gene and genotype frequencies	2	28.10 & 30.10.15
24.	Human genetics, genetic disorders and gene therapy.	2	18.11& 20.11.15

Practical PBG-511 PRINCIPLES OF GENETICS			
S. No.	Name of exercise	Practical	Date of practical
1.	Life cycle of plant & cell division.	1	13.7.15
2.	Study of mitotic cell division	1	20.7.15
3.	Study of meiotic cell division.	1	27.7.15
4.	Study of life cycle of Drosophila	1	3.8.15
5.	Handling and maintenance of Drosophila under artificial laboratory conditions.	2	10.8.& 17.8.15
6.	Study of Monohybrid crosses in Pea/Drosophila.	1	24.8.15
7.	Study of dihybrid crosses in Pea/Drosophila	1	31.8.15
8.	Kinds of gene interaction in plant species	2	7.9 &14.9.15
9.	Detection of linkage and crossing over.	2	5.10 & 12.10.15
10.	Study of inheritance pattern in Human families (ptc test etc.).	1	19.10.15
11.	Allelic frequencies of cross-pollinated crops and their populations.	1	26.10.15
12	Method of DNA Isolation and its demonstration.	1	2.11.15
13	Various molecular techniques and their significance (demonstration)	2	16.10 & 23.10.15

PBG 512 CELL BIOLOGY AND MOLECULAR GENETICS 3 (3+0)

S.No.	**Topic**	**Lectures**	**Date of class**
1	Ultrastructure of the cell; Differences between eukaryotic and prokaryotic cells	1	9.7.15
2	Macromolecules; Structure and function of cell wall, nuclear membrane and plasma membrane	1	14.7.15
3	Cellular Organelles – nucleus, plastidschloro/ chromoplast, mitochondria endoplasmic reticulum, Golgi complex, lysosomes, peroxisomes.	1	16.7.15
4	Bioenergetics; Ultrastructure and function of mitochondria and biological membranes; Chloroplast and other photosynthetic organelles	2	21.7 & 23.7.15
5	Interphase nucleus- Structure and chemical composition;	1	25.7.15
6	Cell division and physiology of cell division.	1	28.7.15
7	Historical background of molecular genetics; Genetic material in organisms	1	30.7.15
8	Structure and properties of nucleic acid, DNA transcription and its regulation – Transcription factors and their role; Genetic code	2	1.8.15 & 4.8.15

9	DNA sequencing	1	6.8.15
10	Regulation of protein synthesis in prokaryotes and eukaryotes – ribosomes, t -RNAs and translational factors	3	11 &13.8.15
11	Transposable elements	1	18.8.15
12	Review class	1	20.8.15
13	Mechanisms of recombination in prokaryote	2	22.8 & 25.8.15
14	DNA organization in eukaryotic chromosomes	2	27.8 &1.9.15
15	DNA content variation,	1	3.9.15
16	Types of DNA sequences – Unique and repetitive sequences; Mini satellites and micro satellites	2	8 & 10.9.15
17	Structural and functional genomics.	1	15.9.15
18	Marker assisted selection.	2	17 & 19.9.15
19	Molecular mapping & tagging of genes	2	6 & 8.10.15
20	Gene amplification and its significance;	2	15&17.10.15
21	Proteomics and protein-protein interaction	2	2 & 22.10.15
22	Signal transduction;	2	29&31.10.15
23	Genes in development	2	3& 17.11.15
24	Cancer and cell aging	2	19&21.11.15

PBG 513 Principles of Plant Breeding 3(2+1)

S.No.	Topic	Lectures	Date of class
1	Plant Breeding and its objectives and Historical development-Pre and post Mendelien era	1	9.7.15
2	Center of biodiversity and its significance	1	13.7.15
3	Mode of reproduction and its significance in plant breeding	1	16.7.15
4	Type of gene action and their role in plant breeding, Heritability, Genetic advance and combining ability	1	20.7.15
5	Domestication and introduction	1	23.7.15
6	Pure line theory, pure line selection and mass selection	1	27.7.15
7	Pedigree selection	1	30.7.15
8	Bulk selection, single seed decent method and doubled haploidy methods	1	3.8.15
9	Back cross methods and Multi line breeding	1	6.8.15
10	Diallel selective matting approach	1	10.8.15
11	Breeding methods for cross pollinated crops. Intra population improvement methods- Mass selection	1	13.8.15
12	Half sib, full sib, S1 and S2 selection	1	17.8.15
13	Inter population improvement methods- Half sib and full sib method	1	20.8.15
14	Heterosis and its basis	1	24.8.15

