

SCHEME

The structure of the course will comprise nine-papers in Semester.

SEMESTER - III

S. NO.	SUBJECT TITLE	SUBJECT CODE	CREDIT
1.	Crop Production Technology – I (Kharif Crops)	BAGRI20S301	2 (1+1)
2.	Fundamentals of Plant Breeding	BAGRI20S302	3(2+1)
3.	Agricultural Finance and Cooperation	BAGRI20S303	3(2+1)
4.	Agri- Informatics	BAGRI20S304	2 (1+1)
5.	Farm Machinery and Power	BAGRI20S305	2 (1+1)
6.	Production Technology for Vegetables and Spices	BAGRI20S306	2 (1+1)
7.	Environmental Studies and Disaster Management	BAGRI20S307	3(2+1)
8.	Statistical Methods	BAGRI20S308	2 (1+1)
9.	Livestock and Poultry Management	BAGRI20S309	4 (3+1)
TOTAL			23(14+9)

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Class			B.Sc. (Hons.) Agriculture	
Year/Semester			2 nd Year, III Semester	
Department			Agriculture	
Paper Name			Crop Production Technology – I (Kharif Crops)	
Subject Code			BAGRI20S301	
L	T	P	Credit Total	2(1+1)
1	0	1		

Course Objectives: The course is aimed at

1. Imparting the fundamentals of crop production technology of kharif crops.
2. Demonstrating practical applications of crop production.
3. Providing knowledge on the importance and practices followed in growing kharif crops.

Expected Course Outcome: At the end of the course the student should be able to

1. Comprehend the fundamentals of crop production of cereals.
2. Decide on the crops, fertilizers and irrigation measures for production of pulses.
3. Plan for sustainable crop production of oilseeds.
4. Explain the techniques involved in crop production of fibre and forage crops.
5. Correlate parameters involved in crop cultivation and practice kharif crop cultivation.

Unit	Syllabus	Periods
UNIT 1	Origin, geographical distribution, economic importance, soil and rice, pigeonpea, soybean	3
UNIT 2	Origin, geographical distribution, economic importance, soil and maize, mung bean and groundnut, jute	3
UNIT 3	Origin, geographical distribution, economic importance, soil and sorghum, urd bean, cowpea, cotton	3
UNIT 4	Origin, geographical distribution, economic importance, soil and pearl millet, forage crops-sorghum	3
UNIT 5	Origin, geographical distribution, economic importance, soil and finger millet, cluster bean and napier	3

Practical (30 periods)

Rice nursery preparation, transplanting of rice, sowing of soybean, pigeonpea and mungbean. Maize, groundnut and cotton, effect of seed size on germination and seedling vigour of kharif season crops, effect of sowing depth on germination of kharif crops, identification of weeds in kharif season crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of kharif season crops, study of crop varieties and important agronomic experiments at experimental farm. Study of forage experiments, morphological description of kharif season crops, visit to research centres of related crops.

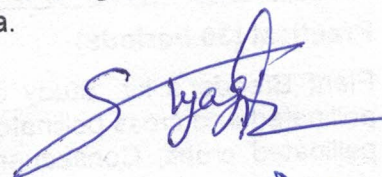
Text books

1. Singh, Chhidda, Singh, Prem and Singh, Rajbir. 2003. Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co., New Delhi.
2. Panda, S.C. 2012. Modern Concepts and Advance Principles in Crop Production. Agrobios (India), Jodhpur

References books

1. Singh, S.S. and Singh, Rajesh. 2015. Principles and Practices of Agronomy (5th Re-set), Kalyani Publishers, New Delhi, Kalyani Publishers, Ludhiana.






