Detailed Course Scheme

Bachelor of Science (Hons.)

Agriculture

Semester- III

(2023- 27)

DOC202407170009

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,
Bikaner, Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System along with Choice Based Credit System as per latest guidelines of University Grants Commission (UGC). Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June).** Also, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The Curriculum for B. Sc Agriculture program for (July-December) Odd Semester 2025 along with examination pattern is as follows:

Course Scheme

Semester –III

S.No.	Course Code	Course Name	L	T	P	Credits
1.	20012200	Crop Production Technology – I (*Kharif Crops*)	1	0	0	1
2.	20012300	Crop Production Technology – I Lab (*Kharif Crops*)	0	0	2	1
3.	20002100	Fundamentals of Plant Breeding	2	0	0	2
4.	20002200	Fundamentals of Plant Breeding Lab	0	0	2	1
5.	20012600	Agricultural Finance and Cooperation	2	0	0	2
6.	20012700	Agricultural Finance and Cooperation Lab	0	0	2	1
7.	20012800	Agri- Informatics	1	0	0	1
8.	20012900	Agri- Informatics Lab	0	0	2	1
9.	20013000	Farm Machinery and Power	1	0	0	1
10.	20013100	Farm Machinery and Power lab	0	0	2	1
11.	20013200	Production Technology for Vegetables and Spices	1	0	0	1
12.	20013300	Production Technology for Vegetables and Spices Lab	0	0	2	1
13.	20027600	Environmental Studies & Disaster Management	1	0	2	2
14.	20027700	Statistical Methods	1	0	0	1
15.	20027800	Statistical Methods Lab	0	0	2	1
16.	20013800	Livestock and Poultry Management	3	0	0	3
17.	20013900	Livestock and Poultry Management Lab	0	0	2	1
18.	20014100	Ability and Skill Enhancement -III	2	0	0	2
19.	99003300	Workshops & Seminars/ Human Values & SocialService/NCC/NSS	-	-	-	1
	Total		**15**	**0**	**18**	**25**

EVALUATION SCHEME - THEORY

The evaluation of the theory paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows:

Type	Details	Marks
Mid Term	Two Mid-term Sessional of 15 marks each (15+15)	30
Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc.	Average of marks obtained	15
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME - PRACTICAL

The evaluation of the practical paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Attendance	75%+ : 5 marks	5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of Semester.

2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of Semester.

Course	Course outcomes: - After completion of these courses students should be able to
8.1 Semester – III	
20012200 - Crop Production Technology – I (Kharif Crops)	**CO1:** Find the knowledge on Kharif season crops, its classification (cereal crops, oilseed crops, pulse crops, sugar crops, fodder crops) and its importance in agriculture and national economy. **CO2:** Illustrate the origin, geographical distribution and economic importance of Kharif crops **CO3:** Identify the soil and climatic requirements of Kharif crops **CO4:** Examine the cultural practices, varieties and yield of Kharif crops **CO5:** Identification of different weeds of Kharif season
20012300 Crop Production Technology – I Lab (Kharif Crops)	**CO1:** List of Kharif crop with their botanical name **CO2:** Explain effect of sowing depth on germination of Kharif crops. **CO3:** Identification of weeds in Kharif season crops, **CO4:** Compare method of rice nursery rising. **CO5:** Importance of top dressing and foliar feeding of nutrients.
20002100 Fundamentals of Plant Breeding	**CO1:** Explain about centers of origin, components of genetic variation; heritability and genetic advance. **CO2:** Interpret modes of reproduction and apomixes, self-incompatibility and male sterility. **CO3:** Evaluate the Genetic basis, methods of breeding in cross pollinated crops and modes of selection. **CO4:** Adapt the breeding method for self, cross and asexually propagated crops. **CO5:** Develop a consultant company to guide & supply the better varieties to the farmers.
20002200 Fundamentals of Plant Breeding Lab	**CO1:** Define the study of floral structure of self pollinated and cross pollinated crops. **CO2:** Interpret the consequences of inbreeding on genetic structure of resulting populations. **CO3:** Explain the emasculation and hybridization techniques in self & cross pollinated crops. **CO4:** Examine the handling of segregating populations. **CO5:** Classify different germplasm of various crops.
20012600 - Agricultural Finance and Cooperation	**CO1:** Explain the different credit needs and its role in Indian agriculture. **CO2:** Summarize how the commercial banks are working, functioning the RRB's, KCC and lead bank scheme, preparing the income statements, balance sheets and project proposal. **CO3:** Summarize the ability to understand the terminology and facts about agriculture Finance and Cooperation. **CO4:** Classify with the different cooperatives working in India. **CO5:** Discuss the roles and responsibility of ICA, NCUI, NCDC, and NAFED.

20012700 Agricultural Finance and Cooperation Lab	**CO1:** Analysis of progress and performance of cooperatives using published data. **CO2:** Identify of most profitable level of capital use. Optimum allocation of limited amount of capital among different enterprise. **CO3:** Apply of a loan proposal- A case study. **CO4:** Classify and analysis of income statement – A case study. **CO5:** Criteria for Bankable projects for various agricultural products and its value- added products.
20012800 - Agri-Informatics	**CO1:** Interpret with basic terms of software and hardware, input/output devices, database, World Wide Web, DBMS in Agriculture, ICT in Agriculture, etc. **CO2:** Explain about computer models for understanding plant processes. **CO3:** Make use of MS Office for document creation & Editing, Data presentation, interpretation, graph creation, statistical analysis and mathematical expressions. **CO4:** Develop the understanding of application software, Smartphone apps, programming languages, geospatial technology for generating valuable agri-information, decision support systems, etc. **CO5:** Importance of geospatial technology for generating valuable agri-information, decision support systems
20012900 Agri- Informatics Lab	**CO1:** What are the components of a computer, introduction to computer languages, operating system, mobile agricultural applications, expert systems and decision support systems **CO2:** Demonstrating how to use expert system and of geospatial technology for generating valuable information for agriculture. **CO3:** Construct word document, excel sheets, power point and data bases using MS Office **CO4:** Estimate the crop stimulation models **CO5:** Develop contingent crop planning.
20013000 - Farm Machinery and Power	**CO1:** What are primary and secondary tillage implement and Tell about the implement used for hill agriculture. **CO2:** Explain about air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor **CO3:** Identify different components of I.C. engine, I.C. engine terminology and solved problems. **CO4:** Analyse the operation of farm machinery equipment also examines the harvesting, threshing and land preparation (heavy) machinery needed for agricultural farm. **CO5:** Develop the Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.
20013100 Farm Machinery and Power lab	**CO1:** Create a habit of handling the implements carefully. **CO2:** Compare the efficiency of two stroke and four stroke engine. **CO3:** Operation of tractor and its mechanization. **CO4:** Demonstrate through various models' farm implements.