15	Review class	1	27.8.15
16	Development of inbred lines	1	31.8.15
17	Development of hybrids	1	3.9.15
18	Development of synthetics and Composites	1	7.9.15
19	Prediction of performance	1	10.9.15
20	Inbred line improvement	1	14.9.15
21	Review class	1	17.9.15
22	Seed production of inbred lines and hybrids	1	5.10.15
23	Breeding for clonally propagated crops-Colonel selection and apomixes	1	8.10.15
24	Self-incompatibility and male sterility in crop plants and their commercial exploitation	1	12.10.15
25	Concept of plant ideotype and its role in crop improvement	1	15.10.15
26	Mutation breeding	1	19.10.15
27	Breeding for abiotic and biotic stresses	1	26.10.15
28	Procedure for release of new varieties	1	29.10.15
29	Maintenance breeding and Participatory Plant Breeding	1	2.11.15
30	Plant breeders' rights and regulations for plant variety protection and farmers rights	2	16 & 19.11.15
31	Review class	1	23.11.15

Practical PBG 513 Principles of Plant Breeding 3(2+1)

S.No.	Topic	Lectures	Date of class
1	Flower structure and biology of different self and cross pollinated crops	1	15.7.15
2	Emasculation and crossing in sorghum	1	22.7.15
3	Emasculation and crossing in pigeon pea	1	29.7.15
4	Emasculation and crossing in cotton	1	5.8.15
5	Hybridisation in maize	2	12.8.15 & 19.8.15
6	Hybrid seed production in sorghum using male sterility	2	26.815& 2.9.15
7	Breeder seed production in sorghum	1	9.9.15
8	Breeder seed production of inbred lines in maize	1	16.9.15
9	Maintenance of experimental record	2	7.10.15
10	Analysis of variance and mean comparison	1	14.10.15
11	Calculation of variability parameters and their interpretation	2	28.10.15 &18.11.15

PBG 532 Breeding for biotic and abiotic stress resistance 3(2+1)

S.No.	Topic	Lecture	Date of class
1.	Importance of plant breeding with special reference to biotic and abiotic stress resistance; Classification of biotic stresses.	1	9.7.15
2.	Major pests and diseases of economically important crops - Concepts in insect and pathogen resistance;	1	13.7.15
3.	Analysis and inheritance of resistance variation;	1	16.7.15
4.	Host defence responses to pathogen invasions- Biochemical and molecular mechanisms;	1	20.7.15
5.	Acquired and induced immunity and systemic acquired resistance (SAR);	1	23.7.15
6.	Host-pathogen interaction, gene-for-gene hypothesis, molecular evidence for its operation and exceptions;	1	27.7.15
7.	Concept of signal transduction and other host-defense mechanisms against viruses and bacteria.	1	30.7.15
8.	Types and genetic mechanisms of resistance to biotic stresses – Horizontal and vertical resistance in crop plants.	1	3.8.15
9.	Quantitative resistance/Adult plant resistance and Slow rusting resistance	1	6.8.15
10.	Classical and molecular breeding methods - Measuring plant resistance using plant fitness;	2	10 &13.8.15
11.	Behavioural, physiological and insect gain studies.	1	17.8.15
12.	Gene pyramiding methods and their implications.	1	20.8.15
13.	Classification of abiotic stresses - Stress inducing factors –moisture stress/drought and water logging & submergence;	2	24.8 & 27.8.15
14.	Acidity, salinity/alkalinity/sodicity ; High/low temperature, wind stresses, etc.	2	31.8.15& 3.9.15
15.	Stress due to soil factors and mineral toxicity; Physiological and Phenological responses.	2	7.9 & 10.9.15
16.	Emphasis of abiotic stresses in developing breeding methodologies.	1	14.9.15
17.	Genetics of abiotic stress resistance;	1	17.9.15
18.	Genes and genomics in breeding cultivars suitable to low water regimes, high temperatures;	1	8.10.15
19.	Utilizing MAS procedures for identifying resistant types in important crop like rice / sorghum / wheat / cotton etc;	2	12 & 15.10.15