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ज्ञान प्राप्तये लक्ष्यं संधानम्

Estd. by Madhya Pradesh Nig. Vishwavidyalaya (Shekari Avam Sanchohars) Aghyadesh, 2020

SCHOOL OF AGRICULTURE

Class			B.Sc. (Hons.) Agriculture	
Year/Semester			2 nd Year, III Semester	
Department			Agriculture	
Paper Name			Fundamentals of Plant Breeding	
Subject code			BAGRI20S302	
L	T	P	Credit Total	3(2+1)
2	0	1		
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. Imparting knowledge on the use of genetic resources. 2. Describing concepts of breeding crops based on objectives. 3. Teaching hybrid seed production techniques and introducing to modern breeding concepts. <p>Expected Course Outcome: At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. Infer the importance of plant genetic resources and utilize it in crop improvement. 2. Design crop specific breeding methodology. 3. Comprehend breeding methods specific to an objective. 4. Describe hybrid seed production of various Kharif crops. 5. Practice hybridization and plant breeding. 				
Unit	Syllabus			Periods
UNIT 1	Historical development, concept, nature, role, aim and objectives of plant breeding, Major achievements and future prospects, Domestication, Acclimatization and Introduction, Centre of origin/diversity, Modes of reproduction and apomixes and its genetic consequences.			7
UNIT 2	Concepts of population genetics and Hardy-Weinberg Law, Self-incompatibility and male-sterility, Genetics in relation to plant breeding; Components of Genetic variation, Heritability and genetic advance.			5
UNIT 3	Genetic basis and breeding methods in self pollinated crops- mass selection and pure line selection, hybridization techniques and handling of segregating population. Multiline concept.			5
UNIT 4	Heterosis and inbreeding depression. Development of inbred lines and hybrids, composite and synthetic varieties. Genetic basis and methods of breeding for cross pollinated crops, modes of selection. Population improvement Schemes- Ear to row method, Modified Ear to Row method, Recurrent selection schemes.			7
UNIT 5	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; Intellectual Property Rights, Patenting, Plant Breeders and & Farmer's Rights. Maintenance of breeding records and data collection.			6

Practical (30 Periods)

Plant Breeder's kit, Study of germplasm of various crops, Study of floral structure of self-pollinated and cross pollinated crops, Emasculation and hybridization techniques in self & cross pollinated crops, Consequences of inbreeding on genetic structure of resulting populations,

Study of male sterility system, Handling of segregation populations, Methods of calculating mean, range, variance, standard deviation and heritability, Designs used in plant breeding experiment; analysis of Randomized Block Design, Estimation of heterosis and inbreeding depression, Layout of field experiments, Work out the mode of pollination in a given crop and extent of natural out crossing, Prediction of performance of double cross hybrids.

Text books

1. Chahel, G.S. and S.S. Ghosal.2002.Principles and Procedures of Plant Breeding, Biotechnological and Conventional Approaches. Narosa Publishing House, New Delhi.
2. Singh, B.D. 2005. Plant Breeding. Kalyani Publishing House, New Delhi.
3. Singh, P. 2001.Essentials of Plant Breeding-Principles and Methods. Kalyani Publishing House, New Delhi.

References books

1. Alard, R.W. 2000.Principles of Plant Breeding. John Willey & Sons, New York.
2. Jain,H.K. and M.C. Kharkwal.2004. Plant Breeding- Mendelian to Molecular Approach. Narosa Publishing House, New Delhi.
3. Sharma, A.K. 2005. Breeding Technology of Crop Plants (Edt.). Yash Publishing House, Bikaner.

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			2 nd Year, III Semester		
Department			Agriculture		
Paper Name			Agricultural Finance and Co-Operation		
Subject code			BAGRI20S303		
L	T	P	Credit Total	3(2+1)	
2	0	1			
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. Discussing the principles of farm management and production economics. 2. Explaining farm business management. 3. Imparting knowledge on risks in agricultural production and management of resources. <p>Expected Course Outcome: At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. Explain the importance of farm management in agriculture. 2. Comprehend the benefits and cost involved in farm management. 3. Analyze farm business. 4. Devise plans to overcome risks and manage farm resources. 5. Manage a farm. 					
Unit	Syllabus				Periods
UNIT 1	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.				5
UNIT 2	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. 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.				10
UNIT 3	Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.				3
UNIT 4	Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture.				5
UNIT 5	Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCU, NCDC, NAFED.				7

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Practical (30 Periods)

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

Text books

1. S. Subba Reddy, P. Raghu Ram, 1996, Agricultural finance and management, Oxford & IBH Pub. Co, New Delhi
2. Kamat, G.S., 1978, New Dimensions of Cooperative Management, Himalyan Publishing House, Mumbai.