	CO5: Identify different components of engine and various agricultural implements.
20013200 - Production Technology for Vegetables and Spices	**CO1:** Find practical knowledge on specific production techniques of vegetables and spices. **CO2:** Explain importance of vegetables and spices in human nutrition. **CO3:** Outline scope of vegetables and spices in national economy. **CO4:** Solve the Problems of nursery and field. **CO5:** Evaluate the nutrition requirement for humans through Vegetables
20013300 Production Technology for Vegetables and Spices Lab	**CO1:** Develop the understanding of vegetable growing. **CO2:** Compare between various parts vegetable and spices. **CO3:** Design of various nursery beds for raising of seedlings. **CO4:** Classify the various vegetables on basis of their nutritional Values. **CO5:** Develop the seedlings through the pro-tray method.
20027600 Environmental Studies & Disaster Management	**CO1:** Define the scope and importance of environmental studies, and explain its multidisciplinary nature. **CO2:** Analyze the use and impacts of natural resources, and assess associated environmental problems. **CO3:** Describe ecosystem structures and functions, and evaluate biodiversity conservation methods. **CO4:** Identify pollution causes and control measures, and propose solutions for social issues related to sustainability. **CO5:** Describe types and effects of disasters, and design disaster management strategies involving various organizations.
20027700 Statistical Methods	**CO1:** Define key statistical concepts and illustrate their applications in agriculture. **CO2:** Represent data graphically and summarize it using measures of central tendency and dispersion. **CO3:** Apply probability theorems to solve simple problems, and use binomial and Poisson distributions. **CO4:** Calculate correlation and regression coefficients, and analyze relationships between variables. **CO5:** Conduct hypothesis tests and evaluate results using t-tests, Chi-Square tests, and analysis of variance.
20027800 Statistical Methods Lab	**CO1:** Represent data graphically and interpret measures of central tendency and dispersion for ungrouped and grouped data. **CO2:** Calculate quartiles, deciles, percentiles, moments, skewness, and kurtosis for both ungrouped and grouped data, and compare their distributions. **CO3:** Analyze correlation and regression, and apply the one-sample t-test and two-sample Fisher's t-test. **CO4:** Conduct Chi-Square tests for goodness of fit and independence of attributes, and evaluate their results. **CO5:** Design experiments using analysis of variance (one-way and two-way) and implement simple random sampling techniques for selecting random samples.
20013800 - Livestock and Poultry Management	**CO1:** Identify indigenous and exotic breeds of cattle, buffalo, sheep, goat and poultry. **CO2:** Discover the understanding about principles, planning, and technical approach for reproduction management in different farm animals.

	Introduce the diseases of livestock and poultry and its prevention (including vaccination schedule) and control of important diseases of livestock and poultry. **CO3:** Determine the ability to select different types of houses suited in specific climatic conditions for best management of calves, growing heifers and milch animals. **CO4:** Discuss digestive system of livestock and poultry, classification of feed stuffs, nutrients and their functions with animal diseases. **CO5:** Information about Indian agricultural concerns and future prospects
20013900 Livestock and Poultry Management Lab	**CO1:** What are external body parts of different animals. **CO2:** Classify the different animals. **CO3:** Identification methods of farm animals and poultry. **CO4:** Survey of IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records. **CO5:** Estimate the economics yield of cattle, buffalo, sheep, goat, swine and poultry production.
20014100 - Ability and Skill Enhancement - III	**CO1:** Classify the different types of reviews i.e. book review, movie review etc. **CO2:** Express his/ her feeling at pressor situation or emotional situation **CO3:** Explain his/her thoughts in group discussion and also build leadership quality **CO4:** Enhance creativity in making documentary etc. **CO5:** Manage negative emotions keeping balance of mental stability, stress and distress.

8.2 Mapping: Semester – III

20012200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		2	3	3	2		2	2		3	2
CO2	3			2		3	2	2				
CO3	3	2	2		3	3	2		2	3	3	3
CO4	2	3	3	3	3		3	3		3	3	3
CO5	3	2		3	2		2		2		3	2

20012300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	2	2	2	2	3	2	2	2
CO2	2		3	3	2	2	3	2	3	3	2	3
CO3	3	3	2	3	2	2	2		2	2	3	2
CO4	2	3	2	2	3	2	2	3	3	2	2	3
CO5	3	2	3	2	2	3	3	2	2	2	2	3

20002100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3		2	3		2	2	2		2
CO2	2	2	3	2		3	2		3	3	2	
CO3	3	3			2	2	3	3	3		2	3
CO4	3	3	2	2	3		2		2	2	3	2
CO5	2	3	2	3		3	3	3	2		2	2

20002200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	2		2	2		2	2	2	3	2
CO2	2	2	3		3	3	2			3	2	2
CO3	2	2		2		2	3	1	2	2	3	3

CO4	3	3	2	2	2	1	2	3	3		2	
CO5	3	3	3	3		2	3	2	3	3		2

20012600	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3		2		2	2	3	2	2
CO2	3	2	3	2	2	2			2		3	
CO3	2	3	2	3			2	2		2		3
CO4	3	2			3	2	2		3	2	2	
CO5	2	2	2		3		2	3	3		2	3

20012700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	3	3	2	2		3		3
CO2	2	3		3	2	3	2	2	3	3		3
CO3	3	3	2	2	2	2	3	3	2	2	3	2
CO4	2		2	3		3		2		2	2	3
CO5	2	2	3	2	3	3	2		2	2	2	3

20012800	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1				3	2	3	3		2	3	3
CO2	3	2	2		3	2	3	3		3	3	3
CO3	3	2		3	3		3			2	3	3
CO4	3	3	3	2	2	2	2	2	3	2	2	2
CO5	3	3	3	3	3	3		2	2		3	3

20012900	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2		3	2	2	3		2	3	3	2
CO2		1	2	2	3		3	2	3		3	3

CO3	2			2	2	3	2	1		3		3
CO4	3	3	2			3			3		3	
CO5	2	2	3	3	3		3	3		3	3	2

20013000	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	3	3	2	1	3	2	1	3
CO2	3	1	2	3	3	3	2	1	3	2	2	3
CO3	3	2	2	3	3	3	1	2	3	2	2	1
CO4	3	3	3	1	3	3	3	2	3	2	2	3
CO5	2	2	2	2	3	2	2	3	3	2	2	2

20013100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	3	2	2	2	2	2	1	2	2
CO2	3	2	2	3	3	1	2	3	2	2	1	2
CO3	3	3	2	3	3	3	1	2	2	2	1	1
CO4	3	2	2	3	3	2	3	1	3	1	1	1
CO5	2	3	3	2	1	1	2	3	2	2	1	1

20013200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	2	1	3	2	2	1	2
CO2	3	3	1	2	1	1	3	2	1	2	3	1
CO3	3	3	2	2	3	2	1	2	3	1	2	3
CO4	3	2	1	3	2	1	2	1	2	2	1	2
CO5	3	3	2	3	2	3	3	2	3	3	3	2