20.	Breeding for resistance to stresses caused by toxicity, deficiency and pollutants/contaminants in soil, water and environment.	2	19 &26.10.15
21.	Exploitation of wild relatives as a source of resistance to biotic and abiotic factors in major field crops	2	29.10 & 2.11.15
22.	Transgenics in management of biotic and abiotic stresses	1	16.11.15
23.	Use of toxins, protease inhibitors, lectins, chitnases and Bt for diseases and insect pest management- Achievements.	2	19& 23.11.15
	Practical :Breeding for biotic and abiotic stress resistance		
1	Phenotypic screening techniques for sucking pests and chewing pests	1	14.7.15
2	Traits to be observed at plant and insect level	1	21.7.15
3	Phenotypic screening techniques for nematodes and borers;	1	28.7.15
4	Breeding strategies - weeds – ecological, environmental impacts on the crops;	1	4.8.15
	Review class	1	11.8.15
5	Breeding for herbicide resistance -	1	18.8.15
6	Evaluating the available populations like RIL, NIL etc. for pest resistance;	1	25.8.15
7	Use of standard MAS procedures	1	1.9.15
8	Phenotypic screening methods for diseases symptoms and data recording caused by fungi and bacteria;	1	8.9.15
9	Review class	1	15.9.15
10	Screening crops for drought and flood resistance or factors to be considered and breeding strategies	1	6.10.15
11	Screening varieties of major crops for acidity and alkalinity- their effects and breeding strategies;	1	20.10.15
12.	Understanding the climatologically parameters and predisposal of biotic and abiotic stress factors- ways of combating them.	1	27.10.15
13	Review class	1	3.11.15 & 17.11.15

PBG 534 Breeding for cereals, forages and seed spices 3(3+0)

Theory

S.No.	Topic	Lecture	Date of class
1.	Rice: Evolution and distribution of species and forms - wild relatives and germplasm	1	14.7.15
2.	Genetics of rice – cytogenetic and genome relationship	1	
3.	Rice Breeding objectives- yield, quality characters,	1	16.7.15
4.	Biotic and abiotic stress resistance in rice .	1	
5.	Hybrid rice breeding- potential and outcome - Aerobic rice and its implications.	2	21.7& 23.7.15
6.	Wheat: Evolution and distribution of species and forms - wild relatives and germplasm	1	25.7.15
7.	Wheat cytogenetic and genome relationship;	1	
8.	Wheat Breeding objectives yield, quality characters,	1	28.7 & 30.7 .15
9.	Biotic and abiotic stress resistance, exploitation of heterosis in wheat	2	
10	Sorghum: Evolution and distribution of species and forms - wild relatives and germplasm	1	1.8.15
11	Sorghum- cytogenetic and genome relationship	1	
12	Sorghum Breeding objectives- yield, quality characters	1	4.8.15
13	Biotic and abiotic stress resistance in sorghum	1	
14	Pearl millet: Evolution and distribution of species and forms - wild relatives and germplasm;	1	6.8.15
15	Pearl millet Cytogenetic and genome relationship;	1	
16	Review class		11.8.15
17	Pearl millet Breeding objectives- yield, quality characters.	1	13.8.15
18	Maize: Evolution and distribution of species and forms - wild relatives and germplasm	1	18.8.15
19	Maize Cytogenetic and genome relationship;	1	
20	Maize Breeding objectives: yield, quality characters	1	20.8.15
21	QPM and Bt maize – strategies and implications	2	22 & 25.8.15
22	Heterosis breeding attempts taken in Sorghum, Pearl Millet and Maize;	2	27.8 & 1.9.15
23	Minor millets: Evolution and distribution of species and forms - wild relatives and germplasm;	1	3.9.15
24	Minor millets Cytogenetic and genome relationship	1	
25	Small millets: breeding objectives yield, quality characters	1	8. 9.15
26	Review class	1	10.9.15
27	Forage legumes: Evolution and distribution of species and forms; Wild relatives and germplasm;	1	15.9.15
28	Forage legumes Cytogenetic and genome relationship;	1	17.9.15
29	Forage legumes breeding objectives- yield, quality characters.	1	
30	Seed spices: Evolution and distribution of species and forms - wild relatives and germplasm;	1	19.9.15
31	Seed spices breeding objectives- yield, quality characters and palatability studies.	1	6.10.15
32	Distinguishing features of popular released varieties in Rice and Sorghum , Wheat, Pearl millet, Maize and other millets, forage legumes	2	8.10.15 & 15.10.15

