SEMESTER FOURTH Hrs: 29

Corse Code	Course Title	Load Allocation			Marks Distribution		Total	Credits
		L	T	P	Internal	External		
BSAG-401	Principles of Agronomy II (Rabi Crops)	2	0	0	40	60	100	2
BSAG-402	Organic Farming	1	0	0	40	60	100	1
BSAG-403	Farm Management & Agriculture Finance	2	0	0	40	60	100	2
BSAG-404	Insect Ecology and Integrated Pest Management	2	0	0	40	60	100	2
BSAG-405	Extension Methodology and Communication Skills for Transfer of technology	2	0	0	40	60	100	2
BSAG-406	Principles of Seed Technology	2	0	0	40	60	100	2
BSAG-407	Manures and Fertilizers	2	0	0	40	60	100	2
BSAG-408	Farm Power & Machinery	2	0	0	40	60	100	2
BSAG-409	Basic Statistics	2	0	0	40	60	100	2
BSAG-410	Principles of Agronomy II (Rabi Crops) (Practical)	0	0	2	20	30	50	1
BSAG-411	Organic Farming (Practical)	0	0	2	20	30	50	1
BSAG-412	Farm Management and Agriculture Finance (Practical)	0	0	2	20	30	50	1
BSAG-413	Insect Ecology and Integrated Pest Management (Practical)	0	0	2	20	30	50	1
BSAG-414	Principles of Seed Technology (Practical)	0	0	2	20	30	50	1
BSAG-415	Farm Power & Machinery (Practical)	0	0	2	20	30	50	1
	TOTAL	17	0	12	480	720	1200	23

BSAG-401: Principles of Agronomy -II (Rabi Crops) Credits: 2

Section-1

Origin, geographic distribution of crops, Area, yield and production of rabi crops in different states of India; Causes of variation in productivity; National and International Agricultural Research Institutes in India and their mandate.

Section-2

Economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi cereal crops

Section-3

Economic importance, soil and climatic requirements, varieties, cultural practices and yield of rabi pulse crops-chickpea, lentil, field pea, French bean and oilseed crops- rapeseed and mustard, sunflower, safflower, linseed

Section-4

Economic importance, soil and climatic requirements, varieties, cultural practices and yield of other rabi crops such as sugarcane, sugar beet, potato, tobacco and forage crops- berseem, Lucerne and oats

BSAG-402: Organic Farming Credits: 1

(In collaboration with Department of Soil Science, Entomology and Plant Pathology)

Section-1

Organic farming: introduction, concept, relevance in the present context; Organic production requirements; Biological intensive nutrient management.

Section-2

Recycling of organic residues; Soil improvement and amendments; integrated diseases and pest management

Section-3

Use of bio-control agents; bio-pesticides; pheromones, trap crops and bird perches

Section-4

Weed management; Quality considerations- certification, labeling and accreditation processors, marketing and exports.

BSAG-403: Farm Management and Agricultural Finance

Credits: 2

Section-1

Agricultural Production Economics: definition, nature and scope; Laws of returns; Factor-product Relationships; determination of optimum input and output; Farm management: meaning, definition and Importance; Economic principles applicable to the organizations of farm business.

Section-2

Types and systems of farming; Farm planning and budgeting; Risk and uncertainty

Section-3

Agricultural finance: nature and scope, compounding and discounting. Agricultural credit: meaning, definition, need and classification; Credit appraisal; History of financing agriculture in India. Agricultural Financial Institutions

Section-4

Assessment of crop losses; Determination of compensation; Crop insurance; Agricultural Cooperation- philosophy and principles; History of Indian Cooperative Movement; Reorganization of cooperative credit structure and single window system

Books recommended:

Farm Business Accounting-Joginder Singh

Agricultural Economics-Lekhi and Singh

Fundamental of Farm Mnagement- Johl and Kapoor

BSAG-404 **Insect Ecology and Pest Management**

Section-1

Insect Ecology- Introduction, environment and its components, effect of abiotic and biotic factors. Biotic potential, environmental resistance and causes of pest outbreaks in agro-ecosystem. Categories of pests. Insects, Pests and Crop Losses; Present agriculture and pest problems. Beneficial insects: important pollinators, weed killers and scavangers; their importance. Important non-insect pests: mites, rodents and birds.