20013300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	2	1	2	2	3	1	1

CO2	3	3	3	3	2	2	2	2	1	2	2	2
CO3	3	3	2	2	3	3	2	3	2	2	2	1
CO4	2	3	2	3	3	3	3	2	1	2	2	1
CO5	3	2	3	3	2	2	3	3	3	1	2	2

20027600	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	2	2	3	2	3	3
CO2	2	3	3	3	2	3	3	2	2	3	2	3
CO3	3	2	2	3	3	2	3	2	3	3	2	3
CO4	3	2	3	3	2	2	3	3	3	2	2	3
CO5	2	3	2	3	3	2	3	2	2	3	3	2

20027700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3		3	2	3	2	2	3	3		3
CO2		3	3		2	2		3			3	3
CO3	3		2	3	3	2	3	3	3	2	2	2
CO4	2	2	2	2	3	3	3	2	2	3	2	2
CO5	3	3	3	3		3	3		3	3	3	3

20027800	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3		2	1	3	2	2	1	3		2
CO2		3	3		2	2		3			3	3
CO3	2		2	3	3	2	3	3	2	2	2	2
CO4	1	2	2	2	3	2	3	2	2	3	2	2
CO5	3	3	3	3		3	2		3	3	3	3

20013800	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					2		2	2	2	3	
CO2	2	3	3	3	2			2	2		3	2
CO3	2	2	3	2	3	3	2		2	2	2	3
CO4	2		2	3		3		2		2	2	3
CO5	2		2		3	3	3	3	3		3	3

20013900	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1					2		2	2	2	3	
CO2	2	1	2	3	2			2	1		3	2
CO3	2	2	1	2	1	3	2		2	2	1	
CO4	2		2	3		1		2		2	2	3
CO5	2		2		3	3	3	3	3			3

20014100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	3		3		2	2	3	3	2
CO2	2	2	3	3		2		2		3	2	2
CO3	2				3	2		3	2	3	2	2
CO4	2		2		2			2		3		2
CO5	3	3	2	2	2	2	3	3	2	2	3	2

CURRICULUM

Course Name: Crop Production Technology – I (Kharif Crops)

Course Code: 20012200

Course Outline

Unit I

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of *Kharif* crops. Cereals – rice, maize, sorghum, pearl millet and finger millet,

Unit II

Pulses-pigeonpea, mungbean and urdbean; oilseeds- groundnut, and soybean; fibre crops- cotton & jute; forage crops-sorghum, cowpea, cluster bean and napier.

Course Name: Crop Production Technology – I Lab (Kharif Crops)

Course Code: 20012300

Course Outline

1. Rice nursery preparation, transplanting of rice
2. Sowing of soybean, pigeonpea, mungbean, maize, groundnut and cotton
3. Effect of seed size on germination and seedling vigour of Kharif season crops
4. Effect of sowing depth on germination of Kharif crops
5. Identification of weeds in Kharif season crops
6. Top dressing and foliar feeding of nutrients
7. Study of yield contributing characters and yield calculation of Kharif season crops
8. Study of crop varieties and important agronomic experiments at experimental farm
9. Study of forage experiments
10. Morphological description of Kharif season crops
11. Visit to research centres of related crops

Course Name : Fundamentals of Plant Breeding

Course Code: 20002100

Course Outline

Unit 1
Historical development, concept, nature and role of plant breeding, objectives of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction, pollination and apomixes, self – incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization, introduction; Centre of origin/diversity.

Unit II
Component of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops- mass and pure line selection, pedigree, bullk, SSD and backcross methods, hybridization techniques and handling of segregating population; Multiline concept.
Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties;

Unit III
Breeding methods in asexually propagated crops, clonal selection and hybridization; Wide hybridization and pre-breeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses;
Breeding for important biotic and abiotic stresses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Development and release of varieties

Suggested Readings:

1. Alard, R.W. 2000.Principles of Plant Breeding. John Willey & Sons, New York.
2. Chahel, G.S. and S.S. Ghosal.2002.Principles and Procedures of Plant Breeding, Biotechnological and Conventional Approaches. Narosa Publishing House, New Delhi.
3. Singh, B.D. 2005. Plant Breeding.Kalyani Publishing House, New Delhi.
4. Singh, P. 2001.Essentials of Plant Breeding-Principles and Methods. Kalyani Publishing House, New Delhi.
5. Jain,H.K. and M.C. Kharkwal.2004. Plant Breeding- Mendelian to Molecular Approach.Narosa Publishing House, New Delhi.
6. Sharma, A.K. 2005. Breeding Technology of Crop Plants (Edt.).Yash Publishing House, Bikaner.
7. Shekhawat, S. S. (ed) (2016). Advances and Current Issues in Agriculture, VoI.III. Shiksha Prakashan, S. M. S. Highway, Jaipur.

Course Name: Fundamentals of Plant Breeding Lab

Course Code: 20002200

Practical:

1. Plant Breeder's kit, Study of germplasm of various crops.
2. Study of floral structure of self pollinated and cross pollinated crops.
3. Emasculation and hybridization techniques in self & cross pollinated crops.
4. Consequences of inbreeding on genetic structure of resulting populations.
5. Study of male sterility system.
6. Handling of segregating populations.
7. Methods of calculating mean, range, variance, standard deviation, heritability.
8. Designs used in plant breeding experiment, analysis of Randomized Block Design and components of genetic variance.
9. To work out the mode of pollination in a given crop and extent of natural out crossing. Prediction of performance of double cross hybrids.

Suggested Readings:

1. Alard, R.W. 2000.Principles of Plant Breeding. John Willey & Sons, New York.
2. Chahel, G.S. and S.S. Ghosal.2002.Principles and Procedures of Plant Breeding, Biotechnological and Conventional Approaches. Narosa Publishing House, New Delhi.
3. Singh, B.D. 2005. Plant Breeding.Kalyani Publishing House, New Delhi.
4. Singh, P. 2001.Essentials of Plant Breeding-Principles and Methods. Kalyani Publishing House, New Delhi.
5. Jain,H.K. and M.C. Kharkwal.2004. Plant Breeding- Mendelian to Molecular Approach.Narosa Publishing House, New Delhi.
6. Sharma, A.K. 2005. Breeding Technology of Crop Plants (Edt.).Yash Publishing House, Bikaner.
7. Shekhawat, S. S. (ed) (2016). Advances and Current Issues in Agriculture, VoI. III. ShikshaPrakashan, S. M. S. Highway, Jaipur.

Course Name: Agricultural Finance and Cooperation

Course Code: 20012600

Course Outline

Unit I

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits. Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial

banks, Micro financing including KCC. Lead bank scheme, RRBs, Scale of finance and unit cost.

Unit II

An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India. Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.

Unit III

Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

Course Name: Agricultural Finance and Cooperation Lab

Course Code: 20012700

Course Outline

Practical

1. Determination of most profitable level of capital use.
2. Optimum allocation of limited amount of capital among different enterprise.
3. Analysis of progress and performance of cooperatives using published data.
4. Analysis of progress and performance of commercial banks and RRBs using published data.
5. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures.
6. Estimation of credit requirement of farm business – A case study.
7. Preparation and analysis of balance sheet – A case study.
8. Preparation and analysis of income statement – A case study.
9. Appraisal of a loan proposal- A case study.
10. Techno-economic parameters for preparation of projects.
11. Preparation of Bankable projects for various agricultural products and its value-added products.
12. Seminar on selected topics.