			&17.10.15
33	Application to DUS testing of popular released varieties	2	20.10 & 27.10.15
34	Maintenance of seed purity - Nucleus and Breeder Seed Production.	2	29.10 & 31.10.15
35	Review class	2	3.11.15&17.11.15

PBG 621 Crop Evolution 3 (3+0)

Theory

S.No.	Topic	Lecture	Date of class
1.	Origin and evolution of species;	1	9.7.15
2.	Centers of diversity/origin, diffused centers;	1	14.7.15
3.	Domestication and uniformity – Characteristics of early domestication and changes	1	15.7.15
4.	Time and place of domestication;	1	16.7.15
5.	Patterns of evolution and domestication-examples and Case studies.	2	21.7& 22.7.15
6.	Concept of gene pools and crop evolution;	1	23.7.15
7.	Selection and Genetic drift - Consequences.	1	28.7.15
8.	Speciation and The process of speciation	1	29.7.15
9.	Reproductive isolation barriers	1	30.7.15
10.	Genetic differentiation during speciation	1	4.8.15
11.	Hybridization and extinction	1	5.8.15
12.	Distant hybridization and introgression- Inter-specific hybridization, inter-generic hybridization,	1	6.8.15
13.	Distant hybridization and introgression - scope and limitations, techniques to overcome the limitations;	1	11.8.15
14.	Exploitation of natural variation and Early attempts to increase variation	1	12.8.15
15.	Gene transfer into cultivated species, tools and techniques;	2	13.8 &18.8.15
16.	Validation of transferred genes and their expression;	1	19.8.15
17.	Processes in crop evolution and stabilization of polyploids, cytogenetic and genetic stabilization;	2	20.8& 25.8.15
18.	Genome organization and Transgenesis in crop evolution.	1	26.8.15
19.	Multifactorial genome ,Intragenomic interaction and Intergenomic interaction	1	27.8.15
20.	Genome introgression and Controlled introgressions.	1	1.9.15
21.	Methods to study crop evolution	1	2.9.15
22.	Contemporary Methods – Based on morphological features ,Cytogenetic analysis, Allozyme variations	2	3.9 & 8.9.15

23.	Crop evolution – DNA markers, genome analysis and comparative genomics.	2	9& 10.9. 15
24.	Evolutionary significance of polyploidy,	1	15.9.15
25.	Evolution of crop plants through ploidy manipulations;	1	16.9.15
26.	Polyploids: methods, use of autopolyploid;	1	17.9.15
27.	Haploidy-method of production and use;	1	7.10.15
28.	Allopolyploids- synthesis of new crops;	1	8.10.15
29.	Case studies – Cereals and Pulses	1	14 & 15.10.15
30.	Case studies –Oilseeds and vegetables,	1	20 & 27.10.15
31.	Case studies –Fibre crops and Plantation crops	1	28 & 29.10.15
32.	Case studies –Forage crops and Tuber crops	1	13 & 17.11.15
33.	Case studies –Medicinal Plants.	1	18 & 19.11.15

PBG 526 BREEDING FOR LEGUMES, OILSEEDS, FIBRE AND VEGETATIVE PROPAGATED CROPS 3 (3+0)

