



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Agriculture

B.Sc. (Hons) Agriculture

BAG601 : Rainfed Agriculture and Watershed Management – (New)

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*			
BAG601	Rainfed Agriculture and Watershed Management	50	30	00	15	05	1	1	2

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: Basic knowledge of rain fed agriculture and water shed management

Course Outcome:

1. Student can able to understand objective, principles and component of watershed management
2. Student can able to understand about rainfed agriculture and its introduction, problem and prospects in India

Unit-1: Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India ;

Unit-2: Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques,

Unit-3: Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought;

Unit-4: Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas,

Unit-5: Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

Practical : BAGL 601

Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of



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rainfed area on map of India. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed.

Suggested Readings

1. Rainfed Agriculture and Watershed Management by Dr. Rayees Ahmad Shah, Kushal
Publication 2017



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BAG602: Protected Cultivation and Secondary Agriculture

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*			
BAG602	Protected Cultivation and Secondary Agriculture	50	30	00	15	05	1	1	2

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 about Green house technology

Course Outcomes:

1. Student will able to understand Important of Protected Cultivation
2. Student will able to understand how to grow plant in protected condition

Unit-1: Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.

Unit-2: Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.

Unit-3: Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration;

Unit-4: moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer).

Unit-5: Material handling equipment; conveyer and elevators, their principle, working and selection.



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Practical : BAGL 602

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipments. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

BOOKS:

1. RadhaManohar, K. and Igathinathene.C. greenhouse Technology and Management, 2nd edition, BS publications
2. TiwaryG.N. Greenhouse Technology for Controlled Environment.Narosa Publishing House. Pvt Ltd.
3. Singh Brrahma and Balraj Singh. 2014. Advances in Protected Cultivation, New India Publishing Company
4. Sahay, K.M. and Singh,K.K. 1994. Unit Operation of Agricultural Processing. Vikas Publishing House Pvt Ltd., New delhi



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BAG603: Diseases of Field & Horticultural Crops & their Management-II

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*			
BAG603	Diseases of Field & Horticultural Crops & their Management-II	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 the about major diseases of Horticultural crops and their management

Course Outcomes:

1. Student will able to identified the horticulture crops diseases
2. Student will able to understand how to management the diseases of horticulture crops

Symptoms, etiology, disease cycle and management of following diseases:

Unit-1:Field Crops:Wheat: rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear cockle;Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng;

Unit-2:Sunflower: Sclerotinia stem rot and Alternaria blight; Mustard: Alternaria blight, white rust, downy mildew and Sclerotinia stem rot; Gram: wilt, grey mould and Ascochyta blight; Lentil: rust and wilt; Cotton: anthracnose, vascular wilt, and black arm; Pea: downy mildew, powdery mildew and rust.

Unit-3:Horticultural Crops:Mango: anthracnose, malformation, bacterial blight and powdery mildew; Citrus: canker andgummosis; Grape vine: downy mildew, Powdery mildew and anthracnose; Apple: scab, powderymildew, fire blight and crown gall; Peach: leaf curl.

Unit-4:Strawberry: leaf spot Potato: early and late blight, black scurf, leaf roll, and mosaic;Cucurbits: downy mildew, powdery mildew, wilt; Onion and garlic: purple blotch, and Stemphylium blight; Chillies: anthracnose and fruit rot, wilt and leaf curl;

Unit-5:Turmeric: leaf spot Coriander: stem gall Marigold: Botrytis blight; Rose: dieback, powdery mildew and black leaf spot.



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Practical: BAGL 603

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for herbarium.

Note: Students should submit 50 pressed and well-mounted specimens.

Books:

1. Reddy, P.P. Plant protection in horticulture vol. 1-3
2. Rangaswami, G.K.Mahadevan.2001. Diseases of crop plants in India. Prentice Hall of India Pvt. Ltd., New Delhi
3. Singh, R.S.2005. Plant Diseases. Oxford &IBH Publication, New Delhi
4. Kalita, M.K. Diseases of field and horticulture crops and their management-II



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BAG604: Post-harvest Management and Value Addition of Fruits and Vegetables 2(1+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*			
BAG604	Post-harvest Management and Value Addition of Fruits and Vegetables	50	30	00	15	05	1	1	2

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 about importance of post harvest management

Course Outcomes:

1. Student will able to understand methods and process of preservation
2. Student will able to understand how to manage fruits and vegetables after harvesting

Unit-1:Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses;

Unit-2:Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate;

Unit-3:Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation;

Unit-4:Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.

Unit-5:Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning — Concepts and Standards, packaging of products.