Course Name: Agri- Informatics

Course Code: 20012800

Course Outline

Unit I

Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components

Unit II

Introduction to computer programming languages, concepts and standard input/output operations e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc.

Unit III

Geospatial technology for generating valuable agri-information Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools

Suggested Readings

1. Sinha, P.K. Computer Fundamentals (BPB Publications).
2. Niranjan Mansal and Jayshri Saraogi Computer Made Easy For Beginners (Hindi).
3. Satish Jain, Shashank Jain and Madhullika Jain. It Tools and Applications (BPB Publications).
4. MS Office 2000. Joe Habraken.
5. Rapidex Computer Course (Pustak Mahal)
6. Davinder Singh Minhas- Dynamic Memory Computer Course (Fusin Books), New Delhi.

Course Name: Agri- Informatics Lab

Course Code: 20012900

Course Outline

1. Study of Computer Components, accessories, practice of important DOS Commands.
2. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document.

3. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.
4. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system.
5. Introduction to World Wide Web (WWW).
6. Introduction of programming languages.
7. Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost;
8. Computation of water and nutrient requirements of crop using CSM and IT tools.
9. Introduction of Geospatial Technology for generating valuable information for Agriculture.
10. Hands on Decision Support System.
11. Preparation of contingent crop planning.

Course Name: Farm Machinery and Power

Course Code: 20013000

Course Outline

Unit I

Status of Farm Power in India, Sources of Farm Power , I.C. engines, working principles of IC engines, comparison of two stroke and four stroke cycle engines , Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication ,fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor , Tractor types, Cost analysis of tractor power and attached implement.

Unit II

Familiarization with Primary and Secondary Tillage implement, implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Suggested Readings:

1. Principles of Farm Machinery – Roy Bainer, R.A. Kepner, E.L. Barger
2. Farm Machinery and Equipment – C.P. Nakra
3. Elements of Farm Machinery – J. Sahay

Course Name: Farm Machinery and Power Lab

Course Code: 20013100

Course Outline

1. Study of different components of I.C. engine
2. To study air cleaning and cooling system of engine
3. Familiarization with clutch, transmission, differential and final drive of a tractor
4. Familiarization with lubrication and fuel supply system of engine
5. Familiarization with brake, steering, hydraulic control system of engine
6. Learning of tractor driving
7. Familiarization with operation of power tiller, Implements for hill agriculture
8. Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow.
9. Familiarization with seedcum- fertilizer drills their seed metering mechanism and calibration, planters and transplanter
10. Familiarization with different types of sprayers and dusters
11. Familiarization with different intercultivation equipment
12. Familiarization with harvesting and threshing machinery

Course Name: Production Technology for Vegetables and Spices

Course Code: 20013200

Course Outline

Unit I

Importance of vegetables & spices in human nutrition and national economy, kitchen gardening, brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield,

Unit II

Physiological disorders of important vegetable and spices (Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, French bean, Peas); Cole crops such as Cabbage, Cauliflower, Knol-khol; Bulb crops such as Onion, Garlic; Root crops such as Carrot, Raddish, Beetroot; Tuber crops such as Potato; Leafy vegetables such as Amaranth, Palak. Perennial vegetables).

Course Name: Production Technology for Vegetables and Spices Lab

Course Code: 20013300

Course Outline

1. Identification of vegetables & spice crops and their seeds.
2. Nursery raising.
3. Direct seed sowing
4. Transplanting.
5. Study of morphological characters of different vegetables & spices.
6. Fertilizers applications.
7. Harvesting & preparation for market.
8. Economics of vegetables and spices cultivation.

Course Name: Environmental Studies & Disaster Management

Course Code: 20027600

Course Outline

Unit I
Multidisciplinary nature of environmental studies Definition, scope and importance.
Natural Resources: Renewable and non-renewable resources.

Unit II
Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefitsh and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.

Unit III
Ecosystems • Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following ecosystem : a. Forest ecosystem; b. Grassland ecosystem; c. Desert ecosystem; d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit IV
Biodiversity and its conservation. Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity.

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit V

Environmental Pollution: definition, cause, effects and control measures of :a. Air pollution; b. Water pollution; c. Soil pollution; d. Marine pollution; e. Noise pollution; f. Thermal pollution; g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.

Unit VI

Social Issues and the Environment: From Unsustainable to Sustainable development; Urban problems related to energy; Water conservation, rain water harvesting, watershed management; Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dyes. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

Unit VII

Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

Disaster Management

Unit I

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

Unit II

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.

Unit III

Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community – based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

1. Pollution case studies.
2. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain.

3 Visit to a local polluted site. Urban/Rural/Industrial/ Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

Suggested Readings

1. Ecology and Environment- P D Sharma, 2010, Rastogi publication, Meerut- New Delhi
2. Environmental Science: A New Approach- Pushpa Dahiya, Manisha Ahlawat, 2013, Alpha Science
3. Fundamentals of environmental Sciences, Bamanayha B. R. Verma L. N. and Verma A., 2005, Yash publishing house, Bikaner
4. Disaster Management and Risk Reduction: Role of Environmenta Knowledge, Editor(s): Anil K. Gupta, Sreeja S. Nair, Florian Bemmerlein-Lux, Sandhya Chatterji, 2013, Alpha Science
5. Environmental Biology, Agarwal K C, 1999, Agro Botanica, Bikaner

Course Name: Statistical Methods

Course Code: 20027700

Course Outline:

Unit I

Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion, Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions,

Unit II

Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in 2 ×2 Contingency Table.

Unit III

Introduction to Analysis of Variance, Analysis of One Way Classification. Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample.

Course Name: Statistical Methods Lab

Course Code: 20027800

Course Outline

1. Graphical Representation of Data.
2. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles.
3. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.
4. Measures of Dispersion (Ungrouped Data).
5. Measures of Dispersion (Grouped Data).
6. Moments, Measures of Skewness & Kurtosis (Ungrouped Data).
7. Moments, Measures of Skewness & Kurtosis (Grouped Data).
8. Correlation & Regression Analysis.
9. Application of One Sample t-test. Application of Two Sample Fisher' s t-test.
10. Chi-Square test of Goodness of Fit.
11. Chi-Square test of Independence of Attributes for 2 ×2 contingency table.
12. Analysis of Variance One Way Classification.
13. Analysis of Variance
14. Two Way Classification.
15. Selection of random sample using Simple Random Sampling.

Course Name: Livestock and Poultry Management

Course Code: 20013800

Course Outline

Unit I

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry.

Unit II

Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. Introduction of livestock and poultry diseases.

Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

Course Name: Livestock and Poultry Management Lab

Course Code: 20013900

Course Outline

1. External body parts of cattle, buffalo, sheep, goat, swine and poultry.
2. Handling and restraining of livestock.
3. Identification methods of farm animals and poultry.
4. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.
5. Judging of cattle, buffalo and poultry.
6. Culling of livestock and poultry. Planning and layout of housing for different types of livestock.
7. Computation of rations for livestock. Formulation of concentrate mixtures.
8. Clean milk production, milking methods. Hatchery operations, incubation and hatching equipments.
9. Management of chicks, growers and layers. Debeaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

Course Name: Ability and Skill Enhancement III

Course Code: 20014100

Course Outline - Final Assessment – Preparing a documentary

Unit I: Book & Movie Reviews

What is Book Review, Purpose & Importance of Book Review, Types of Book Review, Elements & Steps of Writing Book Review, What is Movie Review, Purpose & Importance of Movie Review, Types of Movie Review, Elements & Steps of Writing Movie Review.

Unit II: LSWR Skills

Reading Comprehension, Rewriting Mythology/Folklore, Debate, News Analysis, Role Plays.

Unit III: Emotional Intelligence & Handling Emotions

What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence, Emotions handling-identifying good and bad emotions, how to control emotions, how to manage negative emotions keeping balance of mental stability, stress and distress.

Unit IV: Group Discussion Skills

What is GD, Types of Group Discussions, Do's & Don'ts, Participation, Thinking, Structuring, Group Behaviour, Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills.

Unit V: Documentary Making

What is documentary, aims & objectives, documentary for social cause, Documentary/Movie Screening & Reviews, preparing a documentary, Narration.

Note: The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

8.3 Lesson Plan – Semester - III

20012200 – Crop Production Technology – I (Kharif Crops)

Unit	Particulars	Class No.	Pedagogy of Class
UNIT-I	Cultivation of Rice	C1	Lecture
UNIT-I	Cultivation of Maize	C2	Lecture
UNIT-I	Cultivation of sorghum	C3	Lecture
UNIT-I	Cultivation of pearl millet	C4	lecture
UNIT-I	Cultivation of mung bean and urd bean	C5	Lecture
UNIT-I	Cultivation of groundnut	C6	Lecture
UNIT-I	Cultivation of Soybean	C7	Lecture
UNIT-I	Cultivation of cotton	C8	lecture
UNIT-I	Cultivation of jute	C9	Lecture
UNIT-I	Presentation	C10	Presentation
UNIT-I	Cultivation of forage sorghum	C11	Lecture
UNIT-I	Cultivation of cowpea	C12	Lecture
UNIT-I	Cultivation of cluster bean and Naiper	C13	Lecture
	Class Room Assignment	C14	Class Room Assignment
	Home Assignment		Home Assignment
	Clarification Class	C15	Clarification Class

20012300 – Crop Production Technology – I Lab (Kharif Crops)

S. No.	Particulars	Class No.	Pedagogy of Class
1	Rice nursery preparation, transplanting of rice	P1	Practical
2	Sowing of soybean, pigeonpea and mung bean. Maize	P2	Practical
3	Sowing of groundnut and cotton	P3	Practical
4	Effect of seed size on germination and seedling vigour of Kharif season crops	P4	Practical
5	Effect of sowing depth on germination of Kharif crops	P5	Practical
6	Identification of weeds in Kharif season crops	P6	Practical
7	Identification of weeds in Kharif season crops	P7	Practical
8	Top dressing and foliar feeding of nutrients	P8	Practical
9	study of yield contributing characters in Kharif crops	P9	Practical
10	study of yield calculation in Kharif crops	P10	Practical
11	study of crop varieties at experimental farm	P11	Practical
12	study of important agronomic experiments at experimental farm	P12	Practical
13	Study of forage experiments	P13	Practical
14	Study of morphological description of Kharif season crops	P14	Practical
15	visit to research centres of related crops	P15	Practical

20002100 – Fundamentals of Plant Breeding

Unit	Particulars	Class No.	Pedagogy of Class
UNIT-I	Overview of the historical development of plant breeding.	C1	Lecture
UNIT-I	Understanding the concept, nature, and role of plant breeding.	C2	Lecture
UNIT-I	Discussing the main objectives of plant breeding.	C3	Lecture
UNIT-I	Major Achievements and Future Prospects	C4	lecture
UNIT-I	The relationship between genetics and plant breeding.	C5	Lecture
UNIT-I	Modes of Reproduction, Pollination, and Apomixes	C6	Lecture
UNIT-I	Self-incompatibility and Male Sterility	C7	Lecture
UNIT-I	Domestication and Acclimatization	C8	lecture
UNIT-I	Introduction; Centre of Origin/Diversity	C9	Lecture
	Presentation	C10	Presentation
	Clarification Class	C11	Clarification Class
UNIT-II	Component of Genetic Variation	C12	Lecture
UNIT-II	Heritability and Genetic Advance	C13	Lecture
UNIT-II	Breeding Methods in Self-Pollinated Crops	C14	Lecture
UNIT-II	Hybridization Techniques and Handling of Segregating Population	C15	Lecture
UNIT-II	Multiline Concept	C16	Lecture
UNIT-II	Population Genetics and Hardy-Weinberg Law	C17	Lecture
UNIT-II	Breeding Methods in Cross-Pollinated Crops	C18	Lecture
UNIT-II	Heterosis and Inbreeding Depression	C19	Lecture
UNIT-II	Development of Composite and Synthetic Varieties	C20	Lecture
	Clarification Class	C21	Clarification Class
	Class Room Assignment-I	C22	Class Room Assignment-I

	Home Assignment-I		Home Assignment-I
UNIT-III	Breeding Methods in Asexually Propagated Crops	C23	Lecture
UNIT-III	Wide Hybridization and Pre-breeding	C24	Lecture
UNIT-III	Polyploidy and Mutation Breeding	C25	Lecture
UNIT-III	Breeding for Biotic and Abiotic Stresses	C26	Lecture
UNIT-III	Biotechnological Tools and Marker Assisted Selection	C27	Lecture
UNIT-III	Participatory Plant Breeding and Development and Release of Varieties	C28	Lecture
	Clarification Class	C29	Clarification Class
	Class Room Assignment-II	C30	Class Room Assignment-II
	Home Assignment-II		Quiz

20002200– Fundamentals of Plant Breeding Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1.	Introduction to plant breeder's kit and examination of germplasm of various crops.	P-1	Practical
2.	Detailed study of the floral structure of self-pollinated crops.	P-2	Practical
3.	Detailed study of the floral structure of cross-pollinated crops	P-3	Practical
4.	Practical demonstration and practice of emasculation techniques in self-pollinated crops.	P-4	Practical
5.	Practical demonstration and practice of hybridization techniques in self-pollinated crops.	P-5	Practical
6.	Practical demonstration and practice of emasculation techniques in cross-pollinated crops.	P-6	Practical
7.	Practical demonstration and practice of hybridization techniques in cross-pollinated crops.	P-7	Practical
8.	Observation and analysis of the genetic structure of inbred populations.	P-8	Practical
9.	Examination and identification of male sterility systems in crops.	P-9	Practical
10.	Techniques for managing and analyzing segregating populations.	P-10	Practical
11.	Practical exercises on calculating mean, range, variance, and standard deviation from sample data.	P-11	Practical
12.	Practical exercises on heritability calculation using different methods.	P-12	Practical
13.	Practical analysis of data using Randomized Block Design (RBD) and understanding components of genetic variance.	P-13	Practical
14.	Working out the mode of pollination in a given crop and determining the extent of natural outcrossing.	P-14	Practical
15.	Practical exercises on predicting the performance of double cross hybrids using genetic principles.	P-15	Practical