S.No.	Topic	Lectures	Date of class
1	Pigeonpea: Evolution and distribution of species and forms; Wild relatives and germplasm; Genetics, cytogenetics and genome relationship	1	10.7.15
2	Morphological and molecular descriptors used for differentiating the accessions; Breeding objectives- yield, quality characters	1	13.7.15
3	Biotic and abiotic stress *etc* - Hybrid technology; maintenance of male sterile, fertile and restorer lines, progress made at ICRISAT and other Institutes.	1	17.7.15
4	Chickpea: Evolution and distribution of species and forms - Wild relatives and germplasm	1	20.7.15
5	Cytogenetics and genome relationship; Breeding objectives- yield, quality characters.	1	24.7.15
6	Biotic and abiotic stress etc; Protein quality improvement; Conventional and modern plant breeding approaches, progress made. Breeding for anti nutritional factors.	1	25.7.15
7	Other pulses: Greengram, blackgram, cowpea, mothbean: Evolution, cytogenetics and genome relationship; Learning the descriptors;	1	27.7.15
8	Breeding objectives- yield, quality characters, biotic and abiotic stress etc;	1	31.7.15
9	Interspecific crosses attempted and its implications, reasons for	1	1.8.15

	failure, ways of overcoming them.		
10	Groundnut: Evolution and distribution of species and forms; Wild relatives and germplasm; Cytogenetics and genome relationship	1	3.8.15
11	Pod and kernel characters	1	7.8.15
12	Breeding objectives- yield, quality characters, biotic and abiotic stress etc.	1	10.8.15
13	Rapeseed and Mustard: Breeding objectives, utilization of wild relatives for yield and quality improvement, biotic and abiotic stress etc	1	17.8.15
14	Oil quality – characteristics in different oils; Evolution and distribution of species and forms		21.8 .15
15	Wild relatives and germplasm; Genetics, cytogenetics and genome relationship.	1	22.8.15
16	Soybean: Breeding objectives, utilization of wild relatives for yield and quality improvement, biotic and abiotic stress etc	1	24.8.15
17	Oil quality – characteristics; Evolution and distribution of species and forms;	1	28.8.15
18	Wild relatives and germplasm; Genetics, cytogenetics and genome relationship.	1	4.9.15
19	Other oilseed crops: castor and sesame: Evolution and distribution of species and forms; Wild relatives and germplasm;	1	7.9.15
20	Cytogenetics and genome relationship; breeding objectives- yield, quality characters.	1	14.9.15
21	Breeding objectives- yield, quality characters.	1	18.9.15
22	Cotton: Evolution of cotton; Breeding objectives- yield, quality characters, biotic and abiotic stress etc	1	19 .9.15
23	Development and maintenance of male sterile lines – Hybrid development and seed production.	1	9.10.15
24	Scenario of Bt cottons, evaluation procedures for Bt cotton.	1	12.10.15
25	Sugarcane: Evolution and distribution of species and forms; Wild relatives and germplasm.,	1	16.10.15
26	Cytogenetics and genome relationship.	1	17.10.15
27	Breeding objectives yield, quality characters and achievements.	1	19.10.15
28	Potato: Evolution and distribution of species and forms; Wild relatives and germplasm.,	2	23 & 26.10.15
29	Cytogenetics and genome relationship.	1	30.10.15
30	Breeding objectives yield, quality characters and achievements.	1	31.10.15
31	Distinguishing features of the released varieties in pulses, oilseeds, cotton and vegetative propagated crops. Maintenance of seed purity and seed production.	2	2.11 & 16.11.15
32	Overall review of complete course.	2	20.11 & 21.11.15

COURSE NO. - SCHEM -111
TITLE: INTRODUCTION TO SOIL SCIENCE
Credit HOUR: 3 (2+1)

