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B.Sc. (Hons.) Agriculture

Bag402: Production Technology for Ornamental Crops, MAPs and Landscaping

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG402	**Production Technology For Ornamental Crops, MAPs And Landscaping**	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; P – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of technology of production of ornamental, medicinal and aromatic crops

Course Outcomes:
1. Student will able to understand importance and scope of ornamental, medicinal and aromatic crops
2. Student will able to understand package of practices and processing of ornamental, medicinal and aromatic crops

Unit-1
Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers.

Unit-2
Production technology of important cut flowers like rose, gerbera, carnation, Lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions.

Unit-3
Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol.

Unit-4
Production technology of aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver.

Unit-5
Processing and value addition in ornamental crops and MAPs produce.

BAGL 402: **Practical**

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures – care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post-harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

Books:

1. Chattopadhyay,S.K. 2007. Commercial Floriculture. Gene-Tech Books, New Delhi
2. Srivastava,H.C.2014.Medicinal and Aromatic Plants, ICAR, New Delhi.
3. Kumar,N., Abdul Khader, J.B.M,Rangaswamy, P and Irulappan, I. 2004. Introduction to Spieces, Plantation Crops, Medicinal and Aromatic Crops.Oxford and IBH publishing Co., New Delhi.

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BAG403: RENEWABLE ENERGY AND GREEN TECHNOLOGY

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 403	Renewable Energy And Green Technology	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of renewable energy and green technology

Course Outcomes:

1. Student will able to understand biogas, bio-alcohol, biodiesel and bio-oil production and their utilization
2. Student will able to understand solar energy production and their utilization

Unit-1

Classification of energy sources, contribution of these sources in agricultural sector,

Unit-2

Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers,

Unit-3

Biogas, bio-alcohol, biodiesel and bio-oil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application,

Unit-4

Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying,

Unit-5

Solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

BAGL 403: Practical

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, and solar fencing. To study solar cooker, to study solar drying system. To study solar distillation and solar pond.

Books:

1. Rai, G.D. 2004. Non-Conventional Energy Sources. Khanna Publishers, New Delhi
2. Rajput, R.K. 2012. Non-Conventional Energy Sources.S. Chand Publishers, New Delhi

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BAG304: AGRI- INFORMATICS

Course Code	Course Name	Teaching & Evaluation Scheme							
		Theory			Practical		L	P	Credits
		End Sem University Exam	Two Term Exam*	Teachers Assessment*	End Sem University Exam	Teachers Assessment*			
BAG304	**Agri- Informatics**	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: basic knowledge of information technology in Agriculture

Course Outcomes:
1. Student will able to learn computer application for the development of agriculture
2. Student will able to learn IT tools for the development of agriculture

Unit-1
Introduction to Computers, Operating Systems, definition and types, Applications of MS-Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types.

Unit-2
Uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations.

Unit-3
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.

Unit-4
Computer-controlled devices (automated systems) for Agri.-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc.Geospatial technology for generating valuable agri.-information.

Unit-5

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.

BAGL :304 Practical

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 Power point for creating, editing and presenting 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 (CSM) such as DSSAT/Crop-Info/CropSyst/ 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.

Books:

1. John Walkenbach, Herb Tyson, Michael R.Groh, FaitheWempen, Microsoft Office 2010 Bible
2. Bangia,LearningMs Office 2010
3. Prof. Satish Jain and M.Geetha, MS-Office 2010 Training Guide
4. Kate Shoup, Microsoft Office 2010
5. Melanie Gass, It’s All about You! Office 2010
6. Nancy Conner and Matthew MacDonald, Office 2010: The Missing Manual

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BAG 305:FARM MACHINERY AND POWER

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG305	Farm Machinery And Power	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C**-Credit; ***Teacher Assessment** shall be based on following components: Quiz / Assignment / Project / Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective: Basic knowledge of farm machinery and power

Course Outcomes

1. Student will able to understand use of different farm machinery in Agriculture
2. Student will able to understand significance of power to operate farm machinery

Unit-1:
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,

Unit-2:
Study of different components of I.C. engine, I.C engine, terminology and solved problems, Familiarization with different systems of I.C. engines:

Unit-3
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

Unit-4
Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Till age implement, Implement for hill agriculture, implement for intercultural operations,

Unit-5
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.