20012600 – Agricultural Finance and Cooperation

Unit	Particulars	Class No.	Pedagogy of Class
Unit I	Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture.	C1	Lecture
Unit I	Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits.	C2	Lecture
Unit I	Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC.	C3	Lecture
Unit I	Lead bank scheme, RRBs, Scale of finance and unit cost.	C4	Lecture
	Clarification Class	C5	Clarification Class
	Classroom Assignment	C6	Classroom Assignment
	Quiz	C7	Quiz
	Presentation	C8	Presentation
	Home Assignment		Home Assignment
Unit II	An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India.	C9	Lecture
Unit II	Cost of credit. Recent development in agricultural credit.	C10	Lecture
Unit II	Preparation and analysis of financial statements – Balance Sheet and Income Statement.	C11	Lecture
Unit II	Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.	C12	Lecture
Unit II	Agricultural Cooperation – Meaning, brief history of cooperative development in India,	C13	Lecture
Unit II	Objectives, principles of cooperation, significance of cooperatives in Indian agriculture.	C14	Lecture
	Clarification Class	C15	Clarification Class

	Classroom Assignment	C16	Classroom Assignment
	Presentation	C17	Presentation
Unit III	Agricultural Cooperation – Meaning, brief history of cooperative development in India,	C18	Lecture
Unit III	Agricultural Cooperation – Meaning, brief history of cooperative development in India,	C19	Lecture
Unit III	Objectives, principles of cooperation, significance of cooperatives in Indian agriculture.	C20	Lecture
Unit III	Objectives, principles of cooperation, significance of cooperatives in Indian agriculture.	C21	Lecture
Unit III	Agricultural Cooperation in India- credit, marketing,	C22	Lecture
Unit III	Agricultural Cooperation in India- credit, marketing,	C23	Lecture
Unit III	Consumer and multi-purpose cooperatives,	C24	Lecture
Unit III	Farmers' service cooperative societies, processing cooperatives,	C25	Lecture
Unit III	Farming cooperatives,	C26	Lecture
Unit III	Cooperative warehousing;	C27	Lecture
Unit III	Role of ICA, NCUI, NCDC, NAFED.	C28	Lecture
Unit III	Role of ICA, NCUI, NCDC, NAFED.	C29	Lecture
	Clarification Class	C30	Clarification Class
	Home Assignment		Home Assignment

20012700 – Agricultural Finance and Cooperation Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Determinants of most profitable level of capital	P1	Practical
2	Optimum allocation of resources and limited capita	P2	Practical
3	Analysis of progress and performance of cooperation using published data	P3	Practical
4	Performance of commercial banks	P4	Practical
5	Performance of Regional Rural banks	P5	Practical
6	Commercial Banks Visit	P6	Practical
7	Visit of cooperative bank and cooperative society	P7	Practical
8	Various schemes of banks and cooperative society	P8	Practical
9	Estimation of credit requirement of farm business	P9	Practical
10	Case study - Analysis of balance sheet	P10	Practical
10	Case study - Analysis of Income statement	P11	Practical
12	Appraisal of loan policy	P12	Practical
13	Project preparation - Technoeconomic parameters	P13	Practical
14	Bank project preparation for bank projects	P14	Practical
15	Value added products	P15	Practical

20012800 – Agri- Informatics

Unit	Particulars	Class No.	Pedagogy of Class
Unit I	Introduction to Computers, Operating Systems, definition and types	C1	Lecture
Unit I	Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph Creation	C2	Lecture
Unit I	Statistical analysis, mathematical expressions, Database, concepts and types	C3	Lecture
Unit I	Uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components	C4	Lecture
Unit I	Clarification Class	C5	Clarification Class
Unit I	Home Assignments		Home Assignments
Unit II	Introduction to computer programming languages, concepts and standard input/output operations e-Agriculture, concepts and applications	C6	Lecture
Unit II	Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops	C7	Lecture
Unit II	Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc.	C8	Lecture
Unit II	Clarification Class	C9	Clarification Class
Unit II	Home Assignments		Home Assignments
Unit III	Geospatial technology for generating valuable agri-information Decision support systems, concepts, components and applications in Agriculture	C10	Lecture
Unit III	Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions	C11	Lecture
Unit III	Preparation of contingent crop-planning using IT tools	C12	Lecture
Unit III	Clarification Class	C13	Clarification Class

Unit III	Class Room Assignment	C14	Class Assignment
Unit III	Presentation	C15	Presentation

20012900 – Agri- Informatics Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Study of Computer Components, accessories, practice of important DOS Commands.	P1	Practical
2	Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document	P2	Practical
3	Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document	P3	Practical
4	Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document	P4	Practical
5	MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.	P5	Practical
6	MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.	P6	Practical
7	MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri- information system.	P7	Practical
8	Introduction to World Wide Web (WWW).	P8	Practical
9	Introduction of programming languages.	P9	Practical
10	Introduction of programming languages.	P10	Practical
11	Hands on Crop Simulation Models (CSM) such as DSSAT/ Crop-Info/ Crop Syst/ Wofost	P11	Practical
12	Computation of water and nutrient requirements of crop using CSM and IT tools.	P12	Practical

13	Introduction of Geospatial Technology for generating valuable information for Agriculture	P13	Practical
14	Hands on Decision Support System.	P14	Practical
15	Preparation of contingent crop planning.	P15	Practical

20013000 – Farm Machinery and Power

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Status of Farm Power in India, Sources of Farm Power	C-1	Lecture
Unit-I	I.C. engines, working principles of IC engines	C-2	Lecture
Unit-I	Comparison of two-stroke and four-stroke cycle engines	C-3	Lecture
Unit-I	Study of different components of I.C. engine, I.C. engine terminology and solved problems	C-4	Lecture
Unit-I	Air cleaning, cooling, lubrication, fuel supply systems	C-5	Lecture
Unit-I	Hydraulic control system of a tractor	C-6	Lecture
Unit-I	Power transmission system: clutch, gear box, differential, final drive	C-7	Lecture
Unit-I	Tractor types, Cost analysis of tractor power and attached implement	C-8	Lecture
	Clarification Class	C-9	Lecture
Unit-II	Primary and Secondary Tillage implement, implement for hill agriculture	C-10	Lecture
Unit-II	Implement for intercultural operations, sowing and planting equipment	C-11	Lecture
Unit-II	Calibration of a seed drill and solved examples, Plant Protection equipment	C-12	Lecture
Unit-II	Harvesting and threshing equipment	C-13	Lecture
	Clarification Class	C-14	Clarification Class
	Home Assignment		Home Assignment
	Class Room Assignment	C-15	Class Room Assignment