A. LECTURE SCHEDULE—THEORY

B. COURSE TEACHERS- DR. S.C.MEENA & DR. D.P.SINGH

S. No	Topic	Dated	
	A Batch- Class Room No. 1 & B Batch – Class Room No. 2	**Batch B**	**Batch A**
1.	Pedological and edaphological concepts	8.7.15	9.7.15
2.	Origin of earth crust, definition and composition	15.7.15	16.7.15
3.	Rocks and minerals and their classification	22.7.15	23.7.15
4.	Physical, chemical and biological weathering of rocks	29.7.15	30.7.15
5.	Factors of soil formation, Fundamental and specific soil forming processes	5.8.15	6.8.15
6.	Components of soil and soil profile	12.8.15	13.8.15
7.	Characteristics of acid, salt affected and calcareous soils	19.8.15	20.8.15
8.	Quality of irrigation water, Appraisal, standards and use in agriculture	26.8.15	27.8.15
9.	Soil aggregate and its significance in agriculture	2.9.15	3.9.15
10.	Dry, moist and wet soil consistence, agricultural significance, factors affecting it, Atterberg's limit and constants of soil consistency	9.9.15	10.9.15
11.	Soil crusting and its formation and management	16.9.15	17.9.15
12.	Bulk density, particle density and porosity, factors affecting them, agricultural significance and manipulation	1.10.15	9.10.15
13.	Soil colour and expression of soil colour with munsell soil colour chart	20.10.15	12.10.15
14.	Reclamation of acid, salt affected and calcareous soils	19.11.15	-
15.	Soil water classification	13.7.15	14.7.15
16.	Forces of soil water retention and potential	20.7.15	21.7.15
17.	Movement of soil water	27.7.15	28.7.15
18.	Infiltration, percolation, permeability and drainage and factors affecting it	3.8.15	4.8.15
19.	Methods of soil moisture determination : - Gravimetric method, Electrical resistance and Neutron scattering method	10.8.15	11.8.15
20.	Soil Texture, classifications of soil separates importance of soil texture, particle size analysis.	17.8.15	18.8.15
21.	Soil aeration ,gaseous exchange and its composition in relation to plant growth	24.8.15	25.8.15
22.	Soil colloids, types of soil colloids and their significance	31.8.15	1.9.15

23.	1:1,2:1and 2:1:1 types of layer silicates, their structure and characteristics	7.9.15	8.9.15
24.	Sources of charges on soil colloids.	14.9.15	15.9.15
25.	Cation and anion exchange phenomenon and factors influencing ion exchange and significance	5.10.15	6.10.15
26.	Adsorption of ions, soil reaction and buffering capacity	20.10.15	12.10.15
27.	Thermal capacity, conductivity and diffusivity	19.10.15	27.10.15
28.	Soil temperature: and factors affecting soil temperature in relation to plant growth Stoke's law	26.10.15	3.11.15
29.	Soil structure and types of soil structure, mechanism of soil structure formation, management of soil structure.	2.11.15	17.11.15
30.	Interaction of student	16.11.15	24.11.15
31.	Interaction of student	23.11.15	-

COURSE NO. - SCHEM -111
TITLE: INTRODUCTION TO SOIL SCIENCE
Credit HOUR: 3 (2+1)

A. LECTURE SCHEDULE—THEORY

B. COURSE TEACHERS- DR. S.C.MEENA & DR. D.P.SINGH

S. No	Topic	Dated	
	A Batch- Class Room No. 1 & B Batch – Class Room No. 2	**Batch B**	**Batch A**
1.	Pedological and edaphological concepts	8.7.15	9.7.15
2.	Origin of earth crust, definition and composition	15.7.15	16.7.15
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4.	Physical, chemical and biological weathering of rocks	29.7.15	30.7.15
5.	Factors of soil formation, Fundamental and specific soil forming processes	5.8.15	6.8.15
6.	Components of soil and soil profile	12.8.15	13.8.15
7.	Characteristics of acid, salt affected and calcareous soils	19.8.15	20.8.15
8.	Quality of irrigation water, Appraisal, standards and use in agriculture	26.8.15	27.8.15
9.	Soil aggregate and its significance in agriculture	2.9.15	3.9.15
10.	Dry, moist and wet soil consistence, agricultural significance, factors affecting it, Atterberg's limit and constants of soil consistency	9.9.15	10.9.15
11.	Soil crusting and its formation and management	16.9.15	17.9.15
12.	Bulk density, particle density and porosity, factors affecting them, agricultural significance and manipulation	1.10.15	9.10.15
13.	Soil colour and expression of soil colour with munsell soil colour chart	20.10.15	12.10.15
14.	Reclamation of acid, salt affected and calcareous soils	19.11.15	-
15.	Soil water classification	13.7.15	14.7.15
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22.	Soil colloids, types of soil colloids and their significance	31.8.15	1.9.15