References books

1. Nelson and Murray, 1988. Agricultural Finance. Kalyani Publishers, New Delhi.
2. Pandey, U.K. 1990. An Introduction to Agricultural Finance, Kalyani Publishers, New Delhi.
3. Singh, J.P., 1988, Agricultural Finance Theory and Practices, Ashish Publishing House, New Delhi.
4. Muniraj, R. 1987, Farm finance for development, Oxford & IBH Pub. Co., New Delhi.

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Esttd. by Madhya Pradesh Nij Vishwavidyalaya (Shapurji Avram Santhorland Adhyadesh, 2020

SCHOOL OF AGRICULTURE

Class			B.Sc. (Hons.) Agriculture		
Year/Semester			2 nd Year, III Semester		
Department			Agriculture		
Paper Name			Agri- Informatics		
Subject code			BAGRI20S304		
L	T	P	Credit Total	3(2+1)	
2	0	1			

Course Objectives: The course is aimed at

1. Describing computers and their usefulness in agriculture.
2. Explaining the effectiveness of Information and Communications Technology in agriculture.
3. Demonstrating new technologies which generate valuable information in agriculture.

Expected Course Outcome: At the end of the course the student should be able to

1. Able to utilize operating systems like MS office and DBMS in agriculture.
2. Comprehend programming languages.
3. Use the internet for obtaining useful information regarding agriculture.
4. Retrieve and generate information using geospatial technology.
5. Relate contemporary ideas.
6. Compute, create, operate and translate data using operating systems and IT tools.

Unit	Syllabus	Periods
UNIT 1	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,	8
UNIT 2	Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.	8
UNIT 3	e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes.	3
UNIT 4	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.	6
UNIT 5	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.	5

Practical (30 Periods)

Study of Computer Components, accessories, practice of important DOS Commands. 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 a scientific Document. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop Simulation Models

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(CSM) such as DSSAT/Crop-Info/Crop Syst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Introduction of Geospatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparation of contingent crop planning.

Text Books

1. Mamta Rana D. Prasad. 2017. Agro-informatics. Bioscientific Publisher, India.
2. Vanitha, G and Kalpana, M. 2011. Agro-informatics. New India Publishing Agency, India.

Reference Books

1. Raju, K. V., V. R. Hegde and Satish A. Hegde. 2018. Geospatial Technologies for Agriculture: Case Studies from India. Springer International Publishing, Switzerland.
2. Chandan Kumar Panda, Anil Paswan and Siya Ram Singh. 2018. Advances in ICT in Agriculture. New Delhi Publisher, India.

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Class			B.Sc. (Hons.) Agriculture		
Year/Semester			2 nd Year, III Semester		
Department			Agriculture		
Paper Name			Farm Machinery and Power		
Subject code			BAGRI20S305		
L	T	P	Credit Total	2(1+1)	
1	0	1			

Course Objectives: The course is aimed to

1. Explain the farm and tractor power used in agriculture.
2. Demonstrate different farm implements and its uses in agriculture.
3. Discuss the selection of farm implements and its cost benefit analysis.

Expected Course Outcome: Upon completion, students will be able to

1. Identify and differentiate two stroke and four stroke I.C engines.
2. Distinguish different components and systems of IC engines.
3. Compare different tillage implements used for various agricultural purposes.
4. Classify various farm implements and comprehend its calibration methods.
5. Estimate the cost benefit economics of various farm implements.
6. Experiment with different equipment used in agricultural fields from planting to harvesting.