BAGL: 305Practical
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.

Books:

1. Jagdiswar Sahay – Elements of Agricultural Engineering
2. Surendra Singh- Farm machinery –Principles and applications, ICAR, New Delhi
3. Jain, S.C. and C.R.Rai. Farm Tractor and maintenance and repair. Standard Publishers, 1705-B, Naisarak,. Delhi- 110006
4. Ojha, T.P. and A.M. Michael, A.M. Principles of Agricultural Engineering. Vol.I. Jain brothers, 16/893, East Park Road, Karol Bagh, New Delhi -110005

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BAG 404: PROBLEMATIC SOILS AND THEIR MANAGEMENT

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 404	**Problematic Soils And Their Management**	50	40	10	00	00	2	0	2

Legends: **L** - Lecture; P – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of soil problem and it`s management in agriculture

Course Outcomes:

1. Student will able to understand soil distribution and it`s problem in agriculture
2. Student will able to understand soil problem management in agriculture

Unit-1

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties.

Unit-2

Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils.

Unit-3

Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils.

Unit-4

Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification.

Unit-5

Problematic soils under different Agro-ecosystems.

Books:

1. Indian Society of Soil Science 2012. Fundamentals of Soil Science. IARI, New Delhi
2. Das,D.K. 2015Intrioductory soil science, 4th edition, Kalyani Publishers, New Delhi.

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BAG 306: PRODUCTION TECHNOLOGYFOR VEGETABLEANDSPICES

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG306	Production Technology For Vegetableandspices	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of production technology of Vegetable and spices

Course Outcomes

1. Student will able to understand importance of vegetable and spices in nutrition and economy
2. Student will able to learn cultivation of vegetable and spices

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, trans-planting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disordersof vegetable and spices of:Root crops such as Carrot, Radish, Beetroot;

Unit-2:
Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, trans-planting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders ofvegetable and spices:Tomato, Brinjal, Chili, Capsicum,

Unit-3
Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, trans-planting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disordersof important vegetable and spices: Cucumber, Melons, Gourds, Pumpkin

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 disordersof important vegetable and spices: Frenchbean, Peas;ColecropssuchasCabbage,Cauliflower,Knol-khol;

Unit-5
Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, trans-planting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of vegetable and spices: Bulb crops such as Onion, Garlic; Tuber crops such as Potato; Leafy vegetables such as Amaranth, Palak. Perennial vegetables.

BAGL 306: Practical

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

Books:

1. Pranab Hazra, A.Chattopadhyay, K.Karmakar and S.Dutta.2010.Modern Technology in Vegetable Production. New India Publishing Agency,New Delhi

2. Shanmugavelu,K.G.,N.Kumar and K.V.Peter 2005, Production Technology of Spices and Plantation Crops. Agrobios(India), Jodhpur.

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BAG405: PRODUCTIONTECHNOLOGY FOR FRUITAND PLANTATION CROPS

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG405	Production Technology For Fruit And Plantation Crops	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **P** – Practical; **C**-Credit; ***Teacher Assessment** shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of technology of production fruit and crops

Course Outcomes:

1. Student will able to understand importance and scope of fruit and crop plantation

Unit-1

Importance and scope of fruit and plantation crop industry in India;

Unit-2

Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape.

Unit-3

Production technologies for the cultivation of guava, litchi, papaya, Sapota, apple, pear.

Unit-4

Production technologies for the cultivation of peach, walnut, almond and; minor fruits- date, ber, pineapple, pomegranate, jackfruit.

Unit-5

Production technologies for the cultivation of strawberry, plantation crops-coconut, areca-nut, cashew, tea, coffee & rubber.

BAGL: 405 Practical

Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops. Description and identification of fruit. Preparation of plant bio regulators and their uses, important pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchards.