20013100 – Farm Machinery and Power Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Study of different components of I.C. engine	P-1	Practical
2	Study of different components of I.C. engine	P-2	Practical
3	To study air cleaning and cooling system of engine	P-3	Practical
4	Familiarization with clutch, transmission, differential and final drive of a tractor	P-4	Practical
5	Familiarization with lubrication and fuel supply system of engine	P-5	Practical
6	Familiarization with brake, steering, hydraulic control system of engine	P-6	Practical
7	Learning of tractor driving	P-7	Practical
8	Familiarization with operation of power tiller, Implements for hill agriculture	P-8	Practical
9	Familiarization with different types of primary and secondary tillage implements	P-9	Practical
10	Familiarization with different types of primary and secondary tillage implements	P-10	Practical
11	Familiarization with seed-cum-fertilizer drills, their seed metering mechanism, and calibration	P-11	Practical
12	Familiarization with seed-cum-fertilizer drills, their seed metering mechanism, and calibration	P-12	Practical
13	Familiarization with different types of sprayers and dusters	P-13	Practical
14	Familiarization with different inter cultivation equipment	P-14	Practical
15	Familiarization with harvesting and threshing machinery	P-15	Practical

20013200 – Production Technology for Vegetables and Spices

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Importance of vegetables & spices in human nutrition and national economy, kitchen gardening	C1-C2	Lecture
Unit-I	Brief about origin, area, climate, soil, improved varieties;	C3	Lecture
Unit-I	Cultivation practices; Solanaceae	C4	
Unit-I	Cultivation practices; Cucurbitaceae	C5	Lecture
Unit-I	Cultivation practices; Beans	C6	Lecture
Unit-II	Cultivation practices; Cole crops	C7	Lecture
Unit-II	Cultivation practices; Bulb crops	C8	Lecture
Unit-II	Cultivation practices; Root Crops	C9	Lecture
Unit-II	Cultivation practices; Tuber Crops	C10	Lecture
Unit-II	Cultivation practices; Leafy Vegetables	C11	Lecture
Unit-II	Cultivation practices; Perennial vegetables	C12	Lecture
12	Presentation	C13	Presentation
13	Home Assignments		Take Home Assignments
14	Clarification Class	C14	Clarification Class
15	Class Room Assignment	C15	Class Room Assignment

20013300– Production Technology for Vegetables and Spices Lab

S. No.	Particulars	Class No.	Pedagogy of Class
I	Identification of vegetables & spice crops and their seeds.	P1-P2	Practical
2	Nursery raising.	P3-P4	Practical
3	Direct seed sowing and transplanting	P5-P6	Practical
4	Study of morphological characters of different vegetables & spices	P7-P8	Practical
5	Study of morphological characters of different vegetables & spices	P9-P10	Practical
6	Fertilizers applications. Harvesting & preparation for market	P11-P12	Practical
7	Economics of vegetables and spices cultivation	P13-P15	Practical

20027600 – Environmental Studies & Disaster Management

Unit	Particulars	Class No.	Pedagogy of Class
Unit 1	Multidisciplinary nature of environmental studies Definition, scope and importance	C1	Lecture
Unit 2	Natural Resources: Renewable and non-renewable resources. Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people	C2	Lecture
Unit 2	b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefitsh and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies	C3	Lecture
Unit 2	d)Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies). Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies	C4	Lecture
Unit 2	Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles	C5	Lecture
Unit 3	Ecosystems • Concept of an ecosystem, Structure and function of an ecosystem. • Producers, consumers and decomposers.	C6	Lecture
Unit 3	Energy flow in the ecosystem. • Ecological succession, Food chains, food webs and ecological pyramids	C7	Lecture
Unit 3	Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem; b. Grassland ecosystem; c. Desert ecosystem; d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	C8	Lecture

Unit 4	Biodiversity and its conservation:- Introduction, definition, genetic, species & ecosystem diversity Biogeographical classification of India	C9	Lecture
Unit 4	Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values	C10	Lecture
Unit 4	Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts	C11	Lecture
Unit 4	Endangered and endemic species of India. Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity	C12	Lecture
Unit 5	Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution; b. Water pollution c. Soil pollution; d. Marine pollution. Noise pollution; f. Thermal pollution; g. Nuclear hazards	C13	Lecture
Unit 5	Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies	C14	Lecture
Unit 6	Social Issues and the Environment: From Unsustainable to Sustainable development; Urban problems related to energy. Water conservation, rain water harvesting, watershed management	C15	Lecture
Unit 6	Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dyes. Wasteland reclamation	C16	Lecture
Unit 6	Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness	C17	Lecture
Unit 7	Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme.	C18	Lecture

Unit 7	Environment and human health: Human Rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health	C19	Lecture
	Clarification Class	C20	Clarification Class
	Home Assignment		Home Assignment
	Presentation	C21	Presentation
	Class Room Assignment	C22	Class Room Assignment
Unit 1	**Disaster Management** Natural Disasters- Meaning and nature of natural disasters, their types and effects	C23	Lecture
Unit 1	Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion	C24	Lecture
Unit 2	Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents	C25	Lecture
Unit 3	Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community – based organizations and media	C26	Lecture
Unit 3	Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations	C27	Lecture
	Class Room Assignment	C28	Class Room Assignment
	Presentation	C29	
	Clarification Class 4	C30	Clarification Class

20027700– Statistical Methods

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to Statistics and its Applications in Agriculture	C1	Lecture
Unit-I	Graphical Representation of Data	C2	Lecture
Unit-I	Measures of Central Tendency	C3	Lecture
Unit-I	Measures of Dispersion	C4	Lecture
Unit-I	Definition of Probability and Basic Theorems	C5	Lecture
Unit-I	Binomial and Poisson Distributions	C6	Lecture
	Clarification Class	C7	Clarification Class
Unit-II	Definition of Correlation and Scatter Diagram	C8	Lecture
Unit-II	Karl Pearson's Coefficient of Correlation	C9	Lecture
Unit-II	Linear Regression Equations	C10	Lecture
Unit-II	Introduction to Test of Significance and Chi-Square Test of Independence	C11	Lecture
Unit-II	Introduction to Analysis of Variance and Sampling Methods	C12	Lecture
	Clarification Class	C13	Clarification Class
	Class Room Assignment	C14	Class Room Assignment
	Home Assignment		Home Assignment
	Presentation	C15	Presentation