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Practical : BAGL 604

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

BOOKS:

1. Rathore, N.S., Mathur, G.K., Chasta, S.s. 2012. Post-harvest Management and Processing of Fruits and Vegetables. ICAR, New Delhi
2. Srivastava, R.P. and Sanjeev Kumar, 2002. Fruit and vegetable Preservation: Principles and Practices. International Book Distributio Company, Lucknow.
3. Giridharilal, G.S., Siddappa and Tondon, G.L. 2007. Preservation of Fruits and Vegetables. ICAR, New Delhi.



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BAG605: Management of Beneficial Insects 2(1+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*			
BAG605	Management of Beneficial Insects	50	30	00	15	05	1	1	2

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

Objectives: To study the beneficial insects with respect to its commercial use in agriculture.

Outcomes:

1. Student should know the rearing of beneficial insects commercially along with its use in pest control.

Unit-1:Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants.

Unit-2:Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

Unit-3:Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac-products. Identification of major parasitoids and predators commonly being used in biological control.

Unit-4:Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques.

Unit-5:Important species of pollinator, weed killers and scavengers with their importance.



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Practical : BAGL 605

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

References

1. Vasantharaj David, B., and V.V.Ramanamurthy, 2003. Elements of Economic Entomology. Popular Book Depot, Coimbatore.
2. Ganga, G. and Sulochana Chetty, J 1997 (2nd ed). An introduction to Sericulture .Oxford and IBH Publishing Co. Pvt Ltd., New Delhi
3. Hisao Aragu 1994.Principles of Sericulture. Oxford and IBH Publishing Co. Pvt Ltd., New Delhi
4. Glover P M 1937. Lac cultivation in India>The Indian Lac Research Institute, Ranchi
5. Mishra R C 1995. Honey bees and their management in India .ICAR, New Delhi



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BAG606: Crop Improvement – II (Rabi) 2(1+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*			
BAG606	Crop Improvement – II (Rabi)	50	30	00	15	05	1	1	2

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: Basic knowledge of rabi crops and its crop improvement approach

Course Outcome:

1. Student will be able to understand major plant breeding approach of rabi crops
2. Student will be able to understand hybrid seed production technology of rabi crops

Unit-1: Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops;

Unit-2: Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters;

Unit-3: Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional);

Unit-4: Hybrid seed production technology of *rabi* crops.

Unit-5: Ideotype concept and climate resilient crop varieties for future.

Practical : BAGL 606

Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion; Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Rabi* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field



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experiments; Study of quality characters, study of donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops

Suggested Readings

1. Textbook of field crops production, Prasad. R. ,IARI Publisher
2. Text Book of field crops by Mukund Joshi



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BAG607: Practical Crop Production-II (Rabi Crops) 2(0+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*			
BAG607	Practical Crop Production-II (Rabi Crops)	0	0	00	60	40	0	2	2

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 about package and practices of Rabi crops

Course Outcomes:

1. Student will able to understand the preparation field for rising crop
2. Student will able to understand the package and practices of Rabi crops

Practical: BAGL 607

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

Books:

1. <http://www.agrimoon.com/practical-crop-production-pdf-book/>
2. jain L. K. manual on fundamentals of agronomy
3. Das, N R practical manual on basic agronomy with theory 2 nd Ed



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BAG608: Principles of Organic Farming 2(1+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*			
BAG608	Principles of Organic Farming	50	30	00	15	05	1	1	2

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 about how to produce organic product

Course Outcomes:

1. Student will able to understand the importance and principles of organic farming
2. Student will able to understand Certification process and standards of organic farming

Unit-1: Organic farming, principles and its scope in India; Initiatives taken by Government (central/ state), NGOs and other organizations for promotion of organic agriculture;

Unit-2: Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming;

Unit-3: Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production;

Unit-4: Operational structure of NPOP; Certification process and standards of organic farming;

Unit-5: Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

Practical: BAGL 608

Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, vermin-compost, bio-fertilizers/bio-inoculants and their quality analysis; Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.

Books:

1. Rajendra Prasad: organic farming
2. Reddy, SR principles of organic farming
3. Palaniappan SP: organic farming – theory and practice



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BAG609: Farm Management, Production and Resource Economics 2(1+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*			
BAG609	Farm Management, Production and Resource Economics	50	30	00	15	05	1	1	2

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 impart basic knowledge of principles applied Farm Management dealing with the analysis of limited farm resources to students.

Course Outcomes:

1. Students will be able to understand different types of farms and economic principles applied to manage farms.
2. Students will be able to prepare budgeting of farms as well as different enterprises of farms.
3. Students will be able to understand resource management strategy to achieve economic and sustainable production of farms.

Unit-1: Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage.

Unit-2: Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises.

Unit-3: Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm



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planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises.

Unit-4: Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance– weather based crop insurance, features, determinants of compensation.