Books:

1. Bose,T.K. and Mitra, S.K.1990. fruits-Tropical and Sub-tropical. Naya Prakashan, Calcutta.
2. 2. Chattopadhya,P.K. Year. Text Book on Pomology(Fundamentals of Fruit Growing). Kalyani Publishers, Ludhiana.
3. 3. Bijendra Singh. 2012. Horticulture at a Glance. Kalyani Publishers, Ludhiana.

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BAG 307: ENVIRONMENTALSTUDIESAND DISASTER MANAGEMENT

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG307	Environmental studies and Disaster Management	50	30	00	15	05	2	1	3

Legends: **L** - Lecture; P – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of Environmental studies

Course Outcomes

1. Student will able to understand scope and importance of environmental studies
2. Student will able to understand Natural Disasters and it`s management

Unit-1:

Multi disciplinary 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 non- renewable energy sources, use of alternate energy sources. Case studies. 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-2:

Ecosystems: Concept of aneco-system, 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. Aquatic eco-systems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit-3

Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and bio-geographical 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-4

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. Social Issues and the Environment: From Unsustainable to Sustainable development, urban problems related to energy, Water conservation, rainwater harvesting, and watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accident and holocaust. dies. Wasteland reclamation.

Unit-5

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. 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

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 frame work; 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.

BAGL 307: Practical

Pollution case studies. Case Studies- Fieldwork: Visit to a local area to document environmental assets river/ forest/ grass and / hill/ mountain, 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.

Books:

1. Bharucha, E. 2005. Text book of Environmental Studies for undergraduate courses. University Grants Commission, New Delhi.

2. Anjaneyalu, Y. 2004. Introduction to Environmental Science, BS Publications, Hyderabad, A.P.,India.

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BAG308: STATISTICAL METHODS

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG308	STATISTICAL METHODS	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of statistics in agriculture
Course Outcomes:
1. Student will able to understand statistics approach in agriculture research

Unit-1

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).

Unit-2

Simple Problems Based on Probability. Binomial & Poisson Distributions, Definition of Correlation, Scatter Diagram.

Unit-3

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-4

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.

Unit-5
Use of Random Number Tables for selection of Simple Random Sample.

BAGL 308: Practical:
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 ×2 contingency table. Analysis of Variance One-Way Classification. Analysis of Variance Two Way Classification. Selection of random sample using Simple Random Sampling.

Books:

1. Nageswara Rao, G 2007.Statistics for Agricultural Sciences. B.S Publications, Hyderabad
2. Rangaswamy, R 1995. A Text Book of Agricultural Statistics. New Age International (P) Ltd., Publishers, Hyderabad.
3. Chandel SRS, Hand Book of Agricultural Statistics. Achal Prakashan Mandir Publications, New Delhi.
4. Agrawal, B.L. programmed Statistics. 2nd Edition, New Age International Publishers, Hyderabad.

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BAG408: AGRICULTURAL MARKETING, TRADE AND PRICES

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 408	**Agricultural Marketing, Trade And Prices**	50	30	00	15	05	2	1	3

Legends: **L** - Lecture; P – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic Knowledge of Agricultural marketing

Course Outcomes:

1. Student will able to understand agricultural marketing for contribution in Indian economy

Unit-1

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets**;**

Unit-2

demand, supply and producer's surplus of Agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of Agri-commodities; product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC;

Unit-3

pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; facilitating functions – packaging, branding, grading, quality control and labeling (Agmark);

Unit-4

Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing:

Unit-5

Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India; Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

BAGL 408 :Practical

Plotting and study of demand and supply curves and calculation of elasticities**;** Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behaviour over time for some selected commodities; Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning; Application of principles of comparative advantage of international trade.