Section-2

Chemical Control: importance, hazards and limitations. Integrated Pest Management(IPM): need; its tools and limitations. Natural Control. Host plant resistance. Physical, Mechanical and Cultural Control. Biological Control: parasitoids, predators and microbes. Legislative Control. Insecticide Act 1968.

Section-3

Classification, toxicity and formulations of insecticides. Study of important insecticides: botanicals, organochlorines, organophosphates, carbamates, synthetic pyrethroids, neonicotinoids, oxydiazines, nereistoxin derivatives, phenyl pyrazoles, thiourea derivatives, pyridines, pyroles,etc., rodenticides,acaricides and fumigants. Biorational and other innovative approaches in pest management: insect growth regulators, semiochemicals, light-activated pesticides, propesticides, avermectins, antifeedants, chemosterilants, genetic control etc.

Section-4

Pest surveillance, monitoring and forecasting. Economic threshold and Economic injury levels. Integration of various control tactics. IPM in important vegetables.

Books

1. Agricultural Pests of South Asia and Their Management. A. S. Atwal and G.S Dhaliwal. Kalyani Publishers, Ludhiana.
2. Principles of Insect Pest Management. G. S. Dhaliwal and Ramesh Arora. National Agricultural Technology Information Centre, Ludhiana.
3. Entomology At a Glance. R.C. Saxena and R. C. Srivastava. Agrotech Publishing Academy, Udaipur.
4. Applied Animal Ecology. S.S.Bains and A.S. Atwal.Kalyani Publishers, Ludhiana.

BSAG-405: Extension Methodologies and Communication Skills for Transfer of Technology **Credits: 2**

Section-1

Meaning, nature, importance, models and barriers in communication; Extension programme planning; Principles and steps in programme development process; Monitoring and evaluation of extension programmes

Section-2

Extension teaching methods and factors influencing their selection and use; Combination (Media Mix) of teaching methods; Innovative information sources; Audio- visual aids; Meaning, scope and importance of agricultural journalism.

Section-3

Diffusion and adoption of innovations; Models of adoption process. Factors influencing adoption process.

Section-4

Capacity building of extension personnel and farmers; Communication skills for effective transfer of technology; Organizing Field days, exhibitions; seminars and conferences

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BSAG 406: Principles of Seed Technology **Credits: 2**

Section -1

Introduction to seed production; seed policy; deterioration of crop varieties; maintenance of genetic purity during seed production; seed quality

Section-2

Different classes of seed; Nucleus, Breeder, Foundation and certified seed production of varieties and hybrids of field and vegetable crops

Section-3

Seed certification, phases of certification, procedure for seed certification, field inspection and field counts etc.; central seed committee, central seed certification board, state seed certification agency, central and state seed testing laboratories; duties and powers of seed inspectors, offences and penalties; seed control order; Seed Act; other issues related to WTO, IPRs, Patenting, Plant Breeder's Rights; varietal identification through grow-out test and electrophoresis; seed drying; establishment of seed processing plant; establishing a seed testing laboratory

Section-4

Seed testing procedures for quality assessment, seed treatment, importance of seed treatment, types of seed treatment, seed packing and seed storage, stages of seed storage, factors affecting seed longevity during storage and conditions required for good storage, general principles of seed storage, measures for pest and disease control, temperature control, seed marketing, factors affecting seed marketing.

BSAG-407: Manures and Fertilizers **Credits: 2**

Section-1

Fertilizers- classification, manufacturing processes and properties of major nitrogenous (ammonium sulphate, urea, calcium ammonium nitrate, ammonium nitrate, ammonium sulphate nitrate), phosphatic (single super phosphate, enriched super phosphate, diammonium phosphate, ammonium poly phosphate), potassic and complex fertilizers

Section-2

Fate and reactions of various types of fertilizers in the soil

Section-3

Secondary and micronutrient fertilizers and amendments; Adulteration in fertilizers; Fertilizer Control Order; Fertilizer storage

Section-4

Bio-fertilizers and their advantages; Manures- bulky and concentrated, Farm Yard and poultry Manures; Composting – different methods, mechanical compost plants, vermin-composting, green manuring, oil cakes. Sewage and sludge-biogas plant slurry, plant and animal refuges.