Unit-5: Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

Practical : BAGL 609

Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.

References:

1. Johl and Kapoor (2005). Farm Business Management.
2. Panda SC(2007). Farm Management & Agricultural Marketing. Kalyani Publications.
3. Sankhayan, P.L. (1988), Introduction to the Economics of Agricultural Production, Prentice Hall of India Private Limited, New Delhi-110 001.
4. Raju, V.T. and Rao, D.V.S. (1990), Economics of Farm Production and Management, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi-110 001.
5. Dhondyal, S.P. (1985), Farm Management, Friends Publication Meerut (India).
6. Kahlon, A.S. and Karam Singh (1992), Economics of Farm Management, Allied Publishers, New Delhi.
7. Doll, John P. and Orazem. F. (1984), Production Economics: Theory with Application, John Wiley and Sons, New York.



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BAG610: Principles of Food Science and Nutrition 2(2+0)

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*			
BAG610	Principles of Food Science and Nutrition	50	40	10	0	0	2	0	2

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 impart basic knowledge of Food Science and Nutrition to students.

Course Outcomes:

1. Students will be able to understand differentiating reagents of food and their chemistry.
2. Students will be able to understand principles and methods of preservation and processing of food.
3. Students will be able to understand roles of different microbes in food items.
4. Students will be able to understand correlation between food, nutrition and manner to overcome malnutrition problems.

Unit-1: Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.);

Unit-2: Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavors, colors, miscellaneous bio-actives, important reactions);

Unit-3: Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods);

Unit-4: Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.);

Unit-5: Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

References:

1. Food Science and Nutrition (2018). Sunetra Roday, Oxford Publication.
2. Food Science. B. Laxmi, New Age International Publisher
3. Text Book of Food Science and Technology (2017). Sharma A., CBS Publishers and Distributors Pvt. Ltd.
4. Principles of Food Science and Nutrition. Swati Gupta, Minna Bagga
5. Essentials of Food Science. Vaclavik, Vickie, Christian, Elizabeth W., Springer.



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BAG611: Weed Management [Elective Course]

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*			
BAG611	Weed 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: Be able to define a weed and its stages of development, differences between weeds, cultural weed controls, advantages and disadvantages of the various methods of herbicide applications, herbicide carryover and how to prevent it. Know what herbicide adjuvant are.

Outcome:

1. Understand the benefits of integrated weed management.
2. Understand what herbicide resistance is and how to minimize risk of it.
3. Select appropriate objectives for weed management.
4. Employ correct timing of weed management & bio herbicides.

Unit-1: Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds.

Unit-2: Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity.

Unit-3: Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture.

Unit-4: Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application.



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Unit-5: Integration of herbicides with non-chemical methods of weed management. Herbicide Resistance and its management.

Practical: BAGL 611

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and agrochemicals study. Shift of weed flora study in long term experiments. Study of methods of herbicide application, spraying equipments. Calculations of herbicide doses and weed control efficiency and weed index.

Reference and books:

1. "Recent Advances in Weed Management" by Bhagirath S Chauhan and Gulshan Mahajan
2. "Weed Management Principles And Practices" by Gupta and O P
3. "Weed Management" by U S Walia
4. "A Text Book of Weed Management (Weeds and their Control Methods)" by B L Jana
5. "Non-Chemical Weed Management in Rice" by Riaz Muhammad Yasir and Ullah Smi
6. "Weed management in horticultural crops" by A P Sivamurugan



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BAG612: System Simulation and Agro-advisory [Elective Course]

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		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	Two term exam*	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG612	System Simulation and Agro-advisory	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: Be able to define a system approach and system simulation, crop modeling techniques, weather conditions for crop production and many remote tools to simulate the crop production. To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks.

Outcome:.

- Agro Advisory provides basic, timely and accurately pre-information of different climate and weather conditions of different crops.
- Agro Advisory helpful to farmers for increase interest, knowledge, adoption and impact of climate changes on agricultural practices.

Unit:1 System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams.

Unit: 2 Evaluation of crop responses to weather elements; Elementary crop growth models; calibration, validation, verification and sensitivity analysis. Potential and achievable crop production-concept and modeling techniques for their estimation.

Unit:3 Crop production in moisture and nutrient limited conditions; components of soil water and nutrient balance. Weather forecasting, types, methods, tools & techniques, forecast verification;

Unit:4 Value added weather forecast, ITK for weather forecast and its validity; Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast.

Unit:5 Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.



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Practical: BAGL 612

Preparation of crop weather calendars. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. Working with statistical and simulation models for crop growth. Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. Sensitivity analysis of varying weather and crop management practices. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast. Feedback from farmers about the agro advisory.

