

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Agriculture
B.Sc. (Hons.) Agriculture



BAG 401: CROP PRODUCTION TECHNOLOGY –II RABI CROP

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 401	Crop Production Technology-II Rabi Crop	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:

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

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; wheat and barley.

Unit-2

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; pulses –chickpea, lentil, peas.

Unit-3

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; oil seeds –rape seed, mustard and sunflower.

Unit-4

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; sugar crops –sugarcane. Medicinal and aromatic crops – mentha, lemon grass and citronella.

Unit-5

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops Forage crops-berseem, Lucerne and oat

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BAGL 401: Practical

Sowing methods of wheat and sugarcane, Identification of weeds in rabi season crops, study of morphological characteristics of rabi crops, study of yield contributing characters of rabi season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of rabi crops at experimental farms. Study of rabi forage experiments, oil extraction of medicinal crops, visit to research stations of related crops

Books:

1. Reddy, S.R. and Reddi Ramu. 5th edition. Agronomy of Field Crops, Kalyani Publishers, Ludhiana.
2. Chidha Singh, Singh, P. and Singh, R. 2003. Modern Techniques of Raising Field Crops. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Rajendra Prasad (ed.), 2004. Text Book of Field Crop Production, Commercial Crops, Volume -II. ICAR, New Delhi.

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Bag402: Production Technology for Ornamental Crops, MAPs And Landscaping

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	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.

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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 Spices, Plantation Crops, Medicinal and Aromatic Crops. Oxford and IBH publishing Co., New Delhi.

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BAG403: RENEWABLE ENERGY AND GREEN TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	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 bio fuel 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 bio energy 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

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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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BAG 404: PROBLEMATIC SOILS AND THEIR MANAGEMENT

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	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. 2015Introductory soil science, 4th edition, Kalyani Publishers, New Delhi.

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BAG405: PRODUCTION TECHNOLOGY FOR FRUIT AND PLANTATION CROPS

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	Teachers Assessment*	Exam END SEM University	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, arecanut, 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:

2. Bose, T.K. and Mitra, S.K. 1990. fruits-Tropical and Sub-tropical. NayaPrakashan, Calcutta.
3. 2. Chattopadhyaya, P.K. Year. Text Book on Pomology (Fundamentals of Fruit Growing). Kalyani

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Publishers, Ludhiana.

4. 3. Bijendra Singh. 2012. Horticulture at a Glance. Kalyani Publishers, Ludhiana.

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BSAG406: PRINCIPLES OF SEED TECHNOLOGY

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BSAG406	PRINCIPLES OF SEED TECHNOLOGY	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 seed and different aspect of seed technology

Course Outcomes:

1. Student will able to understand character and different class of seed
2. Student will able to understand seed processing, assessment and seed marketing strategy

Unit-1

Seed and seed technology: Introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality.

Unit-2

Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereal, pulses, oil seeds, fodder and vegetables.

Unit-3

Seed certification, phases of certification, procedure for seed certifications, field inspections. Seed Act and Seed Act enforcement. Duty and powers of Seed Inspector, offences and penalties. Seed Control Order 1983, Varietal identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test, Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.

Unit-4

Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage.

Unit-5

Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and

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their production and marketing strategies.

Practical:BSAGL 122

Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Moong, Pigeon pea, Lentil, Gram, Field bean, pea. Seed Production in major oil seeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard. Seed production. Seed Production in important vegetable crops. Seed sampling and testing: Physical purity, germination, viability etc. Seed and seedling vigor test. Genetic purity test: Grow out test and electrophoresis. Seed certification: Procedure, Field inspection, Preparation of field inspection report. Visit to seed production farms, seed testing laboratories and seed processing plant

Books:

1. Seed Technology, R. L. Agarwal , Oxford &IBH Publishing, New Delhi (2017)
2. Seed Technology, DhirendreKhare, M.S. Bhale , Scientific Publishers (India) 2017

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BAG407: FARMING SYSTEM AND SUSTAINABLE AGRICULTURE

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	Teachers Assessment*	END SEM University Exam	ssment*Teachers			
BAG407	Farming System and Sustainable Agriculture	50	40	10	00	00	1	0	1

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 farming system and sustainable agriculture

Course Outcomes:

1. Student will able to understand different farming and cropping system
2. Student will able to understand Sustainable agriculture problems and its impact

Unit-1

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance,

Unit-2

Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system;

Unit-3

Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability,

Unit-4

Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site-specific development of IFS model for different agro-climatic zones,

Unit-5

Resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/institutes and farmers field.

Books:

1. Arun Kumar Sharma. 2006. A Handbook of Organic Farming. Agrobios (India), Jodhpur.
2. Jayanthi, C., Devasenapathy, P. and Vinnila, C. 2008. Farming Systems, Principles and Practices, Satish Serial Publishing House, Delhi.

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BAG408: AGRICULTURAL MARKETING, TRADE AND PRICES

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		Exam END SEM University	exam* Two term	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;

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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 BhavaniDevi,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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BAG409: INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	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

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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 Agro meteorology. Kalyani Publishers, Ludhiana, Punjab.
3. Radha Krishna Murthy, V. 2002. Basic Principles of Agricultural meteorology, B.S. Publications, Koti, Hyderabad.

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BAG410 : Agrochemicals 3 (2+1)

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	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 oxychloride. Organic fungicides- Mode of action- Dithiocarbamates-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 Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses.

Unit-4

Fertilizers and their importance. Nitrogenous fertilizers: Feedstocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow release N-fertilizers. Phosphatic

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fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassiumchloride, 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, nitrophosphates 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 water soluble P₂O₅ and citrate soluble P₂O₅ in single super phosphate. Estimation of potassium in

Muraite of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in Copper oxychloride. 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. Ravichandra

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BAG 411: Landscaping 3(2+1)

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	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

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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. Hemla Naik B, Mr. S.Y. Chandrashekhar, Dr. M. Jawaharlal

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

SUBJECT CODE	SUBJECT NAME	TEACHING & EVALUATION SCHEME							
		THEORY			PRACTICAL		L	P	CREDITS
		END SEM University Exam	exam*Two term	Teachers Assessment*	END SEM University Exam	Teachers Assessment*			
BAG 412	Commercial Plant Breeding	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

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

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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