23.	1:1,2:1and 2:1:1 types of layer silicates, their structure and characteristics	7.9.15	8.9.15
24.	Sources of charges on soil colloids.	14.9.15	15.9.15
25.	Cation and anion exchange phenomenon and factors influencing ion exchange and significance	5.10.15	6.10.15
26.	Adsorption of ions, soil reaction and buffering capacity	20.10.15	12.10.15
27.	Thermal capacity, conductivity and diffusivity	19.10.15	27.10.15
28.	Soil temperature: and factors affecting soil temperature in relation to plant growth Stoke's law	26.10.15	3.11.15
29.	Soil structure and types of soil structure, mechanism of soil structure formation, management of soil structure.	2.11.15	17.11.15
30.	Interaction of student	16.11.15	24.11.15
31.	Interaction of student	23.11.15	-

DEPARTMENT OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE

COURSE NO. - SCHEM 532 CREDIT HOUR: 3(2+1)

TITLE: MANAGEMENT OF PROBLEM SOILS AND WATERS

LECTURE SCHEDULE

Course Teacher: Dr. S.K. Sharma

S.No.	Topic	No. of lecture	Date
1.	Area and distribution of problem soils – acidic, saline, sodic and physically degraded soils	3	9,13&16 July
2.	Origin and basic concept of problematic soils, and factors responsible	2	20&23 July
3.	Morphological features of saline, sodic and saline-sodic soils	2	27&30 July
4.	Characterization of salt-affected soils - soluble salts, ESP, pH; physical, chemical and microbiological properties	2	3&6 August
5.	Management of salt-affected soils	2	10&13 August
6.	Salt tolerance of crops - mechanism and ratings;	2	17&20 August
7.	Monitoring of soil salinity in the field;	1	24th August
8.	Management principles for sandy, clayey, red lateritic and dry land soils.	2	27&31st August
9.	Acid soils - nature of soil acidity, sources of soil acidity; effect on plant growth, lime requirement of acid soils;	2	3&7th September
10.	Management of acid soils; biological sickness of soils and its management.	2	14th September&1st October
	Interaction Class	1	5th October
11.	Quality of irrigation water	2	8&12October
12.	Management of brackish water for irrigation;	2	15th &19thOctober
13.	Salt balance under irrigation;	1	26th October
14.	Characterization of brackish waters, area and extent; relationship in water use and quality	2	29th October&2nd November
15.	Agronomic practices in relation to problematic soils;	1	16th November
16.	Cropping pattern for utilizing poor quality ground waters.	1	19th November
17	Interaction Class		23rd November

DEPARTMENT OF AGRICULTURAL CHEMISTRY AND SOIL SCIENCE

LECTURE SCHEDULE

COURSE NO. - SCHEM 621 CREDIT HOUR: 3(2+1)

TITLE: **SOIL GENESIS AND MICROPEDOLOGY**

Course Teacher: Dr. S.K. Sharma

S.No.	Topic	No. of lecture	Dates
1.	Introduction about soil genesis and pedology,Soil versus regolith,composition of soil	1	13th July
2.	Pedogenic evolution of soils,the earth's spheres	1	14th July
3.	Composition of The earth's crust and Rocks in The earth's crust	1	20th July
4.	Rock forming minerals:Formation,characteristics and Classification	2	21st &27th July
5.,	Rocks: formation,Nature and Classification	2	28th July &3rd August
6.	Weathering of Rocks and minerals:Physical,chemical and biological weathering	2	4th & 10th August
7.	Soil formation:Passive and Active Soil forming factors	3	11,17&18th August
8.	Pedogenic processes :Fundamental and Specific processes	3	24,25&31st August
9.	Stability and weathering sequences of minerals	3	1st ,7th &8th September
	Interaction classes	2	14&15th September
7.	Assessment of soil profile development by mineralogical and chemical analysis	3	29th September&5,6th October
8.	Micro-pedological features of soils – their structure,	3	12,19&20th October
9.	fabric analysis, role in genesis and classification	2	2nd &3rd November
10	Describing and interpreting soil profile	2	16th &17th November
	Interaction classes	2	23rd&24th November