Unit	Syllabus	Periods
UNIT 1	Status of Farm Power in India, Sources of Farm Power	2
UNIT 2	I.C. engines, working principles of I C 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.	3
UNIT 3	Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor.	3
UNIT 4	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.	3
UNIT 5	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.	4

Practical (30 Periods)

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow. Familiarization with seed cum-fertilizer drills their seed metering mechanism and calibration, planters and trans planter Familiarization with different types of sprayers and dusters Familiarization with different inter cultivation equipment, Familiarization with harvesting and threshing machinery.

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Class			B.Sc. (Hons.) Agriculture		
Year/Semester			2 nd Year, III Semester		
Department			Agriculture		
Paper Name			Production Technology for Vegetables and Spices		
Subject code			BAGRI20S306		
L	T	P	Credit Total	2(1+1)	
1	0	1			

Course Objectives: The course is aimed at

1. Demonstrating the fundamental production technology of vegetables.
2. Imparting knowledge on production technology of spices.
3. Imparting practical experience on production technology of vegetables and spices.

Expected Course Outcomes: At the end of the course the student should be able to

1. Appreciate the importance of cultivating vegetables and spices.
2. Demonstrate ideas on cultivating vegetables and spices.
3. Understand the physiological disorders undermining the yield of vegetables and spices.
4. Plan for commercial cultivation of vegetables and spices.
5. Cultivate and demonstrate marketing of vegetables.

Unit	Syllabus	Periods
UNIT 1	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, physiological disorders, of important vegetable and spices :Tomato, Brinjal, Chilli, Capsicum.	5
UNIT 2	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, physiological disorders :Cucumber, Melons, Gourds, Pumpkin,	2
UNIT 3	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, physiological disorders : French bean, Peas;	2
UNIT 4	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, physiological disorder: Cole crops such as Cabbage, Cauliflower, Knol-khol	3
UNIT 5	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, physiological disorder: Bulb crops such as Onion, Garlic; Root crops such as Carrot, Radish, Beetroot; Tuber crops such as Potato; Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing,	3

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	transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorder: Leafy vegetables such as Amaranth, Palak. Perennial vegetables.	
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Practical (30 Periods)

Identification of vegetables & spice crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Fertilizers applications. Harvesting & preparation for market. Economics of vegetables and spices cultivation.

Text Books

1. B.R.Choudhary A Text book on production technology of vegetables (2009) Kalyani Publishers.
2. K S Yawalkar Vegetable crops in India (2008) Agri-Horticultural Pub. House. Nagpur.
3. K.V.Kamath Vegetable Crop Production (2007) Oxford Book Company.
4. M.K.Rana Olericulture in India (2008) Kalyani Publishers.

Reference Books

1. M.S.Dhaliwal Handbook of Vegetable Crops (2008) Kalyani Publishers.
2. Nath Prem Vegetables for the Tropical Regions (1994) ICAR New Delhi.
3. P.Hazra Modern Technology in Vegetable Production (2011) New India Publishing Agency, New Delhi.
4. Pruthi, J.S Major Spices of India- Crop Management Postharvest Technology (1993) ICAR.

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Class			B.Sc. (Hons.) Agriculture		
Year/Semester			2 nd Year, III Semester		
Department			Agriculture		
Paper Name			Environmental Studies and Disaster Management		
Subject code			BAGRI20S307		
L	T	P	Credit Total	3(2+1)	
2	0	1			

Course Objectives: The course is aimed at

1. Demonstrating fundamental principles of nature and problems associated with it.
2. Developing skills of managing natural calamities and/or disasters.
3. Defining current technologies used in environmental management.

Expected Course Outcome: At the end of the course the student should be able to

1. Summarize natural sources and state the need for conserving the resources.
2. Understand the functions of ecosystems.
3. Comprehend the importance of conserving species on earth.
4. Delineate manmade disasters and plan towards sustainable development.
5. Demonstrate knowledge acquired in natural disaster management.
6. Assess disaster issues based on knowledge gained and field work and design remedies.