Suggested Readings:

1. Chang Jan Hu 1968. Climate and Agriculture on Ecological Survey. Aldine Publ.
2. Critchfield HJ. 1995. General Climatology. Prentice Hall of India.
3. Das PK. 1968. The Monsoons. National Book Trust Publ.
4. Lal DS. 1998. Climatology. Sharda Pustak Bhawan.
5. Variraju R & Krishnamurthy 1995. Practical Manual on Agricultural Meteorology. Kalyani.
6. Varshneya MC & Balakrishna Pillai P. 2003. Textbook of Agricultural Meteorology. ICAR



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BAG613: Agricultural Journalism [Elective Course]

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*			
BAG613	Agricultural Journalism	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: Examine communication and human dimension issues in co-relation to agriculture; it covers a wide range of subject areas, giving insight of story writing, photography use of print & electronic media for dissemination of success stories and also prevailing scenario of agriculture.

Outcome:

1. Agriculture Journalism opens a plethora of career options such as becoming an agricultural client for advertising firms & end up becoming journalists and editors of agricultural/rural magazines and newspapers.

Unit:1 Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different from other types of journalism. Newspapers and magazines as communication media:

Unit:2 Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines: Style and language of newspapers and magazines, parts of newspapers and magazines.

Unit:3 The agricultural story: Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story. Gathering agricultural information: Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials, wire services, other agricultural news sources.

Unit:4 Writing the story: Organizing the material, treatment of the story, writing the news lead and the body, readability measures. Illustrating agricultural stories:



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Unit:5

Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. Editorial mechanics: Copy reading, headline and title writing, proofreading, lay outting.

Practical: BAGL 613

Practice in interviewing. Covering agricultural events. Abstracting stories from research and scientific materials and from wire services. Writing different types of agricultural stories. Selecting pictures and artwork for the agricultural story. Practice in editing, copy reading, headline and title writing, proofreading, lay outting. Testing copy with a readability formula. Visit to a publishing office.

Reference Books:

1. Agricultural Journalism, By Jana Bl
2. Agricultural Extension And Rural Journalism With Practical (Sagar Mondal, Samares Kumar Das)
3. Agricultural Extension and Farm Journalism, by A K Singh (Author)
4. Hand Book of Farm Journalism Edited by Dr. Subin K. Mohan, BVSc & AH, MVSc Mr. G. Prasad Babu, BSc (Ag.), MSc Mrs. Talata C. Ratnayake, BSc (Ag.), MSc (AUS.) Mr. Ram Datt, BSc (Ag.), MSc



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BAG614: Food Safety and Standards [Elective Course]

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*			
BAG614	Food Safety and Standards	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 improve nutrition and health outcomes of populations through an integrated, gender equal, environmentally sustainable systems approach to food availability and access, and food safety and quality. Food packaging and labeling. Food standards.

Outcome:

- Students will acquire knowledge of nutrition requirement, particularly among children and women, through changes in school lunch programs and nutrition education & hygiene.
- Change in consumer behavior towards, increased consumption of a diversified diet of vegetable and fruits,

Unit:1 Food Safety – Definition, Importance, Scope and Factors affecting Food Safety. Hazards and Risks, Types of hazards - Biological, Chemical, Physical hazards. Management of hazards - Need. Control of parameters. Temperature control.

Unit:2 Food storage. Product design. Hygiene and Sanitation in Food Service Establishments- Introduction. Sources of contamination and their control. Waste Disposal. Pest and Rodent Control. Personnel Hygiene. Food Safety Measures.

Unit:3 Food Safety Management Tools- Basic concepts. PRPs, GHPs, GMPs, SSOPs etc. HACCP. ISO series. TQM- concept and need for quality, components of TQM, Kaizen. Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene.



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Unit:4Food laws and Standards-Indian Food Regulatory Regime, FSSA. Global Scenario CAC. Other laws and standards related to food. Recent concerns- New and Emerging Pathogens.

Unit:5Packaging, Product labeling andNutritional labeling. Genetically modified foods/transgenic.Organic foods.Newer approachesto food safety.Recent Outbreaks.Indian and International Standards for food products.

Practical: BAGL614

Water quality analysis physico-chemical and microbiological.Preparation of different types of media.Microbiological Examination of different food samples.Assessment of surfac sanitation by swab/rinse method.Assessment of personal hygiene. Biochemical tests for identification of bacteria. Scheme for the detection of food borne pathogens. Preparation of plans for Implementation of FSMS - HACCP, ISO: 22000.

Reference and Books:

1. Food Safety And Standards Act,2006 (Paperback, Editorial Board of Universal Law Publishing (An Imprint of Lexis Nexis))
2. Objective Food Science and Safety standards (English, Paperback, Prabodh Halde, sanjeev Sharma)