Department of Plant Pathology, RCA, MPUAT, Udaipur

Title: Advanced Virology **Course Teacher: Dr. Rakesh Shah**

Course No.: Pl.Path-621 **Credit Hrs : 3 (2+1)**

THEORY

S. No.	Topic	No. of Lectures	Date
1.	Mechanism of virus transmission by vectors, virus-vector relationship, bimodal transmission and taxonomy of vectors and viruses, vector specificity for classes of viruses	**3**	**8,9&15 July,2015**
2.	Virus replication, assembly and architecture	**3**	**16,22&23 July,2015**
3.	Ultrastructural changes due to virus infection, variation, mutation and virus strains.	**2**	**29&30 July,2015**
4.	Immunoglobulin structure and functions of various domains, methods of immunodiagnosis, hybridoma technology and use of monoclonal antibodies in identification of viruses and their strains	**3**	**5,6&12 August,2015**
5.	Polymerase Chain Reaction	**1**	**13August,2015**
6.	Genome organization, replication, transcription and translational strategies of pararetroviruses and gemini viruses, satellite viruses and satellite RNA	**3**	**19,20 &26 August,2015**
7.	Genome organization in tobamo-, poty-, bromo, cucummo, ilar and tospoviruses.	**2**	**27August &2 Sept,2015**
8.	Gene expression and regulation, viral promoters, molecular mechanism of host virus interactions, virus induced gene	**2**	**3,9&10 Sept,2015**
9	Molecular mechanism of vector transmission, symptom expression, viroids and prions	**2**	**10,16&17 Sept,2015**
10.	Genetic engineering with plant viruses	**2**	**24&30 Sept,2015**
11.	Viral suppressors, a RNAi dynamics, resistant genes. Viruses potential as vectors, genetically engineered resistance, transgenic plants.	**3**	**1,7&8 Oct.,2015**
12.	Techniques and application of tissue culture.	**2**	**14&15 Oct.,2015**
13.	Origin, evolution and inter- relationship with animal viruses.	**2**	**28&29 Oct.,2015**

Course No.: Pl.Path-621 Credit Hrs : 3(2+1)

PRACTICALS

S. No.	Topic	No. of Lectures	Date
1.	Purification of virus	**2**	**10 &17 July, 2015**
2.	SDS-PAGE for molecular weight determination	**1**	**24 July, 2015**
3.	Production of polyclonal antiserum, purification of IgG and conjugate preparation	**2**	**31July&7 Aug., 2015**
4.	Serological techniques (i) DAC-ELISA (ii) DAS -ELISA (iii) DIBA (iv) Western blots (v) (ab) 2-ELISA,	**2**	**14&21 Aug., 2015**
5.	Vector transmission (one each with aphid, leaf hopper and whitefly), methods for collecting vectors and their maintenance	**2**	**28July, &4 Sept. 2015**
6.	Nucleic acid isolation,	**1**	**11Sept., 2015**
7.	DOT-blot, southern hybridization	**2**	**18 Sept. &9 Oct. 2015**
8.	Probe preparation and autoradiography	**1**	**16Oct. 2015**
9.	PCR application	**1**	**23 Oct. 2015**
10.	Viral genome cloning, sequencing annotation of genes	**1**	**30Oct. 2015**

Suggested Readings:

Davies 1997. *Molecular Plant Virology: Replication and Gene Expression*. CRC Press, Florida.

Fauquet *et al*. 2005. *Vius Taxonomy*. VIII Report of ICTV. Academic Press, New York.

Gibbs A and Harrison B. 1976. *Plant Virology - The Principles.* Edward Arnold, London.

Jones P, Jones PG and Sutton JM. 1997. *Plant Molecular Biology: Essential Techniques*. John Wiley & Sons, New York.

Khan JA and Dijkstra. 2002. *Plant Viruses as Molecular Pathogens*. Howarth Press, New York.

Maramorosch K, Murphy FA and Shatkin AJ. 1996. *Advances in VirusResearch*. Vol. 46. Academic Press, New York.

Pirone TP and Shaw JG. 1990. *Viral Genes and Plant Pathogenesis*.SpringerVerlag, New York.

Roger Hull 2002. *Mathew's Plant Virology* (4^{th} Ed.). Academic Press, New York.

Thresh JM. 2006. *Plant Virus Epidemiology.* Advances in Virus Research 67. Academic Press, New York