BSAG-408; Farm Power & Machinery **Credits: 1**

Section-1

Historical perspective of farm power development in India, socio-economic implications of farm mechanization in India, internal combustion (IC) engines and terminology; working principles of two stroke and four stroke engines

Section-2

Different systems of tractors- types and selection

Section-3

Primary and secondary tillage implements; implements for agricultural operations; seed drills, paddy translators- their calibrations

Section-4

Plant protection equipments; harvesting and threshing equipments; cost of operation of tractor and other farm machinery

BSAG 409: Basic Statistics **Credits 2**

Section-1

Definition of statistics, its use and limitations; frequency distribution and frequency curves; Measures of central tendency- arithmetic mean, geometric mean, harmonic mean, median, mode, weighted mean; Measures of dispersion- mean de4viation, standard deviation, coefficient of variation; Basic applications of probability theory; Normal distribution and its properties

Section-2

Introduction to sampling; tests of significance, standard normal deviate test for means, student's t-test for single sample, two samples and paired t-test, F-test, Chi-square test in 2*2 contingency tables; Yates correction for continuity

Section-3

Correlation; computation of correlation coefficient and its testing; linear regression of Y upon X and X upon Y; interrelation between correlation and regression coefficients

Section-4

Experimental designs, layout and analysis of Completely Randomized Design; Randomized Block Design, Latin Square Design and Factorial Design

BSAG 410: Principles of Agronomy -II (Rabi Crops) (Practical) Credits: 1

Study of manures, fertilizers and green manure crops; Study of interculture implements; Methods of fertilizer application; Seed bed preparation and sowing of wheat, sugarcane and sunflower; Calculations of seed rate; Identification of weeds in wheat and grain legumes; Morphological characteristics of wheat, sugarcane, chickpea and mustard; Yield components of wheat and sugarcane.

BSAG-411: Organic Farming (Practical) Credits: 1

Raising of vegetable crops through organic sources. Diseases and pest management; Vermi-composting; Vegetable and ornamental nursery raising; Macro quality analysis; Grading, packaging and post harvest management.

BSAG 412: Farm Management and Agricultural Finance (Practical) Credits: 1

Methods of depreciation. Analysis of net-worth statement. Farm inventory analysis: preparation of farm plans and budgets, profit and loss account. Break-even analysis. Economic analysis of different crop and livestock enterprises. Compounding and discounting. Preparation of balance sheet, income statement and cash flow analysis. Estimation of credit needs. Determination of unit costs. Preparations and analysis of loan proposals.

BSAG-413 Insect Ecology and Pest Management (Practical) Credits: 1

Study of terrestrial and pond ecosystem, behaviour, orientation, distribution patterns of insects. Sampling techniques for the estimation of insect poplulation and damage. Pest surveillance through light and pheromone traps. Practicable IPM practices. Insecticides and their formulations; calculation of doses of insecticides. Compatibility of pesticides. Identification of common insect-pests, phytophagous mites, rodent, bird pests and their damage, other beneficial insect-pollinators, weed killers and scavangers.

BSAG-414 Principles of Seed Technology (Practical) Credits: 1

Seed sampling principles and procedures; physical purity analysis of field crops; germination analysis of field crops; moisture tests of field crops; viability test of field crops; seed health test of field crops; seed dormancy and breaking methods; grow out tests for varietal identification; visit to seed production plots; visit to seed processing plants; visit to seed testing laboratories; planting ratios, isolation distance and rouging, etc.

BSAG-415 Farm Power & Machinery (Practical) Credits: 1

Study of different IC engines; Working of two stroke and four stroke engines; various systems of tractor, disc plough, seed-cum-fertilizer drills, furrow openers, metering mechanism and calibration; study of different types of farm machinery and equipment, repair, adjustment and operation of sprayers and dusters; registration procedures.