Unit	Syllabus	Periods
UNIT 1	Multidisciplinary nature of environmental studies Definition, scope and importance. 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. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits 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 nonrenewable 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 life styles.	6
UNIT 2	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. 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	6

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UNIT 3	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). Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographically 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-spots 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.	6
UNIT 4	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. Wasteland reclamation. Consumerism and waste products. 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.	6
UNIT 5	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. 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. 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.	6

Practical (30 Periods)

Pollution case studies, Case Studies- Field work: Visit to a local area to document, environmental assets river/ forest/ grassland/ hill/ mountain, Visit to a local polluted site- Urban/Rural/Industrial/ Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.

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Text Books

1. P D Sharma, 2010, Ecology and Environment- Rastogi publication, Meerut- New Delhi.
2. Pushpa Dahiya, Manisha Ahlawat, 2013, Environmental Science: A New Approach- Alpha Science.
3. Bamanayha B. R. Verma L. N. and Verma A., 2005, Fundamentals of environmental Sciences, Yash publishing house, Bikaner.

Reference Books

1. Anil K. Gupta, Sreeja S. Nair, Florian Bemmerlein-Lux, Sandhya Chatterji, 2013, Disaster Management and Risk Reduction: Role of Environmental Knowledge, Editor(s): Alpha Science.
2. Agarwal K C, 1999, Environmental Biology, Agro Botanica, Bikaner.

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.Class			B.Sc. (Hons.) Agriculture	
Year/Semester			2 nd Year, III Semester	
Department			Agriculture	
Paper Name			Statistical Methods	
Subject code			BAGRI20S308	
L	T	P	Credit Total	2(1+1)
1	0	1		

Course Objectives: The course is aimed at

1. Explaining the role of statistics in agriculture.
2. Imparting knowledge on collection, analysis and presentation of data.
3. Interpreting simple agricultural experiments.

Expected Course Outcome: After completing the course, the student should be able to

1. Present and analyze scientific data.
2. Solve problems on probability.
3. Interpret statistical test outcomes.
4. Design and analyze experiments.
5. Appreciate the applications of statistical methods in science and engineering.
6. Apply relevant statistical analysis to experimental data.

Unit	Syllabus	Periods
UNIT 1	Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion.	3
UNIT 2	Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions.	3
UNIT 3	Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations.	2
UNIT 4	Introduction to Test of Significance, One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in 2 x 2 Contingency Table.	3
UNIT 5	Introductions 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.	4

Practical (30 Periods)

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Dispersion (Ungrouped Data). Measures of Dispersion (Grouped Data). Moments, Measures of Skewness & Kurtosis (Ungrouped Data). Moments, Measures of Skewness & Kurtosis (Grouped Data). Correlation & Regression Analysis. Application of One Sample t-test. Application of Two Sample Fisher's t-test. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for 2 x 2 contingency table. Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification. Selection of random sample using Simple Random Sampling.

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Text Books

1. Chandel, S.R.S. 1998. Handbook of Agril. Statistics. Achal Prakashan Mandir, Kanpur.
2. Gupta S.P. 2002. Statistical Methods. Sultan Chand & Sons, New Delhi.

Reference Books

1. Agarwal B.L. 1991. Basic Statistics Wiley Eastern, New Delhi.

Unit	Topics	Time
UNIT 1	Introduction to Statistics and its Applications in Agriculture, Definition of Statistics, Characteristics of Statistics, Classification of Statistics, Scope and Limitations of Statistics, Statistical Inference	10
UNIT 2	Probability, Probability Distributions, Binomial, Poisson & Normal Distributions	10
UNIT 3	Correlation, Regression, Coefficient of Correlation, Regression Lines, Properties of Regression Lines, Correlation and Regression	10
UNIT 4	Introduction to Test of Significance, One Sample & Two Sample Test, Chi-square Test of Independence of Attributes in 2 x 2 Contingency Table	10
UNIT 5	Introduction to Analysis of Variance, Analysis of One Way ANOVA, Questioning techniques in Sampling Method, Sampling error, Population Parameter, Sample Frame, Sampling with and without replacement, Use of Random Number Table for selection of Sample	10

Practical (10 Papers)