20027800– Statistical Methods Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Graphical Representation of Data.	P1	Practical
2	Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles.	P2	Practical
3	Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.	P3	Practical
4	Measures of Dispersion (Ungrouped Data).	P4	Practical
5	Measures of Dispersion (Grouped Data).	P5	Practical
6	Moments, Measures of Skewness & Kurtosis (Ungrouped Data).	P6	Practical
7	Moments, Measures of Skewness & Kurtosis (Grouped Data).	P7	Practical
8	Correlation & Regression Analysis.	P8	Practical
9	Application of One Sample t-test. Application of Two Sample Fisher’ s t-test.	P9	Practical
10	Chi-Square test of Goodness of Fit.	P10	Practical
11	Chi-Square test of Independence of Attributes for 2 ×2 contingency table.	P11	Practical
12	Analysis of Variance One Way Classification.	P12	Practical
13	Analysis of Variance	P13	Practical
14	Two Way Classification.	P14	Practical
15	Selection of random sample using Simple Random Sampling.	P15	Practical

20013800 – Livestock and Poultry Management

Unit	Particulars	Class No.	Pedagogy of Class
UNIT-I	Role of the livestock in national economy	C-1	Lecture
UNIT-I	Reproduction of farm animals	C-2	Lecture
UNIT-I	Reproduction of poultry	C-3	Lecture
	Clarification class	C-4	Clarification class
UNIT-II	Housing of Livestock	C-5	Lecture
UNIT-II	Housing of poultry	C-6	Lecture
	Clarification class	C-7	Clarification class
	Classroom assignment	C-8	Classroom assignment
UNIT-III	Management of calves	C-9	Lecture
UNIT-III	Management of growing heifers	C-10	Lecture
UNIT-III	Management of milch animals	C-11	Lecture
UNIT-III	Management of Sheep and goat	C-12	Lecture
UNIT-III	Management of Swine	C-13	Lecture
	Clarification class	C-14	Clarification class
UNIT-IV	Incubation, Hatching and Brooding	C-15	Lecture
UNIT-IV	Management of growers	C-16	Lecture
	Home assignment	C-16	Home assignment
UNIT-IV	Management of layers	C-17	Lecture
	Classroom assignment	C-18	Classroom assignment
UNIT-V	Breeds of cows	C-19	Lecture
UNIT-V	Breeds of buffaloes	C-20	Lecture
UNIT-V	Breeds of goat	C-21	Lecture
UNIT-V	Breeds of sheep	C-22	Lecture
UNIT-V	Breeds of Swine	C-23	Lecture

UNIT-V	Breeds of poultry	C-24	Lecture
	Clarification class	C-25	Clarification class
	Presentation	C-26	Presentation
UNIT-VI	Improvement of farm animals	C-27	Lecture
UNIT-VI	Improvement of poultry	C-28	Lecture
	Home assignment	C-28	Home assignment
	Clarification class	C-29	Clarification class
UNIT-VII	Digestion of Farm animals	C-30	Lecture
UNIT-VII	Digestion of poultry	C-31	Lecture
UNIT-VII	Classification of feedstuffs	C-32	Lecture
	Webinar	C-33	Webinar
	Classroom assignment	C-34	Classroom assignment
UNIT-VII	Principles of animal ration	C-35	Lecture
UNIT-VII	Feed ingredients for livestock ration	C-36	Lecture
UNIT-VII	Feed ingredients for poultry ration	C-37	Lecture
UNIT-VII	Feed supplements and additives	C-38	Lecture
	Home assignment	C-38	Home assignment
	Guest Lecture	C-39	Guest Lecture
UNIT-VIII	Livestock diseases and their management	C-40	Lecture
	Clarification class	C-41	Clarification class
UNIT-VIII	Poultry disease and their management	C-42	Lecture
	Clarification class	C-43	Clarification class
	Quiz	C-44	Quiz
	Presentation	C-45	Presentation

20013900 – Livestock and Poultry Management Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	External body parts of cattle and buffalo	P-1	Practical
2	External body parts of sheep and goat	P-2	Practical
3	External body parts of swine	P-3	Practical
4	External body parts of poultry	P-4	Practical
5	Handling and restraining of farm animals	P-5	Practical
6	Identification methods of animals and poultry	P-6	Practical
7	Visit of IDF and IPF farm to know about the breeds of animals and poultry including the study of farm records	P-7	Practical
8	Judging of cattle	P-8	Practical
9	Judging of poultry	P-9	Practical
10	Culling of livestock and poultry	P-10	Practical
11	Housing of livestock and Computation of ration for animals	P-11	Practical
12	Formulation of concentrate mixture, Clean milk production	P-12	Practical
13	Methods of milking, Hatching and incubation operations in poultry	P-13	Practical
14	Management of chicks and growers, Management of layers and Debeaking	P-14	Practical
15	Vaccination in livestock and poultry. Economics of livestock and poultry production	P-15	Practical

20014100 – Ability and Skill Enhancement – III

Unit	Particulars	Class No.	Pedagogy of Class
UNIT I	What is Book Review, Purpose & Importance of Book Review Types of Book Review, Elements & Steps of Writing Book Review	C-1	Lecture
UNIT I	Book Review Writing	C-2	Lecture
UNIT I	What is Movie Review, Purpose & Importance of Movie Review Types of Movie Review, Elements & Steps of Writing Movie Review	C-3	Lecture
UNIT I	Watch a movie	C-4	Activity
UNIT I	Write the review of the movie shown in the class	C-5	Activity
UNIT I	Clarification Class Unit 1	C-6	Clarification Class
UNITII	Reading Comprehension	C-7	Lecture
UNITII	Debate	C-8	Lecture
UNITII	Rewriting Mythology/Folklore	C-9	Lecture
UNITII	Watch an international Greek myth or Indian folklore	C-10	Activity
UNITII	Rewriting Mythology/Folklore watched in the class		Home Assignments
UNITII	News Analysis	C-11	Activity
UNITII	Role Plays	C-12	Lecture
UNITII	Role Plays	C-13	Class Assignment
UNIT III	What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence,	C-14	Lecture
UNIT III	Emotions handling- identifying good and bad emotions	C-15	Lecture

UNIT III	how to control emotions, how to manage negative emotions keeping balance of mental stability	C-16	Lecture
UNIT III	stress and distress	C-17	Class Assignment
UNIT III	Activity/Case Study	C-18	Activity
UNIT III	Clarification Class III	C-19	Clarification Class
UNIT IV	What is GD, Types of Group Discussions	C-20	Lecture
UNIT IV	GD: Thinking, Structuring, Group Behaviour	C-21	Class Assignment
UNIT IV	Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills	C-22	Lecture
UNIT IV	Clarification Class	C-23	Clarification Class
UNIT V	What is documentary, aims & objectives	C-24	Lecture
UNIT V	Documentary/Movie Screening & Reviews	C-25	Activity
UNIT V	documentary for social cause	C-26	Presentation
UNIT V	documentary for social cause: Screening and Narration	C-27	Presentation
UNIT V	preparing a documentary		Home Assignments
	Guest Lecture	C-28	Guest lecture
	Webinar	C-29	Webinar
	Seminar	C-30	Seminar

Note:

This is a tentative lesson plan. The same may change from faculty to faculty as per the teaching pedagogy adopted by the faculty.

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