Books:

1. SubbaReddy,S. and P.Raghuram,P., Sastry,T.V.N. and Bhavani Devi,I. 2016. Agricultural Economics.Oxford & IBH Publishing Company Private Ltd., NewDehi
2. S.S.Acharya and N.L.Agarwal.2012.Agricultural Marketing in India. Oxford &IBH Publications Co.Pvt Ltd., New Delhi
3. S.S.Acharya and N.L.Agarwal. Agricultural Price: analysis and Policy. Oxford &IBH Publications Co.Pvt Ltd., New Delhi
4. Kahlon,A.S. and Tyagi, D.S. 1983. Agricultural price policy in India. Allied Publishers Pvt. Ltd.,New Delhi

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BAG309: LIVESTOCK & POULTRY MANAGEMENT

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG309	**Livestock & Poultry Management**	50	30	00	15	05	3	1	4

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of livestock and poultry in agriculture

Course Outcomes:

1. Student will able to understand role of livestock in agriculture economy

2. Student will able to able to learn management livestock and poultry

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.

Unit-2

Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers.

Unit-3

Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Digestion in livestock and poultry.

Unit-4

Classification of feed stuffs. 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.

Unit-5

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

BAGL 309: Practical:

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. Debeaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production

Books:

1. A Textbook of Animal Husbandry – G.C. Benerjee
2. Livestock Production and Management – N.S.R. Sastri, C.K. Thomas, R.A. Singh
3. Essentials of Animal Production and Management – R. Singh
4. A Handbook of Animal Husbandry – ICAR
5. A Textbook of Livestock Production Management in Tropics – D.N. Verma

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BAG409: INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG409	**Introductory Agro meteorology & Climate Change**	50	30	00	15	05	1	1	2

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment-__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective: Basic knowledge of Agro meteorology

Course Outcomes:

1. Student will able to understand scope of meteorology in agriculture
2.Student will able to understand weather mechanism and its importance in agriculture

Unit-1

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze;

Unit-2

Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, long wave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth;

Unit-3

Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking.

Unit-4

Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat wave and cold wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production.

Unit-5

Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

BAGL409: Practical

Visit of Agro-meteorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and long wave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of wind rose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

Books:

1. Radha Krishna Murthy, V. 2016.Principles and Practices of agricultural disaster management, B.S. Publications, Koti, Hyderabad.

2. Reddy, S.R. 2014. Introduction to Agriculture and Agrometeorology.Kalyani Publishers, Ludhiana, Punjab.

3. Radha Krishna Murthy, V. 2002.Basic Principles of Agricultural meteorology, B.S. Publications, Koti, Hyderabad.

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BAG 413: Agri-business Management 3 (2+1)

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 413	Agri-business Management	50	30	00	15	05	2	1	3

1. **Legends**: **L -** Lecture; **P** – Practical; **C**-Credit;
2. ***Teacher Assessment** shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course objective: To study management in the context of its nature, types, tasks and responsibilities, elaborate capital management in agri-business.

Outcome:

1. They will be able to manage Agricultural value chain effectively and will be able to manage business and farm management.

Unit-1:

Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy.

Unit-2:

Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, Procedures to set up agro based industries. Constraints in establishing agro-based industries.

Unit-3:

Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, polices procedures, rules, programs and budget.

Unit-4:

Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance.

Unit-5:

Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behavior analysis, Product Life Cycle (PLC).Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

BAGL 413: Practical

Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets, retails trade commodity trading, and value added products. Study of financing institutions- Cooperative, Commercial banks, RRBs, Agribusiness Finance Limited, NABARD. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Appraisal/evaluation techniques of identifying viable project- Non-discounting techniques. Case study of agro-based industries. Trend and growth rate of prices of agricultural commodities. Net present worth technique for selection of viable project. Internal rate of return.