1. Practical application of Des. Measures of Central Tendency (ungrouped data) with Definition of Central Tendency, Measures of Central Tendency (ungrouped data)

2. Definition of Statistics, Characteristics of Statistics, Classification of Statistics (ungrouped data)

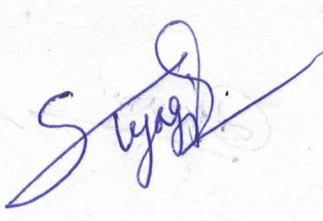
3. Probability Distributions (Binomial, Poisson & Normal)

4. Correlation & Regression, Measures of Correlation & Regression Lines, Properties of Regression Lines, Correlation and Regression

5. Introduction to Test of Significance, One Sample Test, Application of Two Sample Test, Chi-square Test of Independence of Attributes in 2 x 2 Contingency Table

6. Analysis of Variance, One Way ANOVA, Analysis of Variance, Sampling with and without replacement, Use of Random Number Table for selection of Sample





S. B. Bhat



Class			B.Sc. (Hons.) Agriculture		
Year/Semester			2 nd Year, III Semester		
Department			Agriculture		
Paper Name			Livestock & Poultry Management		
Subject code			BAGRI20S309		
L	T	P	Credit Total	4(3+1)	
3	0	1			
<p>Course Objectives: The course is aimed at</p> <ol style="list-style-type: none"> 1. Imparting knowledge on poultry and animal husbandry management. 2. Interpreting the usage of scientific techniques involved in rearing livestock and poultry. 3. Stating the importance of breeds and designing nutrient based feeds. <p>Expected Course Outcome : At the end of the course the student should be able to</p> <ol style="list-style-type: none"> 1. Understand the importance of livestock in human welfare. 2. Demonstrate knowledge on housing requirements for poultry and livestock. 3. Handle the different life stages of livestock and select best breeds for growing. 4. Design and ration feedstuffs for livestock. 5. Manage and prevent the occurrence of livestock diseases. 					
Unit	Syllabus				Periods
UNIT 1	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.				3
UNIT 2	Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers.				3
UNIT 3	Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry.				2
UNIT 4	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.				3
UNIT 5	Feeding of livestock and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.				4

Practical (30 Periods)

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

Text Books

1. Singh, R A. 1996. Poultry Production 3rd Ed. Kalyani.
2. ICAR, Handbook of Animal Husbandry, 2011. 3rd revised Ed.
3. Prasad, J. 2008. Poultry Production and management. Kalyani Pub.

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Reference Books

1. Banerjee, G.C. 2013. A Text Book of Animal Husbandary. 8th Ed. ICAR.
2. Sastry N S R and Thomas, Ck 2006. Livestock Production and Management, Kalyani Pub.

Unit	Topics	Reference Books
UNIT 1	Role of livestock in the national economy, Production in India, animals and poultry, livestock diseases, animal husbandry, different species of livestock and poultry, management of livestock, growing calves and other animals.	Banerjee, G.C. 2013. A Text Book of Animal Husbandary. 8th Ed. ICAR.
UNIT 2	Management of sheep, goat and other ruminants, husbandry, breeding management of livestock and poultry.	Banerjee, G.C. 2013. A Text Book of Animal Husbandary. 8th Ed. ICAR.
UNIT 3	Genetics and quality improvement of livestock and poultry, production in livestock and poultry, classification of livestock, important diseases of livestock and poultry, prevention and control of important diseases of livestock and poultry.	Banerjee, G.C. 2013. A Text Book of Animal Husbandary. 8th Ed. ICAR.
UNIT 4	Prevention and control of important diseases of livestock and poultry, prevention and control of important diseases of livestock and poultry.	Banerjee, G.C. 2013. A Text Book of Animal Husbandary. 8th Ed. ICAR.
UNIT 5	Prevention and control of important diseases of livestock and poultry, prevention and control of important diseases of livestock and poultry.	Banerjee, G.C. 2013. A Text Book of Animal Husbandary. 8th Ed. ICAR.

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