Reference books:

1. “Objective Agribusiness Management” By S R Panigrahy
2. “Agribusiness: Management, Marketing, Human Resource Development, Communication, And Technology” By Robert H Usry And Lanny W Hass
3. “Agribusiness And Market Management” By Amod Sharma
4. “Farm Business Management: The Fundamentals Of Good Practice” By Peter L Nuthall

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BAG410: Agrochemicals 3 (2+1)

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG410	Agrochemicals	50	30	00	15	05	2	1	3

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective:

To study the Origin, geographical distribution, economic importance and different practices and yield of Rabi crops

Course Outcomes:

1. Student will able to understand the cultural practices and yield of Rabi crops
2. Student will able to recognize the Rabi crops

Unit-1

An introduction to agrochemicals, their type and role in agriculture, effect on environment, Soil, human and animal health, merits and demerits of their uses in agriculture, management of Agrochemicals for sustainable agriculture. Herbicides-Major classes, properties and important herbicides. Fate of herbicides

Unit-2

Fungicides - Classification – Inorganic fungicides - characteristics, preparation and use of Sulfur and copper, Mode of action-Bordeaux mixture and copper oxy-chloride. Organic fungicides- Mode of action- Di-thiocarbamates-characteristics, preparation and use of Zineb and maneb. Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use.

Unit-3

Introduction and classification of insecticides: inorganic and organic insecticides Organ chlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Bio-pesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.

Unit-4

Fertilizers and their importance. Nitrogenous fertilizers: Feed stocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate.

Unit-5

Mixed and complex fertilizers: Sources and compatibility–preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitro phosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

BAGL 410: Practical-Sampling of fertilizers and pesticides. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. To study and identify

various Formulations of insecticide available kin market. Estimation of nitrogen in Urea. Estimation of soluble P_2O_5 and citrate soluble P_2O_5 in single super phosphate. Estimation of potassium in Muriate of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in Copper ox chloride. Determination of Sulphur content in Sulphur fungicide. Determination Of thiram. Determination of ziram content.

Books: 1. **Agrochemicals and Pest Management (Hardcover, T. V. Sathe)**
2. **Agrochemicals in Plant Disease Management N. G. Ravi Chandra**

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BAG 412: Commercial Plant Breeding 3(1+2)

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 412	Commercial Plant Breeding	50	30	00	15	05	1	2	3

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective:

To study the Origin, geographical distribution, economic importance and different practices and yield of Rabi crops

Course Outcomes:

1. Student will able to understand the cultural practices and yield of Rabi crops
2. Student will able to recognize the Rabi crops

Unit-1

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self and cross pollinated crops (A/B/R and two line system) for development of hybrids and seed production..

Unit-2

Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment

Unit-3

Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and Biotechnological tools.

Unit-4

IPR issues in commercial plant breeding: DUS testing and registration of Varieties under PPV & FR Act

Unit-5

Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self and cross pollinated crops.

BAGL 412: Practical

Floral biology in self and cross pollinated species, selfing and crossing techniques. Techniques of seed production in self and cross pollinated crops using A/B/R and two line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. Concept of line its multiplication and purification in hybrid seed production. Role of pollinators in hybrid seed production. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. Sampling and analytical procedures for purity testing and detection of spurious seed. Seed drying and storage structure in quality seed management. Screening techniques during seed processing viz., grading and packaging. Visit to public private seed production and processing plants.

Books:

1. Essentials of Plant Breeding , Phundhan Singh, Kalyani Publishers 2018
2. Plant Breeding, Principles and methods , Kalyani Publishers 2017

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BAG 411: Landscaping 3(2+1)

Course Code	Course Name	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 411	Landscaping	50	30	00	15	05	2	1	3

Legends: **L** - Lecture; **P** – Practical; **C**-Credit;
*__Teacher Assessment__ shall be based on following components: Quiz / Assignment / Project / Participation in Class,

Course Objective:

To study the Origin, geographical distribution, economic importance and different practices and yield of Rabi crops

Course Outcomes:

1. Student will able to understand the cultural practices and yield of Rabi crops
2. Student will able to recognize the Rabi crops

Unit-1

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc.

Unit-2

Gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture.

Unit-3

Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management.

Unit-4

Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural Areas, Peri-urban landscaping,

Unit-5

Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

BAGL 411: Practical

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

Books:

1. Principles Of Landscape Gardening – Dr.HemlaNaik B, Mr. S.Y. Chandrashekhar, Dr. M. Jawaharlal